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The analysis of the relation between depreciation and financial lease from the point of view of the lessor

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1. INTRODUCTION

Normal business circumstances assume that during the realization of the business objective positive yield is produced, but from this as a result of the accounting of depreciation allowance only that part can be divided, which is not necessary to keep the activity's level unchanged. Thus **depreciation** contributes to the maintenance of capital, the replacement of asset stock and under certain circumstances even to its expansion. Moreover, the generated tax saving also emphasizes the **significance** of depreciation **from the financing aspect**, which enables the entrepreneur to finance his repeated investments from partly tax free source. Depreciation is a significant category not only on the micro level, but also from the economic policy point of view, since it transfers the value of capital as production factor into the result and tax base. As during the development of an economy changes occur in the relative ratios of production's labour and capital intensivity – due to technological development usually for the benefit of the latter –, depreciation gains an ever important role in the implementation of investments directed towards asset modernization, and indirectly in the strengthening, maintenance of competitiveness.

Depreciation is a **colourful economic concept** with diverse aspects, which fulfills its above mentioned functions through its further point of connection, the accounting system. **The scientific area of accounting** approaches depreciation as cost, since depreciation eventually expresses the deterioration, value transfer of assets – as yield producing resources. Through its accounting assets appear in the books with updated values, this is why a main branch of the theory of depreciation is valuation approach, which is handled by the system of finance and accounting in different ways. Those present development tendencies, which can be observed in the theory of accounting aim at bringing the financial and accounting approach nearer from various points of view, bringing forward a switch from the cost allocational approach of depreciation towards its valuation aspects.

Should **the purchase** of a depreciating asset be financed from **external source**, then the **creditor will also become interested in** the asset's utilization, the development of the revenues produced and **the determination of depreciation** accounted against them. A special form of asset purchase from external source is asset based (structured) financing, including financial lease.

An important feature of **asset based financing** is that the creditor relies on the yield generating ability of the asset and not on the direct cash flow generating ability of the owner or operator regarding the return of its exposure. In Hungary leasing market is the nearest to the competitive circumstances according to its width and depth from the point of view of the market of financial assets and credit market. Competitive market prices the yield producing ability of an asset for a given period through the change in prices from one period to the other, which change in price is equal to the service value and user cost of an asset for a given period. Thus approaching leasing as asset based financing the leasing rental (rental charge) of the leased object should adapt to the asset's change in market value (at the same time yield producing ability). Furthermore, eventually thinking within an economic framework **the return on capital of two economic actors depend on the operation of the asset** – as collateral – by the lessee: the lessee wants to provide cover for the replacement of the asset through the accounting of the occurring depreciation allowance, and the lessor wants to finance further exposure from the claim relating to the yield produced by the operation of the asset (gross operating surplus) and recovered by the lessee to him.

In the books of the lessor, according to the transaction's calculation the percentage of the asset's recognition value financed by him and not paid by the lessee appears as leasing debit. The depreciation of the leased object – as a cost connected to the asset's possessing and utilization – has to be accounted by the lessee during the maturity of the transaction. Regarding the applied depreciation methodologies and processes the lessee has freedom of choice within the framework provided by the accounting regulation. However, through the use of the asset he has to produce a yield quantity enabling the maintenance of his entrepreneurial activity: capital maintenance and the payment of outstanding as well. The leased object produces gross operating surplus for the lessee, but since the asset is financed from an external source, the part of the operating surplus produced by the asset exceeding depreciation is granted to the lessor as revenue also accounted in the yield after the loan to value provided by him not paid by the lessee, to an extent calculated with the transactional interest rate. Should the lessee withdraw a higher yield from the gross operating surplus produced by the operation of the asset (account lower depreciation allowance), than what could be realistic considering the asset's depreciation originating from its use and revaluation, then the maintenance of its capital invested in the asset (asset maintenance – the lessee transforms its outstanding through the accounted depreciation of the asset into equity) is

not ensured for him. This is why the accounting of the depreciation mapping the actual change in value is significant from the valuation point of view. During the phrasing of the hypotheses I assumed that the decrease of ’depreciation’ of the capital debit – observable in the planned transaction calculation – appearing in the lessor’s books has to adapt to this change in value from the same aspect (capital maintenance), at the formation of which the lessor based on its market knowledge is able to take all factors into consideration, which influence the economic depreciation and revaluation of the asset and appear in the asset’s market prices.

The former logical deduction matches the essence of asset based financing very well, according to which the value of the asset has to cover the debit originating from the asset’s financing on a theoretical plane all the time, so tracing the asset value’s depreciation is of fundamental interest and utmost significance for the lessor from this aspect, too. And should the lessor wish to realize revenue from the lease payment on a level higher than the yield enabled by the change in the asset’s market value, it is only possible if the lessee

- uses the asset with an intensity that it is able to produce a gross operating surplus corresponding to the value of lease payments or
- its creditworthiness (cash flow producing ability) is excellent disregarding the asset’s operation, too.

Thus **the financial- accounting aspects of the lessee and the lessor coincide** by the transaction, it is the interest of both of them to adapt the value development of the asset appearing in their books (in case of the lessor this being the debit) in connection with the financing construction to the yield producing ability of the leased object, according to depreciation theory their long term operation and **maintaining capital intact** is ensured only in this case. The question is whether compared to the value of theoretical peridocal service value or – in an efficient market – user cost reflected in the change in market value on a theoretical plane i) which amount of yield the lessee is able to produce by the asset, so what is its actual asset based liability-fulfillment ability like, and ii) what return on debit the lessor expects.

From the two relations through the empirical examinations of the dissertation I focus on the second. First I examine the relation between asset value process (time series depreciation) and the exposure planned to finance according to the transaction’s calculation approaching from the lessor’s point of view, which is completed by further assumptions pointing towards the conclusions of their relation. Such examinations can

be interesting, since on the credit market **the increasing competition** characterizing the years before the financial crisis did not leave the supply side of the financial lease branch untouched, either. Leasing companies served their clients with **less and less risk consciously developed transactions** (less focusing on asset and client profitability) responding to the saturation of the market. Financing structure did become more risky not only because of the switch towards currency based transactions, but disregarding this, also based on its relation to the value development of the asset beyond. The increase in the risk appetite compared to the asset's value can become extremely unfavourable in case of such constructions as financial lease, where the leased object is the funder's only collateral beyond the transaction and the asset use habits influencing the change in the leased object's value fall out of his own scope (the effects of the further factors influencing price development is not significant - general and asset specific price change is moderate, the interest rate-environment is more or less predictable -, and pricing of the leasing deal follows them).

Through the hypotheses of the dissertation I describe **the changes in** Hungarian **financial lease practice between 1999 and 2008** according to the valuation approach of depreciation, considering financial lease as asset based financing. I also **search for those transactional features, in case of the occurrence of which the capital maintenance of the lessor is more/less ensured independently from the client's creditworthiness**, only tracing back to the more important parameters of the leasing construction – determined by the lessor and also influencing the use of the leased object by the lessee.

I divided the dissertation into four well separable parts according to the main interfaces of the topic. In the first part containing chapters 2-3. I examine the financial significance and factors of depreciation (the relation between depreciation, corporate profitability and cash flow, the valuation approach of depreciation, the factors influencing depreciation). After illuminating the relation of depreciation and asset value/profitability and the significance of its accounting as part of the corporate yield, in the second part I switch to the accounting display of depreciation since the theoretical category is able to fulfill its economic significance through its mapping taking place in the framework of accounting. After an overview of the accounting handling of depreciation and the placing of valuation approach into accounting frameworks – the theoretical foundation of the dissertation's topic from two sides – in the third part (Chapters 5-6.) I examine the concept and market significance of financial lease as asset based financing based on

the theoretical statements of the first two parts in details. I also look at the interfaces between financial lease and the valuation approach of depreciation as the bases for the grounds of empirical research and then its hypotheses.

It leads us towards the practical utilizability of the results if we manage to prove that during the establishment of their credit policies, taking the long term sustainability of their operation into consideration leasing companies act the right way if during the establishment of their calculations they follow the market development of the factors influencing asset value (initial depreciation, useful lifespan, residual value). Should they differ from this, they do it keeping in mind that through this they influence the habits of asset use of the lessee to a certain extent and at the same time they run an asset risk that cannot be directly controlled by themselves.

Through the examination methods of the hypotheses (factor analysis, correlation calculations, cluster analysis, variance analysis) I **managed to prove** that during the establishment of their constructions leasing funders do not go beyond keeping **their current capital outstanding continuously below the market value of the financed asset** during maturity. The control of asset use – and at the same time yield producing ability – by the lessor is enabled by the determination of three important transaction parameters: downpayment, residual value and maturity. However, the financing practice of the leasing market was transformed in the middle of the 2000's due to increasing competitive intensity besides these parameters, exposures switched toward transactions with a combination of lower downpayment, higher residual value and slightly increasing maturity. This adaptation took place independently from the change in **factors** actually **shaping** the underlying **asset value**, as a consequence of which the average loan to values interpreted for the whole maturity increased.

During the verification of hypotheses **it has been proved that there is a connection between the factors influencing the value function of the transaction** (downpayment-residual value-maturity) **and the financial settlement of transactions.** Beyond this we can find the fact that through the downpayment-residual value-maturity factor combination the lessor influences the asset use of the lessee (which for the lessor is embodied in a theoretical depreciation function) and the relation to capital function. With these parameters he shapes what yield surplus and in what term the lessee can realize above the leasing payment through theoretical depreciation:

- it is a function of the size of downpayment when the operation of the asset becomes profitable for the lessee
- the residual value (and the relation between residual value and downpayment) limits how huge the yield surplus remaining at the lessee is
- maturity influences the length of the realization of yield surplus and

in the end it is a function of these parameters what asset yield the lessor and the lessee divide among themselves and in what ratio.

Thus it can be concluded that although the profitability of an asset can be usually interpreted in a corporate context, in case of financial lease the **corporate independent characteristics of asset use and profitability can be discovered**, too, from which it can be concluded that leasing funders can actively influence the quality of their transactions through the most important parameters of their constructions.

From the point of view of the transaction's **return and quality of settlement, risk** the financing share through which the lessor exposes his transactions is not an individual **decisive factor**, but this is refined also by **what theoretical depreciation the lessor forces out of the lessee and how he allocates the yield embodied in depreciation** (as change in value) **among the contracting parties through transactional parameters**. From this aspect based on the results of the research the internal credit practice of leasing funders can be finetuned, which was primarily directed at keeping loan to values (or financing shares) low – maintaining the right amount of collateral surplus value compared to transactional exposure. The same line of thoughts is typical of the regulatory views, too, from which Goverment Regulation 361/2009. (XII.30.) on the conditions for prudent public loans and the examination of creditworthiness extensively directed at leasing also regulate the maximum of the ratio of exposure value and the motor vehicle's market value at the examination of loan requests (i.e. the initial LTV).

2. THE FINANCIAL ASPECTS OF DEPRECIATION WITHIN AN EVOLUTIONAL FRAMEWORK

The theoretical category of depreciation – similarly to numerous nowadays generally widespread economic concepts – has a long history to look back on. The differentiation of physical capital, connected to which the concept of depreciation gains meaning, appeared in the mid-1700's. The great economic thinkers of the era – Quesnay, Smith, Ricardo[1] – discovered that time that the assets in production are incorporated into the values of products in various ways, thus we can differentiate between fixed assets and current assets, which differ mainly in durability, the amount of resources necessary to their production and the time features of their value transfer, their rates of use.

2.1. The role of depreciation in capital maintenance

Based on their role in the reproduction process, current assets are said to be taking part in the activities on the short term, while the assets contributing to fixed capital serve the business objective through more periods.[2] Independently from their relation to time – since both take part in value creation – turning their value into revenue is obvious for the Reader living in the – though continuously renewing, but – mostly distilled theoretical relations of the modern era, contrary to the holders from 300-400 ago.

*In my thesis I use the concepts of **fixed asset, durable asset and capital good** as synonyms; they are considered to be assets which serve the business objective through more financial reporting periods, their contribution to revenue – independently from their form of financing – is realized within a period longer than one year; the concepts related to assets are used within the framework summarized in Figure 1.*
In the chronological overview the differentiation based on the appearance among durable assets (formal product or not) does not appear, since the role of immaterial goods in the business activity became considerable much later. Partly because of this, or since the assessment of immaterial goods has further specific features, I use the concepts of durable assets and physical assets primarily for tangible assets in my thesis,

[1] Regarding the mentioned thinkers' contribution to economic theories further see e.g. (Bekker et al. 2000), (Mátyás 1999).
[2] Since in the given age the financing of business activity from an external source was not widespread, literature used the concepts of capital and asset as synonyms. From the wording of the period I will later switch to the use of the concepts of physical asset and its two subcategories of durable (tangible) asset and current asset.

however where the processing of the topic enables it, I apply the wider concept category.

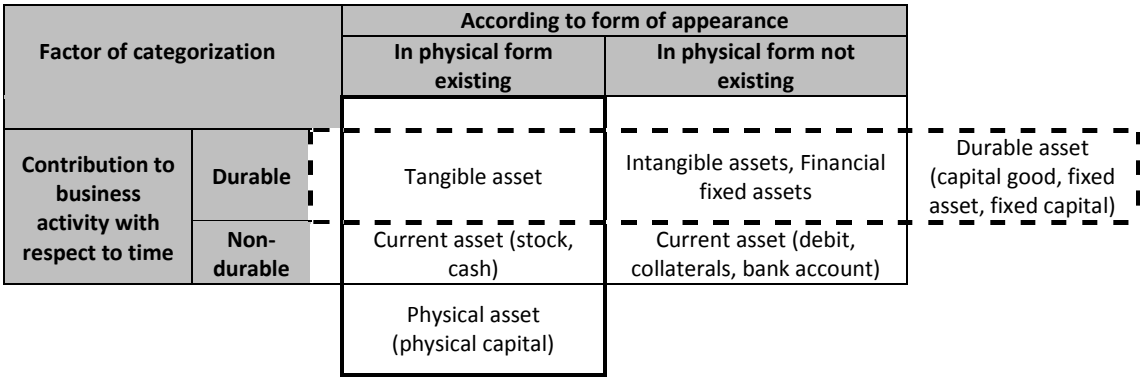

Figure 1. – Types of assets within the framework of Hungarian accounting regulations (self made)

Numerous theoretical revelations were born too early and gained recognition through later environmental changes. It was similar with **depreciation**: the great **industrial revolution** between 1780 and 1850 and the **induced** economic-social and especially technological changes lead to the **recognition of its significance**. As a result of the technological achievements of the era, masses of long-lived assets appeared in production, whose value transfer through deterioration only occasionally contributed to the value calculation of the products obtained at first. Accounting became generally widespread through the first bigger wave of equipment and machine replacement, their significant resource implication made it clear that similarly to the value of current assets involved in production the depreciation indicating the deterioration of durable assets has to appear among the production costs and together with those has to be incorporated into the value of the products obtained and their selling price. Without taking this into consideration, the ratio of dividend paid out to the owners from the positive accounting result is higher, in case of offensive dividend policy replacement – considering constant prices and technological conditions – can be realized only through drastic withholding of the achieved profit or repeated call for external funding, which sooner or later might collide with the interests of the owners. Although the recognition of depreciation as cost is against the interests of owners through the reduction of paid out result on the short term, on the longer term it still enforces their interests. Thus for the first time, the recognition of the significance of depreciation gained importance through the role of depreciation allowance in replacement.

Technical terminology uses the concept of depreciation allowance as a synonym for depreciation. In my thesis I use the concept of depreciation for the division of the asset's value throughout the duration of use, while depreciation allowance means the profit and loss affecting accounting of the sum concerning the individual years as cost. Hereinafter I use depreciation for the part of the change in the asset's value occurring between the two dates that can be ordered to the production of the business activity's product (asset side value correction; it can be measured for any time period within the asset's life cycle); while in case of the part allocated from depreciation to the residual periods between the two dates I use ***interim depreciation*** *or* ***depreciation allowance*** *(profit and loss accounting concerning a business reporting period).*

It is important to highlight though that depreciation by itself does not provide a source or reserve base for the replacement of assets; as Bélyácz also describes the surrounding confusion of thoughts (Bélyácz 1991). Although depreciation in the period of accounting is a cost without money outflow (expense can arise related to the procurement of the asset),[3] by itself it does not produce an available fund. For its formation a revenue – also providing cover for the sum of depreciation – is needed, which is also realized financially at the time of sale or afterwards. Thus the financial return arising from the accounting of depreciation assumes the efficient operation of the asset, the generation of revenues.

Result factors (data in thousand HUF)		**Without accounting of depreciation**	**With the accounting of depreciation**
Income (financially realized)		1.000	1.000
Cost	Accompanied by cash outflow	200	200
	Depreciation (not accompanied by cash outflow)	0	100
Result		800	700
Amount of money available (cash-flow)		800	800
From this:	Maximum dividend to purchase	800	700
	Remaining at the enterprise	0	100

Table 1. – The development of result and available amount of money as a function of accounting of depreciation
(own example)

Table 1 demonstrates that besides the accounting of depreciation – if the revenue provides cover for this – the expense involved in the compensation of the deterioration of assets can be compensated from the part of the financially realized gain remaining at

[3] An asset can also become the property of the enterprise in a way that it is not connected to monetary expense, e.g. through contribution in kind, acceptance free of charge, swap, present, barter agreement etc., so non-monetary transactions. Certainly the way of recognition – without cash flow – as a sole condition cannot be a ground for the unnecessity of the accounting of depreciation connected to the asset.

the enterprise. Should a yield compensating the costs not incur (in the example we should assume that no income occurs in the given period), that is not considered to be an exonerating circumstance regarding the accounting of depreciation, since the value erosion of the asset occurs independently from the income (from the use of asset). In this case a higher loss occurs besides the accounting of depreciation (in the example demonstrated in the table 300 000 HUF instead of 200 000), thus the critical capital situation incurs earlier, forcing the owners for an additional fund raising. Regarding the accounting of **depreciation** as cost it can be stated to an absolute certainty that it **indirectly contributes to the capital maintenance of the enterprise**; however, it does not directly produces a fund, at most saves it from the utilization out of the enterprise.

The Hicksian concept of income (with its split of the income into consumption and change in capital ensuring the preservation of the opening value capital) highlighted that 'the danger of overconsumption is real, the preservation of capital cannot be ensured and the insufficient reinvestment does not collateral the future money flow necessary for future consumption should we not recognize the periodical change occurring in the capital during the determination of the yield…. To keep the yield on a constant level… capital definitely has to be preserved, by the reinvestment of the economic theoretical depreciation ratio of the realized money flow at the given dates of realization'[4] (quotes (Bélyácz 2002) p. 748., 750.). Bélyácz introduces Hicks' way of thinking thoroughly, in a quantified form, supporting that the lack of accounting of depreciation leads to the consumption of capital and yield-producing ability in the long term. Even if a surplus incurs temporarily in the money stock, its separation through depreciation is not a liability, its placing into named reserve is not realized, but it is connected to the flow of the wealth of the enterprise in a transformed way. Thus besides the accounting of the depreciation allowance expressing the deterioration of the durable asset the transformation of wealth also takes place, since – in case of the existance of certain conditions – it temporarily transfers the value of a durable asset into current asset, demonstrates it in a liquid form. The incurred temporary financing surplus can be processed as per its original function for the maintenance of the stock of durable assets (replacement, financing of replacement), can take part in the financing of operation in the strict sense and can also serve investment objectives; under certain circumstances

[4] It has to be noted that more aspects of capital maintenance putting depreciation into different perspectives exist, which I will describe later.

the repeated investment of the regained deprecation can play a role in the financing of improvements.

Returning to historical development, at the beginning of history of manufacturing industry, until the end of the 1800's the accounting of depreciation was optional – or even if it took place, under the undeveloped financial and capital market conditions it rather took part in the expansion of the tangible asset stock. In this period, the reinvestment of the available withheld sums was a bigger problem than the repeated access of the lump sum necessary for the replacement of assets,[5] the concept and accounting of depreciation were not recognized by the law and there were even countries (e.g. USA), where its accounting was actually banned. In the attitude of practice to depreciation the birth of tax policies lead to a change, which took place in the last decades of the 19th century (Bélyácz 1992).

[5] Historically the end of the period of original capital accumulation end the appearance of the accounting of depreciation took place at the same time.

2.2. About the relation between depreciation and yield taxation

As in the capitalist states the practice of corporate taxation started to develop, the entrepreneurs' need for the accounting of depreciation and its inclusion in the taxable amount began to strengthen. Depreciation decreases the corporate taxable amount, so its recognition by the tax authorities contributes to the reduction of state revenues. Two arguments are for its relevance though: on one hand by taking depreciation into consideration the enterprise's payment of dividend from the deterioration of its durable assets can be avoided, on the other hand **the enterprise cannot be restricted to replace its deteriorating assets from its exempt yield up to the sum of its original investment**, thus its actual – over the asset stock maintenance – surplus property yield would fall under the scope of taxability.

Considering the taxation effects, the example from the previous table is amended as follows.

No.	**Result factors** (data in thousand HUF)		**Without accounting of depreciation**	**With accounting of depreciation**	
				Without recognition in the tax base	**With recognition in the tax base**
1.	Income (financially realized)		1.000	1.000	1.000
2a.	Cost	Accompanied by cash outflow	200	200	200
2b.		Depreciation (not accompanied by cash outflow)	0	100	100
3.	Result before taxation		800	700	700
4.	Tax base		800	800	700
5.	Corporate tax (10%)		80	80	70
6.	Profit after tax (3. – 5.)		720	620	630
7.	**Amount of money available** (1. - 2a. - 5.)		720	720	730
8.	From this:	Net yield (6.)	720	620	630
9.		Depreciation (2b)	0	100	100

Table 1. – The significance of depreciation from the taxation point of view (own example)

As per the above it can be easily monitored that the financial significance of depreciation besides the points mentioned in the previous part of the chapter is that **the enterprise** does not have to pay taxes up to the sum of depreciation recognized in the corporate taxable amount, so **it realizes tax saving with a value of the tax rate**

applicable to depreciation (100 thousand HUF*10% = 10 thousand HUF).[6] In this form by regaining the depreciation tax rebate it can get an interest free, cheap extra resource, the sum of which can be interpreted as the yield of the advanced capital provided by either the owner or the enterprise for the purchase of the durable asset.

Technological development did not automatically lead to the uniform treatment of depreciation on the corporate and regulatory level, in the beginning it only contributed to conflicts of interest related to depreciation, since that influenced the sum of the allotted yield. Thus the owners, the enterprises and the state turned against each other because of depreciation having a different meaning to each of them. However, due to the changes taking place in economy, the former strictly opposing behaviour of the tax authorities – according to which the recognition of depreciation would mean an unjustified decrease in the taxable amount – passed, and from the end of the 19th& beginning of the 20th century depreciation was gradually incorporated into tax law as a compensation of capital consumption. In the beginning, tax authorities assigned the determination of fair depreciation recognizable during taxation to the entrepreneur, they only gave a guidance, help to its calculation besides the entrepreneur having to prove the relevance of its sum towards them. Following this, together with the acceleration of mechanization they tried to concretize the scope and content of allowance, but they recognized only the proportional division of the actual cost of the asset to the period of operation, the so-called straight-line method as depreciation method. After World War I, a huge increase in depreciation funds was observable – e.g. the accounted depreciation in the USA surpassed the total sum of taxable yield ((Bélyácz 1992) p. 80.) –, it resulted in the first direct intervention in the accounting of depreciation, which in the beginning was observed in the direct decrease in the accountable sum, then concrete critical values were set (in the form of from-to limits) via asset groups regarding the useful lifespan and the urge of justification related to the accounted depreciation increased, too. The events between 1929 and 1933 also apparently lead to the spread of restrictions. Due to the Great Depression depreciation began its journey towards being recognized as an important asset of economic regulation through its **role contributed to tax policy**.[7]

[6] The rate of occurring tax saving is described by Bélyácz in a formalized way, and he further points out that the different rate of occurring tax saving can influence the choice between the different depreciation methods, whose amount finally depends on the useful lifespan and the risk-free interest rate (Bélyácz 1991).

[7] From the literature on the yield taxation aspects of depreciation see e.g. (Raboy 1982), (Brown 1962).

The next important development regarding the topic can also be linked to the change in environmental conditions since after World War II a significant fall in investment rate happened which highlighted the role of depreciation in replacement.[8] In an economy with inflation the distribution of an asset's recognition value in the form of depreciation besides increasing prices is not enough to keep the assets on a quality, quantity level, furthermore the value of the incurring tax saving also erodes as a result of the increase in nominal interest rates, so under these conditions tax policy should be more loyal regarding the recognition of depreciation (this statement is illustrated by derivation ((Bélyácz 1991) p. 138-142.). It was realized that under the – for the period relevant – inflational circumstances the straight-line method can lead to the exhaustion of durable assets, overtaxation, eventually to the transformation into capital governance revenue invested into durable assets and the theoretical achievements clarifying the role of depreciation strengthened, whose major representatives were e.g. Domar and Eisner (Eisner 1952) who carried out extensive research regarding the relations between depreciation, replacement and gross investment. Domar (Domar 1953) also expresses with mathematical tools the ratio of depreciation to the value of gross investments and points out that it is inversely proportional to the growth rate of investment and replacement cycle time (further see (Bélyácz 1978)).[9]

As a solution they broke up with the generally widespread practice of the straight-line method and in the 1950's accelerated depreciation and later the degressive accounting of depreciation was authorized, which all lead towards previous return and financing collateral. The stimulating economic and taxing policy spread by Keynes also highly contributed to the observable tendencies that wanted to drive the economy towards a state of equilibrium leading out of the crisis by increasing demand and investment as a part of it. The investment expansion of companies was certainly a condition for the efficiency of changed depreciation circumstances and for its promotion two further important tools appeared: investment tax allowance and – for certain assets – the practice of lump sum depreciation, too.[10] Thus the tax policy and the depreciation policy constituting a part of it followed more objectives at the same time: besides increasing

[8] The role of depreciation in replacement is certainly influenced by the way and the scope for which replacement is interpreted; various aspects of it are detailed by Bélyácz (Bélyácz 1993).

[9] It has to be noted that the depreciation related work of the mentioned economists can be eventually considered as the rediscovery of certain thoughts of Marx, since Marx examined the possibility of expanded reproduction through depreciation much earlier in his book Capital II. and in his 1862 correspondence with Engels (see further (Marx 1973), (Marx, Engels 1956)).

[10] The changes in tax regulation are further interpreted by (Magill, de Kosmian 1954), (Austin et al. 1954).

the rate of downpayment through the accountable higher depreciation in the beginning of the lifespan it made the regaining of higher sums possible when the asset was of high capacity and could produce the highest revenue.

This way **depreciation** ceased to be a category to be treated only on a corporate level, **as a tax policy tool it was built into the toolbar of macroeconomic regulators,** and temporarily it proved to be efficient, since an expansion was to be observed in the stock of investments. However in the 1960's liberalization lost part of its power and this made another shift reasonable, which was observable through the further decrease in the depreciation period. As a result of the changes that took place until the end of the '80's the values of machines and equipments were accountable in 3-5 years, those of buildings in 10-15 years and furthermore the asset groups regulated in tax laws were further aggregated (instead of the previous differentiation of more thousand groups, first nearly 100 subgroups and 3 main groups of assets were distinguished).

Depreciation in the United States

*Sunley describes the effect of tax changes related to depreciation introduced by Nixon in 1971 (Asset Depreciation Range System (**ADRS**)) – the shortening of the asset's life span acknowledged through taxation and the authorization of accelerated depreciation in the early years of the asset – on the effective tax rate and investment tax credit (Sunley Jr. 1971).*

*Following this, based on the motion submitted and made famous by **Conable and Jones** President Carter undertook reforms (in 3 asset groups: properties/machines/vehicles – realization of 10-5-3 year long depreciation period). The effects of the Conable-Jones motion are analyzed by Hulten and Wykoff, based on their conclusions, assuming anti-inflational endeavours and environment accelerated depreciation might as well lead to zero or negative effective tax rates (Hulten, Wykoff 1981a).*

*The tax regulations of the USA regarding depreciation – due to the unfavourable budgetary effects of Conable-Jones – were modified twice in the 1980's (1981, 1986), according to which more diversified asset categories were introduced again (within Accelerated Cost Recovery System – **ACRS**) and the depreciation methods were changed, too. In the United States currently a finetuned version of this system constitutes the taxation regulatory framework of depreciation allowance (whose short form of reference is **MACRS** – M as Modified).*

Besides this it is important to highlight that **depreciation is not an almighty tool** for stimulating investments, since numerous other macroeconomical features have an effect on their development, e.g. interest rate, conjunctural relations, the changes in the expectations of investors etc. Furthermore capacity utilisation is an important factor in the development of investments on the micro level and since balanced modernization

cannot be assumed in each and every sector of economy, from every holder, rebates on depreciation eventually affect capital concentration, too. The liberalization having taken place has one more important aspect, since due to the fact that the accounting of depreciation gained importance from different aspects for the owners of the company (influence on dividend base) and the state (tax effects), **in the second half of the 20th century the values of depreciation accounted in corporate balance sheet and to be displayed in the tax base were separated from one another**. By the end of the century the options for the accounting of depreciation – demonstrating the deterioration rate of assets, so having a capital financial assessment relevance – were widened and parallelly recognizability in the tax base was further simplified. In the taxation practice of developed countries considerable depreciation allowance was simplified for the main types of assets and to be determined by the given tax rate, which was underpinned by the growth in the number of enterprises and thus the need for simplification of the tasks of tax authorities, the requirement of transparency and the validation of the principle of non-discrimination from the taxation aspect. In modern economies corporate taxation and depreciation policy – since they mutually affect each other – have to be synchronized, and from this point of view it is important to highlight that low kept tax rates can also lead towards the weakening of the role of depreciation. From a macroeconomical point of view, based on its role in the tracking of technical development – since modernization also requires intensive capital input in most cases – it can also gain importance as a factor shaping competitiveness.[11]

> ***Depreciation in planned economies***
> *However compared to the evolution characterizing Western countries a significant part of economies can look back on another path. The practice of the accounting of depreciation was hardly born and widespread by the first half of the 20th century, theories about depreciation took a different turn in Eastern Block socialist countries, among them in Hungary.*
> *In the domestic practice from the beginning of planned economy* ***a centrally determined depreciation based on a mandatory norm was in force.*** *The negation of technological deterioration was a general concept, since it was replaceable by work force, as a response for the problems of tangible asset reproduction. Based on this and leaving enough space for central deduction the prescribed straight line depreciation rates were kept unrealistically low, and a long period of depreciation was applied (in case of equipments and supplies assuming an annual 3-4% and a utilization lifespan of 25-30 years). In addition to this, result was centralized, so the individual holders did not possess investment*

[11] Szalavetz however draws attention to the fact that in certain industries and regarding certain fixed asset types new technology can even have a capital saving effect (Szalavetz 2007).

resources, but they got to the large companies worth it, which course of action necessarily lead to the freezing of production structures.
In the 1960's *the time was right to rethink the concept of depreciation, too, since by this time significant amount of postponed investment needs occured on the corporate level. Through the new economic mechanism of 1968 an attempt to introduce certain market stimulators was made, as a result of this the role of central planning decreased and the independence of companies regarding production and investments grew. The role of depreciation in reproduction was also reviewed, the* ***rates applied were increased****, and sixty percent of the accounted depreciation was left at the companies (considering the 40% left as unnecessary, to be invested somewhere else).* ***However*** *in a few years' time it became evident that* ***the endeavours of the reform were not effective –*** *they did not stimulate the modernization of assets –, and the companies continued their operations with fully depreciated but further operated, deteriorated assets. Since the sum of depreciation left at them was not enough for quality development, as a response from the end of the 1970's switch to accelerated depreciation became possible within a certain restricted area. However by itself it did not solve the problem, since it was efficient only if the enterprises had the opportunity for reasonable, independent, efficient durable asset management and also assumed the operation capital and financial markets. (Bélyácz 1983) However their development in Hungary started only during the transition period, in the end of the 1980's when during the introduction of regulation depreciation allowance was not separated from the accounting and taxation point of view*

Based on the review of the financial functions of depreciation allowance it can be seen that after the discovery of the theoretical and practical significance of depreciation almost hundred years had to pass for its concept – from the point of view of the undeniability of its necessity – to occupy its right place in economic thinking. However it does not mean that economic theoretical and practical experts would see depreciation and even further its method of division among individual entrepreneural periods overlapping the asset's lifecycle considered to be right as a single definition. This is why in the next chapter I will concentrate on the overview of the possible approaches of depreciation allowance.

3. VARIOUS APPROACHES OF DEPRECIATION ALLOWANCE

The conceptual confusions regarding depreciation and its necessary periodical accounting were summarized by Hatfield (Hatfield 1936), who besides describing the historical aspects of the ’right’ treatment of depreciation successfully identified the inconsistent statements of authors of the age regarding depreciation. He drew attention to the fact that in order to correctly interprete the depreciation describing asset utilization we have to differentiate between the physical and economic (financial) aspects of the concept. The interpretation of these two dimensions even permeates the depreciation theoretical approaches of the late 20th and early 21st century, see e.g. (Triplett 1996), (Hulten, Wykoff 1996), (Schreyer 2009). In sync with the facts introduced in the previous chapters Hatfield emphasises that depreciation by itself does not constitute money surplus or a base for replacement, cannot be considered as loss but does not protect from it either, is not qualified as reserve, return or any type of liability. Based on this, it can be stated for sure that **the accounting of depreciation is necessary for capital maintenance** and as a result of its allocation for more periods **it transfers asset value from one date to another.**

In order to allocate the depreciation of durable assets serving the production activity through more periods for individual accounting periods the concepts of capital and value have to be specified.

3.1. The conceptual dimensions of capital and value

Capital is the quantity of resources through the operation of which the business objective can be realized, so its definition is one of the key issues of economics and its definition became a subject to a long theoretical debate already in the beginning of the 20th century in which the quantity and value dimensions of capital collided.

The capital functioning as a factor of production can be defined as an entity of capital goods and the services provided by them in the physical sense. One of the representatives of this approach was Pigou, according to whom the preservation of the intactness of capital does not mean the replacement of certain value losses, but of those which are the consequences of physical losses (Hayek 1935). Contrary to this, the thinkers concentrating on the value dimension considered capital as a value embodied in

certain goods and in groups of theirs. The conflict between the quantity and valuation approaches was apparent relatively long, which is also summarized by Hicks, who can be considered as a representative of the valuation approach, too (Hicks 1942).

Besides the periodical accounting of depreciation constituting a condition for the intactness of capital, it also expresses the change in value. The concept of value – together with capital – was a subject to economic thinking for a long time, and even until today numerous value definitions depending on disciplines exist, whose common feature is that they can be deemed subjective from more points of view, their objectivity can be realized in connection with some kind of external (e.g. market) judegment. From the economic point of view a thing can be considered valuable, if the '… things, objects, business units possessing it [economic value – note: J. Veres] are able to produce benefit for their owners, possessors or users' ((Molnárfi 1992) p. 14.). According to this, already in the era of the representatives of early classical economics (A. Smith, Veblen) the valuation approach of capital was accompanied with the assumption that a group of goods are considered to be capital they are useful in the economic sense, thus able to produce yield.

Thus durable assets are actually **carriers of value** and their maintenance can also be interpreted in various ways. Highlighting the essence from the detailed description of Bélyácz ((Bélyácz 1992), (Bélyácz 1994b)) capital maintenance can aim to the maintenance of

1. the initial physical capital (so concrete asset),
2. the initial capacity (abstracting from the concrete asset form),
3. the initial capital value and
4. the initial yield producing ability.

The first two concepts of capital maintenance can be linked to the physical, quantitative approach of capital, while according to Sweeney the latter two – connected to the valuation approach – based on the change in the purchasing power of money as the unit of measure of value can be further differentiated into nominal or real capital maintenance (Sweeney 1930).[12] Although the capital maintenance approaches concentrating on the physical dimension received much criticism, they have a solid place in the theory of depreciation. However, physical capital maintenance and capital maintenance in value cannot be separated from each other, since physical capital

[12] Sweeney further differentiates between relative (determined in relation with total social capital) and absolute capital maintenance, considering the latter as relevant.

maintenance in the long term cannot be interpreted without capital maintenance in value, which eventually also dissolves the apparent contrast between them, as Triplett (Triplett 1996) points this out, too (50 years earlier Scott reached similar conclusions in his article regarding the question of turnover in depreciation (Scott 1945)).

The operation of the capital good is directed towards the establishment of **value,** which in the economic sense **means the same as utility**, and utility is embodied in generating revenues and yield flow. Based on this thought capital good and the returns produced by it are unseparable, according to Fisher (Fisher 1896) it is only about the fact that the former is the stock, the latter is the flow feature of equity. The change in capital between the two dates (disregarding the injection and withdrawal of capital during the period), the yield, can be interpreted as the quantity of return not utilized in order to maintain the activity's unchanged level. This connection was pointed out by Hicks when he realized that the revenues originating from economic activities cannot be considered as yield until the owner did not ensure the maintenance of capital value (Hicks 1978). In this context depreciation is eventually the yield consumed, only the part of the yield above the recognition of the amount of depreciation related to the given period can constitute the subject to the allocation of income (as I also demonstrated in Table 1.).

*Thus **capital** is the source of operation available for long or unlimited term, which is embodied in the form of physical or intangible asset for the sake of the activity and its maintenance is a function of the revenue and yield production from its operation, for the sake of which – assuming the continuity of the enterprise – the part of the yield not necessary to maintain the activity's unchanged level can be a subject of allocation.*

The evaluation feature of durable assets is originated i.a. from the feature not specific to other assets[13] that their services are usually produced thoughout years. This feature – as (Hulten, Wykoff 1996) also highlight – leads to difficulties in measurement and requires the use of built-in methods and approaches during their assessment – which thus also influences the allocation of depreciation to individual production periods (that means depreciation allowance).

[13] Disregarding durable investments into financial assets.

3.2. How to approach depreciation allowance

Deprecation allowance means the allocation of the asset's value transfer to operational subintervals during the business activity and its result side accounting. Its determination would be less problematic if the stakeholders of the enterprise made do with the ex post conclusion of the durable asset's profitability, but since the need for information regarding the subject of their investment occurs more often than this, the allocation of depreciation to business accounting periods becomes necessary.

The contextual aspect of depreciation and its allocation (which – similarly to its resultant, durable assets – can also be approached by the physical/quantitative and value dimension) gains importance from the point of view of physical investments, replacement requirements, estimation of the capital stock and asset and product/service prices, taxation, yield measurement and the analysis of the former. These relations are **important** not only on the **micro- but also on the macro level**, since capital is one of the factors of production shaping the performance of the national economy to a significant extent. Thus the examination of depreciation allowance has a long history to look back on and is directed towards finding the method for its correct rate – since its measurement mistakes affect all of the above categories (Wykoff 2003) and through them return and productivity. Regarding this it was certainly a subject of debates whether a **real depreciation allowance method exists,** which allocates the value of the asset for the given production periods proportionally to its real value transfer.[14] As Wright also quotes, the accounting experts of the era 'reluctantly made the conclusion that no real depreciation method exists and all the used or offered methods are simple conventions, the choice between which is only a simple question of convenience' ((Wright 1964) p. 80.). However numerous theoretical and practical attempts were born on how to establish a depreciation allowance methodology the closest to reality – resulting in the correct yield, capital and asset value.

Bélyácz introduces three approaches of depreciation allowance for the value transfer of durable assets during the business activity, which consider depreciation as a provision putting forward replacement, the systematic allocation of the initial recognition value or a real change in value (Bélyácz 1993).

[14] See e.g. Hagstroem's and és Preinreich's articles responding to the views of each other: (Preinreich 1938), (Hagstroem 1939), (Preinreich 1941), (Hagstroem 1941).

According to **the theory of provision for future replacement** depreciation allowance means the provision of a certain amount, which is sufficient for the future purchase of the given asset or the asset providing equivalent services. Theoretically the method could be suitable to fulfill the role of depreciation related to the maintenance of capital value, but in the beginning of the 1930's a successful attack was launched among others with the reason that it negates the necessity of the replacement of unused assets. Based on this and originating from the uncertainty of the necessity of replacement the point of view demonstrating depreciation as **the allocation of the initial cost for the useful lifespan** started to spread, which approached depreciation as simple cost allocational mechanism (Diewert 1996). Within the cost allocational framework Böhm-Bawerk mentions the simple straight-line method (describing it as a ratio of the original recognition value or the market value of the new asset and its operational lifespan) (Böhm-Bawerk 1891), which was completed with further allocational methods by Canning. Among the latter e.g. the so-called declining balance method is often quoted, which is the product of the current – not yet depreciated – value of the asset and a constant rate (Canning 1929). Although the allocation of the initial value is easily applicable in business practice, we can contrarily mention that it is very rarely able to fulfill the valuation approach of depreciation – the expression of the right asset value – therefore its application covers an arbitrary allocational method, which results in an asset value not acknowledged by market mechanisms and in case of significant price changes does not ensure capital maintenance. Among the ones supporting a **depreciation allowance tracking the real, observable change in value** Hotelling was the first who pointed out that allocation of depreciation cannot take place without considering the theoretical prices, because the cost of a given good does not simply determine the value, but it is also affected by the demand for it (Hotelling 1925).

3.3. Depreciation allowance based on the change in value and its influencing factors

The value of a given production good is **the function of the quantity of capital services** included and the assigned **service values** (as unit price). According to literature ((Brief 1967) and (Wright 1967)), the earliest depreciation allowance approach originated from these ideas on value can be derived from Ladelle's views. The significance of the contribution of Ladelle is based on the realization that the

intertemporal allocation of depreciation should be derived from the correct evaluation of the residual asset services (Ladelle 1890).

Ladelle identifies the allocation of depreciation among the individual periods as the value 'contributed to' the use of an asset (which within the described theoretical frames is equal to the amount paid for the use). As illustration he considers an asset which is utilized by more owners, not in the form of common asset use, but as a utilization sequence through (y) periods.[15] Within this frame 'the asset enjoyment' value (b_s) of the (s) aged asset on the owner within the period of asset ownership should be borne by each owner. But since in his example the owner using the asset for the first time has to pay the total value of the asset (V_0) in the beginning of the utilization period[16] the owner will give effect to an interest rate (r) for its net investment ($V_0 - b_s$) towards the next owner taking over the asset in the end of its utilization period for a given sum (V_1). Thus the corresponding interim depreciation (d_s) is shown by the following formula:

(1) $d_1 = V_0 - (V_0 - b_s) \times (1 + r)$; where b_s is due in the beginning of the utilization period and $(V_0 - b_s) \times (1 + r) = V_1$ and

$V_0 = \sum_{s=1}^{y} v_s = \sum_{s=1}^{y} \frac{b_s}{(1+r)^{s-1}}$; in a general form:

(2) $d_s = V_{s-1} - V_s = V_{s-1} - (V_{s-1} - b_s) \times (1 + r)$; rearranged

(3) $d_s = b_s - (V_{s-1} - b_s) \times r$

Wright pointed out the valuation theoretical aspects of Ladelle's work (Wright 1967), since the second term of the right side of equation (2) is nothing else but the residual service value of the asset, which based on (2) can be easily expressed through a small rearrangement the following way. If:

(4) $V_s = (V_{s-1} - b_s) \times (1 + r)$, then $V_{s-1} = b_s + \frac{V_s}{(1+r)}$

(5) $V_s = b_{s+1} + \frac{V_{s+1}}{(1+r)}$,

[15] Therefore the level of demand for the asset's services is ensured for every future period and can be calculated in advance.

[16] The value of the asset – according to its English equivalent – is denoted by V (for Value), which in case of certain market conditions is equal to the asset's market price.

then on the right side of equation (5) continuing the expansion of the second term of the sum for the whole asset lifespan, we get to the usual capitalisation formula:

$$(6)\quad V_{s-1} = b_s + \frac{b_{s+1}}{(1+r)} + \frac{b_y}{(1+r)^{y-s}} = \sum_{s=1}^{y-s} \frac{b_y}{(1+r)^{y-s}}$$

In the above we can perfectly discover the relations identified by Hotelling almost 40 years later. But in Ladelle's framework – besides realizing that the value of 'asset enjoyment' (b_s) can change from period to period –, the net present value of services has to be equal to the purchase price of the asset, thus its actual cost, which has two consequences:

- if the present value of the asset's services due in future periods is different from the actual cost, then depreciation should be defined based on the estimated future service values adjusted by the ratio of these two (whose interpretation is illustrated by the example of Brief and Owen (Brief, Owen 1968)), so Ladelle implicitly supported the view that from the difference in value occurring as a consequence of estimational uncertainties every intermediate period of the asset's lifespan has to benefit;[17]
- Ladelle's approach was interpreted by certain authors (e.g. Brief 1967) as simple cost (actual value) allocational mechanism.

Various subversions of depreciation based on future service values – as factors determining the actual change in value – were born (annuity method (Moonitz, Brown 1939), compound interest method (Bierman Jr. 1961), decreasing charge or declining balance method (Kraus, Huefner 1972)). But in order to get closer to the depreciation allowance fulfilling its objective (resulting in capital and yield maintenance and the right asset value), it is worth covering the factors influencing asset value and asset services and their service value as its component.

[17] This solution can be executed only in case of perfect foresight. Although as an alternative solution Ladelle mentions placing the difference into a common reserve base and its bearing by the owner from the given period, he certainly supports the facts described above personally.

3.3.1. Methods of approaching depreciation allocation based on the actual change in value

The asset value used for depreciation allowance based on the actual change in value – as the sum of service values – can be defined in various ways considering different circumstances.

The simplest method is **the perspective based on the *direct observation* of market prices** (market perspective), which however – since the unbiasity of secondary prices is questionable – can be applied in a restricted way. Nevertheless, the doubts regarding the reliability of secondary market prices from the asset valuation point of view can be shaded in more ways, see e.g. Hulten and Wykoff, according to whom market information is not asymmetric to an extent that only assets of lower quality (thus representing lower asset value and generating higher loss of value) would get to the secondary market (Hulten, Wykoff 1981c). On the other hand customers are in many cases specialists of the given asset and even if the former do not prevail, distortion is present and its rate can be estimated. The views of those arguing against the usability of secondary market prices for asset valuation are based on the fact that most durable assets do not have a wide secondary market or if they do, then secondary market prices are distorted because of the force for offer and the sporadic feature of the market or because lower quality assets dominate, as Akerlof also pointed out (Akerlof 1970).

Eventually these uncertainty factors attach significance to the findings of Ladelle, the ***indirect definition*** of asset value. According to one of the methods for the definition of indirect asset value the value of the asset is equal to the present value of its **remaining service values** (income perspective) – as it is also shown by formula (6) based on Ladelle's deduction, or as Böhm-Bawerk also highlights the stock flow connections of value based on it. According to Bierman's approach the purchase of a long lifespan asset can rather be regarded as the sequence of revenue producing services than the purchase of an asset only existing in a physical form (Bierman Jr. 1961). And within this framework of thought the value of asset service is equal to the gross operating surplus achieved by the operation of the asset within a given period. Gross operating surplus is the difference between operating revenues and operating costs –

different from depreciation.[18] Under given circumstances gross operating surplus is equal to the rental charge of the asset for a given period, so in case of an established and well functioning market service value can also be estimated by it (Hicks 1942), (Griliches 1963), (Schreyer 2009). Normally the sum of gross operating surplus should cover capital cost, thus depreciation and the sum of the profit/return on investment.[19] The return on investment (its profit content from the point of view of accountancy) is certainly influenced by the conditions for the utilization of the asset – the quality and quantity of operating inputs, the intensity of use, the decisions of the leaders, environmental, market conditions etc. –, due to which gross operating surplus can differ from the expected level in both positive and negative direction.[20] In present thesis I assume competitive or nearly competitive market conditions transmitting homogenous products (assets), as a result of which through demand-supply corrections market does not provide the opportunity to achieve additional profit (profit or loss). It also implies that

- the gross operating surplus realized by the asset is independent from the enterprise operating the asset,
- market price (as the sum of the present value of market rental charges) reflects the asset value,[21] and
- gross operating surplus can be also estimated from the cost and not only the revenue side.

Based on the latter, the other method of the indirect determination of asset value, **cost perspective** will be possible, the existence of which is reinforced by the fact that

- durable assets in many cases are utilized by their owners or if they are not, then they do not have a widely and deeply developed rental market and
- even if they do, rental charges can classically rather be perceived as revenue type of result component, so they contain not only the net return on the rented out asset, but also components providing cover for other operating costs (Schreyer 2009), and
- market rental charges constitute ex ante category.

[18] By gross operating cost I intentionally mean a not financially realized category – monetary expenses (so I do not identify it with cash flow known from corporate finances) –, because asset service represents value independently from financial compensation.
[19] Otherwise the investor would disregard the given investment opportunity.
[20] The question of discount rate used for the determination of present value of future service values and its stability/change means a problem of similar type, to which I will get back later.
[21] Correspondingly I exchange the former (V – Value) denotation for denotation P (P as Price, market price) and I use the concepts of asset value and market price, service value and rental charge as synonyms.

The user cost approach avoids the previous problems and according to this, the value of asset service on the unit period (u_s) can be determined as the sum of the alternative cost of asset investment (as minimum profit expectation) and periodical depreciation.[22] The user cost approach touched almost everyone contributing to the literature of depreciation, e.g. (Scott 1953), (Wykoff 1973), (Diewert 1996), (Hulten, Wykoff 1996), (Christensen, Jorgenson 1969) etc.

The widely discussed causation can be easily recognized, if we transform equation (1) assuming an end-of-period yield flow:

$$u_1 = b_1 = P_0 \times (1 + r) - P_1 \rightarrow$$

(7) $u_1 = b_1 = P_0 \times r + (P_0 - P_1)$, generally

$$u_s = b_s = P_{s-1} \times r + (P_{s-1} - P_s)$$

Certainly the user cost or in other words implicit rental charge is the function of the age of the asset and time, accordingly the factor expressing the change in price has to be included in formula (7), as a result of which revaluation difference (gain or loss) incurs regarding the asset (see e.g. (Griliches 1963) definition of user cost and rental charge). According to the present formula this effect appears as a part of price difference ($P_{s-1} - P_s$), where P_s shows the nominal value of the asset bought for price P_{s-1} in the beginning of the period in the end of period (s-1). I will get back to the breaking down of price difference into factors later, and I will also point out whether revaluation difference has to constitute a part of depreciation allowance.

Taking a look at the formula for ex-post user cost (7) the question arises what progression the depreciation allowance based on actual change in value means regarding the firstly mentioned method – based on the direct observation of market prices. Since the value of the new asset at purchase (P_0) is explicitly given, the same cannot or not always can be said about the end-of-period value (P_1) – see the depreciation allowance based on the direct observation of market prices described above. Based on this critical observation the storehouse of methodologies deducting the

[22] Considering the two indirect methods it can be observed that the first approaches depreciation expressing capital employment from the output, the second from the input side, as durable assets themselves can also be perceived as production output and input. However regarding the views looking at the activity from two different directions it is still not completely clarified till now under which conditions they lead to the same result, do they have to lead to the same result at all? (Reference to this and thought experiments related to the answers can be seen e.g. (Hulten, Wykoff 1996) or (Triplett 1996).)

depreciation allowance in the second term of the right side of equation (7) – furthermore indicated by δ – from the change in certain features of the new asset emerged.

3.3.2. The factors influencing the depreciation allocation based on actual change in value

The next step is the observation of the factors transferring the value of a new (of age s=0) asset into the value of an asset of age (s+). In order to explore all factors of this change the date of asset valuation (t) also has to be involved in the examination, which I neglected in case of equations (1) - (7). To highlight the effects of the increase in the age of the asset and the change in the date of valuation I choose the framework of Hulten-Wykoff's matrix (Hulten, Wykoff 1981b).

Dimension	t=0	t=1	t=2	…	…	t=τ+s
s=0	$P_{t,s}$	$P_{t+1,s}$	$P_{t+2,s}$	…	…	…
s=1	$P_{t,s+1}$	$P_{t+1,s+1}$	$P_{t+2,s+1}$	…	…	…
s=2	$P_{t,s+2}$	$P_{t+1,s+2}$	$P_{t+2,s+2}$	…	…	…
…	…	…	…	…	…	…
…	…	…	…	…	…	…
s=y	…	…	…	…	…	…

Table 2. – Dimensions of factors influencing change in value (Based on (Hulten, Wykoff 1981b))

Since the interpretation of periodical change in value on the asset group level will not be relevant from the point of view of my further examinations, I concentrate on the change in value for individual assets from now on, and I leave the aspects of change interpreted for asset groups (e.g. retirement). To be able to identify the factors influencing the change in asset value named by Wykoff (Wykoff 1989) – deterioration, obscolence and revaluation –, we have to turn back to the asset services influencing the development of values described in the beginning of Chapter 3.3. The service value of the asset indicated by $b_{t,s}$ for a given (t) period can be broken down into two further factors: the quantity of services ($q_{t,s}$) an d the unit price of the service ($p_{t,s}$), so the equation

(8) $b_{t,s} = q_{t,s} \times p_{t,s}$ is true.

The initial assumptions are the following:

a) there is no technological development,
b) the general price level or its change is stable, no asset specific price change exists, since there is no technological development,
c) the intensity of use is the same in every period and the asset operates with full capacity utilisation,
d) all other factors – influencing the asset value – are known and unchanged during the lifespan of the asset.

In the light of these the change in the asset's value can be traced back to the asset's **deterioration**, which according to Griliches' (Griliches 1963) use of concepts has two factors, on the one hand exhaustion, on the other hand decay. Due to exhaustion the asset's remaining useful lifespan decreases, thus the asset gets one unit nearer to the date of its retirement. As a result of decay the efficiency of the asset changes, which means that more time is needed for unit service or the asset is of less service within unit time. For the latter Feldstein and Rothschild introduced the terminology of output decay, differentiating it from input decay, which refers to the fact that keeping the asset's service level requires more input (as (Triplett 1996) quotes).

> *In order to show deterioration we can mention the example of assets used for winning water, where the asset's service is described not by the water itself, but by bringing water to the surface, the water winning ability. The more often a draw well is used, the more the equipment used for winning water is worn, so it is able to win less water (its services deplete); and it is able to bring a unit quantity of water in worse quality to the surface (its services start to decay).*[23]

As a consequence of depletion the elements of the sequence on the right side of equation (6) decrease by one, while as a result of decay a unit of service is worth less ($p_{t,s}$ decreases).

In order to involve obscolescence, the factor of change in price named by Wykoff for second in the examinations, let us dissolve our restriction from the above point a). If we allow technological development, **obsolescence** gets into the scope of examination as a factor, due to which the prices of an asset of age (s) at $t=\tau$ and $t=\tau+s$

[23] Regarding the example it can be felt that the unit price of the assset's service (ability to win water) cannot be seen as independent from the features of the product/service produced by the asset (water brought to the surface). The evaluation difficulties arising from this I will discuss in Chapter 4.5.

dates – contrary to the former – can not be considered the same, so the asset specific change in price is not zero (τ describes any optional future date (t)).

Thus as a result of technological development a new, more developed asset appears on the market, which decreases the value of an older, technologically less developed asset, and as a result it increases its periodical depreciation. Attention was directed towards the significance of technological development i.a. by the examinations of total factor productivity - TFP in the 1960's. According to Jorgenson, Solow was the first who traced the part of national economic output not describable by the value of inputs used in production back to technological developments (Jorgenson 1966). Jorgenson and Hall (Hall 1968) differentiate between embodied and disembodied technological change. In case of the former technological development is embodied in a more developed version of an asset already existing on the market, while in case of the latter a complete change in technology is observable: a new asset appears on the market, which replaces the previous assets as an alternative technology fulfilling the same functions.[24] Based on Hulten's differentiation as a result of disembodied technological development assets of the newer, technologically more developed vintages affect the exhaustion/retirement practice of the former assets (they bring it closer in time); and according to embodied technological development the assets of newer years are qualified more efficient compared to the older (Hulten 1992).

> *Based on the previous example in the field of the assets used for winning water in case of the draw well the appearance of pumping well can be regarded as embodied technological development; while compared to the well bringing tap – as an asset used for winning water – to the market means disembodied technological development.*

As an analogy for technological development Diewert and Wykoff differentiate between embodied and disembodied obsolescence (Diewert, Wykoff 2007). The essence of differentation can be approached the following way.

1. The value deceleration curve of the older, technologically less developed assets is pushed lower in case of embodied technological development (if the new asset is of longer lifespan, it will also be steeper), compared to that of the new asset. Compared to the draw well the pumping well is more efficient, so in unit time it is able to bring a

[24] More efficient production organizational, capacity utilizing methods constitute a possible form of disembodied technological development, too.

higher quantity of water to the surface and it brings a given quantity of water in less time to the surface, providing a service of higher quality (resulting in higher water clarity) thus both the quantity and value of the services of the old asset decrease compared.

Figure 2. – The effect of embodied technological development (own – background data in Annex 1a.)

2. In case of disembodied technological development the value deceleration curve of the old, technologically less developed assets is pushed lower and will be steeper (steepness increases besides the decrease in service value because of the relative shortening of the operating lifespan compared to the new asset, too). Although as a result of the appearance of tap the remaining service quantity of the draw or pumping well in absolute sense does not change, it will be withdrawn from use earlier and the value of its services significantly decreases or as a result of the appearance of tap it will be reduced to zero (due to a lack of demand).[25]

[25] The data used for illustration can be found in the annexes.

Figure 3. – The effect of disembodied technological development (own – background data in Annex 1b.)

It is worth considering that in case of disembodied technological development the service quantities of assets of different ages at a given valuation date will not necessarily be aggregable, since a different measure unit can be linked to them (as another example, the performance of a broom cannot be expressed as that of a vacuum cleaner and vice versa).

Certainly the effect of technological change on the asset value also depends on the rate of penetration of the innovation and the question arises if it makes sense to differentiate between the two types of obsolescence, and if embodied technological development can be regarded as the simplified version of disembodied development vice versa. Regarding the latter, the point of view of literature is not uniform either, e.g. Denison negates that the effects of embodied and disembodied technological development on the asset value can be separated and it makes sense to separate them (Denison 1964).[26] Technological development affects asset prices not only directly, but also indirectly – influencing the lifespan of the asset. Since without obsolescence, in case of other factors being unchanged the physical and technological lifespan of the asset are also equal, the

[26] The same can be said about technological development regarding total factor productivity, too; in connection with TFP the identification of the role of technological development during the interpretation of output increase exceeding the rate of production input was a subject to debate – regarding this see e.g. the point of view of Jorgenson and Griliches, according to whom the ratio of output growth not accompanied by input growth, can be traced back to simple measurement errors (Jorgenson, Griliches 1967).

same cannot be stated in case of the appearance of technological development, because as a result of this the technological lifespan of older assets compared to the lifespan of their physical functionality shortens, since the depletion of the technologically superior asset takes place during a relatively longer lifespan. (The effect of the factors influencing the lifespan of the depreciating asset is illustrated by the examples (Lowe 1963).) Thus the qualitative change of capital goods is experienced in a quantitative sense, not only regarding the prices,[27] but also the quantities of services.

The third factor of the change in price is **revaluation**, which is a result of the asset specific change in price contributable to the changes in the asset's demand/supply (and connected to technological development) and the additionally appearing general change in price. In case of the general change in price – as a so far neglected factor – independently from the existence of technological development it does not apply that the values of a given asset of age (s) at dates $t=\tau$ and $t=\tau+s$ can be considered equal.

In order to demonstrate the above within a single framework let us consider the following table, which for easier understanding applies to two assets of age s=0 produced at dates (t-) and (t), so an unused older one and a completely new one disregarding the general change in price and demonstrates how the above named factors affect the features of the technologically less developed asset. Considering the same example: how the quantity and unit value of the services of the draw well – and so the value of the well – are influenced by the appearance of newer types of water winning options (the arrows demonstrate the direction and strength of change - ↓ or ↓↓).

Dimension (amount of asset service/unit value)		**Technological development**		
		Does not exist	Exists	
			Embodied	Disembodied
		draw well	*pumping well*	*tap*
Deterioration	exhaustion	- / -	↓ / ↓ ↓	↓ ↓ / ↓ ↓
	decay	- / -	↓/ ↓ ↓	↓ ↓ / ↓ ↓

Table 3. – The effect of factors of change in value on the amount and value of asset services, as features of an asset from a former year
(own edit)

[27] Hedonic price indices are assets widely used for the examination of the effects of qualitative development taking place through technological changes on asset prices see e.g. (Griliches 1961), (Triplett 1986).

Based on the table the factors influencing the value of the asset according to equation (6) are built in the asset value the following way assuming an end-of-period yield flow:

$P_s = \sum_{s=1}^{y-s} \frac{b_s}{(1+r)^{y-s}}$, where y marks the operational lifespan of the asset →

(9) $P_{t,s} = \sum_{s=1}^{y-s}(1 + i_t^*)^{y-s} \times \varphi_s \times \frac{b_{t,s}}{(1+r_t^*)^{y-s}}$ [28]

The present value of the future service values representing the value of an asset of given age according to equation (9) **can be derived considering efficiency and revaluation, knowing the rental charge** (service value→$b_{t,s}$) **of the new asset**. However, in order to be able to derive the value of **a used asset of a given age** from the value of a new asset (its rental charge), we need to know the asset lifespan efficiency and the asset lifespan revaluation traces, the joint result of which two effects is the total change in asset value observable besides the diagonal of Table 3.

3.3.3. The derivation of depreciation allowance from the factors influencing the asset value

The (t,s) → (t+1, s+1) change in value[29] demonstrated by the matrix can be broken down the following way. The loss in efficiency occurring as a result of deterioration (exhaustion and decay) and embodied obsolescence can be interpreted as the difference between the values of assets of ages (s) and (s+1) expressed by the unchanged prices of a given year.[30] Furthermore, the effect of revaluation can be described based on the difference between the values of an asset of a given user lifespan at dates (t) and (t+1) (in the matrix a horizontal shift in the right direction). The literature on depreciation uses the name 'age effect' for the former and 'time effect' for the latter, see e.g. (Hulten, Wykoff 1981c), (Hulten, Wykoff 1996), (Hulten 2008).

In order to include age effect, factor φ_s occurs in formula (9), which is nothing else but the **efficiency weight** expressing the productivity of two assets of different ages compared to each other. There are more methods of defining relative

[28] The interpretation of the markings newly introduced in the formula can be found on the next pages.
[29] Since depreciation allowance in the accounting sense usually covers the change in the asset's value during one business year, I disregard the reference for change in value in a more general form.
[30] Within the change in value the effect of disembodied technological development plays a role, too, since the future service values are already calculated taking disembodied obsolescence into consideration (if they can be forecast as I restricted in point d) of inital assumptions).

efficiency weights, the work of authors mentioned in the previous paragraph mentions three alternatives. The efficiency sample traced back to the changes in the physical features of the asset is the simplest, but can be doubted the most, since it omits the decay occurring because of the intensity of use. As a next, second option they mention the efficiency weights derived from the ratio of the relative marginal products (in case of perfect market conditions prices) of the asset, which trace the development of both factors of deterioration, but their measure is not trivial and works only in case of assets perfectly substituting each other. The third method most preferred by modern literature is the mapping of the decrease in efficiency based on certain samples, which can be usually described by constant and linearly or geometrically changing traces (the question whether which of these is the right efficiency sample, is a topic of continuous examination in the literature on the topic).

If at a given date (t) assets of different ages and technological development exist, and by assumption the price of the technologically more developed asset can be observed directly on the market (as $P_{t,0}$ asset price or $b_{t,0}$ rental charge), then in order to derive value $P_{t,s+}$ of asset of a previous age (s+), representing a lower technological level we also need to involve asset specific change in price in the examinations. The latter in formula (9) is denoted by i_t^* **change in asset specific price level in the real sense**.

The general change in price level can be ignored during the quantification of age effect, since the change in value is measured at the same (t) date and it changes the real factors in the numerator and denominator of formula (9) at the same rate. **During the quantification of the time effect** – thus the change in value of an asset of age (s) between dates t and t+1 – besides the change in asset specific real price level – we need to consider the effect of general change in price level (**inflation**), which affects the asset value through the $b_{t,0} \rightarrow b_{t+1,0}$ change of service value in the numerator of formula (9), independently from technological development and asset deterioration.

One branch of the literature of depreciation identifies depreciation as the age effect, so it excludes the consideration of time effect, the effect of revaluation from depreciation. For the depreciation identified this way the concept of **economic depreciation** or cross sectional depreciation is also used, which expresses the decrease in the financial value of capital goods originating from aging, and capital value in the real sense is what we need to reinvest in order to preserve the intact of capital stock. Economic depreciation serves in order to define the value of assets at a given date, but from the yield perspective depreciation can be interpreted not as stock, but as flow

variable – which is measurable during the period between two dates –, so accordingly it also has to include the effect of revaluation. Considering this, Hill regards depreciation allowance as **time series depreciation**, which involves all factors of the shift besides diagonal of Table 3. (Hill 1999), so it represents the depreciation approach based on total change in value founded by Hotelling. Hereinafter I use time series depreciation ensuring nominal capital maintenance for the concept of depreciation allowance, which matches the nominal yield concept applied by the current system of accounting.

If we want to express the service value for a given period in the numerator of equation (9) in the form of user cost or in other words implicit rental charge introduced in formula (7), then we need to break down the change in asset value (P_{s-1}–P_s) into the effects of factors influencing the change in asset value. For the easier traceability I use a simplified version of Table 3. for the explanation, following the thought line presented by Diewert (Diewert 1996).

Age of asset/Time	t=0	T=1
s=0	$P_{t,s}$ = a	$P_{t+1,s}$ = c
s=1	$P_{t,s+1}$ = b	$P_{t+1,s+1}$ = d

Table 4. – The simplified scheme of factors influencing change in value (self made)

Based on Table 5. Formula (7) can be written in the following form:

(10) $$b_1 = a \times r + (a - d).$$

During the breakdown of (a – d) change in value – as depreciation allowance – let us first consider the inclusion of the age effect regarded as cross-sectional depreciation by Hill. Let us see the economic depreciation rate showing the ratio of the prices of a new and a one-year-old – used – asset using the prices of the end of period 0. (beginning of period t=1).

(11) $$1 - \delta_0 = \frac{d}{c}$$

Substituting Formula (11) in the preceding, the user value of the asset is equal to the sum of alternative cost, cross sectional depreciation and revaluation.

(12) $$b_1 = a \times r + c \times \delta_0 + (a - c)$$

If we also involve inflation (ρ) appearing in the time effect in the examination, then with its help equation (12) can be further developed the following way:

if $(1 + \rho) = \frac{c}{a}$, then

(13) $$b_1 = (r - \rho) \times a + (1 + \rho) \times \delta_0 \times a;$$

Thus based on formula (13) the service value of an asset in a given period (13) can be expressed from the price of the new asset (of age s=0), knowing the general change in price level, the economic depreciation including asset specific change in price and the interest rates. It means that the rental charge of the asset has to cover the alternative cost of the investment in the asset and the time series depreciation of the asset. And should the **investor deduct a higher return** from the gross operating result achieved by the operation of the asset than what **could result from** the **consideration of the depreciation** originating from the asset's use and revaluation, then the future **maintenance of its** invested **capital is not ensured** for him.

In the evaluation type of statements above, keeping c) and d) restrictions from Chapter 3.3.2 in effect I consciously omitted numerous factors affecting the development of the asset and the service value.[31] Non-exhaustively these can be the following: the intensity of asset use, the development of interest rates, the maintenance, repair costs of the asset, the taxation points of view, the interactions between capital and other factors of production etc., and the differences originating from the estimational uncertainty of the former and the above mentioned factors. The effect of all these and their combinations to the depreciation allowance certainly contributes to the investigation of the literature on the topic, as also later in the present thesis I will get back to them.

[31] These criteria can be ignored during the empirical examination of the dissertation's hypotheses, too since considering the examination of the depreciation from the lessor's point of view these factors fall out of the lessor's scope of influence.

4. THE REPRESENTATION OF DEPRECIATION IN ACCOUNTING

As of above I reviewed the more important financial aspects of depreciaton, based on which it can be concluded that depreciation gains importance in the maintenance of assets through its contribution to corporate capital maintenance and the tax saving originating from its accounting. Above all, its category is primarily known as an accounting concept nowadays; it is able to carry out its former functions through its mapping realized in accounting; thus Chapter 4. summarizes the Hungarian and international bases of the representation of depreciation in accounting.

4.1. Depreciation as cost[32]

Depreciation serving the representation of the absorption of future return producing ability and its maintenance at the same time **is able to perform** its unique double **function** through its accounting as cost **within the framework of accounting**. Accounting identifies the value of resource utilization occurring for the purposes of the activity expressed in money as cost. In order to reach its objective, holders involve different resources in their activities, which – in one or more phases – transfer their values to the created products, services. The resources involved in operation can be embodied in the form of human workforce, money, current assets existing in physical form (stocks), fixed assets (tangible assets) and intangible goods. The concept of depreciation allowance in the accounting sense is connected to the former two categories, from which within the framework of the thesis I deal with the depreciation of tangible assets existing in physical form.[33] Although intangible assets gain an even higher role in business activity, because of the following reasons I overlook the examination of their change in value. On one hand the ratio of intangible goods within durable assets (disregarding a few special industries) is still low, on the other hand their accounting is developed parallelly with their becoming apparent, their depreciation has further special characteristics based on their intangibleness, and is a nowadays still changing area of accounting – also affected by the regular changes in domestic law.

[32] In subchapters 4.1-4.3. I primarily concentrate on the frameworks provided by Hungarian accounting regulations, but later I also introduce the corresponding approaches of international accounting standards (which during the declaration of depreciation operates a partly similar conceptual system).

[33] Hungarian accounting names immovable property rights and advance payments on investments among tangible assets, too, which based on the above do not constitute part of the subject of my thesis.

Depreciation represents an individual category among the types of costs, accordingly its value appears separated in the total cost profit and loss statement. According to its method of accountability it can be identified as indirect – general – cost, since at the moment of its occurrance it cannot be unambiguously linked to the subject of the activity (product, service), but during the distribution of certain types of general costs to cost bearers – besides the application of traditional methods of calculation – it can be incorporated into the values of produced products, services appearing in the report.[34] In the trading cost type of profit and loss statement matching this cost accounting depreciation allowance – to a certain extent – appears as time cost in the value of the sold products, services and assets and among general costs, and its amount cannot be read separately from the document.

The concept of depreciation is not defined explicitly by the Hungarian Accounting Standard (or Regulation, shortly HAS), but among the provisions related to annual report it states that '… the actual (purchase and production) value of tangible assets reduced by the residual value expected for the end of useful lifespan… has to be distributed among those years in which these assets will be predictably used.' (52.§ (1)) This definition refers to the so-called planned depreciation of assets. Depreciation can also occur due to the change in general circumstances of business, which is identified with the concept of impairment by the Hungarian Accounting Standard. The subject of the thesis can be linked to the normal use of assets, so it is accordingly planned depreciation; thus in each – not differently identified – case the concept of depreciation is planned depreciation.

Bélyácz identifies the role of **depreciation** in accounting as a cost allocational problem (Bélyácz 1993) , which might seem right based on the former quote, but in the light of a fundamental principle of Hungarian **accounting provisions it gains an extended** and in a way different **meaning**. According to the matching principle 'during the determination of the result of a given period we need to consider the realized revenues of the completion of activities in a given period and the costs corresponding to the revenues, independently from the financial achievement. Revenues and costs have to be connected to the period when they economically occurred.' (15.§ (7)) According to the former contextual principle it is obvious that accounting does not consider

[34] More developed net cost accounting systems e.g. Activity Based Costing clearly exclude certain types of depreciation allowance – incurring on the utility maintenance level from the scope of evaluation costs, since their amount cannot be allocated based on exact cause-effect relation. Certainly it does not mean that depreciation allowance is a factor also to be neglected during the calculation of pricing costs.

depreciation allowance as a category separable from the returns generated by an asset, and the base of its method of accounting should be the revenue producing ability of the asset. So theoretically the periodical **depreciation** appearing in the result **cannot be separated from the features of the asset's yield production**. Among the fundamental principles of accounting, two further ones can be more closely linked to the category of depreciation. The **principle of prudence** according to the facts interpreted in the previous chapters sets out that '… depreciation… has to be accounted independently from the result of the business year being profit or loss.' (15.§ (8)) Thus the accounting function of depreciation allowance is the validation of the value transfer of assets immobilized in the activity for a long term against yield, as a result of which – in case of the realization of revenues – no positive result can be detected as long as the costs are not recognized. According to the **principle of item-by-item evaluation**, assets have to be individually recorded and evaluated during accounting and the preparation of the report, so the determination of depreciation connected to the asset has to a subject of individual weighing in each case.

4.2. The factors determining depreciation in accounting

Returning to the provision of Paragraph 52 of the Hungarian Accounting Standard regarding depreciation after a small deviation, more theoretical categories have to be clarified in connection to that. An important condition for the depreciability of the asset is to lose its value due to a natural reason – abrasion, deterioration and technological obsolescence.[35] **The criteria for the depreciability of assets are given.**

Above all, it assumes that the ***recognition value*** of the asset ***can be determined in a reliable way***. With the use of recognition value the enforcer of the law refers to the fact that depreciation is a concept not entirely related to the asset entry accompanied by money expense, the asset received through exchange, as present, via transposition

[35] The value of the asset cannot be depreciated if:
- its recognition value cannot be determined reliably or might not have been produced yet (investment) or its normal utilization has not happened yet;
- it does not lose its value during its lifespan or its value increases every year, so the residual value of the asset does not fall below the recognition value (e.g. plastic art, monuments); furthermore
- the asset's completely depreciated or book value has reached the residual value. (HAS 52. § (2), (5)-(7), 53. § (7))

without charge, barter deal etc. is not freed from its accounting, so the base of its determination is not necessarily the initial expense, but the initial (actual) cost.

Another important criterion is the ***determinability*** of the asset's ***useful lifespan***. From the point of view of lifespan, various types of distinctions can be made regarding an asset. The upper limit of the asset's lifespan is the asset's physical lifespan, which lasts until the complete physical destruction; the operational lifespan within denotes the time interval, during which the physically existing asset is able to provide services (does not break down finally). As a part of it, technological lifespan covers the period occurring until the complete technological obsolescence. During the determination of depreciation the useful lifespan of the asset gains importance, the length of which is typically shorter than the technological lifespan.

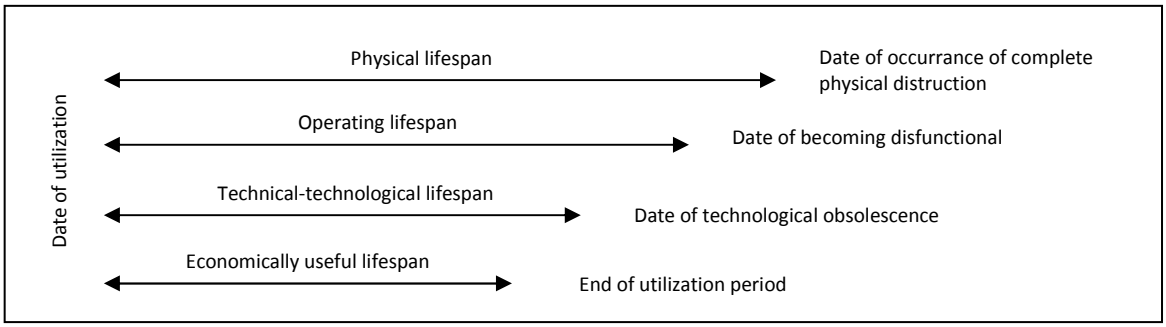

Figure 4. – Corresponding relations of asset lifespan approaches (self made)

Useful lifespan: 'the period, through which the depreciable asset can be accounted in proportion to time or performance by the holder against the result;

a) Useful lifespan is the period, during which the holder will use the depreciable asset considering the expected physical deterioration (number of shifts, circumstances typical of the activity, the physical characteristics of the asset), moral obsolescence (technological changes, demand for products), the legal and other restricting factors related to the use of the asset, or
b) Useful lifespan is the period determined by the consideration of the produceable number, performance to carry out or other unit number, during which period the holder can expectedly produce the former by the use of the depreciable asset.' (HAS 3.§ (4) 5.)

Useful lifespan – contrary to the other lifespan approaches –, is a function of the holder's own subjective judgment, its end coincides with the end of the asset's user lifespan and denotes the period during which the asset can be profitably operated in the

economic sense. Its length can be determined by estimation, for its performance the definition gives a few clues according to which the useful lifespan and throught it depreciation (based on the facts summarized in Chapter 3.3.2.) is a function of physical deterioration, moral obsolescence and the performance of the asset. Nowadays, contrary to what could be observed at the beginning of the development of depreciation, the accounting of depreciation is made much more necessary by technological obsolescence than the deterioration of assets in a physical sense.

The length of useful lifespan – the magnitude of its estimated value – is influenced by the asset's:

- sort, type (the recommendations of the producer);
- the rate of its expected use and the circumstances of management (the magnitude of capacity utilisation, managerial decisions);
- the magnitude of obsolescence and the frequency, nature of mitigating measures (maintenance, renovation, development plans);
- the development of market demand (existence of equivalents, activity of competitors); furthermore
- other external restricting factors (e.g. change in legal environment);

thus the development of circumstances both inside and outside of the enterprise.

During the useful lifespan of the asset the recognition value of the asset reduced by the ***residual value*** should be accounted as depreciation allowance. Residual value is 'the determined value expected to be realized at the end of the useful lifespan, at the date of the normal installation – based on the available pieces of information, as a function of the useful lifespan. Residual value might be zero if its value is predictably not significant.' (HAS 3.§ (4) 6.) Residual value is also a category, whose determination requires estimation from the holder: indeed an estimation of not the present but the future value. During its determination the market value of a similar asset of age and state corresponding to the asset's planned useful lifespan can be a starting point. Should the asset's planned useful lifespan be near enough to its operating lifespan, then we do not need to calculate with residual value during the development of depreciation.

It can be seen that for the planning of depreciation (even independently from the chosen depreciation procedure) the estimation of minimum two factors – useful lifespan and residual value – are necessary, furthemore in certain cases even the recognition value is a subject to estimation, e.g. in case of assets accepted free of charge, as present, legacy, found as surplus recognition value is the market value of the

asset known at the date of acceptance as stock (HAS 50.§ (4)), whose determination in the lack of established market also stimulates subjective judgment. The more factors are considered to be the base of the estimation, the greater significance it gains and the more it contributes to reaching a more well grounded decision, but the greater possibility of error is also a direct consequence of multifactoral estimation. A more precise decision is based on the weighing of more pieces of information in every case, but during estimations we need to consider the cost-benefit principle, too, according to which the cost of information production should be proportional to the relevance of its usability.

Regarding the factors influencing the depreciation of assets numerous theoretical approaches were born, at first the analyses focusing on the determination of lifespan of capital goods. Taylor made an attempt to formalize the useful lifespan also determining the theoretical date of replacement for the first time (Taylor 1923). In his opinion, the period of the asset's operation is a function of its efficiency, which can be connected to the unit cost of its output. An asset can be used efficiently as long as the unit cost of the product produced by it will be minimal; according to his concept depreciation and unit cost are mutually determined by each other. Hotelling's starting point was that the owner wishes to maximize the difference between the value of the product (service) produced by the asset and the operating cost of the asset (Hotelling 1925). According to the views of Preinreich, the equipment has to be rejected when the difference between the interest of residual value and depreciation reaches the difference between business revenues and operating costs (Preinreich 1938). As per the model of the author couple Lutz (quotes (Bélyácz 1993)) replacement is due when gross yield (the sum of future gross yield and residual value reduced by the expense spent on the purchase of the asset) falls below the interest of residual value; they lead their theory through assuming various kinds of replacement events (one machine version without replacement, replacement sequence of definite and indefinite duration). Wright tried to approach the value of the asset and its depreciation from the opportunity value side focusing on the relation between utility and replacement cost (Wright 1964). Bélyácz describes the thought experiments of the mentioned authors regarding depreciation in details (Bélyácz 1993). The theoretical importance of their work is that they managed to detect the connections between lifespan, yields, depreciation and replacement, but their models have not become widespread in practice due to their being difficult to apply. Takács describes a more advantegous method from the point of view of practical

applicability, who defines a computer-aided model for the determination of depreciation with parameters expressing duration, the effects of innovation, inflation and physical deterioration (Takács 1993).

4.3. Allowance methods

Besides the former theoretical approaches the applicable allowance approaches were also subject to examination, their role was put forward by the growing significance of obsolescence. As I already referred to it during the discussion of historical features, **various methods can be applied to distribute the amount of depreciation among the years**, which also appeared quite early – first on a plane of thoughts and later also in practical application. So their relevance – contrary to the attempts shortly described in the previous paragraph – was acknowledged by business life.

The Hungarian Accounting Standard mentions the following connected to this: 'the ratio of depreciation to be accounted annually to the recognition value (gross value) or net value (gross value decreased by depreciation) or the amount of actual cost proportional to performance and the annual absolute amount of depreciation needs to be planned taking the expected use of the individual asset, its arising lifespan, physical deterioration and moral obsolescence, the circumstances characterising the given business activity into consideration…' (HAS 52. § (2)) Thus depreciation can be determined based on the gross or net value of the asset or ignoring that in annual absolute value, too and the law also enables lump-sum accounting of the depreciation of so-called small value assets under an actual cost of 100,000 HUF. (HAS 80.§ (2)) The depreciation to be accounted – independently from its accounting base – can be distributed among the years of useful lifespan using the following methods.

Method of depreciation allowance	Rate of allowance	Advantage of the method	Disadvantage of the method
Linear	constant	easy to calculate enables crash proof cost and price development	very rarely reflects the actual change in value
Degressive	decreasing	follows the general development of income producing ability validates the risk of technological development (faster capital return)	more complicated calculation
Progressive	increasing	handles the phenomenon of delayed value transfer	more complicated calculation
performance proportional	performance dependant	does not account allowance, if the asset is not in use	does not handle the phenomenon of obsolescence properly- more complicated calculation

Table 5. – Methods of depreciation allowance (self made)

The individual methods introduced in Table 6. are presented by and formulas are shown about the depreciation to be defined by them by (Róth et al. 2006), (Baricz 1997), (Bélyácz 1991, Bélyácz 1993).

The mentioned depreciation methods are different from numerous points of views, but if during their assigning to individual assets the matching principle was considered (according to which an asset contributes to revenues to the same extent as depreciation to costs), then theoretically the rate expressing the return (result) on net asset value can be constant in time independently from the method. In connection to an asset depreciation is certainly not the only incurring cost, expenditure that can modify its contribution to the result. According to the former, the Hungarian Accounting Standard ensures the following opportunity: ’during the distribution of the amount of depreciation among the years the other expenditures on income achieved by the use of a given asset connected to the purchase of the asset but not qualified as recognition value (the interest rate on installation, the exchange loss of currency loans), the maintenance costs connected to the continuous use of the asset within the expected useful lifespan of the individual asset calculated based on the circumstances characterising the given business activity…’ (52.§ (3))

The way in which the enterprise determines depreciation in case of its individual assets has to be established in the asset-resource regulations constituting a part of the accounting policy. In connection to the accounted depreciation allowance according to the provisions of the Hungarian Accounting Standard… ’the opening value of the accumulated [planned and exceptional - comment: J. Veres] depreciation, its calendar year increase, decrease, closing value, reclassifications separately, the amount of calendar year depreciation allowance… according to balance sheet items…’ have to be presented in the annex among the accounting information on assets ’in the following breakdown: planned depreciation linearly, degressively, proportionally to performance, with another method…’ (HAS 92.§ (1)-(2)) Thus the law mentions the above presented methods for the determination of depreciation in this context.

During the business activity a situation can arise, which leads to the change in circumstances considered at the planning of depreciation. If the change is qualified as important, then ’the planned depreciation to be accounted can be changed, but the quantified effect of the change on the result needs to be presented in the annex.’ (HAS 53.§ (5))

The Hungarian Accounting Standard – although structurally not at the same place, but in a quite detailed way – touches upon the different aspects of depreciation and based on the facts described above it can be seen that it ensures a relatively great freedom to the holder regarding the determination of depreciation, precisely assuming that its central determinability – contrary to the taxation laws – can be doubtful from the accounting point of view. But the broad choice possibilities in practice did not result in the variability of the accunting of depreciation. Many use the rates enforceable from the taxation point of view in accounting, too (the assumption is verified by (Mohl 2004)), which is a method not corresponding to the essence of depreciation from every point of view. The reason for its widespreadness is that the earnings before taxes in the accounting sense and the corporate tax base are not the same, they differ from each other due to tax base corrections. The tax base has to be increased (retrieved) by the amount of calendar year depreciation determined from the accounting point of view, and depreciation can be recognized (deducted) to an extent recognized by law (details can be found in Law LXXX./1996 on corporate and dividend tax), which leads towards the increase of administrative burdens from the point of view of enterprises.

4.4. The valuation approach of depreciation in accounting

Depreciation allowance apart from being accounted as cost gains content in one more aspect from the accounting point of view. The accounted depreciation on the other hand corrects the recognition value of the asset, appears as an item decreasing that; it has to present the asset of the enterprise with a so-called book value or actualised past cost decreased by accumulated depreciation in its balance sheet. This way we have got to a further aspect of depreciation, its valuation side approach.

Depreciation transfers the recognition value of an asset to some kind of current value and the value is a result of the application of some kind of valuation, valuation method – ranking characteristics, preferences. Valuation is such a ’complex examination, which determines the value of assets considering more components.’ ((Takács 1993) p.1.) In sync with Chapters 3.1 and **Hiba! A hivatkozási forrás nem található.**, in order to determine the value of an asset we need to consider the achievable – future – benefits, which assumes a preliminary valuation. **But accounting** – since based on its essence it has to strive for reliability and objectivity, see (Bierman 1963) –, **emphasizes post-**

valuation primarily; according to which based on Hungarian provisions the base for an asset's depreciation and the starting point for its actual value determination is the past recognition value. To foresee this and understand the changing asset valuation methods we need to review the different accounting valuation principles, methods and the developed theories of balance sheet.

In the accounting sense the **valuation method** determining the value of an asset is 'the concrete form of appearance of the evaluation activity and it changes depending on how we approach the subjects to evaluation and what prices or sub amounts we use for conversion into monetary value or the specification of the balance sheet value' ((Baricz 1997) p. 63.). Based on its subject the evaluation method can be either individual or collective; and according to the steps of conversion into monetary value direct or indirect evaluation can be differentiated. Direct evaluation takes place based on the prices assigned to the quantitatively includable assets, while indirect evaluation covers the possible correction of the value of the quantitatively not includable assets; the two methods cannot be sharply differentiated any more today, direct evaluation is completed by indirect evaluation in numerous cases. The evaluation of tangible assets is typically based on the individual and direct evaluation method, but during the definition of their values indirectly determined modifications can gain importance, too. Individual evaluation methods can be further differentiated based on what prices we consider during the determination of value, this is summarized by the figure below.

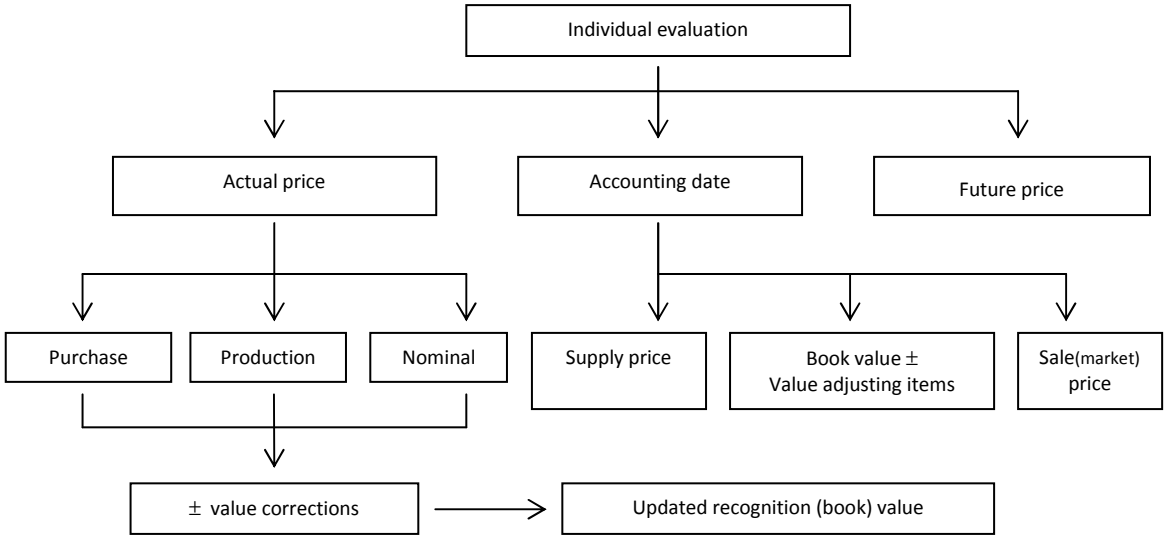

Figure 5. – Possible individual evaluation methods as functions of applied prices (based on (Veres, Mohl 2005) p. 4.)

The various evaluation methods are accompanied by different evaluation principles, whose significance is that depending on their application different highlighted categories of accounting gain importance. The **evaluation principle** ’expresses the theoretical connection between the evaluation method of assets and resources – the applied evaluation methods – and the value of wealth, capital and result and points out the priority of which highlighted indices of the balance sheet is ensured’ ((Baricz 1997) p. 77.). The following evaluation principles can be assigned to the evaluation methods of the above figure (based on (Baricz 1997) p. 77.-79.).

Base for evaluation procedure	Evaluation principle	Priority	Balance sheet theory
Recognition price	realization	Result	dynamic
Accounting date price	time value	wealth and own equity	static
Future price	business estimate value	result, wealth and own equity	organic

Table 6. – The connections between evaluation methods, principles and balance sheet theories (self made)

Realization principle besides the detection of assets through an updated actual cost enables the reflection of the realized result of the given period, but meanwhile does not point out the fair value of wealth and capital. The objective of the time value principle is thus the more precise determination of these two values, for which accounting date evaluation has to be applied. But the obtained result in this case will be fictitious, since the value calculated this way cannot be definitely validated on the market. The business estimate principle does not define priorities, owes the same significance to all three highlighted accounting categories and due to its forward looking feature it can contain significant fiction and uncertainty because of estimates.

As time passed, the operation of business organizations has become even more complex and the changes gained such a size by the end of the 19th century-beginning of 20th century that the mapping of their activity made the birth of various views possible from the accounting point of view. It eventually has become crystallized already until this date that accounting has to provide information about the wealth, financial and income situation of holders. Since it was evident that the system was unable to reflect all three categories back on a ’fair’ value, it has been questioned how and with what priorities the choice among them has to be made. As of the answer different views called balance sheet theories collided. Balance sheet theories are eventually theories deducting the rules of balance sheet production summarizing the criteria for entering assets and resources into inventory, the evaluation principles and methods of wealth and

the classification of the balance sheet in an overall system from concrete balance sheet objectives (Bosnyák 2004a). These balance sheet theories were called material balance sheet theories by posterity, since they are originated from a concrete balance sheet objective. Three main groups can be differentiated (in practice – because of the complexity and versatility of the problem – many more material balance sheet theories were born): static, dynamic and organic balance sheet theories (Baricz 1997).

The advantage of ***static balance sheet theory*** is that based on the time value principle (thus evaluation through daily prices) it is able to determine the updated value of property and capital interesting for the owners. Its advantage also leads to a disadvantage: the fictitious result originating from the evaluation principle can not constitute a base for distribution, purchase of dividend. It can be mentioned against the static approach that the daily prices applied during valuation are not real from the point of view that no actual market measurement can be found behind them, so finally the calculated value of wealth and capital is a fictituous value.

Dynamic balance sheet theory is based on the fact that the objectives of most organizations are survival and continuous operation, so it is less important to detect wealth and capital through daily prices, because their value will become important information primarily in case of revocation. As a result of this, the objective of the balance sheet theory can be nothing else but leading to the precise determination of the result of operation eventually. An advantage of dynamic balance sheet theory is that through its application – originating from the realization principle (evaluation based on past, actual costs) – a result justified by the market and constituting a base for distribution can be detected. Its disadvantage is that it is unable to reflect the accounting date value of wealth and capital and provide information about this to the stakeholders.

The third theory, ***organic balance sheet theory*** was born after the development of the basic characteristics of static and dynamic theories, and through its approach tries to unite the specific features of the previous two approaches: it implements dual evaluation, incorporating the application of time value principle – evaluation through daily prices – and the realization principle preferring evaluation through actual cost. But even due to its positive features it was not introduced in practice, since the validation of its requirements from accounting proved to be insoluble from the practical side.

The three above mentioned schools can be considered similar from the point of view that they all wanted to describe the same slice of reality, but after the short presentation of their views it is clear that they had a quite different view about the world, which on a

certain level can be observed even within certain balance sheet approaches. Their common feature is that all of them focus on that group of phenomena, which can be described by their own theory the most and they interprete other phenomena in an ad hoc way (e.g. orthodox static balance sheet theories with respect to the result). The available facts, based on which their views can be created, are the same for all of them, still they describe the same group of phenomena in a different way.

Regarding the three mentioned competing balance sheet theories it can be concluded that accounting put organic theory aside and **dynamic balance sheet theory has emerged as the primary theory** which constitutes a base for further scientific research. The role of rejected alternatives is to operate as correcting mechanisms and contribute to the finally preferred view's content to become expressed more clearly. Starting from this it has to be mentioned that the pillars of static balance sheet theory have also been utilized in accounting, but due to its way of approach in case of the description of different circumstances (e.g. bankruptcy, winding-up, liquidation), and since the number of these situations is smaller, its role compared to the dynamic balance sheet theory is more peripheral. (However it is enough reason not to be able to make dynamic balance sheet theory appear as the only dominant approach – maximum in a primary role.)

4.5. The accounting approach of depreciation based on the actual change in value

Economic evaluation derives the value of an asset from its future benefits. **Depreciation can be connected to the benefit generating ability of an asset** from two points of view**.** In the accounting sense as a cost it worsens the result, but by making the production of products, services possible it indirectly contributes to the realization of revenues; thus it displays the absorbtion of the yield producing ability and plays a role in the maintenance of future yield producing ability through its contribution to capital maintenance at the same time. As I also referred to it in the beginning of my thesis, the concept of capital maintenance can also be approached from the point of view of the consolidation of future yield. It was discovered relatively early – during the theoretical works of the beginning of the 1900's – that there is a mutual determination between the value of an asset and its product, the relation was first pointed out by Hotelling, according to whom the company strives for the maximization of the present value of the

difference between the asset's output and operating costs (Hotelling 1925). This difference is considered to be the value of the asset and the difference between the values measurable in the beginning and the end of the period are seen as the depreciation occurred in the given period. This derivation of depreciation is called by Bélyácz as **valuation theory approach**, which he describes in details in more previously quoted works e.g. (Bélyácz 1992), (Bélyácz 1994a). From the theoretical side based of the facts mentioned above the relevance of the method cannot be questioned, but its practicability is doubtful.

According to Chapter 4.2 the determination of depreciation requires numerous estimates based on the currently valid accounting provisions, too, compared to which **the significance of estimations** appears **even more pronounced in the valuation approach**. Besides the determination of the asset's assumed useful lifespan and residual value (which require estimation by all means in the currently valid domestic accounting, too) in the valuation model the identification of the future yield achievable by the asset and its two factors: incomes and costs get a primary role. In case of a properly established informational and cost observational, allocational system the costs of the asset can be theoretically well identified, but the same cannot be said regarding the incomes achievable by the asset. The ***contribution*** of most tangible assets ***to incomes*** is hard to identify, measure, assign to the asset (let us just think about a building or a machinery), since these assets do not individually contribute to the production of the result (as e.g. via the interest rates, foreign exchange gain of debt collaterals held for training), but combined with other assets, material and non material resources – so the value of the asset also depends on the value of the other equipment, typically of not identical age composition, they mutually affect each other. Furthermore the profit achievable by the asset can appear not only in the form of incomes, but also as cost saving. Besides the problem of identification of incomes it is a further problem that the ***allocation*** of the yields and the result ***in time is also uncertain***, they do not occur regularly, and they are typically functions of the development of factors outside of the enterprise's scope (e.g. market prices, sales position, strength of competition, general economical relations etc.) The time factor also gains importance from the point of view that for the evaluation we need to determine for what term we take the result components into consideration. As first idea we could use the useful lifespan of the asset, but in case of assets with long period of use the result components further in time can be measured even less reliably and their effect can shrink from the value point of

view due to discounting. The determination of the relevant term from the point of view of asset evaluation can be a futher crucial point.

The achievable result – mostly from the cost side, but also through the achievable revenues – is influenced by the strive for repair, maintenance, the preservation of assets, so the ***circumstances of business***, the care and time preferences of the holder and the rate of technological development. It is a further problem that in case of the right maintenance and as a function of the development of external conditions the value of the asset can be increasing in time, which collides with the derivation of depreciation from the asset value in the beginning and the end of the period. A similar problem, but from the opposite side is that depreciation can be interpreted on a valuation base just in case of assets having a future yield and the result achieved by them is positive. In case the result achieved by the asset is negative or cannot be measured, the method cannot be applied despite the fact that the asset obviously has a value in this case, too.

Another important condition for the determination of the asset value is the application of the appropriate discount rate – expressing the risk, which is another difficulty regarding the method; and even in case of the evaluation of the financial assets simpler from the point of view of determination of revenue-expense/cost/expenditure ***the choice of the applicable discount rate*** is a crucial point.[36] Furthermore since the preferences are different in time, it is usually not enough to determine one single discount rate for the establishment of the value of the tangible assets of typically longer lifespan.[37] The result achievable by the asset cannot be made less dependent from the period of its life the company is in: whether it experiences a growing phase, stalls, grows or decreases according to the last segment of the life curve. It is further affected by the ***intentions of the owners, leaders of the company,*** i.e. who operates the given asset and according to which objective, among which business, economic circumstances in a wider sense.

Regarding the determination of the asset value I insisted in Chapter 3.3.2 that every factor influencing the asset value is known and unchanged during the asset's

[36] Brealey and Myers highlight subjectivity as a disadvantage related to discounted cash flow (which in case of financial assets is the same as cash flow) based evaluation, thus among the ten not yet solved problems of finance the point out that the determination of the correct interest rate can be complicated and even its small deviations might cause a significant change regarding the end result. ((Brealey, Myers 2005) p.1061.)

[37] Possible approaches of the interest rates applicable as discount rate during evaluation are delivered by e.g. Diewert (Diewert 1996); Schreyer weighs the considerations regarding the endogenous and exogenous ex ante and ex post rates of return to consider during the determination of user cost and the interest rates applicable for the evaluation of non-market assets (Schreyer 2009).

lifespan. If I dissolve this condition, then the change in asset value cannot only be contributed to the shown asset and real economic features (deterioration, obsolescence; real interest rate and price change), but also to the lack of certain knowledge regarding the future. Due to ***uncertainty*** the asset value forecast ex ante in the past (at t-1 date) usually differs from the real, ex post value, and the ***expectations*** regarding the factors influencing the development of the asset value can also be different between dates (t-1) and (t). Thus besides deterioration and revaluation as factors influencing the asset value a third factor is built in, which is called capital gain or loss by foreign authors (e.g. Hill, Schreyer) and gain or loss 'fallen from heaven' by Bélyácz. According to Hill's views capital gain or loss cannot be part of time series depreciation, but even himself admits that the practical separability of the two theoretical categories cannot be realized within a rational framework (Hill 1999, Hill & Hill 1999).

The determination of value in case of the yield centred approach contains significant subjectivity, so it increases the uncertainty surrounding the reliability of the value. The effect of uncertainty can be involved in evaluation in the form of ***risk correction*** in numerous ways. On one hand besides a given discount rate the possible result outputs can be taken into consideration weighted by probability; on the other hand the most probable future result series can be discounted by an interest rate appropriately corrected by uncertainty. Although risk correction does display the effect of uncertainty, it imposes even further estimation.

In general it can be stated that the result producing ability of assets shows a tendency decreasing in time. It is underpinned by the increase in operating costs, the development of physical efficiency, technological obsolescence, the price decrease of products, services produced by the asset connected to the appearance of competitors, but based on the facts described above the derivation of the asset's value (and its depreciation) from the future net financial result achievable by the asset (operating surplus) is difficult even in this case.

Regarding the potential yields of capital goods it is obvious that it constitutes a common source for the preservation of capital, yield and depreciation, but it could not become the base for evaluation and interim depreciation accounting. The valuation approach of depreciation ***assigns one single subjective, not standard evaluation method to every asset*** as an output of estimates originated from the weighing of individual circumstances, seizable by assets, which is hard to interprete and see through by the external, independent party reading the financial report. The procedure tries to derive

depreciation externally, taking numerous factors independent from the features of the asset into consideration, not taking into account that the primary source of depreciation is the asset and its most objective features. Although the described method seems to be implementable theoretically, Hotelling also used to recognise that its practical application cannot be the proper solution because of the above mentioned difficulties, although it seems to be an opportunity trying to validate the financial and accounting aspects of depreciation at the same time and to synchronize the two scientific areas.

Practice has reflected that **the procedure can be an appropriate method for the evaluation of capital goods**, **but** it **has not been able to become the base for the determination of depreciation** representing the continuous consumption of capital. Due to the lack of its applicability one common feature for the accounting and financial approach of depreciation has remained: both recognize its significance in replacement and consider it as the amount saved from business yields in order to maintain the value of capital.

The valuation approach is also confronted by the valid – although from this particular point of view changing – accounting theory through its future orientation since a fundamental feature of accounting is that it typically processes events happened in the past, its evaluation approach is significantly affected by the principle of prudence. Based on this accounting principle (principle of realization and dynamic balance sheet theory) assets have to be evaluted to the lowest, while resources to the highest value. The evaluation described above definitely collied with this principle, which can be connected to the time value principle and rather highlights the fundamental accounting principle of reality. The valuation approach of interim depreciation presents the current value of the asset in the accounts and derives the depreciation expressing the exhaustion of profit producing ability from its change. As I mentioned before: accounting establishes a connection between the yield and depreciation of the asset by allocating planned depreciation allowance via the matching principle during the useful lifespan of the asset. The method does not always necessarily reflects the changes in the value of the given asset, but the book differences from the current value can be traced by another method: considering exceptional depreciation allowance and value adjustment. The complete logical model of asset evaluation valid in Hungary is summarized by the following self made figure.

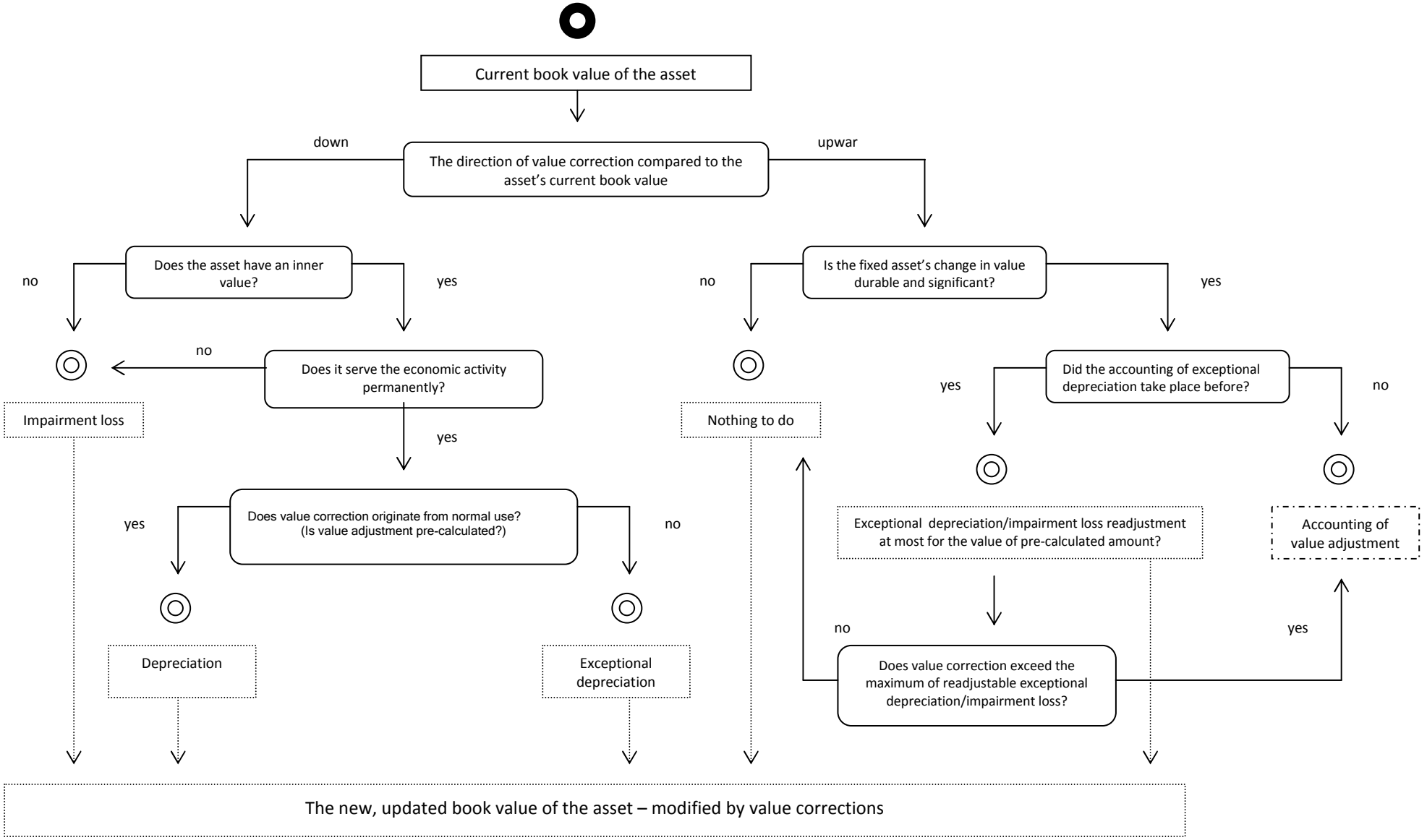

Figure 6. – The factors of asset evaluation in case of recognition value evaluation

The opportunity for the determination of the objective value of the asset rises most probably at two dates: at the date of its recognition and at the withdrawal. During the useful lifespan numerous factors can divert the asset value both upward and downward from the actual value. The accounting title of **downward value correction** primarily depends on the asset's possessing an inner value or not. An asset possesses an inner value if its establishment has a relevant cost: e.g. intangible and tangible – as durable, fixed – assets and stocks.[38] From this point of view financial assets do not have inner value, their value is represented not by themselves but by the promise of the debtor. In case of tangible assets (and intangible goods) ***planned depreciation*** denotes the pre-planned measure of downward value adjustment, which 'has to be planned taking the individual asset's expected use, its arising lifespan, physical deterioration and moral obsolescence, the circumstances characterising the given business activity into consideration…' (HAS 52. § (2)). In case of financial assets and non-durable assets (stocks) without inner value it makes no sense to talk about pre-calculated value adjustment arising from normal use, in their case value adjustment is optional and in the accounting sense identified by the category of depreciation in Hungary. Should the downward value adjustment take place in a not pre-plannable way in case of tangible assets (and intangible goods, where it can be interpreted), then it has to be given effect through the accounting of exceptional depreciation. ***Exceptional depreciation***[39] has to be accounted in case of a tangible asset, if

1. 'it has become unnecessary because of the change in business activity,
2. it has been detroyed,
3. it is missing,
4. it has suffered serious damage or
5. its book value is permanently and significantly higher than the asset's market value.' (Róth et al. 2006)

The adjustment resulting in the withdrawal of the asset from books (1-3.) has to be accounted at the withdrawal, the correction due to damage (4.) at the time when the events occurs, the exceptional depreciation determined by the market value (5.) for the accounting date of the balance sheet. The decrease in value (4-5.) has to be carried out

[38] Except for advances on intangible goods, investments and stocks.

[39] Exceptional depreciation is recognized by Corporate Tax Act in a restricted way, only in case of tangible assets (excluding investment), for which planned depreciation cannot be accounted and if the damage of the asset (also including investment) has happened because of accidental cause. (Corporate Tax Act Annex 1., 10. c)-d))

to the extent that the asset will appear in the books on a market value valid at the evaluation – in the latter case on the date to which the balance sheet relates. (HAS 53.§ (2))

The accounting of exceptional depreciation (and its readjustment) can result in the repeated declaration of the planned depreciation to be accounted annually, the expected useful lifespan and the residual value, which has to be reasoned in the annex of the report in case of occurrance and its effect on the assets, result has to be presented separately. (HAS 53.§ (4))

In case of certain fixed assets[40] the Hungarian Accounting Standard enables **upward value correction,** in case the tendency of value adjustment is durable, and its amount is significant (detailed rules see HAS 57-59.§). In case of tangible assets this adjustment, if previously the accounting of exceptional depreciation took place means its termination at most up to the value of the previously accounted amount and the net value determined taking planned depreciation into account. Should the amount of value adjustment exceed the readjustable exceptional depreciation, then the difference between the asset's market value – on the balance sheet date [41] and its book value after readjustment *can be* considered as ***value adjustment***. The accounted value adjusment is not a part of the asset's book value, it has to be presented on one hand in the balance sheet item 'value adjustment' belonging to the asset, on the other hand in capital – not result efficiently – as the revaluation reserve of value adjustment. The inventory has to include the circumstances of the accounted value adjustment and the regularity of its determination, accounting has to be controlled by the auditor, even if auditing is otherwise not mandatory for the company. The fact of value adjustment does not change the asset's planned depreciation by itself, the value adjusted asset should be further depreciated by a method corresponding to the prescriptions of accounting policy, taking the original factors into consideration. The accuracy of the amount of accounted value adjustment is a subject to change because of this, too. Thus during the future asset evaluation the amount of accounted value adjustment has to be regularly reviewed, and if it's necessary its amount increased/decreased/terminated, possibly exceptional depreciation accounted. The opening amount, variation in stock, closing value of value

[40] Among intangible goods in case of property rights, intellectual property rights, in case of all types of tangible assets except for investments and advances on investments, among financial assets in case of durable shares. (HAS 58.§ (5))

[41] Legislation considers market value relevant in relation to evaluation. It can be problematic if the asset has no extended market, since the law provides no reference for the execution of evaluation in this case – at least related to value adjustment.

adjustment have to be presented separately in the annex at least through related balance sheet item, furthermore the principles and methods applied in case of evaluation per market value have to be shown in a detailed way.

Thus in accounting the asset is presented through the accounting of depreciation – as a specific factor for value adjustment –, besides other circumstances unchanged, on updated past actual value. The logic of its accounting follows the approach of the dynamic balance sheet theory introduced in the chapter dealing with balance sheet theories. However, after some time elements of the static theory were incorporated into dynamic balance sheet theory, so there is an opportunity to display tangible assets on their current (market) value in the report on one hand through the accounting of exceptional depreciation, on the other hand through that of value adjustment. Thus Hungarian accounting regulation – even if in an indirect way – enables the display of **time series depreciation** defined in Chapter 3.3.3 regarding asset side evaluation, so it indirectly represents the depreciation approach based on total change in value founded by Hotelling.

The Reader might ask the question whether the asset evaluation opportunity based on the direct observation of market prices mentioned in Chapter 3.3.1 could be a theoretically suitable asset for the mapping of the valuation approach of depreciation. Since an efficiently operating market prices the asset as per its future service values (and user costs) in an optimal case. In order to get closer to the relevance of observations from both points of view, it is worth taking a brief look at the now present tendencies of the development of accounting again.

4.6. The evaluation of tangible assets within the international accounting framework (IAS/IFRS)

Accounting based on dynamic balance sheet theory has a long normal scientific segment to look back on. In the normal scientific period its subareas were developing considering that it is able to reach its objective – fulfilling the information needs of stakeholders – through the theories, methods established within the framework of evaluation on recognition value, dynamic balance sheet approach. However accounting is a strongly practice and application oriented scientific area which implies that in order to reach its objective – to be able to function as an information system – it had to and have to adapt to a great extent to the needs of the ones wishing to utilize the provided

results in every segment of its development. Through the development of economic life the expectations regarding the information system have become even more wider.
Within the framework of the approaching background of dynamic balance sheet theory numerous problems have been solved, the question is to what extent do expectations regarding accounting qualify as further satisfiable within this system. It was a fair critical observation from the beginnings towards dynamic balance sheet theories that they were unable to evaluate wealth on daily prices. In his response Schmalenbach pointed out (quotes (Baricz 1997)), that in the everyday life of economic organizations the detection of the real value of wealth does not need to be an objective, since the development of the realised result shows a good picture about the management of wealth and so his theory won the trust of the public opinion of profession for a long time. However after some time the static evaluation based on daily prices was incorporated into accounting through the tools of loss of value and value adjustment, but still through the polishing of primary paradigm.

But economic environment has gone through such a change in the meantime that it is now pushing to the frames of evaluation through the actual value from a certain point of view. Globalisation has already reached its adulthood, financial investors are not thinking on the level of smaller areas, regions any more, but on a worldwide level, and according to this they would like to gain information provided by accounting. Even the ones shaping the theoretical bases of accounting have to learn to perceive the changed environment in a new way, they have to see that **environment would not necessarily like to gain information based on the accepted theory.** An important feature of information is that the more complete, the more up-to-date they are the more they are worth, and a basic component of the value of the pieces of information regarding the same subject is their comparability. Due to the changed economic environment the stakeholders utilizing pieces of accounting information impose a higher demand towards accounting information system exactly regarding the former three quality categories. The need for a higher level compliance with these requests **has given birth to the concept of fair value evaluation in accounting.**

Fair value is defined by both the Hungarian Accounting Standard and the international accounting standards. According to the former: ’**Fair value**: is the amount for which an asset can be exchanged (sold and bought), or a liability can be recovered between well informed parties expressing their will to make a deal, within the

framework of a deal (contract) made (or to be made) due to the regular market conditions.' (HAS 3. § (9) 12.)

The advantage and the ground for introduction of fair value lies within its following two basic features.

1. The ***relevance***; fair value expresses the value jugment of the market, independently from the former life of its subject, its owner and the planned form of utilization, and it is more consistent, more transparent than the registration based on updated actual value.
2. The ***reliability***; since fair value can be calculated even if no information (regarding value) is available. In the meantime the estimation regarding fair value has to be consistent, so the reuirement of relevance has a priority. (Veres, Mohl 2005)

According to a criticism against fair value it is nothing else but the 'rewording' of market value. But numerous features contradict this. E.g. the unique treatment of transaction costs and its already mentioned characteristic that it does not include synergies (so it abstracts from the given enterprise). (Bosnyák 2004b) Thus its value can be found not in its realness but in its objectivity and accordingly it can be a subject to professional public agreement, which according to Bierman is the real objective of accounting compared to the measurement/evaluation held right – but impossible to achieve (Bierman 1963).

Fair value is not simply a definition, but it also determines the assumptions and methodology behind value calculation, a new model – still developing nowadays –, an extensive theoretical conception.

The Hungarian Accounting Standard – besides giving a general definition for fair value – lists in which cases, with which method it has to be determined and what we mean by fair value depending on the circumstances.

'Based on the information available about the market perception fair value can be:

a) the market value...

b) the value determined by the general evaluation methods, approaching the market price reasonably.' [42] (HAS 3. § (9) 12.)

[42] Real value evaluation was incorporated into Hungarian Accounting Standard in 2003, its concept first had to be applied for the report made about the business year starting in 2004 and it could be applied for the report on year 2003. The Hungarian Accounting Standard uses real value evaluation for financial instruments, which can be debits, liabilities based on contractual agreement, financial assets, collaterals and derivative transactions.

The novelty of fair value lies within not simply going beyond the actual value, but also widening the concept of market value significantly, and although the legislator does not provide an exact market value definition, it does differentiate between its approaches. Legislation does not clarify the category of general evaluation procedures mentioned in point b) of the definition, but it can contain among others the procedure evaluating the asset through the discounting of its future cash flow (better known as discounted cash flow – shortly DCF – method).

It can be admitted based on the schematic review of fair value evaluation that considering the evaluation procedures fair value evaluation means a further shift towards static balance sheet theory. The appearance of its application is the conclusion of financial view in accounting. It is illustrated by the fact that on the international level accounting is already regulated by international **financial** reporting standards (IFRS). From numerous perspectives traditional paradigm – in our case actual value evaluation – is unable to provide the right background for the mapping of changed environment. The case is the same with fair evaluation, too: financial point of view has brought such anomalies into accounting which can be less successfully solved within the frames of the existing paradigm. Real evaluation has not resulted in a revolutional transition in accounting, but its significance in case of the reports of certain enterprises (possessing masses of financial intruments, e.g. financial institutions, insurance companies, investment service providers etc.) is not negligible.

In Hungary the law offers its application only as an opportunity for business organizations – in case of the compilation of individual reports –, its application is made mandatory only by the regulation of the European Union (EC No. 1606/2002) for the compilation of consolidated reports of quoted companies in the EU, since it prescribes the report compilation according to IFRS accepted by the Union, whose organic part is real evaluation.[43]

Besides the system of IAS (International Accounting Standards)/IFRS, US GAAP (United States Generally Accepted Accounting Principles) also provides accounting provisions applied on the international level (United States Generally Accepted Accounting Principles). In the European Union and in its member Hungary the regulations of the former are relevant, and these days a convergence programme approaching the provisions of IFRS and US GAAP – also connected to tangible assets –

[43] The provision of EU regulation was incorporated into Hungarian legislation through paragraph 10. § (2) of the Hungarian Accounting Standard.

is run, so in the next pages I approach the topic of accounting evaluation of tangible assets through the international accounting standards.

International accounting standards apply a novelty approach for the evaluation of tangible assets, since they expand fair value evaluation – incorporated into Hungarian law only in case of financial instruments – for these assets, too. According to international accounting standards an asset can be activated only if it is under control of the holder, is a result of past events and economic benefit is expected from its possessing, so the profit producing ability of the asset appears as a condition of its detection. Among the assets the general provisions regarding the tangible assets existing in material form is included in standard **IAS 16** entitled **Property, plant and equipment**, the scope of which is extended to those assets of object form, which are owned by the business unit for production, service provision – most probably exceeding one period[44] (afterwards the assets within the scope of IAS 16 are identified by the concept of tangible assets, but we need to note that the rules of other standards (might) relate to certain special tangible assets).

The starting point for the evaluation and the determination of depreciation of tangible assets is recognition value (whose special relations prescribed by IAS 16 I do not discuss), **and the factors to be considered during the determination of depreciation, the criteria for its accountability are basically equivalent to the provisions of the Hungarian Accounting Standard**. The volume of the amount of depreciation is influenced by the residual value of the asset, and the useful lifespan can be determined as a function of time or the performance of the asset. The factors affecting depreciation (residual value and useful lifespan and the method of allocation of depreciation) have to be revised regularly, in the end of each business year and in case of significant change their initial values have to be modified, too (see IAS16 50-59.).[45]

According to the standard when choosing between the depreciation methods we have to take the incurrence of economic advantages arising from the operation of the asset into consideration, various methods can be used for the distribution of an asset's depreciation for years, among which it names the linear, degressive and performance proportional methods. (IAS 16 60.)

[44] Intangible goods also belonging to durable assets – due to their different features – fall within the scope of another standard (IAS 38).

[45] The evaluation of assets has to be in sync with the provisions of standard IAS 8 Accounting policies, changes in accounting estimates and errors.

The **first version of the standard** prescribed the evaluation based on updated recognition value discussed during the description of Hungarian regulation, through the application of which the book value of the individual assets – because of the effects of factors to take into consideration based on different points of view – will not be comparable any more. As a further relating problem we can mention that it is unable to track the change in the updated value of the asset accordingly. In order to avoid this, exceptional depreciation was incorporated into the Hungarian model, which is accounted with the smallest probability connected to the change in market value (although it would be mandatory based on the provisions), and even if it is done, its accounting on the intercorporate level does not happen consistently, since based on its accounting policy every enterprise can consider something else durable and significant.[46] The situation is similar regarding the value adjustment by Hungarian provisions, whose accounting is even less supported and the upward value adjustment realized through it is not mandatory, just an opportunity. Its optional feature is underpinned by the fact that its auditing is mandatory in every case, which also acts against its application through its expensiveness. And if despite all of these value adjustment is accounted, it is often carried out in order to improve the balance sheet (principal amount and capital), through which its category can become a subject to manipulation.

Based on the problems of indirect value correction realized within the frames of recognition value evaluation – exceptional depreciation, value adjustment (such as subjectivity, indirect and optional feature, expensiveness such as e.g. the mandatory auditing of value adjustment, opportunities and objectives for wealth and result manipulation) the **IAS 16 revaluation model** has been developed in case of tangible assets, which also applies valuation aspects regarding the evaluation and depreciation allowance of tangible assets.[47]

Thus in order to evaluate the groups of tangible assets after display, **the holder can choose freely between** the equal options of **recognition value model and revaluation model**, the only restriction is that the chosen model has to be applied for each member of the given asset group in order to claim consistency.

[46] Corporate taxation's not recognizing exceptional depreciation originated from the change in market value in the tax base, which leads to further counterinterest.

[47] The IAS 16 revaluation model was existing as a possible alternative besides the prioritization of the recognition value model for long, and the 2003 adjustment of the standard raised it to the level of the former. IAS 16 in its present form its applicable for the reports made about the business year starting from 01/01/2005 and the subsequent ones, its earlier application is allowed, but not mandatory.

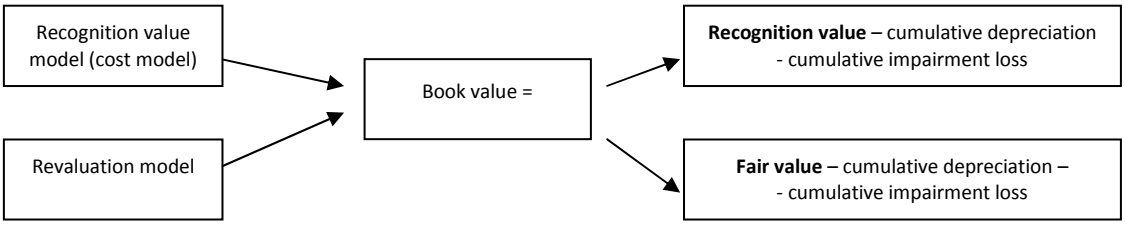

Figure 7. – Recognition value evaluation based on IAS 16 (self made)

In case of financial instruments fair value evaluation is an obvious option, since their value can be determined by general evaluation procedures – most often by discounted cash flow (DCF) method, and most financial assets have an established market (regulated market or outside the stock market), where prices also fluctuate around the value determined by DCF method in many cases.

But **IAS** recognizes **fair value model** not only during the evaluation of financial intruments, as Figure 7. shows, it **also enables its application for the evaluation of tangible assets**, regarding which it does not create a new fair value definition. Its amount can be determined starting from the valued market value and in its lack through generally recognized evaluation methods, e.g. named by IAS 16 through the application of yield based or depreciated supply value approach. In the revaluation model during the evaluation of certain tangible assets – most often estates – various versions of the DCF method can gain a significant role, too. In case of the application of revaluation model the positive difference between the fair value and the book value of the asset can appear as revaluation reserve in the book (within capital, not result efficiently), from this point of view it is similar to the value adjustment introduced in Hungarian practice.

However, **fundamental differences** can be observed between the two systems:

- *revaluation difference* has to be accounted as an *item directly adjusting* the value of the asset in a gross or net form,
- the base for the depreciation of revaluated assets is the revaluated value of the asset and
- the realized revaluation reserve can be *transferred* to the retained earnings.

The use of the **revaluation model** can be practical in case the asset is depreciating, but its reprocurement price can increase as time passes – not exceeding the original recognition value, since in that case the asset cannot be depreciated –, and if significant uncertainties occur regarding the determination of useful lifespan and it is doubtful whether the asset completely deteriorates during its planned useful lifespan or not (Kapásiné Dr. 2006). The method can be **argued** from the point of view that it

provides more space for estimations – thus subjectivity –, which might often prove to be expensive with the inclusion of an external expert, but also without that, especially if the holder emphasizes the precise value determination. At the same time the **advantage** of the revaluation model is that

- it provides a correction opportunity regarding the pre-planned depreciation of the asset, since depreciation in numerous cases is hard to plan in advance and as a result of factors outside the company its value is a subject to fluctuations compared to the plans;
- in an environment of inflation it enforces higher cost against the increased turnover, thus showing a more real picture regarding the result above the financial position, too;
- its use provides *opportunity* for a higher amount to be separated from result for replacement and it promotes capital maintenance more effectively.

According to the standard revaluation difference can be *transferred*[48] to the accumulated result due to the normal use, too. The difference would be definitely realized during the withdrawal of the asset from books, but it can appear in the profit reserve via the transfer of the difference calculated based on revaluation and without that, too (the detailed draft of the example can be found together with the gross and net method of revaluation in annex 2a.).

> *Let's suppose that the actual value of a tangible asset put into service on 1st January is 10.000 thousand HUF, its useful lifespan is 5 years, at the end of which its residual value is zero and its depreciation is determined linearly. The enterprise evaluates its tangible assets based on the revaluation model, the market value of the asset in the end of the third year after its purchase 5.000 thousand HUF, neither revaluation difference nor exceptional depreciation was accounted earlier, the data to be considered during the determination of depreciation due to revaluation do not change.*
> *1. The book value of the asset in the end of the third year is 4.000 thousand HUF, the occurring revaluation difference being (5.000 thousand – 4.000 thousand HUF =) 1.000 thousand HUF, which corrects the value of the asset, and increases the amount of revaluation reserve being a part of capital.*
> *2. The depreciation of the asset based on the revaluated value is 2.500 thousand HUF/year (residual value and useful lifespan do not change due to revaluation), which exceeds the amount of annual depreciation of the non-revaluated asset by 500 thousand HUF. Through the occurring difference – should no further value adjustment take place – the company can gradually eliminate revaluation reserve contrary to the increase in profit reserve in the following two years.*

[48] In original wording „the revaluation surplus included in equity in respect of an item of property, plant and equipment ***may be*** transferred directly to retained earnings …" (IAS 16 40.)

In case of the tracing back of revaluation reserve during the useful lifespan exactly the same amount is realized in the allocated result (the sum of periodical profit after taxation) as the surplus produced via depreciation and revaluation. In this case the sum withheld through depreciation within capital is equal to the annual amount of depreciation determined originally. However should the holder not transfer revaluation reserve during use, the result to be purchased is lower by the amount of depreciation accounted as surplus, the utilization of reserve within the enterprise is ensured, its amount can take part in capital maintenance to a greater extent during the remaining useful lifespan.

From the point of view of total effect on income there is no difference between recognition value evaluation and the two versions of the revaluation model, since the end sum of the result cannot be a function of the chosen accounting method; their difference lies within the allocation of the result between periods (its derivation can be seen in Annex 2b.). **The use of revaluation model gives a stronger effect to the capital maintenance function of depreciation, and** its further advantage is that **with its application the book value of the asset approaches its current (fair) value more**, than recognition value evaluation.

In the revaluation model the registration value of the asset has to be revised regularly, and if it is significantly different from the fair value to be determined for the accounting date, further value corrections have to be carried out.[49] The frequency of revaluation depends on the variability of the fair value of the tangible asset, should the value be volatile and its change be significant, it implies annual revaluation. (IAS 16 34.) If revaluation increases the value of the asset, then the increase appears in the revaluation reserve of capital, except for the case if earlier loss of value[50] was accounted for the asset, in this case the positive difference compensates the expenditure accounted during the revaluation of previous period(s) as income, its exceeding amount can appear as revaluation reserve. The same is true vice versa as well, if the book value of the asset decreases due to revaluation, downward value adjusment have to be accounted basically result efficiently. If revaluation reserve can be connected to the asset, the loss in value

[49] An important difference is that in case of the accounting of value adjustment the Hungarian Accounting Standard prescribes its annual revision, whose main reason is that revaluation difference does not constitute a part of the asset's value. From this point of view the standard is more consistent and with its provisions regarding the frequency of revaluation it supports the implementation of cost effective behaviour of holders.

[50] IAS identifies all not precalculated, downward value correction of assets with the concept of impairment loss. In case of tangible assets impairment loss covers exceptional depreciation as per the Hungarian terminology.

first of all corrects its amount, and appears among expenditures only to the exceeding extent.

Should revaluation not be recognized by the market (e.g. the sale of products produced by the asset becomes loss-making due to the cost increase accounted by revaluation), then we need to switch to net value calculated based on recognition value during the next evaluation (Kapásiné Dr. 2006).

The impairment loss of the asset's value can take place both during the recognition value and fair value evaluation. The general regulations governing impairment **loss in value** – among tangible assets for the ones basically not qualified as available for sale – are contained by Standard IAS 36 entitled Impairment of assets (the standard excludes certain special named assets from its scope), whose accounting **regulations are** also **different from Hungarian provisions**. Based on the standard the existence of the signals referring to loss of value (which can be originated from external or internal source, e.g. the change in market value or unfavourable events occurring in use) have to be examined regarding every accounting date. If a signal for loss of value exists, then the so-called impairment test has to be carried out, which means the determination of recovery value and its comparison to book value. **The recovery value to be examined** is the higher out of the ***value in use*** (the present value of the benefits expected from the asset in the long term) ***and the fair value decreased by sales costs***. If this latter exceeds the asset's value in use, then the holder would sell its asset immediately – in order to realize surplus –, and if the market evaluates its asset lower than its value in use, it obviously keeps it, this is the reason for the validation of the higher one out of the two values.

Fair value can be determined based on IAS 36 in a priority order:

- based on the price determined in the binding sales agreement related to the asset;
- in the lack of the former in case of an active market based on the current demand price or the prices of the most recent transactions;
- should the above conditions not prevail, then taking the prices of similar assets into consideration;
- should the higher priority previous methods have no result, then with the application of the discounted cash flow method.

The sales costs to be deducted from the fair value should reflect those general burdens of disposal, which would not incur in case of keeping the asset.

The ***value in use*** to be parallelly determined in every case could eventually be identified as a named case of one of fair value's determination methods, since it covers the present value of the cash flows expected to be generated by the asset, the factors to take into consideration during the determination of cash flow are presented by the standard in details (IAS 36 30-57.) – whose description I disregard here. However a fundamental difference between the result of DCF method applicable as part of fair value and value in use is that the former has to be determined assuming general market perception, so the it cannot take synergies typical of the enterprise into consideration, while the value in use – based on the best estimates of leadership – encourages the compliance with certain conditions characterising the holder. The accounted loss of value has to be readjusted if a change has occurred in the estimations used for the determination of return value (the apparent growth occurring related to the discounting of future yields for a shorter remaining life span cannot constitute a base for correction, since it is not originated from the adjustment of estimates). The maximum of readjustable impairment loss of value is the book value of the asset without the determination of impairment loss.

4.7. The common features of and most important differences between the Hungarian and IAS provisions of asset evaluation

In his work published in 1992 Iván Bélyácz confidently states that the capital value based on assumption and forecast as an ex ante, not verified phenomenon in accounting cannot be depreciated. However the observant Reader could realise that both the Hungarian accounting regulation and the international standard mention another – besides linear, degressive, performance proportional allowance not named – option for the distribution of depreciation among years. Based on this the annual depreciation allowance of the asset with a value systematically decreasing in the future could be theoretically determined as the difference between the early in the year and year-end amount market value (as fair value). This – if we assume the market value reflects the present value of the asset's future service values in the right way – is nothing else but the valuation approach of the accounting of depreciation detailed in Chapters 3.3.1. and 4.4. The application of the method has not become widespread in accounting practice, but the conclusion of the mentioned author is still not accurate nowadays due to the changes of accounting depreciation theory occurred in the last decade. It is still true that

accounting thinking usually – apart from some special situations – separates the asset's value from its possessor, its operator and for what purposes it is used in the activity, it is also indicated by the definition of its most recently published evaluation category – fair value – abstracting from synergies. However, fair value can be interpreted as a function of the asset's market perception and its estimated future cash flows, which provides an **obvious point of connection with the valuation approach**.

Domestic accounting provisions define the concept of fair value only regarding financial instruments and they imply value adjustment and exceptional depreciation for the market value, whose further single interpretation the legislator dispenses. International accounting standards approach asset evaluation in a much more extended, more detailed way and they make way for real evaluation regarding tangible assets, too. From the point of view of the thesis' topic **the most important difference** between the two systems **is that in the standard revaluation model the current, fair value of the asset becomes a starting point for the determination of depreciation.** According to IAS, indirect evaluation correction has to be applied for the accounting date – contrary to this, the Hungarian Accounting Standard prescribes the use of balance sheet market value. Cash flow based evaluation (to be traced back to service value) also appears during the determination of loss of value in standards, for which also detailed regulations apply. However regarding the asset evaluation provisions determined by the standards – besides recognizing their relevance – it has to be noted that the implementation of detailed rules in many cases can lead to complicated cases, it relates to subjective perception more, which many times is incorporated in the form of expert evaluation, thus increasing the expensiveness of the compilation of the report. The compilation of the less cost effective report in the optimal case has to coincide with the higher usefulness, relevance of the provided information; since the objective of the creators of standards is to provide more up-to-date, objectively produced information for the stakeholders emphasizing the principle of reality through the accounting information system.

According to the capital-related provisions of framework principles regulating the reporting system of IAS/IFRS the provisions of international financial reporting standards related to depreciation can be synchronized with capital concepts mentioned in the beginning of the thesis (physical and value/financial capital maintenance). The capital concept used for the compilation of a given holder's financial report always has to adapt to the needs, interests of those utilizing the report. According to Paragraph 4.65

of the framework principle the chosen concept related to capital maintenance (which from the financial point of view can have a nominal or real sense) determines the accounting model used for financial reporting together with the base for evaluation.

The Hungarian and international accounting provisions described above provide **opportunity** for the time series depreciation (the sum of economic depreciation and revaluation) and capital gain or loss incorporating the **components of change in asset value to appear in the documents of financial reporting**. Although reflecting change in market value is an obvious objective of reporting, the display of the factors of change in value in yield is not identified clearly in case of either frameworks with the asset's total change in value, moreover the fraction of total change in value to be assigned to the product of the business activity is not clearly laid down, either. In an indirect way we can conclude that according to the intention of regulators – in case of strive for capital maintenance – only the part remaining after the accounting of depreciation covering the total change in value for assets can be withdrawn from the revenues produced by durable assets through the distribution of profit (which principle applies according to the Hungarian accounting regulations only taking the rule of dividend barrier into consideration), and within ideal circumstances depreciation allowance has to get close enough to the sum determined this way.

5. ABOUT THE RELATION BETWEEN ASSET DEPRECIATION AND FINANCIAL LEASE

So far I have not included the financing source of capital good in the examinations. The source of the purchase of a tangible asset from outside the enterprise can be the monetary amount made available by the owners (excluding contribution in kind) or the creditors. The strive for the determination of the right amount of depreciation – resulting in an asset value nearest to market value – and its accounting against the interim result according to Chapters 2-3. is also well-grounded if the asset is financed from property resource (also including property lending). By introducing the Hungarian accounting and IAS/IFRS frameworks Chapter 4. underpins that from the side of accounting reporting the space and receptivity are given both locally and internationally to grasp depreciation in this way. Further features are added to these statements if the asset is financed from creditor's resource. In this case the funder also becomes directly interested in the capital maintenance of the enterprise operating the asset – taking out credit – and as a part of it in the determination of asset depreciation and its accounting, especially if the asset is financed in a closed structure.

Thus now I will proceed to the discussion of the relation between external financing and asset depreciation important in the strict sense from the point of view of my hypotheses.

5.1. The concept of asset based financing and the market significance of financial lease in Hungary

Should an asset be financed from an external resource, the amount of the gross operating surplus produced by it has to cover the funding cost (payable interest) and the depreciation of the asset (the capital repayment of the external resource involved in the operation); the owner can realize only the exceeding part of its revenues as profit, contrarily the preservation of its capital invested in the enterprise is not ensured. The spread of financing from an external source can be contributed to the dissimilar financial capital accumulation and the resource reallocation enabled by the development of financial world, and parallelly to the emergence of these two phenomena its role has become even more important in asset purchase.

A special form of asset purchase from external resource is **structured financing**, whose concept in Hungarian law can be approached by the concept of special lending exposure the most: special lending exposure is an exposure,

'a) which exists against the enterprise established for the financing and operation of the tangible asset,

b) in relation to which the credit institution owns significant control of the asset and the yield produced by it based on the contract and

c) the primary source for the repayment of whose liability is the yield produced by the financed asset.' (Government Regulation No 196/2007. 26. § (2))

A specific feature of structured financing is that the repayment source of the creditor's debit (the borrower's credit) are the revenues originated from the sales or operation of the asset, so the asset and the debit appearing in the creditor's books – from the point of view of the return of the latter – constitute a closed structure. Accordingly, from the side of the creditor the development in the asset's change in value (and the appearing yield producing ability) has to gain a significant role in the planning of its outstanding's value, duration and similarly to depreciation's approach based actual change in value credit return has to be steadied from the activity of the holder operating the asset and its business circumstances, features in the strict sense. The definition of structured financing contains numerous named constructions (e.g. factoring or project financing), whose common feature is that financing from the return point of view is based on the asset's yield producing ability and not the owner or operator's direct cash flow generating ability. Thus the funder tries to interprete the asset's creditworthiness and financeability by itself (Nádasdy et al. 2011). In my thesis within structured lending I put **asset based financing** (excluding debit financing and project financing as a non-continuous revenue generating construction during maturity) and within this leasing in the centre of the analysis.[51] The reason for limitation is that in Hungary leasing market is the nearest to the competitive circumstances mentioned in point 3.3.1. according to its width and depth from the point of view of the market of financial assets and credit

[51] The Hungarian Financial Supervisory Authority (PSZÁF) methodological guidelines interpreting the above quoted Government Regulation No 196/2007. also names asset financing as a type of special lending exposures. According to the Government Regulation '*asset financing* serves explicitly the financing of physical assets (e.g. ships, aeroplanes, locomotives or fleet), the primary source for repayment is the revenue generated by the lending of the given asset (rental charge or leasing charge)'. (Varga-Matusek et al. 2006, page 2.) Differentiating from this concept I use the concept of asset based financing, since based on the legal definition of special lending exposure asset financing exists against an enterprise established for the financing of tangible assets, while according to my wording this restriction cannot be connected to asset based financing.

market. Although from the point of view of the transaction's calculation the two basic types of leasing transactions (financial lease and operative leasing) do not show fundamental differences, from the two I only examine financial lease, since this form of outstanding shows further specific features from the point of view of rights and liabilities related to the asset and the operative leasing of rental feature has completely different contractual, financing, risk characteristics than financial lease. From now on I accordingly mean only financial lease under the concept of leasing, but I disregard its special versions (e.g. sale and lease-back, sublease, vendor leasing etc.).

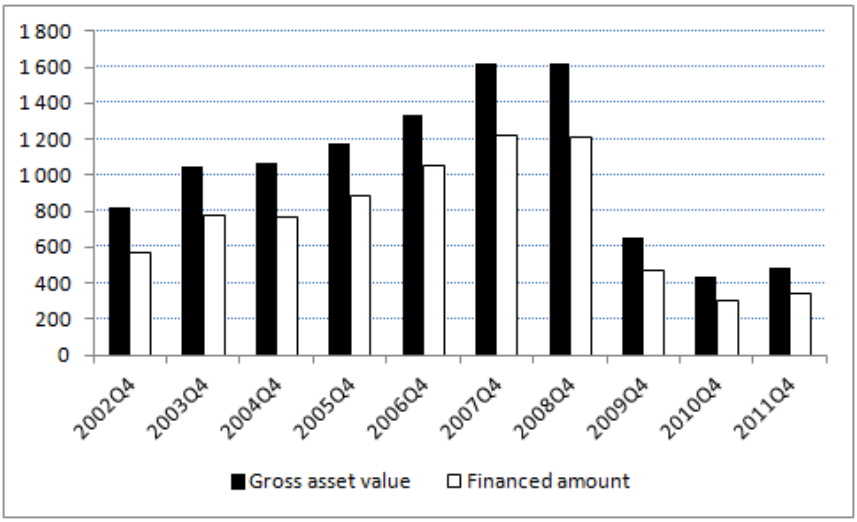

Figure 8. – The development of new outstandings of leasing companies in Hungary – billion HUF (self made figure)[52]

The **Hungarian leasing market outstandings** started to rise dynamically after the millennium – considering the stock of the end of last year as base with an annual average of 15%, the rate of which similarly to the complete lending sector was slowed down by the financial crisis after 2008. Before the downfall the value of assets beyond leasing transactions from the given year reached 1.600 billion HUF per year, besides the cover of which asset stock new payment of 1.200 billion HUF appeared on the market in 2007 and 2008.

Before the financial crisis the **credit market share** of enterprises active in the leasing financing branch was developing the following way: the debits to be found in the balance sheet of leasing companies amounted to 70% of the financing provided by

[52] The figures and tables to be found in the chapter – in the lack of naming a different source – were put together based on the data published by the Hungarian Leasing Association (www.lizingszovetseg.hu) and include all forms of financing offered by financial lease companies (financial lease and lending of credit and monetary loan).

all financial enterprises, while within the book value of all outstandings of credit institutions and leasing associations their proportion is 9% (based on the data of Hungarian Financial Supervisory Authority PSZÁF Golden Book 2008).[53]

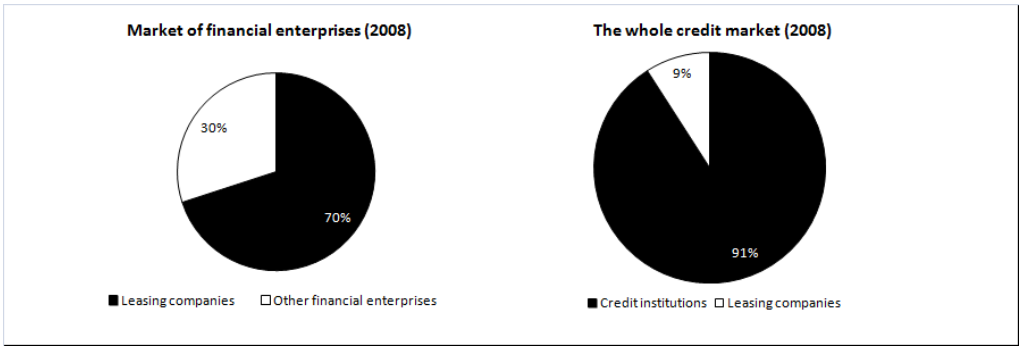

Figure 9. – The market position of financial lease companies

(self made figure, source: Hungarian Financial Supervisory Authority PSZÁF Golden Book 2008)

From the point of view of **product level segmentation** the leasing market is dominated by the financing of motor vehicles (cars, small commercial vehicles and trucks), within the complete product portfolio the percentage of this segment has represented continuously around 70% since 2002.

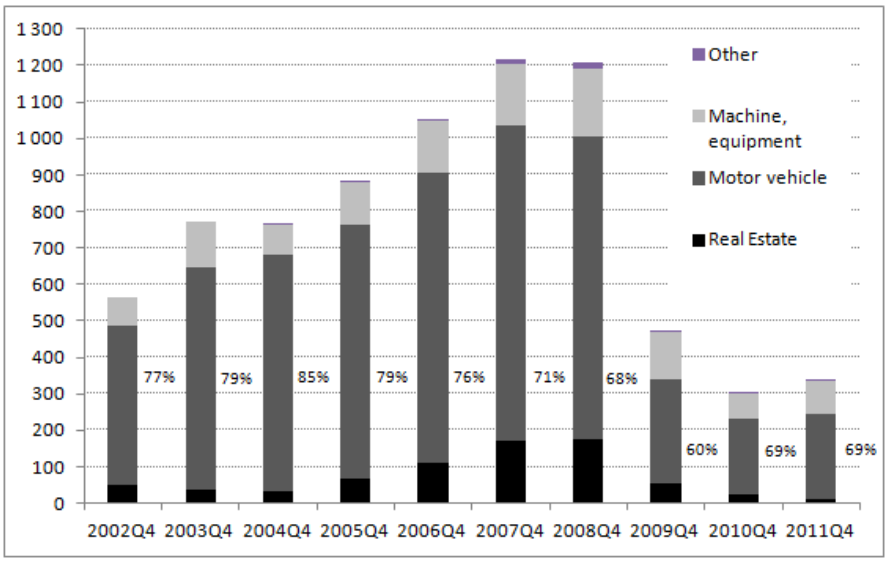

Figure 10. – The distribution of new outstandings of leasing companies according to products – billion HUF (self made figure)

Parallelly to the dynamic expansion lasting until 2008 two remarkable tendencies appeared in financial lease financing. On one hand the continuous **growth** of **financing**

[53] The shown percentages are to be understood based on the data including all forms of financing provided by leasing companies (lending financial lease and credit and monetary loan).

shares (financed amount/gross asset value – in other words loan to value (LTV)), on the other hand the spread of transactions denominated on currency base became typical. The average LTV amounts to around 70-71% on the leasing market of motor vehicles in the long term (between 2002 and 2011), the exceeding average annual LTVs of the years after 2005 presume the change in the risk hunger of leasing funders.

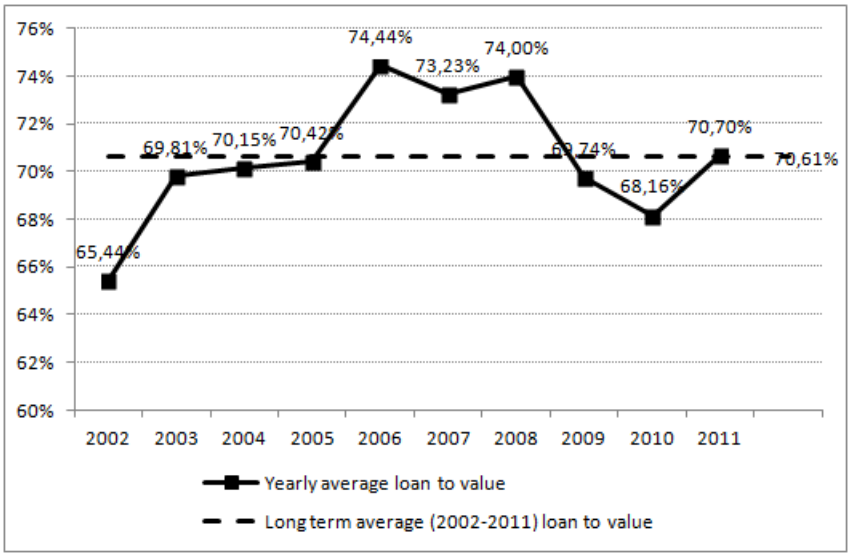

Figure 11. – The average financing shares of motor vehicles (self made table)

Unfortunately no public information is available to demonstrate the development of foreign exchange breakdown in time, but based on the data of Hungarian Leasing Association in 2011 55% of the total outstandings of market actors is denominated on CHF, 30% on EUR and 14% on HUF base. This ratio shifts even further to the direction of CHF financing in case of motor vehicles. The advantage and at the same time the reason for the spread of **currency based financing** is that the interest level connected to the transaction is determined based on the reference interest rate bound to the basic currency (e.g. EURIBOR, CHF LIBOR), the rate of which has proved to be significantly more favourable compared to HUF interests. However a specific and unfavourable feature of currency based financing from the risk point of view is that in Hungary most of the exposures denominated in a currency other than HUF (EUR, CHF) are really accompanied by HUF cash flow based on the contracts. All this means that although the repayment liability is determined in currency, the amount of alltime payment is influenced by the HUF exchange rate, in case of significant HUF deterioration resulting in increasing payment liability.

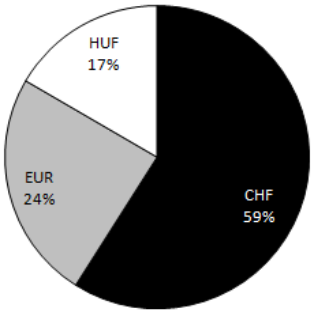

Figure 12. – The currency breakdown of motor vehicle leasing market capital exposures – 2011Q4 (self made figure)

Returning to Figure 11., in the background of the change in financing behaviour on one hand the increasing resource need (hunger) of economic actors, on the other hand the saturation of credit market (increase in competition) could be observed. The financial crisis reaching Europe in Q3 of 2008 did not leave the activity of leasing funders untouched, either, as it can be also observed in the figures shown before. This phenomenon is also underpinned by the development of the amount of agreements concluded, which has been continuously decreasing since 2008. The **increase in the underwriting willingness of leasing companies** and the portfolio of worse risk composition born would have likely led to market hesitation even without the occurrance of the financial crisis.

Number of transactions	31.12. 2008.	31.12. 2009.	31.12.2010.	30. 06. 2011.
New transactions	317.057	117.560	80.531	38.209
Closed contracts	#N/A	103.253	155.350	110.569
Closing stock of transaction	808.060	822.367	747.548	675.188
Change in number of transactions	317.057	14.307	-74.819	-72.360

Table 7. – The development in the number of financial lease transactions ((Gulyás, Veres 2011) p. 3.)

There is no method to demonstrate the tendencies independently from the financial crisis, but the problematic feature of the transaction stock is shown by the fact that the ratio of unproblematic (not terminated and not restructured) contracts decreased to 58% in the leasing market in 2011 compared to the 72% from 2006, while the produced net depreciation (depreciation and value readjustment together) increased to six times the level from 2005 (Gulyás, Veres 2011).

5.2. The specific features of financial lease and its relation to the valuation approach of depreciation

Leasing according to the Hungarian civil law in force is a not named contract and transaction type (its enumeration is planned during the recodification of the Civil Code ongoing parallelly with the writing of this dissertation). From the legal point of view it has been carrying its heterogenous features since its birth, since according to its economic content the features of various transactions (sale, rent, installment payment, lease) can be observed in leasing financing. According to the classical interpretation it is such a type of transaction, **special 'rent'**, during which the lessor buys the asset chosen by the lessee with the aim that against paying the charge it lets the lessee use the asset during the given period. The point is that the ownership, **right of use** and **property right** of the purchased asset are separated from each other during the maturity of the transaction (more precisely doubled), but the lessee has the opportunity to also become the legal owner of the subject of the leasing after its maturity, under certain conditions.

The historical precedings of the development of leasing

After World War II thousands of assets developed for military purposes, but also suitable for civil use were waiting for utilization.The first contracts uniting the conditions for rent, credit and sale were born because of the general lack of capital accompanying this period. The special financing construction was originally invented mostly for those veterans, who wanted to establish an enterprise choosing from the assets of big firms downsizing military capacitiesfor its start-up, but had no capital, could not get bank credit. Leases proved to be favourable for both the factories and enterprises, with its help the former could downsize their machinery that became redundant, the latter could get assets necessary for the start-up of their enterprises. The substantial feature of the transaction was that the rental charge was paid from the profit gained from the operation of the asset and that the lessee became the owner of the asset only if he paid its price in installments. Thus the enterpreneurs could also get wealth, with the help of which they could lay the foundations for the long term success of their enterprises. The new type of financing construction as the forerunner of modern day leasing quickly became popular and rooted in American economy. It appeared and started to spread in Europe in the 60's and by the 70's its application became widespread in European economic practice, too. This form of financing appeared in Hungary in the first years of transition, the transformation into market economy, as a form of financing promoting privatisation, the establishment of entrepreneurial sphere, reducing the lack of capital, and its quick development is characterized by the fact that nowadays on the national economic level significant ratio of investments is financed by leasing. (Ziegler 2001, B. Varga 1997)

The Hungarian legislator defines financial lease in the Hungarian Accounting Standard and the Credit Institution Law. The definition of the **Hungarian Accounting**

Standard is the following: financial lease ’is based on a contract according to which the lessor gives the asset purchased according to the needs of the lessee and being a property of the lessor to the lessee for use and possession against lease payment, for the period determined in the contract. All costs and risks resulting from the use are borne by the lessee, the lessee has the right to gain benefits, in the end of the contractual period the lessee or the assigned party gets (or can get) the property right of the leased asset, either by paying the residual value or without that, and the lessee has a right of pre-emption, but the lessee can forgo these rights before the termination of the contract.’ (Act C of 2000, paragraph 3. § (8), point 13.)

The wording is included in **Credit Institution Law** (shortly Cil.), while financial lease – as a basic type of asset based lending – is qualified as financial service and accordingly it can only be provided on a professional basis by a financial institution (credit institution or financial enterprise). The Cil. Gives a much more detailed definition requiring the existence of stricter conditions, thus it is also relevant in practice. According to the law ’financial lease is the activity during which the lessor gains the property right of an estate or a movable thing and rights representing assets according to the assignment of the lessee for the purpose that he permits the lessee use it for a definite time in a way that it will be detected in the books of the lessee. Through the permission for use the lessee

a) bears the risk occurring from the transfer of exposure,
b) gets the right for gaining benefits
c) bears the direct burdens (including maintenance and depreciational costs, too)
d) can gain the right to get a property right of the thing for himself or the proposed person after the period fixed in the contract by paying the total capital payment and interest payment part of the lease payment and the residual value fixed in the contract. Should the lessee not exercise this right, then the leased object gets back to the lessor’s possession and books. The parties provide for the capital part of the lease payment in the contract – which is equal to the contractual price of the leased asset, property right –, its interest part and the scheduling of its repayment.’ (Act CXII of 1996., Annex 2. point 11.)

Within financial lease two further subversions can be differentiated in professional practice. In case of closed-end financial lease it is decided already in the beginning of the maturity that the lessee gains the property right of the leased object

automatically after paying the last installment or the residual value,[54] in case of the open-end one the lessee can decide in the end of maturity whether he gets the property right on its residual value or not. The separation besides the provision of property right constitutes the base for the differentiation of the two types of financial lease from the value added tax (shortly VAT) point of view. The VAT law (Act CXXVII. of 2007) in its 9. § (1) paragraph defines the leasing of the possessible thing in exchange for price as product sale, which entitles the recipient to act as owner, and in paragraph 10. § a) mentions such rental contracts as qualified cases of product sale, where the certain acquisition of ownership realized by the lessee after the end of maturation is already regulated when signing the contract (according to this closed-end financial lease is qualified as product sale). Such transactions based on leasing contracts where the parties do not provide for the certain acquisition of ownership of the lessee (thus operative leasing and opend-end financial lease) belong to the category of service provision, because according to the law every activity performed in return for price which does not qualify as product sale – thus regarding which the certain acquisition was not regulated –, is service provision (paragraph 13. § (1)). The date of incurrance of tax liability according to the VAT law in case of product sale – closed-end financial lease – is the day of the asset's transfering of ownership, and should the intention of lessee for the acquisition of ownership not be obvious when signing the contract, because the contract contains only option to purchase or option to designate the buyer – so the other basic type of financial lease, open-end construction is present –, then based on the VAT law VAT payment liability incurs according to the feature of the service only in case of the maturity of individual payments (lease payments) (58. § (1)).

Value added tax has to be paid after the capital part independently from the closed or open endedness of the construction, the interest charged – as the price of financial service – considering the other specific feature of the activity is tax-free.

[54] In case of closed-end financial lease should a highlighted, higher lease payment exist in the end of maturity, then instead of close-end financial lease the leasing profession uses the expression 'balloon financing'.

NAMING	Financial lease	
	Closed-end	Open-end
Activity	product sale	service provision (rent)
Date of tax payment liability	date of transfering of ownership	maturity of individual subpayments (lease payments)
Base of tax to pay	total capital part	capital part of individual lease payments
	(the interest is exempt from tax)	

Table 8. – The special VAT regulations of financial lease
(source: (Veres, Gulyás 2008) p. 155.)

In the thesis I disregard the differentiation between financial lease transactions (closed-end vs. open-end), which can be justified from two sides. On one hand no difference can be made between the two subtypes from the point of view of the development of their financial construction: in the financial sense their calculation from the point of view of the lessor is carried out the same way based on the net (without VAT) asset price[55] decreased by the initial installment – so-called downpayment –, considering the same financial parameters (downpayment, maturity, interest rate, residual value), and in the accounting sense their accounting takes place the same way disregarding the VAT dimension. On the other hand VAT financed transactions – although with the passing of time appeared on the leasing market in smaller numbers – do not fall within the scope of empirical examination, since they have such different risk features, which make their exclusion reasonable.

Hungarian legal definitions identify financial lease according to the features of the contract and the transaction, and they do not highlight the contextual element of the construction pointing out its essence: according to the transaction the lessee has the opportunity to realize all benefits arising from the operation of the asset.[56] **Standard IAS 17** about the regulation of leasing assumes the complete transfer of risks and benefits to the lessee, thus considers the transaction financial lease, if any of the following criteria is fulfilled (IAS 17 10-11):

[55] Disregarding cars, in case of which the base of calculation – and financing – is the gross value of the asset, since the amount of value added tax connected to their purchase is not reclaimable from the budget based on the VAT law.

[56] Government Regulation 202 of 2003 published in the end of 2003 fostered the process of accounting standard setting in Hungary, too, in the framework of which Hungarian Accounting Standards Board started the development of Leasing standard among the first. The conception of the standard published in 2006 – on the draft level – tried to approach the regulation of leasing to the international accounting provisions, however unfortunately its further development has been stopped in the following years.

- in the end of maturity property right is transfered to the lessee,
- leasing includes a reduced call option and the lessee is very likely to exercise the option,
- the maturity of the leasing includes the biggest part of the economical lifespan of the leased asset,
- on entering the leasing transaction the present value of the minimum lease payments is greater than or equal to the real market value of the leased object,
- the leased object is such a special asset, which can be used only by the lessee without significant amendment,
- the losses incurring at the lessor in case of the termination of the transaction on behalf of the lessee are borne by the lessee,
- the profit or loss incurring from the fluctuation of the residual value's market value are also borne by the lessee,
- the lessee can prolong the maturity of the transaction against a lease payment much more favourable then market charge for a complimentary period.

From the features, the standard qualifies the first five as arbitral, while the last three can be considered as weaker criteria, these rather only presume financial lease. Without getting into details, I would like to mention that the reformation of IAS is taking place exactly nowadays. It is carried out because the presently effective version does not necessarily paint a real picture in connection with the separation of operative and financial lease (everything that does not match the above listed criteria is operative leasing), since it provides the opportunity for the accounting of economically similar transactions in a different way and thus their accounting effect can take a better shape for holders in financial reports.[57]

'From the point of view of the financing institution **financial lease constitutes a special form of credit**, within the framework of which the lessor also contributes to the purchase of the financed asset to a certain extent, he gains its property right, but realizes benefit not directly from handing over the asset to the lessee as sale – similarly to credit, he achieves it from fees and interests received during maturation.' ((Veres, Gulyás 2008) p. 154.) The lessor plans the scheduling of repayment, the so-called lease payment **calculation** usually with annuity duration, according to which the lessee pays a

[57] The public draft introducing the first version of the new regulatory framework was published in August 2010, whose second version restructured according to the received opinions is promised by the standard setter IASB (International Accounting Standard Board) for Q1 of 2013 (in the end of 2012).

fix amount – lease payment – determined in the transaction's currency with a given frequency, whose capital part represents an increasing, while its interest part a decreasing subratio with the progression of maturity (it is demonstrated by Figure 13. through the example of a 5 year maturity transaction, assuming the financing of an asset of recognition value 100 besides an annual interest rate of 20% and annual repayment).

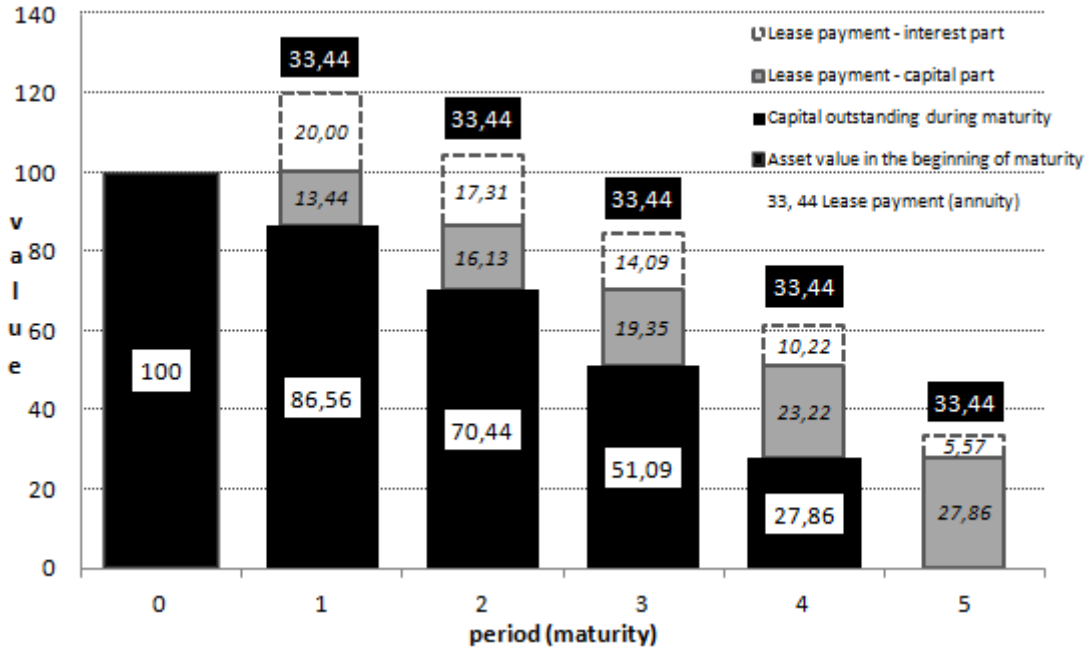

Figure 13. – Calculation of leasing transactions
(self constructed figure)

Regarding the **accounting** of leasing transactions, in connection with its contextual dimension, the right for realization of benefits it is important to highlight that (as the definition of Cil. also sets out) the asset is detected by the lessee in his books, according to which he specifies and accounts its depreciation, too. The essence of the transaction is the duplication of the property right connected to the asset and the right for use/benefit realization – contrary to the interpretation also often readable in literature, which refers to the separation of the two rights. Within the frameworks of the leasing transaction the lessor maintains the asset's property right as a special cover often constituting only one element of the transaction's collateral background.[58] Thinking within economic frameworks the return on capital of two economic actors depends on

[58] The collateral background applied by the leasing funders besides the asset's property right usually includes only regulations related to comfort factors e.g. turnover channelling to the financial institute belonging to the interest sphere of the leasing company, recovery right to the cash flow account of the lessee.

the operation of the asset – collateral – by the lessee: from the gross operating surplus achieved by the operation of the asset the lessee wishes to provide cover for the replacement of the asset (the payment of outstanding during the maturity of financing) through the accounting of the appearing depreciation allowance, from the debit related to the yield gained from the operation of the asset (gross operating surplus)[59] and recovered for him by the lessee – the lessor wishes to finance further outstandings.

According to the valuation approach of depreciation for the sake of capital maintenance the depreciation allowance resulting in an asset value following the asset's change in market value has to be displayed in accounting result. If the asset's market is efficient, then the change in market prices from one date to the other prices the asset's yield producing ability. From this in the result constituting the base for yield allocation only that amount has to be displayed, which is available after the accounting of depreciation allowance enabling the maintenance of capital (see previous deductions in Chapter 3.3.1 and Table 10. constructed based on Formula (7)).

Period (s)	Discount factor (r=0,2)	CF ($=u_s=b_s$)	P_s					Depre-ciation ($P_{s-1}-P_s$)	Alternative cost (interest, $P_{s-1}*r$)
			PV(CF)1	PV(CF)2	PV(CF)3	PV(CF)4	PV(CF)5		
1	0,8333	33,44	27,86					13,44	20,00
2	0,6944	33,44	23,22	27,86				16,13	17,31
3	0,5787	33,44	19,35	23,22	27,86			19,35	14,09
4	0,4823	33,44	16,13	19,35	23,22	27,86		23,22	10,22
5	0,4019	33,44	13,44	16,13	19,35	23,22	27,86	27,86	5,57
Capital debt=Market (book) value of the asset			**100,00**	**86,56**	**70,44**	**51,09**	**27,86**	100,00	-

Table 9. – Asset value duration within a valuation framework (self made table)

Should financial lease be qualified as asset based financing, then the yields produced by the asset – during its continuous operation – constitute the repayment base for the debit of the financing lease company, independently from the ability and willingness of the economic actor – as the operator of the asset – to pay. If we accept that the given asset's yield producing ability is reflected in the change in market prices between the beginning and end of the given period, then the lease payments constructed by the lessor during the calculation have to adapt to the asset's planned change in market value, i.e. time series depreciation. Its consequence is that the capital debt of the funder (lessor) based

[59] In this chapter I use the concept of yield as a synonym for gross operating surplus defined in Chapter 3.3.1.

on return on asset – i.e. the capital calculation of the leasing transaction – has to follow the asset's market value duration (time series depreciation) during the complete period of maturity, for which the planned change in market prices on an efficient market – in case of the exclusion of disembodied technological development as a circumstance – for leasing companies is empirically given. The restriction for the property right of the leased object as collateral provides a further reason for match on behalf of the lessor.

Should this logical connection prevail, then the **depreciation** of the **leased asset** to be presented in the lessee's books **can be expressed as a function of the development of the capital debt planned** by the lessor (i.e. the capital calculation of leasing transaction).

Table 10. also underpins numerically that in case of a transactional interest rate equal to the alternative cost, and if the lessor establishes the leasing transaction according to the actual asset based financing construction, then with the help of the calculation of the leasing transaction illustrated by Figure 13. the time series depreciation of the asset presented in the framework of the valuation approach could be expressed at the lessee.

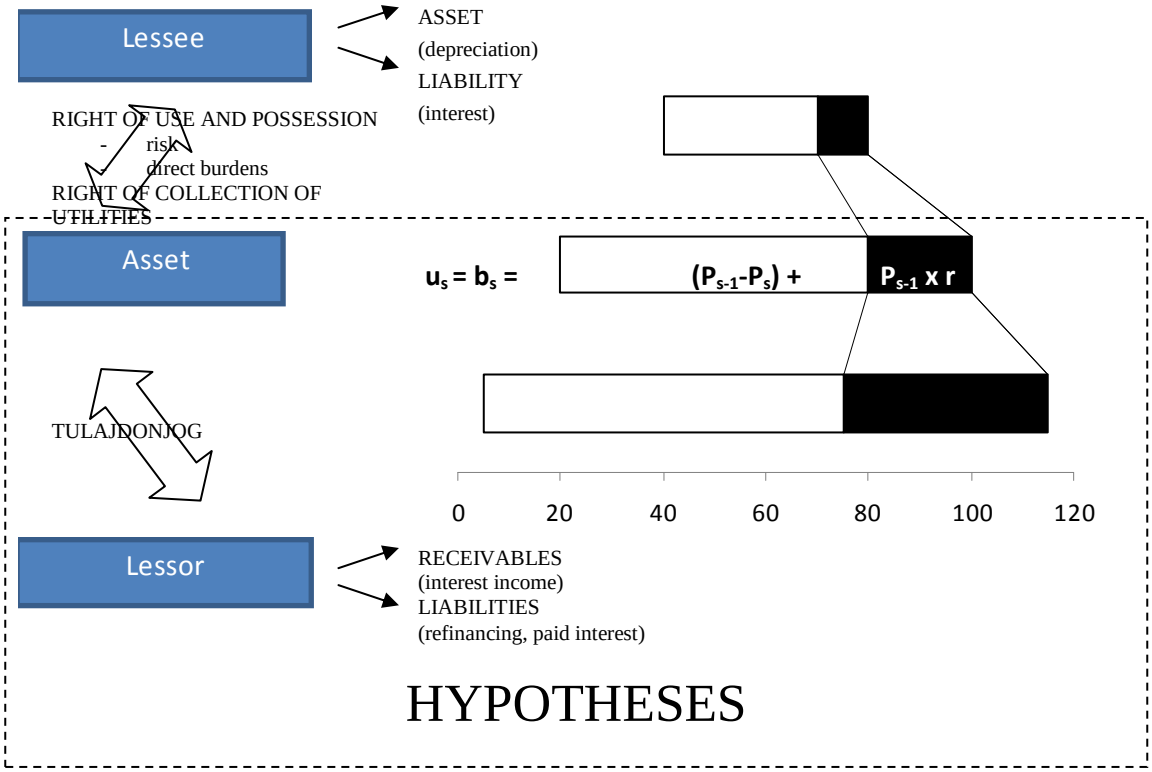

Figure 14. – The connection between the valuation approach of asset evaluation (depreciation) and leasing financing
(self made figure)

The financial-accounting aspects of the lessee and the lessor thus coincide besides the transaction, the interest of both of them is to align the value development of the asset appearing in their books (which in case of the lessor is the debit) to the leased object's market value development, according to the depreciation theory their long term operation and maintaining capital intact is only ensured in this case. The question is that compared to the rate of the theoretical periodical service value (b_s) also appearing in Figure 14. and reflected on a theoretical plane and the equivalent user cost (u_s)

- which amount of yield the lessor is able to produce with the asset → thus what is its actual asset based liability fulfilling ability and
- what return on debit the lessor expects.

From the two relations through the empirical examinations of the thesis – as it is also visible on Figure 14. – I focus on the second. In case of healthy risk appetite the lessor strives to keep the rate of its outstandings under the asset's market value, the primary reason for which is the collateral feature of the leased object. On one hand the market price of the asset continuously moves up and down around an equilibrium value, its mobilization has risks, and if the take-back of the asset happens within the frames of validation as collateral, then the income occurring from the liquidation of the collateral should not only cover the capital (and other transactional) liability, but also other costs (e.g. the costs of recovery). This is achieved by specifying an initial installment to be paid by the lessee in the beginning of the maturity of the leasing transaction (downpayment or excess), which

- is proportional to the depreciation of the leased object in the first period
- and ensures the return on the leased object as collateral during the complete maturity.

By stating that the outstanding of the funder (lessor) based on the return on asset – the calculation of the leasing transaction – has to follow the asset's market value development during the complete period of maturity I mean that the two functions (outstanding of leasing transaction during maturation and market value of the leased object) change in the same ratio from period to period (see Figure 15.).

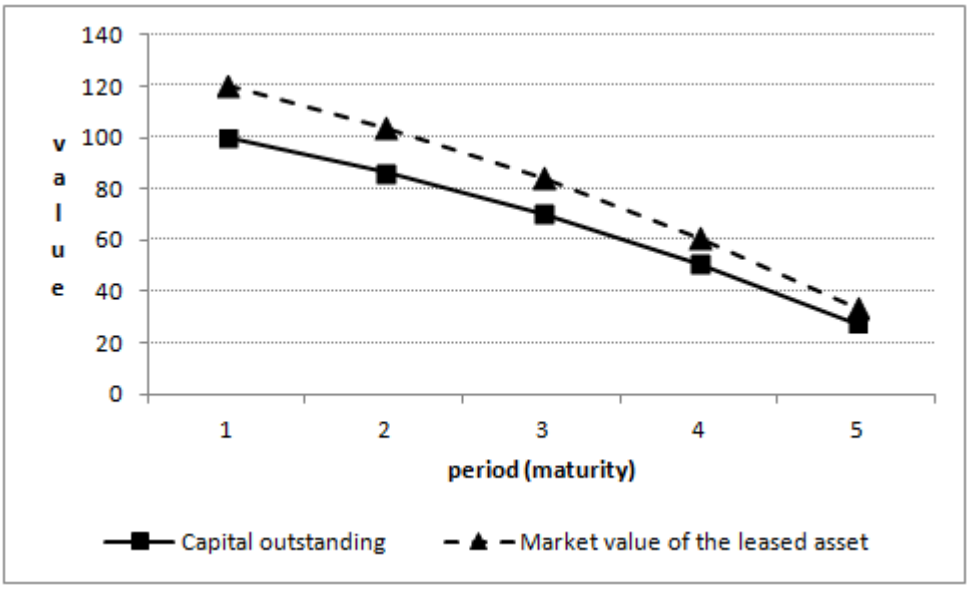

Figure 15. – The relation between the outstanding of the leasing transaction and the market value of the leased object
(self-made figure)

Besides downpayment there are two key factors influencing the relation of the two curves to each other: on one hand the maturity of the transaction, on the other hand the capital debt existing in the end of the transaction's maturity, the amount of so-called residual value. The specification of the transaction's maturity can take place knowing the useful lifespan of the leased object and maturity cannot exceed the asset's useful lifespan, while the residual value in the end of maturity cannot be higher than the market value of the asset estimated by the end of maturity. Should the specification of the three factors – downpayment, maturity, residual value – adapt to their rate shaping the asset's change in market value, then the asset and the yield produced by the asset provide a secure source of return for the debits of the lessor. However should these three factors part from the rates applicable on the asset's market due to an increase in the risk appetite of the lessor, then the leasing construction is not qualified as asset based financing and the return is only ensured if the lessor provides transactions for lessees of good credit rating.

6. THE FOUNDATIONS OF THE FUNCTIONS OF THE RESEARCH AND HYPOTHESES

6.1. An overview of the assumptions, theses constituting the base for the empirical research

In the books of the lessor, according to the calculation of the transaction the percentage of the asset's recognition value financed by him and not paid by the lessee appears as lease receivable.[60] Regarding the empirical examinations of the dissertation I consider as a thesis that **financial lease is classified as asset based financing** and the asset with efficient market is capable of producing the gross operating surplus observable in its change in market price in a given period, independently from its operator. According to the former, the source of return for the lessor's debit is the asset and the gross operating surplus produced by it and the lessor ensures the right of use by preserving the asset's property right based on the contract during the transaction's maturity.

As per the definition of the Credit Institutions Law, the accounting registration of the financially leased asset takes place at the lessee, based on the fact that the right of collection of proceeds originating from the asset and the risk and the burden-sharing obligation of the costs belong to him. According to this **the depreciation of the leased object** – as a cost linked to the possessing and utilization of the asset – also **has to be accounted by the lessee** during the transaction's maturity. The lessee has a freedom of choice regarding the depreciation methodologies and processes applied by him within the framework provided by accounting regulations. In Chapter 4. I presented – and in connection with the hypotheses of the research I rely on it as a thesis – that the effective Hungarian and international (IFRS) provisions are striving to establish the conditions for depreciation's specification and accounting, which lead to a book value well approaching the market value of the given asset. The leased object produces gross operating surplus for the lessee, but since the asset is financed from external source, the

[60] According to the Government Regulation on the accounting features of leasing enterprises – as financial institutions (Gov. Reg. 250/2000. (XII. 24.)) within the framework of the leasing transaction the 'amount invoiced' towards the lessee in the beginning of maturity related to the asset seen as leased object 'does not include the amount of interest rate accounted for the debit related to financial lease' (Gov. Reg. 250/2000. 5.§ (5) h)). The interest rate connected to the capital outstanding will be displayed in the books of the lessor as a sum determined by calculation connected to the individual lease payments as short maturity debit and is in no form part of the capital outstanding of long maturity related to the transaction.

percentage of operating surplus produced by the asset exceeding depreciation belongs to the lessor as revenue also accounted in yield, corresponding to the sum of the LTV provided by him and not paid by the lessee, to an extent calculated by the transactional interest rate. (To demonstrate this in a simplified way see the content of Table 16. made for the simplified accounting mapping of the previous example – also constituting a base for Figure 13., Table 10.)

LESSEE

Assets						Liablilities
	Tangible asset	0)	100	Equity (result)	1)	33,44
		2)	-13,44		2)	-13,44
					3b)	-20
Balance			86,56			0
	Money	1)	33,44	Liability	0)	100
		3a)	-13,44		3a)	-13,44
		3b)	-20			
Balance			0			86,56

LESSOR

Assets						Liabilities
	Debit	0)	100	Equity (result)	0)	100
		3a)	-13,44		3b)	20
Balance			86,56			120
	Money	3a)	13,44			
		3b)	20			
Balance			33,44			

0) Purchase and leasing of the asset
1) Realization of revenue achieved by the asset's operation
2) Accounting of the asset's depreciation
3) Fulfilling leasing liability connected to the asset (a) capital, b) interest)

Figure 16. – Schematic visualisation of the leasing transaction in the books of the lessee and the lessor
(self constructed)

Should the lessee withdraw a yield higher than the one incurring by considering the depreciation originating from the use and revaluation of the asset from the gross operating surplus achieved by its operation (account lower depreciation allowance), then the preservation of its capital invested in the asset is not ensured for him. In Chapter 3. detailing the valuation approach of depreciation I was striving for describing **why the accounting of depreciation mapping the actual change in value was significant**. During the wording of the hypotheses I assume that the decrease or 'depreciation' of the principal receivable appearing in the books of the lessor observable

in the planned transaction calculation has to (should) adapt to this change in value from the same consideration (capital maintenance), during the determination of which the lessor is able to consider all factors presented in equation (13) due to the market knowledge of the lessor, which have an effect on the economic depreciation and revaluation of the asset and appear in the market prices of the asset. Should we approach lease payment from the user cost perspective described in the theoretical introduction, then we can conclude that **in the books of the lessor** the sum of the existing principal receivable – and the return realized in the following period – **has to adapt to the development of the asset's change in market value**. This logical derivation also matches the essence of asset based financing well, according to which on a theoretical plane the value of the asset always has to provide cover for the claim originating from the financing of the asset, so the tracking of the asset value's depreciation is of fundamental interest and utmost significance for the lessor from this point of view, too. And should the lessor want to realize a revenue from the rental on a level above the yield provided by the asset's change in market value, that can potentially result in a loss of capital reflected on him – strictly operating within the framework of asset based financing.

Should the existence of the above described triple connection

- according to which financial lease can be considered as asset based financing,
- the capital and valuation approach of the determination of depreciation is to be followed from the point of view of capital maintenance and
- accounting regulation is striving for carrying out depreciation allowance leading towards a book value reflecting market value

be also observable in practice, then the calculation of the leasing transaction related to the principal receivable could be fundamental for the lessee's determination of the amount of depreciation allowance – matching the valuation framework of depreciation.

However, in the lack of the previous connections the lessee can only fulfill its liabilities connected to the asset involved in financial lease towards the lessor, if

- he uses the asset with such an intensity that it is able to produce the gross operating surplus corresponding to the rate of the rentals or
- its creditworthiness (cash-flow producing ability) is excellent independently from the operation of the asset, too.

However, the increasing competition characterising the years before the unfolding of the financial crisis did not leave the supply side of financial lease branch untouched, either. Responding to the saturation of the market, leasing companies served their clients with transactions developed in a less and less risk conscious way. Financing structure became more risky not only because of a switch towards foreign exchange based deals, but disregarding this, also based on its relation to the change in the underlying asset's value. In addition, the increase in the risk appetite corresponding to the asset's value can become extremely favourable in case of constructions as financial lease, where the leased object itself is the only collateral of the funder beyond the transaction.

6.2. Wording of the hypotheses

The previous line of thoughts serves as a base for the wording of the research and the hypotheses, which approaching from the point of view of the lessor first focus on the examination of the asset value function (time series depreciation) and the exposure planned to finance according to the calculation of the leasing transaction. The first part of the **hypotheses** is built upon **the connection between** the mentioned market **asset value and the planned capital value function**, which is completed by further assumptions pointing towards the direction of their **relation's consequences**.

H1: The capital value function planned according to the calculation of leasing transactions is in connection with the time series depreciation of the leased object determined by market prices.

During the examination of the **first hypothesis** I expect the connection to exist, but its closeness changes in time and – presumably in sync with the description of Figure 11. – such a period can be assumed, before/after which the capital value based on the calculation and the asset value function flow together more/less. The second and third hypotheses are pointed towards the examination of this.

H2: A date (period) can be identified, from which on a change can be observed in the capital value function of leasing transactions based on calculation.

H3: The change in capital value function takes place without a significant amendment in the function describing the time series depreciation of the leased object.

In connection to the **second and third** hypotheses I assume that the features influencing the shape of the capital value function do not change in a way mapping the asset value development observable on the market, but as a consequence of the increase in financing appetite. Financial lease inclines towards this direction if during the development of their planned principal receivable leasing companies take the asset's individual gross operating surplus producing ability and the collateral feature of the leased object less and less into consideration, so their financing practice starts to become aggressive.

As an analogy for what was said in connection with depreciation theory, in this case the sustainability of constant yield flow projected on the asset value is hurt from the point of view of leasing funders, which means that the leased object by itself will not be able to produce such a gross operating surplus, from which the lease payment could be paid; so the leasing transaction will not be loss-making if the client is able to realize enough cash flow from another source independently from the operation of the asset or uses the asset more intensively and depreciates it as a consequence. The fourth and fifth hypotheses of the dissertation expand empirical examinations from this aspect.

H4: The well and less well performing transactions can be separated from each other through the difference of factors influencing the capital value function.

With the **fourth hypothesis** my objective is to underpin empirically that the parameters to be influenced by the lessor considered during the establishment of the financing construction are connected to the transaction's repayment risk. Based on the fourth hypothesis I expect that in case of transactions where the difference between the factors determining the shapes of the two functions is small, there will be fewer problematic transactions, where it is bigger, there will be more problematic transactions; which leads us to the next hypothesis.

H5: Such capital value function influencing factor combinations can be identified, which independently from the clients' ability to pay can effect the performance of transactions.

In connection with the **last hypothesis** I examine those transactions further, the creditworthiness of the clients beyond which is homogenous and can be considered stable. I expect that the transactions can be separated into better and less good quality ones as a function of the more important parameters of the leasing transaction, independently from the clients' ability to pay. The consequence will be that during reaching the asset based financing decision the parameters of the transaction to be determined by the lessor (downpayment, maturity, residual value) will play a significant role, so in the context of the leasing it is important how the lessor takes the assets' firm-independent profitability into consideration during the establishment of its financing practice.

7. VERIFICATION OF THE HYPOTHESES

I examine the hypotheses defined in the dissertation through the mathematical-statistical analysis of a **database** including leasing transactions and the value process of the assets financed within their framework with the help of the IBM SPSS Statistics 18.0 program. During the analysis fundamentally the observational units are transactions and asset values, which in a certain case I examine indirectly, with the help of different analysis units.

The transactions are originated from a **financial lease** contract, from the point of view of data analysis – due to the same calculational methodology – open-end and closed-end contructions are seen on an equivalent level of concern, and because of the same reason no preliminary differentiation is reasonable between transactions with private persons or holders of legal entities. From the accounting point of view the bases of the calculation of transactional exposure – capital value function – are constituted by Hungarian regulation, the reason for which is that although most funders compile their reports according to the international accounting standards at least for internal use, they do it with a logic operated on the aggregated level and not based on records realized on transactional level, or if yes then only in a way leading to a result only approaching the prescriptions. The analysis focuses on the aspects of depreciation related to asset value and yield (capital maintenance), I ignore the corporate taxation aspects mentioned in the theoretical introduction, since that gains importance from the point of view of the lessee. Since in relation to the hypotheses depreciation is interpreted only based on the change in the assets' market value, it is necessary to concentrate on the leasing transactions of assets with a wide market. This is why I chose **motor vehicles** within the group of tangible assets.

From the point of view of verification of hypotheses and drawing conclusions the examination of the stability of financing practice in time proves to be an important aspect. For the sake of this the initial database contains information about the transactions of 10 years: it is built up by transactions, which were realized in the period between 1999 and 2008. I determined the end date of the period considering more aspects retrospectively. A significant fall could be observed in the number and volume of outstandings due to the financial crisis after 2008, which decreases the representativity of the data of the following years, and these transactions cannot be compared to the transactions of the previous period from the risk point of view, either.

On the other hand a high percentage of these transactions is of long maturity (extending to 5 years), which means that some of the data relevant from the point of view of the analysis are not yet available in case of the transactions following 2008.

7.1. Establishment of the data collection necessary for the examination of the hypotheses and the database constituting the base for the analysis

The base for the empirical examinations is constituted by an **initial database** containing data related to the leasing transactions of a leasing company operating in Hungary, which exclusively includes financial lease transactions of active or closed status related to new motor vehicles. I will present the initial database for the sake of the examination of hypotheses and easier transparency divided into five parts (data sets):

- DATABASE1 – i.e. ASSET DATABASE
- DATABASE2 – i.e. TRANSACTION (DEAL) DATABASE
- DATABASE3 – i.e. CALCULATIONAL DATABASE
- DATABASE4 – i.e. DEPRECIATON DATABASE
- DATABASE5 – i.e. EXECUTIONAL (FINANCAL PERFORMANCE) DATABASE

Adapting to the theoretical overview, the base for data collection is built up by assets constituting the object of leasing transactions. The **ASSET DATABASE** – according to the assumption for efficient market and for the sake of the elimination of potential distorting effect of secondary market trade – only includes the data of new, unused motor vehicles. It includes the relevant asset information, the nature of the motor vehicle (car or truck), its make and type, the vehicle specific identifiers (registration number, chassis number, Eurotax ID), the data determining the power of the vehicle,[61] and the year of production. Regarding the later analysis opportunities it is important to highlight that only those assets became the focus of data collection relating to which existing financial lease transaction (e.g. not unrealized, of indicative status) was ever to be detected and the period between the year of production and the starting date of the transaction did not exceed one year.

[61] These pices of information (make, type, registration number, chassis number, Eurotax ID, power) determine the category of motor vehicles, based on which the corresponding market value process curves can be assigned to them.

The features describing the financing of assets can be found in the **TRANSACTION DATABASE**, among them the base for analysis is constituted by the following transactional characteristics: the start date and planned expiry date of the transaction, the planned maturity between these two dates, the currency of the transaction's calculation and financial execution, the exchange rate valid at the date of conclusion of the transaction, the gross value of the financed asset, the first, initial installment executed by the client (downpayment) and the accounting investment constituting the base for calculation as a difference of these two, plus the repayment schedule of the transaction (monthly, quarterly or more rare). The transaction database is completed by the **CALCULATIONAL DATABASE**, which includes the planned repayment schedule of the individual leasing transactions related to the complete maturity (due date and remaining complete outstanding capital – i.e. planned capital value function –, capital repayment installment, interest repayment installment, monthly fee), which shows what incoming cash flow – expressed in the transaction's currency – can the lessor count on at the individual future due dates. During the testing of the first three hypotheses the examination of the relation between the planned capital value function (based on the calculation) and the market value development of the asset gain fundamental significance. The latter pieces of information are included in the **DEPRECIATION DATABASE**, which I received from the Hungarian market leading motor vehicle selling enterprise EurotaxGlass's Hungary Inc. – to be able to carry out the analyses. The depreciation processes contain the depreciational percentages interpreted as average annual time series depreciation for the individual motor vehicle classes.[62] which were formed considering the current (nominal) selling prices valid in the given year (using the data of current year's November month as base). With the help of the depreciational percentages, knowing the motor vehicle market prices valid in the given year the market value process of the individual motor vehicles to be interpreted as time series depreciaton can be determined.

[62] Class A: mini cars (Ford Ka, Renault Twingo, Fiat Seicento...), Class B: small cars (Ford Fiesta, Opel Corsa, Renault Clio, VW Polo), Class C: low-mid category cars (Ford Focus, Opel Astra, VW Golf...), Class D: mid category cars (Ford Mondeo, Opel Vectra/Insignia, VW Passat...), Class E: upper-mid category cars (Mercedes Class E, BMW 5, Audi A6), Class F: luxury/sport (Mercedes Class S, BMW 7, Audi A8, Jaguar XJ etc), Class G: compact (Ford Galaxy, VW Sharan, Renault Scenic...), Class H: small off-road vehicles (Toyota Rav4, Suzuki Vitara..), Class I: large off-road vehicles (Toyota Land Cruiser, VW Touareg, BMW X5...), Class K: small commercial motor vehicles (Renault Kangoo, Citroen Berlingo, VW Caddy...), Class L: large small commercial motor vehicles (Fiat Ducato, Ford Transit, VW Transporter...) up to 3.5 tons, Class N: large commercial (Scania, MAN, DAF...) above 3.5 tons, Class T: trailers (Kögel, Krone...)

Motor vehicle and truck	Motor vehicle class code	Motor vehicle category
Motor vehicles	A	mini cars
	B	small cars
	C	low-mid
	D	mid
	E	upper-mid
	H	small off-road
	G	compact
	I	large off-road
Trucks	K	small commercial
	L	large small commercial
	N	large commercial
	T	Trailers

Table 10. – The meaning of the individual motor vehicle categories

The calculations determining the capital value function of the transactions were mostly created with monthly fee payment frequency, so for the sake of becoming comparable to depreciation process and being able to form a more precise picture about the connection between the two functions, I fit a function representing monthly depreciation on the data expressing annual depreciation in a way to be presented later.

In order to test hypotheses four and five the pieces of information related to the execution of transactions are needed, too, which can be found in the **EXECUTIONAL DATABASE**. The database contains those data on a transactional level, which can be relevant from the point of view of judgment of execution of transactions: the data related to the delay of the transaction (frequency, sum, length of delays), the client rating expressing the creditworthiness of clients (where it was available), restructuring, number and dates of requests for payment, has a termination or asset take-back happened related to the transaction, is it connected to the winding-up or bankruptcy proceeding of the debtor, or has accounting loss occurred related to the transaction (due to its sale or allowance) and if yes, to what extent and at which date.

As a result of the data collection the initial database divisible into five subcategories contains pieces of information related to 19.421 assets besides the above five sets of data. I carried out consistency examinations and data cleansing in the initial database based on cross-tables before the sample serving the establishment of a database used for the testing of hypotheses. The **control of consistency and data cleansing** was carried out so that the sample database used as a base for sampling would contain comprehensive data enabling that the statistical-mathematical analyses would not distort and their axioms would prevail freely.

In the framework of data cleansing I left the following cases out of the initial database:

- assets with zero gross value (data error)
- vehicles with run kilometers greater than zero (despite the collating criterium not new motor vehicles)
- where no individual ID of the motor vehicle is available or it contains unrecoverable data error or if the manufacturer or type information is missing regarding the given asset, since no market value process can be connected to them because of the lack of ID
- if the number of assets to be connected to the manufacturer does not exceed 50 pieces, and considering the manufacturer-type pairs individually for cars and trucks, where the number of elements does not exceed twenty, since in these cases the mass criterium against financing is not fully met
- the leasing transactions starting before 1999, since their number was negligible
- the leasing transactions starting in 2009 or later, since the financial crisis can distort the variables belonging to the sphere of examination of hypotheses
- those transactions, which have been carried out for the leasing of assets that cannot be run by themselves (e.g. motor vehicle bodyworks, equipment), since these are individually not suitable for producing yield
- transactions, where currency constituting the base for the calculation is of not high enough count (e.g. DEM or JPY)
- transactions with a maturity shorter than 12 months, since in this case the length of the period serving the comparison of capital value function and market value process is not sufficient
- if the period between the asset's year of production and the start of the leasing transaction exceeds 12 months, in order to be able to filter the leasing transactions of the obsolete assets
- the transactions formed within the framework of fleet financing and connected to lessees with more than five transactions, since their capital calculation can be distorted because of the mass financing feature
- the transactions, where based on the manufacturer-type combinations the Boxplot figures of gross asset prices show stragglers.

The **sample database** produced following the above steps contains 7.725 transactions regarding the five data sets presented before. Due to the sensitivity of the pieces of information constituting a base for the analysis (business and bank secret) and the high

number of funders I had no opportunity to involve the transaction stock of all leasing companies operating in Hungary in the examination of the hypotheses. This is why the sampling can be considered as probability sampling process only to a restricted extent, assuming that the financing practice of the leasing company providing the initial database represents the behaviour of the complete market, which is possible originating from the intensity of the competition evolved in the 2000's. Since the first three hypotheses examine the connection between the leasing transaction's capital value function and the market value process of the financed asset overall and separately for the individual business years, I apply layered sampling process according to the initial year of transactions, which I further layer from two points of view. From the point of view of sampling regulations it is important that the sample would be more heterogenous considering the manufacturers and types of the individual assets, thus ensuring that the results of the testing would reflect the general deal practice of the lessor companies being independent from assets. From the point of view of the examination of hypotheses H4-5. the lessee is important, too (natural or legal entity), since I aim to examine the executional features of leasing transactions compared to the yield producing ability of the assets being independent from clients. From this point of view an asset is considered as yield producing if it is not leased by a private entity, i.e. its operation serves entrepreneurial objectives. Thus the annual layering is completed by the aspects of asset manufacturer, type and the entity of the lessee.

During the sampling the motor vehicles belonging to the given manufacturer-type (i.e. Ford Focus, Opel Astra etc.) combination included in the sample get a random number starting from one (manufacturer-type number), in order to maintain the heterogeneity according to manufacturer-type. Following this, taking the transaction's initial year, the manufacturer-type number and the lessee's legal form into consideration I distribute line numbers and I choose 100 transactions per year into the sample. The probability of the elements to get in the sample is not the same, since sampling happens by ordering the elements according to

a) manufacturer-type line number and

b) the legal form of the lessee (starting with legal entitities) and filling the annual sampling quote of 100 progressing from the smallest to the highest line number.

Following the sampling in the **analysed database** I had altogether 1.000 transactions for the period of 10 years between 1999 and 2008. The sample ratio reflected on the initial database 1.000/19.421 (5,15%), regarding the sample database 1.000/7.725 pieces

(12,94%). The introduction of the five data sets of the analysed database and its basic statistics can be found in Annex 3a.

7.2. The data transformations necessary for the examination of the hypotheses

Certain data of the analysed database require **data transformation** before the start of the hypotheses' empirical examination for the sake of the comparability of the pieces of information. The data primarily used for the testing of hypotheses H1-H3 are the depreciations belonging to the individual assets and the capital value functions based on the calculation (monetary value), however the two data are available in the analysed database in a not directly comparable way since

1. the frequency of their observations is different → the depreciation data are available in annual, while the capital value functions are typically given in monthly breakdown;
2. their measurement units are different → the depreciation data are expressed as a percentage of the current prices valid in month November of the given year, but the capital value function is given in monetary value.

For the sake of the comparability of transactional depreciation and capital function time series I modify the annual data available in the depreciation database for monthly frequency. The first data shows the time series depreciation expressed as a percentage of the prices valid in the month November of the year following the year of the contract's conclusion for all motor vehicle categories. Assuming that depreciation is of exponential feature, I determined the depreciation data belonging to month January of the year of the contract's conclusion, fitting an exponential function on the first and last known depreciation value. Thus going back in time I obtained rates approaching 95% for month January of the year of the contract's conclusion. The result is close to 100%, this is why I accept and keep my assumption regarding exponenciality. Taking into consideration that in the beginning of the contract's conclusion the value of the asset is 100%, I adapt the exponential curve to this value. Although based on the one sample t-test for the data at a 95% confidence level (see Annex 3b.) it can be rejected that the data representing 100% refer to January of the contract's conclusion year,[63] but

[63] The value approaching 95% cannot be contributed to coincidence.

from now on I will assume this, since the transactions refer to the motor vehicles qualified as new in the year of the contract's conclusion. Following this the depreciational percentages observed in January of the year of the contract's conclusion and in months November of the following years are available for me. Fitting an exponential function to the available data for the successive dates I gain a **depreciation function of monthly frequency**. As a result asset value function data series of monthly frequencies expressing time series depreciation as a percentage of the value of the new asset determined on the given year's November monthly current price is available for all groups – year of the contract's conclusion; motor vehicle category. For an asset purchased and financed in the given year I use the same depreciation function time series valid for the given year and asset category, independently from the month of the transaction's starting month.

The calculational database contains the planned repayment schedule of the individual transactions in a monetary value determined in the transaction's currency, in the form of a time series of frequency corresponding to the repayment schedule (monthly, quarterly). Since I use the capital value function data planned according to the calculation for the analysis, the conversion of the capital value function planned according to the calculation into the currency of repayment is not necessary in case of (foreign exchange based) deals repaying in currencies different from the calculation, either.[64] Another reason for the use of calculational capital value functions expressed in the original transactional basic currency is that the regular repricing of the transactions because of the changing interest rates takes place using the base interest rate connected to the basic currency of the transaction, similarly to the refinancing of the lessors. The effect of regular repricing on capital exposure is contained by capital value function time series, the cleansing of data is not reasonable from this point of view, since the change in interest rate as alternative cost on an efficient market has a similar effect on the market prices financed assets – i.e. time series depreciation.

The depreciation time series contain the percentages expressed based on the current prices valid in the given year, so I have to express the value of capital exposures based on the calculation and valid in the given month for the sake of comparability compared to the current price asset value of the given year as percentage. For this the nominal

[64] Thus I exclude the effect of specific risk feature of foreign exchange based deals (exchange rate volatility) from the focus of the examination, which is also irrelevant from the points of view of hypotheses H1-H3.

price of the new motor vehicle, the leased object valid in the given year has to be determined, for which the market values of all motor vehicles valid at the start of the leasing transaction are given as base. I converted the initial market values of assets into current price values with the help of monthly consumer price indices (CPI's) connected to the transaction's currency (HUF, CHF, EUR). Following this, all data were available to be able to express how the capital exposure planned according to the calculation of the given period (monthly/quarterly) compared to the current – inflated – asset value in the individual periods.

(14) *capital value ratio (%) =*
*capital value based on the calculation of the given period (monthly, quarterly) /(initial asset value * CPI of current priod/CPI at the start of the transaction)*

Capital value ratio shows to what percentage of the initial capital exposure the lessor wants to depreciate his exposure against the lessee, concerning a given future date of the repayment schedule.

Dividing the capital value ratio valid at a given date by the time series depreciation valid at a given date as percentage we will obtain the

(15) *loan to value (LTV) (%) = capital value based on the calculation of the given period (monthly, quarterly)/ current – depreciated – asset value;* where

(16) *current – depreciated – asset value =*
[initial asset value new CPI – for the given period/initial CPI]*depreciation percentage valid for the given period.*

LTV is a measurement expressing the exposure of the lessor compared to the asset value, which can be interpreted for the whole maturity of the transaction. The lower the LTV proves to be, the smaller is the risk exposure (higher the cover) on the given transaction vice versa.

I consider the capital value function of the financing belonging to the individual motor vehicles as variable during the examination of various hypotheses in the analysis. Capital value function is the series of capital value ratios interpreted at

repayment dates during maturity, and the value of the variable is the capital value ratio (as observational unit or case) valid at date N. (month, quarter) following the start of the transaction. When there is no planned capital repayment in the given month according to the calculation (transactions of repayment frequency lower than a month), then the variable is not interpreted, either. In an analogue way I can interprete the depreciation and loan to value of assets as variable, too. Should I diverge from these interpretations during the testing of hypotheses, I will mark it in the next pages

7.3. Verification of hypothesis 1.

The first hypothesis examines the existence of the connection between the transaction's capital value function and the asset's time series depreciation.

H1: The capital value function planned according to the calculation of leasing transactions is in connection with the time series depreciation of the leased object determined by market prices.

Capital value function is the series of capital value ratio determined based on the calculation of the transaction interpreted at repayment dates during maturity. The leased object is the motor vehicle purchased within the framework of leasing transaction and made available for the lessee for use, while time series depreciation is the series of the ratio of the motor vehicle's current market value interpreted at repayment dates during maturity to the new motor vehicle's market value calculated on current prices valid in the given year (from now on depreciation function).

As the first step of testing the hypothesis I checked the presence of factors commonly interpreting the development of variables capital value function - depreciation function with the help of factor analysis.[65] During the **principal component analysis** I interprete all used variables at the same time, and the explanatory power of the result hugely depends on whether the value of the variable is interpreted for the given case (month, quarter). Should we take all variables and all cases into consideration during the statistical examination, then strong distorting effect would be recognized, since the last months of the transactions with the longest maturity were considered with too high weight based on a few cases. In this case the probably too strong connection between the principal components and the variables could originate from this effect, too. In orded to have the stable interpreting of the results ensured, I examined the capital value function variables only for the cases covering the period of months 2-37., furthermore I took only those transactions into consideration, which were interpreted for all of these months. I also included the depreciation function variables interpreted for months 2-37., in order to be able to follow whether an extra component for their interpretation is

[65] The Bartlett test and KMO-criterion used for the examination of the data's suitability for factor analysis could not be run in SPSS for the examined sample (it did not produce a result table) – most probably due to the high number of variables, but the strong correlation between capital value functions and depreciation functions can be assumed without this, too (see later figures of H1 and examinations of H2).

necessary or the same latent variables interprete both depreciation and capital value functions.

In the first step of the examination I do not differentiate between the individual capital value function-depreciation function pairs besides the initial year of transactions, I tested the transactions of 10 years together. According to the obtained results three principal components of eigenvalue above 1 exist, which together explain the total variance of the variables in 99.78%. From the three principal components 98.95% of the total explained variance can be connected to the first component.

Total Variance Explained									
Compo-nent	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cum %	Total	% of Variance	Cum %	Total	% of Variance	Cum %
1	800,518	98,952	98,952	800,518	98,952	98,952	518,252	64,061	64,061
2	5,608	,693	99,645	5,608	,693	99,645	285,045	35,234	99,295
3	1,072	,132	99,777	1,072	,132	99,777	3,901	,482	99,777

Table 11. – The complete results of principal component analysis

Thus the results show that there exists a common factor shaping capital value and depreciation functions the same way, but its explanatory power is completed by further factors. The presence of the latter can also refer to the fact that regarding the individual years differences can be discovered in the factors influencing the relation between the two value processes, so I repeated the factor analysis for the 10 years individually, too.

Total Variance Explained				
Year/Component		Initial Eigenvalues		
		Total	% of Variance	Cumulative %
1999	1	61,062	98,487	98,487
	2	,652	1,052	99,539
2000	1	89,468	99,409	99,409
	2	,367	,408	99,818
2001	1	101,410	98,456	98,456
	2	1,242	1,205	99,662
	3	,162	,158	99,819
2002	1	76,417	99,243	99,243
	2	,378	,491	99,734
2003	1	92,135	99,070	99,070
	2	,686	,738	99,808
2004	1	79,904	98,647	98,647
	2	,721	,890	99,536
2005	1	77,279	99,076	99,076
	2	,450	,576	99,652
2006	1	78,909	98,636	98,636
	2	,746	,933	99,568
2007	1	76,456	99,294	99,294
	2	,332	,431	99,724
2008	1	89,419	99,354	99,354
	2	,442	,491	99,846

Table 12. – The results of principal component analysis broken down into years

According to the results of the factor analysis carried out annually one common factor explains the variance of two variables to an extent of 98.45-99.40% in almost every year. Thus factor analyses underpin hypothesis H1, which means that the lessors take the market value development of financed motor vehicles during maturity into consideration during the planning of capital value function according to calculation. However the factor analysis does only underpin the fact of the connection between the two value functions, it does not provide information about its quality.

For its sake the further examination of the relation between the two value functions is reasonable with the help of **graphic display**.

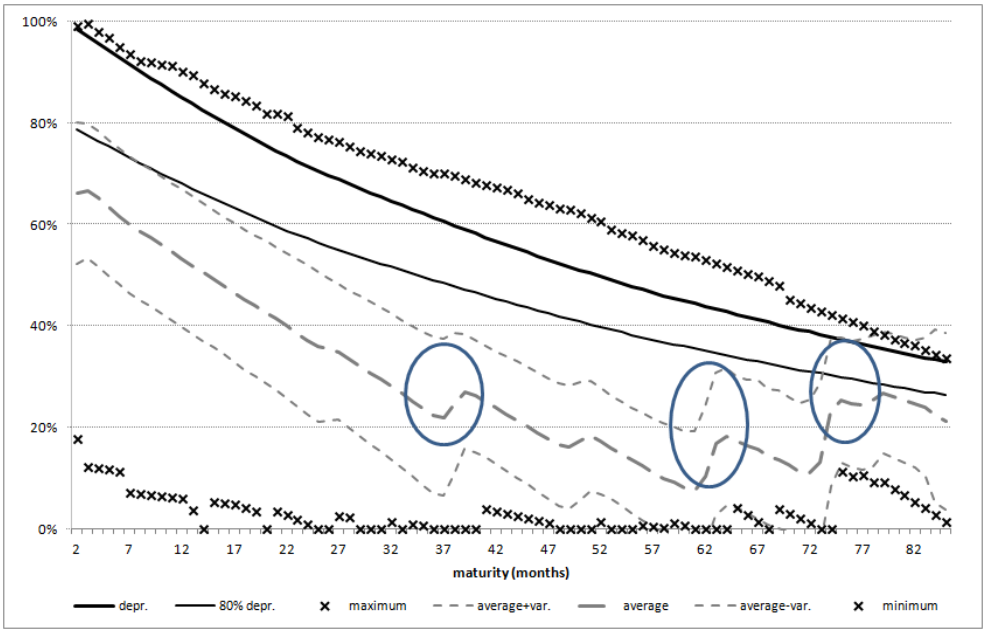

Figure 17. – The relationship between average depreciation function and capital value function

The graph shows the average capital value function of the analysed database's 1000 transactions and the average development of the depreciation of assets beyond transactions, independently from the start of the transaction[66] and the motor vehicle category. A significant break can be observed in the average capital function curves denoted by bold dash line at three dates. The shift in the function can be contributed to the fact that the transactions to be found in the sample database can be put into three well separable groups: transactions of maximum 3 years, 3-5 years and above 5 years of maturity. Since the ratio of transactions with maturity exceeding 5 years within the complete analysed database is low (7.4%) and most of them are initiated in 2005 or

[66] I represent the transactions starting from the second month after the beginning, since the transactions initiated in the second half of the month typically begin repayment according to the calculation leaving out one calendar month.

later, from the point of view of maturity I differentiate between two groups: transactions with short maturity (maximum 37 months) and long maturity (minimum 38 months). [67]

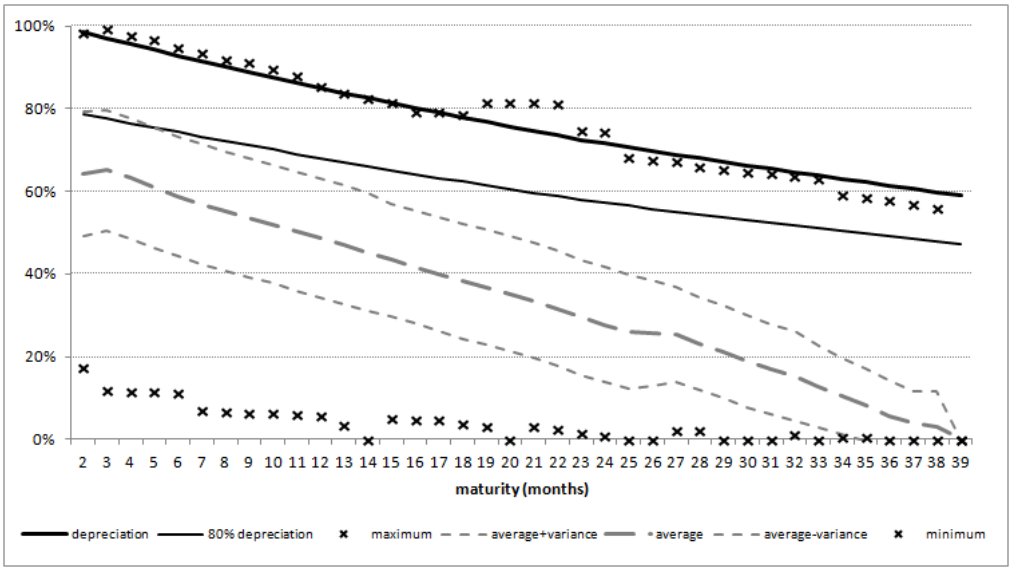

Figure 18. – The average depreciation and the average capital value function of short maturity transactions

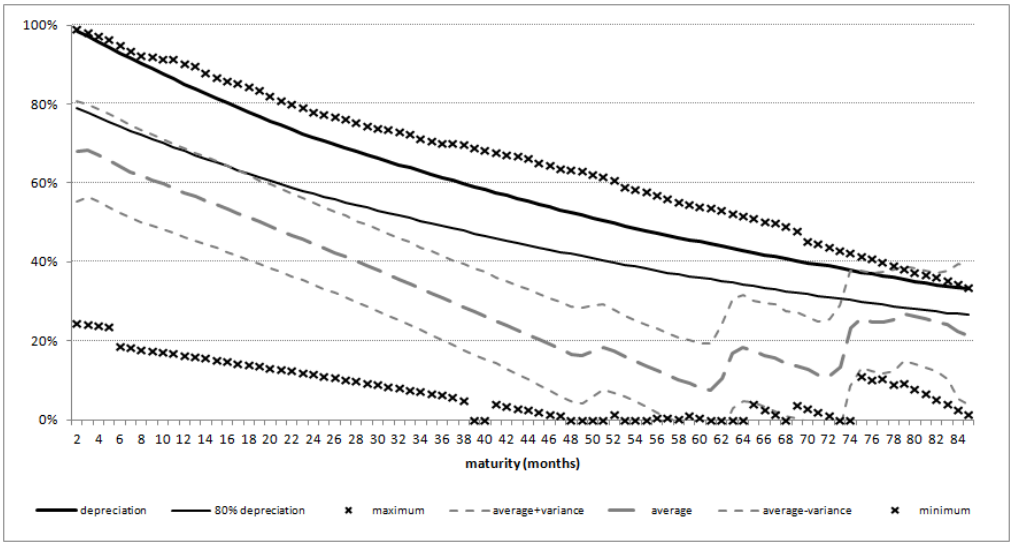

Figure 19. – The average depreciation and the average capital value function of long maturity transactions

The separation by maturity avoids the mentioned breaks compared to the maturity-independent display. **Transactions of shorter and longer maturity can be differentiated** from more points of view according to the relation between capital value function and depreciation. In case of transactions of longer maturity the average LTV is higher, but financing fits the depreciation function more, which is reflected by the fact that in case of longer maturity the difference between depreciation function and average

[67] The relation between the two value functions during maturity does not differ significantly in case of cars and trucks (see Annex 3a.), so from now on I will disregard this separation.

capital value ratio changes in a smaller range during maturity. The average deviation of the capital value function of transactions of shorter maturity is higher than that of transactions of longer maturity, the complete range measured by the difference between maximums and minimums in case of transactions of shorter maturity exceeds the ones observable in case of long maturity in all 37 comparable months, which from the lessor's side can refer to more homogenous financing practice in case of transactions of longer maturity.

Based on the above diagrams in connection with the first hypothesis I further examine **how 'far' the two functions are located** from each other and how their steepnesses are related to each other. The LTV defined in Formula (15) can be also used to observe the distance between the two functions. The related figures show what percentage of the cases observable in the individual months reaches the LTV of 80, 90, 100 per cent.

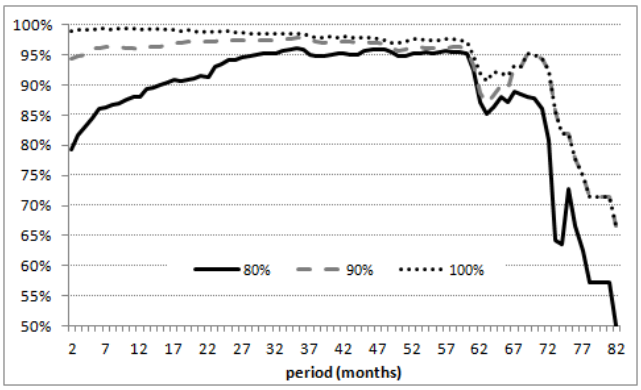

Figure 20. – The development of LTV's during maturity (1999-2008)

Without the differentiation between transactions of shorter or longer maturity it can be said that the capital outstanding in at least

- 50% of the cases stays below 80% of the motor vehicle's market value during the whole maturity,
- 87% of the cases stays below 90% of the motor vehicle's market value during most of the maturity,
- 91% of the cases stays below 100% of the motor vehicle's market value during most of the maturity (first 61 months).[68]

[68] Theoretically LTV cannot exceed100%, but – especially in the beginning of maturity – there are cases, when the asset depreciates quicker than how the capital outstanding according to the calculation decreases. According to the figure it can be observed that as maturity progresses in time the ratio of transactions where the rate of financing exceeds the asset's market value increases – this tendency refers to the anomalies of financing practice, the examination of which I will present later.

The same pieces of information based on the breakdown of transaction into ones of short and long maturity are the following (the corresponding figures see in Annex 4.).

Title		Case%	
		short maturity	long maturity
LTV	80%	81	50
	90%	94	87
	100%	99	97

Table 13. – The development of LTV's according to short and low maturity (1999-2008)

The LTV's applied by the lessor in most of the cases do not exceed 80-90% considering 10 years, which means that the funder builds in a buffer of at least 10-20% in its planned outstanding compared to the market value of the financed asset in an overwhelming part of the cases. However, the LTV is not constant during the maturity of transactions, which can be traced in the graphs presented so far, too:

- the length of average capital value function is shorter than the value function of motor vehicles – i.e. the maturity of leasing transactions stays below the average useful lifespan of financed vehicles,
- moving forward according to maturity transactions reach an LTV of at most 80% to a higher and higher ratio.

This is possible if **capital value function is steeper than the depreciation function of motor vehicles**.

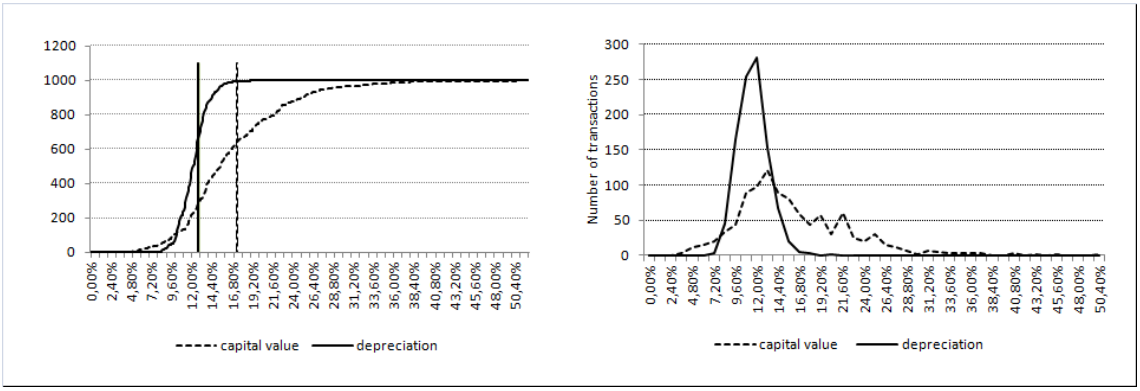

Figure 21. – The average steepness of capital value and depreciation functions

Representing the development of average steepnesses during maturity[69] (percentage/year) in a histogram and distribution function it can be observed that the annual depreciation of assets fluctuates within a range 8.4% and 18%, within which the

[69] The difference between capital value ratio in the beginning of maturity – following the settled downpayment and in the end of maturity and depreciation ratio divided by maturity.

typical value compresses around 10.8-13.2%, and the average annual depreciation weighted by the number of transactions is 12.8%. Contrary to this, the average steepnesses belonging to capital value function fluctuate in a much wider range (between 4.8%-38.4%), their histogram is less peaked and the average annual capital value decrease weighted by number of transactions is 17.27%.

Considering the LTV, the capital value function quicker than depreciation implies that **average LTV's decrease as maturity passes by**.

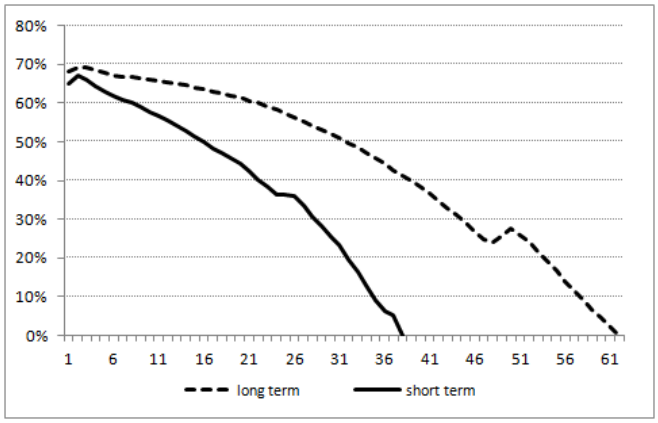

Figure 22. – The development of average LTV's during maturity (1999-2008)

According to the above described, **hypothesis H1 can be accepted**, and it has been justified that during the planning of its liability the lessor takes the time series depreciation of the leased motor vehicle based on market knowledge into consideration. Although the connection between capital value and depreciation function exists, based on the graphic figures it can be seen that during the establishment of financing structure the lessor only focuses on keeping its current capital outstanding continuously under the market value of the asset during maturity.

The reason for this is that compared to the future 'estimated' service values reflecting in the development of market prices the remaining service values of the asset operated by the lessee can be different depending on the habits of asset use. However, the lessor cannot control the depletion and decay (together deterioration) influencing the asset's value, since the deterioration of the vehicle is determined by the business practice of the lessee. It means that he involves the factors influencing the time series depreciation of the asset (deterioration, obsolescence and revaluation) and the related uncertainty in the planning of its financing in a way that he strives to get a certain ratio of the future service value produced by the asset advanced by the lessee in the form of downpayment.

7.4. Verification of hypothesis 2.

In the second hypothesis I examine to what extent the lessor follows a homogenous practice from the point of view of capital value function planning, can any changes of tendency be observed in the period between 1999 and 2008.

H2: A date (period) can be identified, from which on a change can be observed in the capital value function of leasing transactions based on calculation.

As the first step of the examination of the hypothesis I calculate **Pearson's correlation coefficient** for transactions between asset value function and depreciation function pairs for the period of examination for each year, separated for short and long maturity.

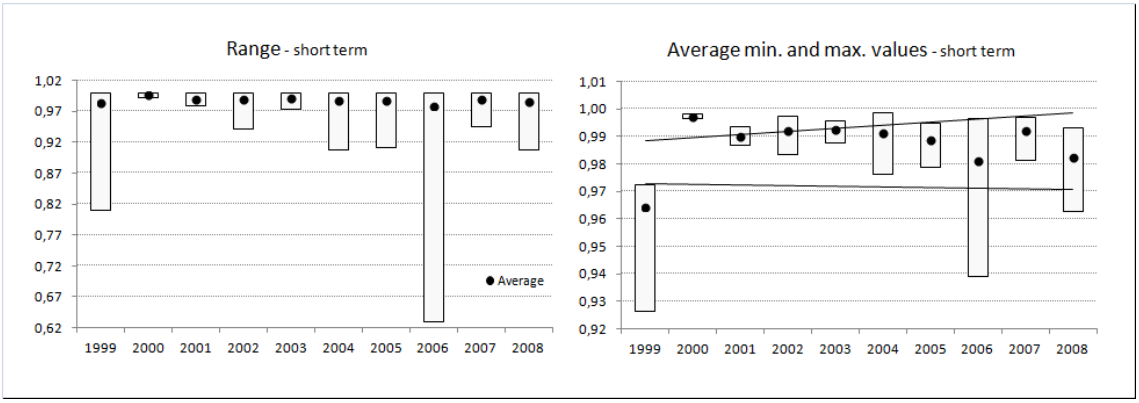

Figure 23. – The development of the correlation between capital value and depreciation function – short maturity

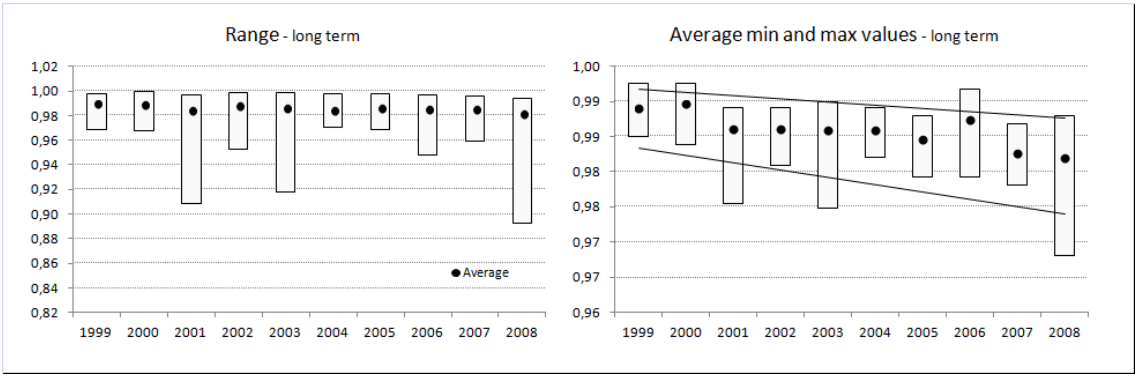

Figure 24. – The development of the correlation between capital value and depreciation function - long maturity

The figures on the left side show the range between the annual absolute minimum and maximum values (correlations), while the ones on the right side represent the average minimums and maximums (the related data can be found in Annex 5.).

Observing the tendency of average values of minimums and maximums in time in the right side figures it is obvious that the **correlation takes on a slightly decreasing and wider range** based on the fitting trendlines moving from 1999 towards 2008. Based on this no date or period can be identified, which would underpin an obvious change contributed to the modification of capital value function. Both the absolute and the average values refer to **a relatively strong correlation** between the two variables, which indicates a further verification regarding hypothesis H1. The fact that both functions are monotonously decreasing also contributes much to the strong correlation. Based on this, I further examine the change in capital value function with the help of an alternative methodology.

In order to observe the change in capital value function in time I followed the graphic display technique used in case of the first hypothesis (Figures 25-26. interpreted for the complete maturity, for all 10 years and individually can be found in Annexes 6-7.).

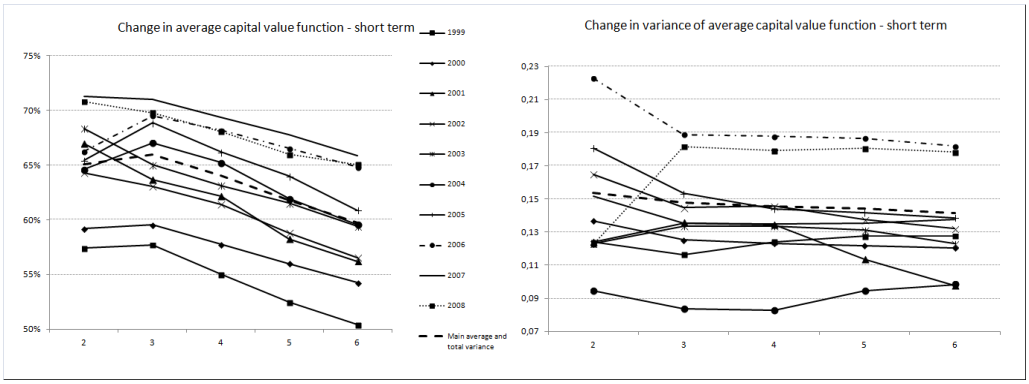

Figure 25. – The change in monthly capital value function – short maturity

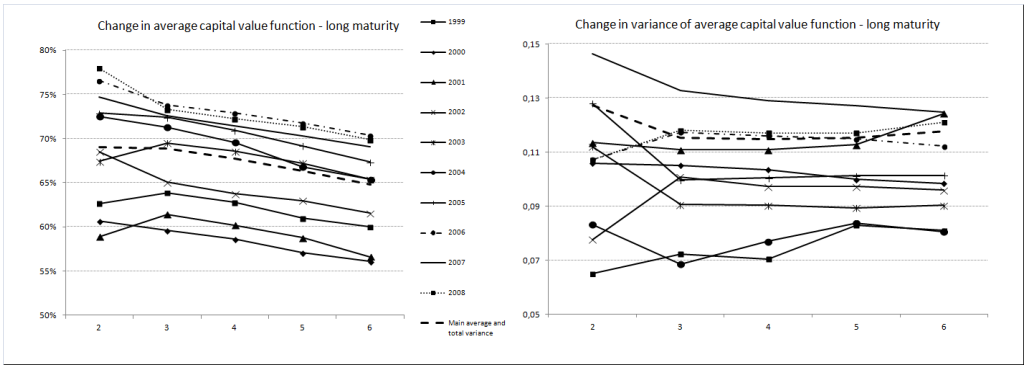

Figure 26. – The change in monthly capital value function – long maturity

On graphs 25-26. the left hand side figures show that the average capital value function curves belonging to the individual years gradually shifted higher moving forward in time between 1999 and 2008 and the capital function percentages exceeded the main average characterising the 10 years denoted by dashed line after 2003 both in case of short and long maturity transactions. More expressively it means that in case of a short (long) maturity transaction initiated in 1999 the lessor wished to finance 50% (56%) of the initial asset value in the 5. month following the start of the transaction based on the calculation, while the same value in 2008 is already 65% (70%).

Year	Motor vehicle		
	Car	Truck	Total
1999	37,53%	31,35%	34,44%
2000	34,78%	31,36%	33,07%
2001	35,78%	31,48%	33,59%
2002	37,76%	34,07%	35,91%
2003	**41,98%**	34,18%	38,00%
2004	41,79%	**38,47%**	**39,47%**
2005	43,83%	40,58%	42,11%
2006	46,79%	41,80%	43,95%
2007	44,90%	46,82%	46,15%
2008	46,07%	45,20%	45,62%
Total	**40,85%**	**37,90%**	**39,23%**

Table 14. – The change in average capital value ratio interpreted for the complete maturity

The development of the variances of capital value ratios shows a similar picture, compared to the total variance interpreted for the data of the 10 year period the variances from 2003 or before are lower, while values after are higher. The change taking place in the middle of the 1999-2008 period can be also observed besides the main transactional parameters determining capital value function. Both the average capital value ratio in the beginning and end of maturity increased, which means that after 2003 the average downpayment decreased, while paralelly the residual value in the end of maturity increased. The average maturity of transactions regarding the two periods does not differ significantly, it is eye-catching though that long maturity transactions almost entirely centred upon period 2. The steepness of capital value function slightly pushes towards the right, but the average steepness did not change significantly, while the distribution function is less peaked compared to the 1999-2003 period. The **variance analysis** interpreted for 10 years as dependent variable also underpins the tendencies indicated by the graphs (result tables see in Annex 8a.). In the individual years, among the four factors interpreted as dependent variables (downpayment, residual value, maturity, steepness), based on the Levene-test we only

talk about variance homogenity in case of steepnesses, which means that a **differentiation can be made among the transactions of 10 years besides the** other **three factors**.

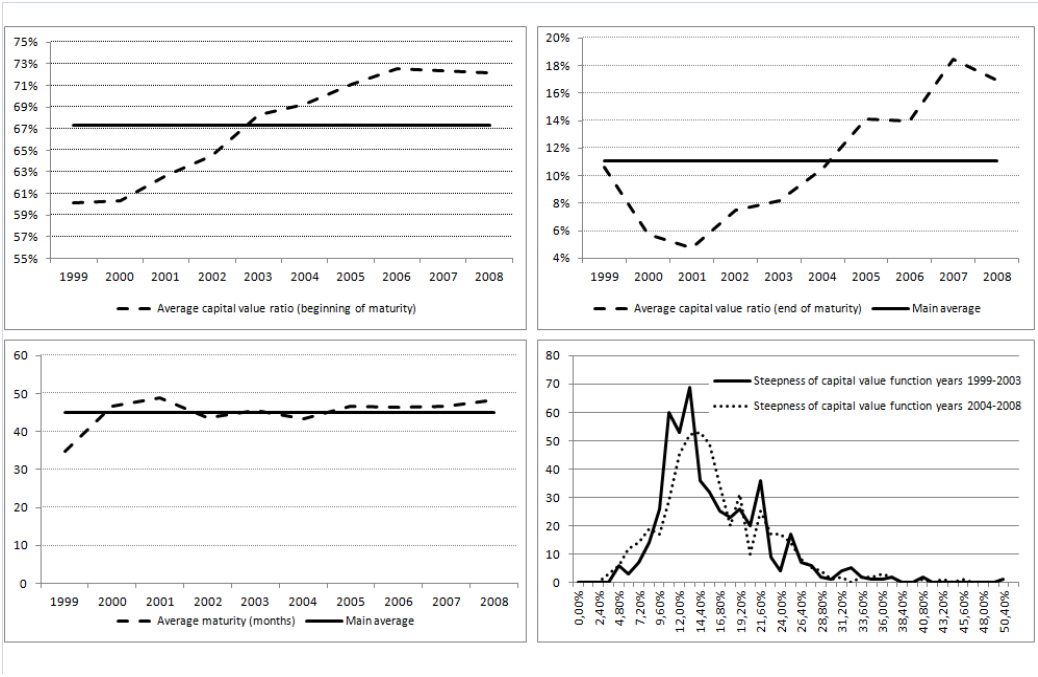

Figure 27. – The development in transactional parameters characterising financing practice

Dividing the 10 year period into two parts and running variance analysis for the periods between 1999-2003 and 2004-2008 the 'F' value of the two periods[70] are much higher than interpreted separately for the 10 years, which means that the transactions can be significantly separated besides their maturity, downpayment and residual value depending on whether they were initiated before January 2004 or afterwards.[71] With the help of variance analysis it can only be determined whether a significant differentiation can be made between the given periods, it does not directly give an answer for the correlation between the individual years observable besides the variables. I tested it by post-hoc comparison in pairs with the help of Games-Howell test also applicable in case of variance heterogeneity (see Annex 8b.). The test underpins the connection between

[70] F shows the ratio of squares between the groups and within the groups.

[71] A condition for variance analysis is that the dependant variables have to follow normal distribution within the individual groups (years). It is not fulfilled individually for the 10 years and related to the two subperiods, either, the results of tests directed towards their examination see in Annex 8c. It has to be noted though that variance analysis is not sensitive for the deviation of the inclination of distribution form normal, the effects of difference in peakedness cause distortion only in extreme case, which does not prevail this time.

the transactions initiated in 1999-2003 and 2004-2008 in case of both the downpayment and the residual value variables.[72]

Based on this **I accept hypothesis H2 and indentify 2003/2004** as a turning point, from which on a significant change – increase – can be observed in the capital value function of leasing transactions.

Until now I examined the change in capital value function independently from the value development of underlying motor vehicles. In Annexes 6b., 7b. the graphs interpreted individually for the different years can also be found (broken down for short and long maturity), based on which the change in annual average capital value function can be interpreted in relation to the depreciation function, and hypothesis H3 widens empirical examinations further in this direction.

7.5. Verification of hypothesis 3.

The increase in the average capital value ratio interpreted during maturity between the two periods can be approached from two directions. It can be caused by technological development, i.e. such superior motor vehicles will become available in the market whose appearance pushes the initial prices of financed assets downwards; or it can be contributed to the change in the lessor's risk appetite, i.e. the increase in LTV's. Thus in the third hypothesis I further examine the change in capital value function between the two periods, taking the time series depreciation of motor vehicles and its development in time into consideration.

H3: The change in capital value function takes place without a significant amendment in the function describing the time series depreciation of the leased object.

For the examination of the hypothesis I set up an an **alternative hypothesis**:

$H3_0$: The coefficient of capital value ratio and depreciation is constant through the complete maturity in the years between 1999 and 2008.

[72] The transactions initiated in the given year significantly differ from the transactions initiated in different years with a significance level below low (0.05). Regarding maturity and steepness no significant difference can be made between transactions of the individual years, thus the aggregating statistics does not give significant results.

According to the counterhypothesis I assume that even if the capital value ratio itself changes with time in the mentioned period, its change will follow the change in the function describing the depreciation function, which means that the LTV describing the relation between the two variables is constant.

A number of tendencies already mentioned by me underpin the rejection of the counterhypothesis. The first step towards the testing of hypothesis H2 was the examination of the development of correlations between capital value and depreciation function in time, during which I pointed out that although the correlation between the two variables is very strong, but moving from 1999 towards 2008 shows a slightly weakening tendency. Based on the graphs to be found in Annexes 6-7b. it could be observed that as we progress in time, the average capital value function curves approach the time series depreciation (market value) function curves more and more. Parallelly to this, the average capital value function curve shifts more and more from the minimum value to the function representing the maximum value and its respective values vary in an increasing interval. These changes occur without a significant change in time series depreciation curves representing the change in market value, which is also demonstrated by the following figure.

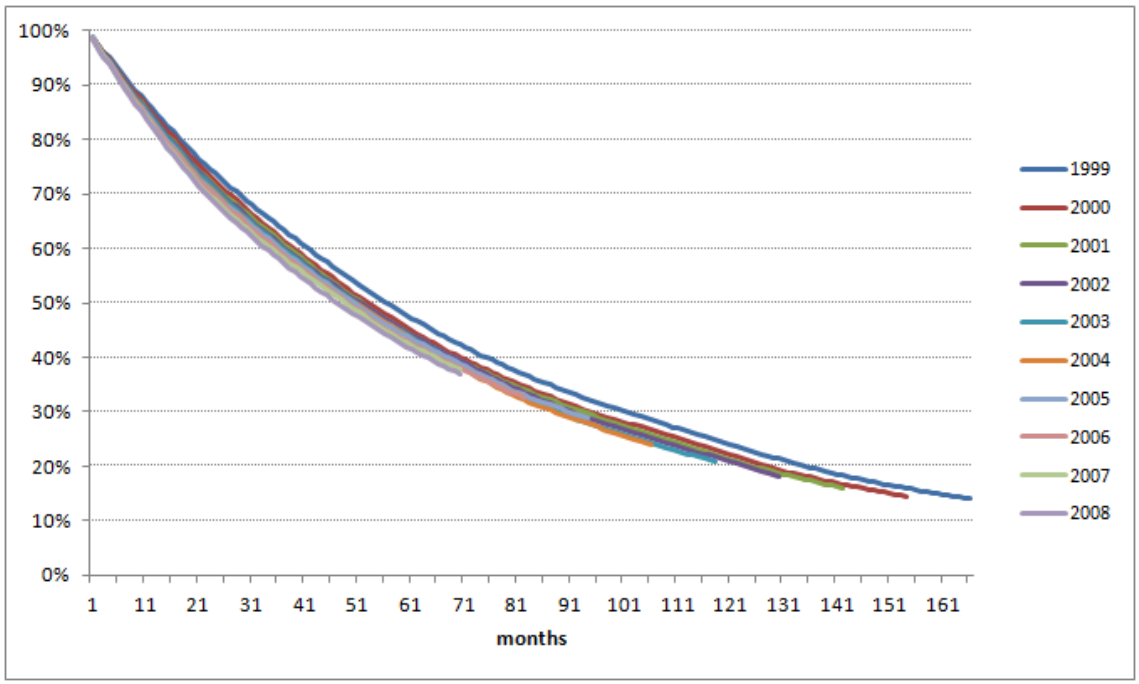

Figure 28. – The average depreciation function of the individual motor vehicle age-groups[73]

[73] The coloured versions of the figure can be found in Annex 9.

Thus the observations point towards the financing practice having changed, so as a result of the increase in the risk appetite of the lessor leasing as a financing structure started to lose its closed feature more and more. In connection with the counterhypothesis related to the identity of LTVs – depending on the fulfilment of the assumption related to the equality of variances – I test with two-sample T-test or Welch-test[74] for short and long term maturity separately if the monthly average of groups based on the successive years is equal or how significant the difference is. Before the start of testing based on the similarity between LTVs I summed up the data of 10 years in 4 and 3 groups the following way (the graphs serving as a base for grouping can be found in Annex 10.):

Title	Short maturity	Long maturity
Group 1.	1999-2000	1999-2001
Group 2.	2001-2002	2002-2004
Group 3.	2003-2005	2005-2008
Group 4.	2006-2008	-

The difference proves to be significant in case of all comparisons for almost every month (in case of the zero hypothesis related to the equality of averages Sig.<0,1), so the probability of the difference being merely chance is small enough to reject the counterhypothesis related to the equality of average LTV's, at the same time I **accept hypothesis H3** (the results of statistical tests can be found in Annex 11.).

7.6. Verification of hypothesis 4.

Based on hypotheses H1-H3 it can be concluded that with repect to the market depreciation of the leased object **financial lease cannot be considered a classical asset based financing construction**. On one hand the capital function determined by the financial calculation of the lease can be described by a concave, while market depreciation by a convex function, on the other hand during the determination of the amount of residual value in the end of maturity the lessor does not adapt to the asset prices valid at the given date observable in the market – besides the average maturity being significantly shorter than the useful lifespan of the asset. In addition the relation between capital value function and market depreciation cannot be considered constant

[74] If we assume that variances are equal (the significance value of the Levene test being >0,1), then the t-test, otherwise the Welch-test is the statistics considered to be relevant.

during the examined ten years, i.e. the behaviour of the lessor does not consistently reflect the same financing practice.

All these point toward the direction that from the point of view of his return on outstanding the lessor will not be able to disregard client risk. It is a question though whether there are transactional characteristics, which alone can influence the development of the lessee's willingness to pay. Accordingly my objective with the fourth hypothesis is the empirical examination and underpinning of the statement that the parameters taken into consideration during the establishment of the financing construction – and to be influenced by the lessor – can be connected to the transaction's repayment risk.

H4: The well and less well performing transactions can be separated from each other through the difference of factors influencing the capital value function.

Thus within the frameworks of hypothesis H4 I indirectly examine how lease is **qualified as asset based financing from the point of view of the lessee**.[75] Should the lessee wish to repay its liability connected to the leased object from the gross operating surplus produced by the asset considering lease as asset based financing, then the asset use, i.e. depreciation has to take on such an intensity that by the end of maturity the asset value would approach the amount of the residual value of the lease.[76]

Thus as a consequence of the assumed behaviour of the lessee such a **theoretical depreciation function** exists, which reflects the lessee's asset use fitting leasing parameters (maturity, residual value) and corresponding to market depreciation only regarding its shape (convexity). It can be assumed that such not leased assets are also available on the market, which deteriorate much slower meaning that the market depreciation curve – representing a market average independently from the financing of the asset – can be more depressed, but its shape will be representative considering the assets financed by lease, too.

[75] During the testing of hypotheses H4-H5 I will continue to disregard the separation between transactions connected to the financing of cars and trucks and also the categorization according to maturity, since from now on such executional features of the transactions constitute the subject of examination (see the operationalisation of the concepts of the hypothesis in the next page), which are independent from the length of maturity.

[76] Otherwise the leased object does not provide the necessary cover for the fulfilment of the liability originating from the transaction.

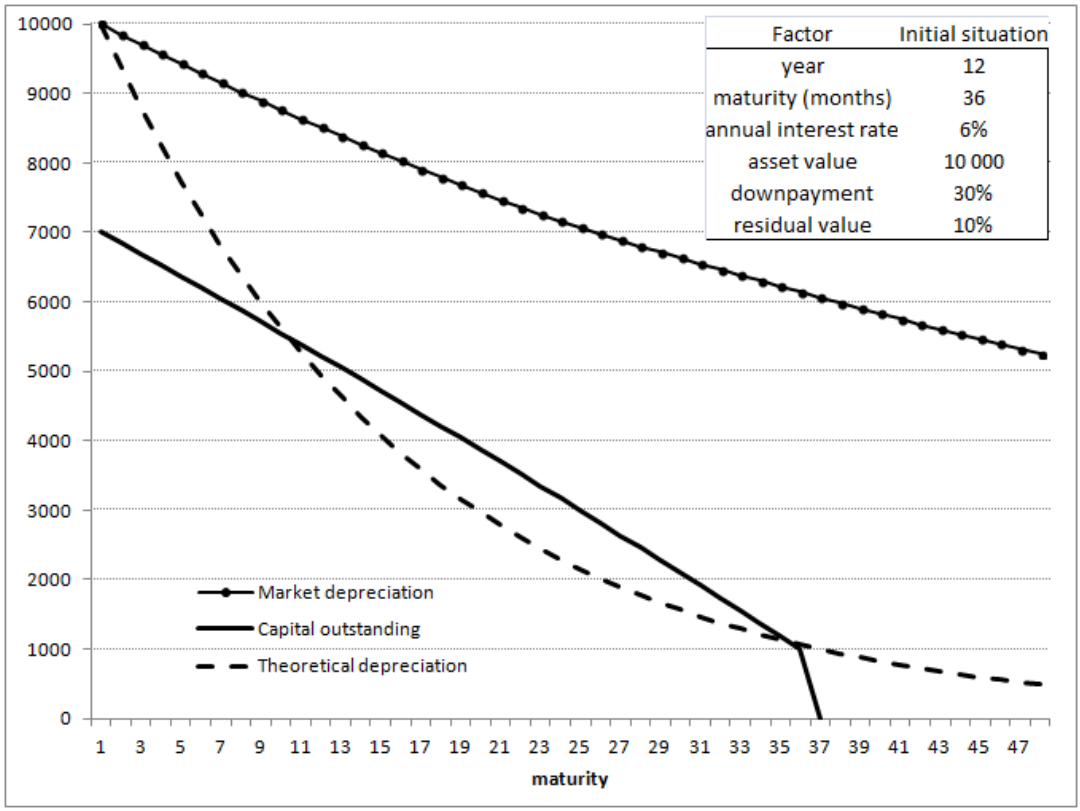

Figure 29. – Theoretical depreciation fitting capital value function

During the testing of the hypothesis I consider downpayment, maturity and residual value and their combinations as **factors influencing capital value function**, I interprete their differences with respect to the transactions of the database. **I operationalize the quality of the execution of the transaction by the number of payment notices for one month and the ratio of maximum delay during maturity to the initial accounting investment of the lessor** (asset value decreased by downpayment). In the executional database further executional variables are also given besides payment delay and payment notice, but their number of cases is too low to be able to derive reliable consequences from the statistical-mathematical analyses built on them. However according to literature the two chosen variables show strong correlation to the probability of collapse (frequency of payment delays) and the amount of loss (amount of delay), meaning that the executional or credit risk of transactions can be well approached by their use.

I involved only those transactions in the statistical examinations – in order to filter the effect of financial crisis – in case of which at least 75% of the maturity was over until the end of 2009. First I tried to explore the possible structures in these 820 transaction with the help of **hierarchical cluster analysis**. During the cluster analysis the

transactions characterized by the downpayment-maturity-residual value dimensions were grouped in more steps, so that we would get the most heterogenous groups – most different from each other – from the executional point of view. For the cluster analysis I chose two algorhythms: the 'average linkage' method examining the average of distances/differences between transactions during the establishment of groups, and the Ward method aiming at minimum variance within the group. In both cases I used two measures of distance: the classical Euclidean distance and Euclidean square distance. Before classification I standardized the variables so that the different scales of measurement would not cause distortion during the grouping and the interpretation of results. Based on the obtained results the Ward method using the squared Eucledian distance resulted in the most separated classification where the number of elements in given groups does not drastically differ from each other. During the classification I gathered the transactions into 10-3 clusters, as a result of which it can be seen that **the highest repayment risk is related to transaction parameters low downpayment-high residual value-short maturity** (the outputs belonging to cluster analysis can be found in Annex 12.).

Variable/ Cluster	Maturity	Residual value	Downpayment	Number of payment notices/month	Ratio of greatest delays
1	Shorter	significantly lower	Average	Average	average
2	Significantly shorter	significantly higher	Lower	Higher	significantly higher
3	Significantly higher	significantly lower	Average	Average	lower

Table 15. – The relation of cluster averages to the main average of variables

Cluster analysis was useful for me to discover that in the database there exists a structure to be defined by the factors of transactions from the executional point of view. However it is not directly suitable to be able to unequivocally determine, which concrete factor combinations belong to different executional characteristics. For this reason and because clusters differ only to a very small extent due to downpayment, I introduced an **artificial variable** according to the factor-values of transactions, which eventually can be interpreted as a grouping criterion. The categorization according to **group (code)** shows, what the concrete transaction is like based on the values of downpayment-maturity-residual value compared to the total sample average of the given parameter (see the last row of Figure 30.).

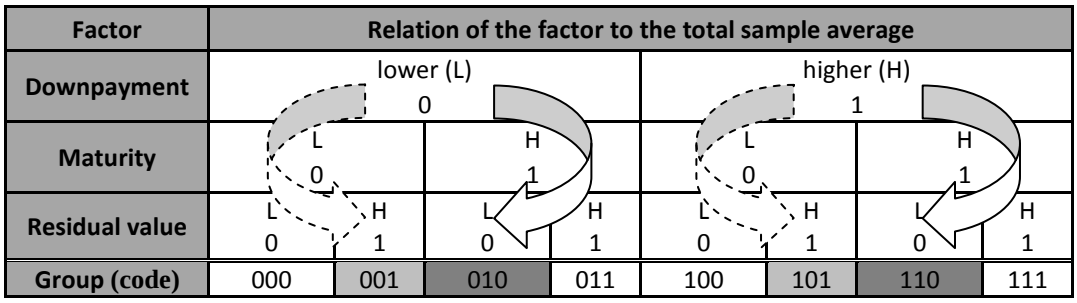

Figure 30. – The size of transaction parameters compared to the total sample average

After the introduced more finetuned categorization I continued the analysis pointing towards more precise statements by **variance analysis**. In connection with the normality test constituting a condition for variance analysis the facts explained in footnote 71. regarding H2, since the dependant variables are the same here. Variance analysis showed[77] that the transactions of more and less favourable repayment characteristics can be clearly distinguished by both the fact of problematicness (number of notices) and its extent (relative amount of delay).[78]

The transactions marked by dash arrow in Figure 30. proved to be worse, while the ones marked by plain arrow better, i. e.:

- shorter maturity and higher residual value determine worse performance,
- longer maturity, lower residual value determine better performance.

Based on this it has been justified that the financing strategy of the lessor related to the combination of downpayment, residual value, maturity has a consequence for the execution of transactions, so **I accept hypothesis H4**.

Thus lease funders can actively influence the quality of their transactions according to the more important parameters of their constructions. Thinking in this context **the relation between theoretical depreciation and capital value function** described in Figure 29. proves to be a **decisive factor**: i.e. where and what distance the difference between the two functions takes on with respect to maturity.

1. There will be a date (t_p), from which on the asset produces a higher yield within unit maturity than what the lessor requires from the lessee as repayment (in period t_p - t_{max}) – i.e. theoretical depreciation is steeper than capital value function

[77] The connected statistical results can be found in Annex 13.

[78] Carrying out the variance analysis for 820 transactions and among these for the 524 transactions of payment notices separately, based on the number of payment notices per month different groups prove to be better/worse, but according to the amount of payment delays (ratio of greatest delays) there is no difference between the two sets.

➔ the lessee acting as careful holder can place this surplus in bank deposit or capitalize on this recycling it into its operation – so in case he wants he can recover the yield produced by the asset for the lease payment in a later stage of the transaction (should the tendency change).

2. There will be a date (t_{max}), from which on the asset produces a lower yield within unit time than what the lessor requires from the lessee as repayment (in period t_{max} - t_e) – i.e. its capital value function is steeper than its theoretical depreciation

   ➔ the lessee in this period has the opportunity to compensate the gross operating surplus produced by the asset from the yield surplus realized in period (t_p - t_{max}) so that he can pay the asset's lease payment.

However after the realization of the yield surplus originating from more intensive asset use expressed by theoretical depreciation the lessee's willingness to pay might be lower independently from his creditworthiness (it is indicated by the analysed data showing that before point t_{max} the number of average payment notices per month is 0.12, while afterwards 0.2) so it is realistic that the lessor faces a higher average asset risk considering the whole maturity.[79]

Through the downpayment-residual value-maturity factor combination the lessor influences exactly **the relation between theoretical depreciation and capital value function:** with these parameters he shapes the amount of yield surplus the lessee realizes above the lease payment through theoretical depreciation and the length of the period of realization:

- it is a function of the amount of downpayment when the operation of the asset will become profitable for the lessee (when t_p occurs)[80]
- residual value (and the relation between residual value and downpayment) restricts the amount of yield surplus left at the lessee
- maturity determines the length of the yield surplus realization period

  ➔ in the end it is a function of these parameters what asset yield and in what ratio the lessor and the lessee divide among each other.

[79] If point t_{max} occurs too early with respect to maturity and it is not compensated by the yield surplus corresponding to the leasing liability produced by the asset.

[80] In this respect the interest of downpayment as sunk cost also constitutes a major weighing aspect. It is important what yield surplus exceeding rental payment the asset produces with respect to the lost interest yield of downpayment until point t_p (hypotetically thinking what interest payment burden the loan necessary for the financing of downpayment bears). However I will disregard this aspect, since financial accounting disregards opportunity cost statement.

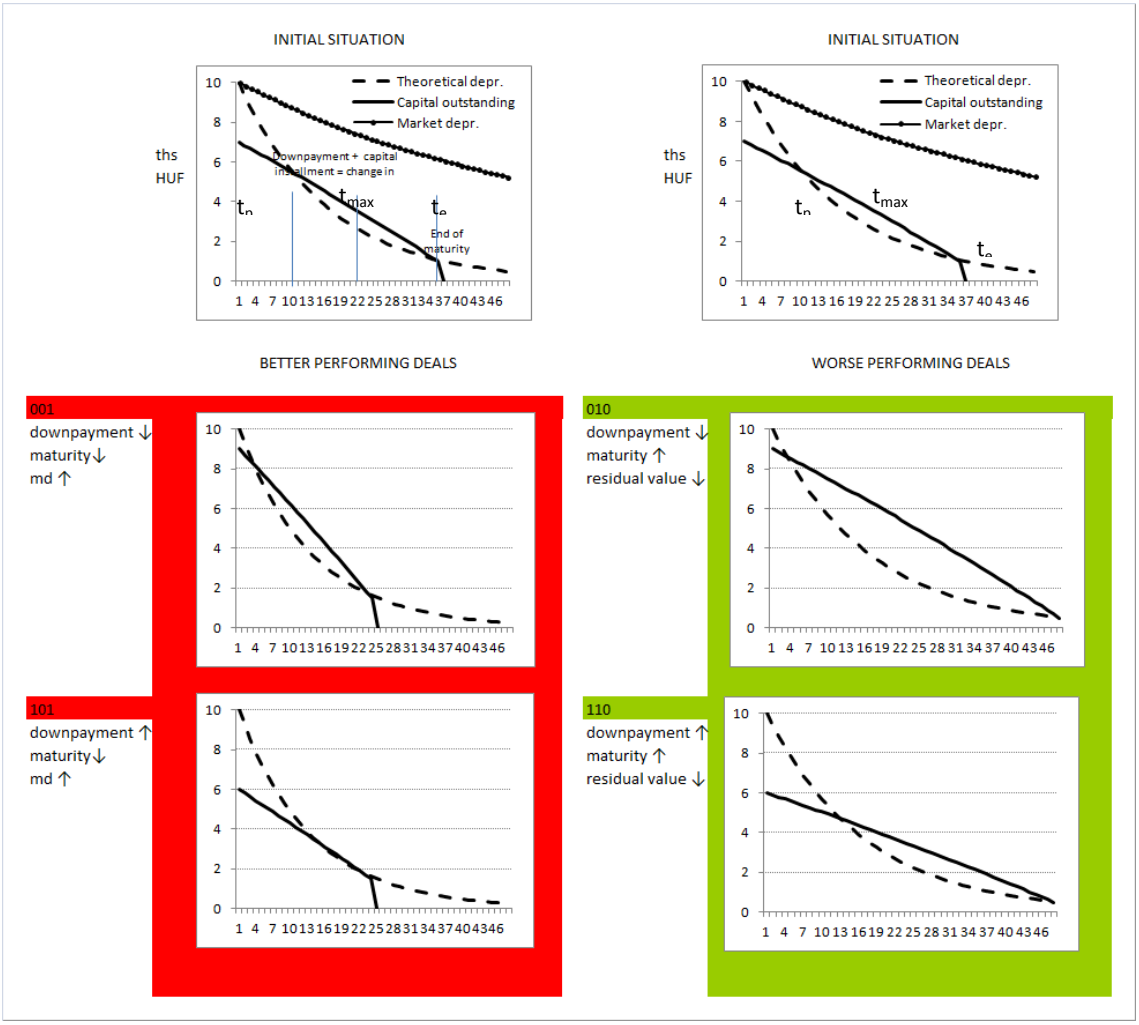

Figure 31. – The simulated function of theoretical depreciation and capital value in case of better and worse performing transactions[81]

Figure 31. simulates the theoretical depreciation and capital value functions of better and worse performing transactions based on variance analysis compared to the basic situation on Figure 29. Based on the former deduction:

1. The **decrease** in maturity and **the increase in residual value** independently from downpayment (left side part of Figure 31.) – interpreting lease as asset based financing – imply that the lessee will not have the opportunity to produce the yield surplus above the lease payment with the help of the leased object for the period between dates t_p and $t_{max,}$ which enables for him the execution of the lease payment after date t_{max}. Despite the fact that he starts to realize yield surplus early (t_p is small), he does not have enough time to capitalize on the yield surplus low

[81] The figures together with the parameters of simulation can be found in Annex 14., together with the graphs belonging to group codes qualified as of 'neutral' execution.

compared to expenditure surpluses and based on this the credit risk of the transaction increases.

2. If **maturity increases** and **residual value decreases**, then he can ensure the cover for lease payment liability for the second period between t_{max} and t_e through a longer period and the capitalization on higher yield surplus.

For the sake of more detailed display the more important transactional parameters describing the relation between theoretical depreciation and capital value function valid for the eight group codes can be found in Annex 14.[82]

Referring back to the results of hypotheses H2-H3 it is important to highlight that such shifts can be observed in financing practice between the two subintervals of the examined 10 year period (with respect to 1999-2003 → 2004-2008), which pushed transactions towards the characteristics to be found in the upper left range of Figure 31. (001 group code – increasing residual value, decreasing downpayment and exposures of constant or hardly lengthening maturity).

7.7. Verification of hypothesis 5.

The **conclusions of the fourth hypothesis** can be traced back to the asset risk connected to depreciation only if the above statements are true **independently from the client's creditworthiness**. In the fifth hypothesis I continued the empirical examinations completed by this aspect.

H5: Such capital value function influencing factor combinations can be identified, which independently from the clients' ability to pay can effect the execution of transactions.

For the testing I considered those transactions as base, in case of which 75% of the maturity is over until the end of 2009 and there exists a so-called quantitative client rating calculated from financial indices based on the client's financial report in the beginning and in the end of maturity (256 transactions). It is important that this client

[82] The net saving connected to transactions of better execution does not show a clean picture in the annex (it is not clearly positive in both cases), which can also be traced back to the fact that based on the results of variance analysis the transactions of better execution cannot be unambigously separated according to the number of payment notices (all transactions expiring to an extent of 75% until the end of 2009 and within this population with only payment notice not the same group codes are separated as transactions of better execution).

rating reflects the client's ability to pay and is not corrected by those qualitative factors based on subjective information,[83] which express the client's willingness to pay in connection with the judgement of creditworthiness. Regarding client rating I fixed the client rating not to change significantly between the beginning and end of maturity (it is constant or is modified by maximum two grades in absolute value[84]), which was necessary to clean the executional information from the change in the clients' creditworthiness.

In order to carry out statistical examinations I gathered the elements into bigger groups based on the average of client ratings belonging to the transactions in the beginning and end of maturity because of their excessive dividedness.

Value of client rating (x)	Client rating block
X<= 2.0	1.
2.0<x<=3.0	2.
3.0<x<4.0	3.
x>=4.0	4.

Table 16. – Grouping of client ratings

As the **first step** of the examination of the hypothesis I carried out **variance analysis** for the elements of the **2. cluster** with the highest repayment risk during the cluster analysis of hypothesis **H4**. With the analysis I examined whether the frequency and amount of payment delay depends on which client rating block the client belongs to based on his willingness to pay. The obtained results show that no differentiation can be made between clients belonging to the individual client rating blocks according to their executional characteristics, so a consequence of the low downpayment, high residual value, short maturity parameter combination is the worse execution, independently from the client's repayment ability (see the results in Annex15a.).

As second step I also utilized the further results obtained **during the testing of H4**, so based on **the eight group codes I gathered** the group codes of better, worse and neutral execution **into one parameter group:**

- transactions of better execution group code 010, 110 → parameter group 1.
- transactions of neutral execution group code 000, 011, 100, 111 → parameter group 2.
- transactions of worse execution group code 001, 101 → parameter group 3.

[83] E.g. the judgment of the client's market situation, management, ownership background, business plans etc.

[84] The client rating scale consists of 10 grades: between 0.5-5.0 with steps of 0.5.

Examining the average number of payment notices and the average ratio of delays according to parameter groups and client rating blocks it can be concluded that the transactions of the group with bad parameters (parameter group 3.) received more, while the transactions of the group with good parameters (parameter group 1.) received fewer payment notices, independently from client rating. The same homogeneity is typical of only parameter group 3. regarding the sum (ratio) of delays. Analysing the individual parameter groups and the client ratings included with the help of **variance analysis** it can be concluded that within the individual parameter groups no significant differentiation can be made between client rating blocks, and within group 2. the individual client rating blocks show much higher differences, than in case of groups 1. and 3. It means that in case of these transaction parameter combinations the creditworthiness of the client operating the financed asset is much more significant from the aspect of the return on outstanding, contrary to the other two groups (the detailed results can be viewed in Annex 15b.).

Thus in an indirect way it can be deducted that based on the quantitative client rating reflecting the clients' creditworthiness no significant differentiation can be made between transactions of worse execution belonging to group codes '001' and '010' and those of better execution denoted by group codes '101' and '110', i.e. I consider the **fifth hypothesis as verified**.

8. CONCLUSIONS AND POTENTIAL USES OF RESULTS, FURTHER POSSIBLE RESEARCH DIRECTIONS

The empirical examinations justified that besides the existence of the connection between capital value and depreciation process, during the development of the financing strategy the lessor only concentrates on keeping its **current capital liability** continuously **below the market value of the asset** during maturity. The reason for this is that compared to the future 'estimated' service value reflecting in the development of market prices the remaining service values of the asset operated by the lessee can differ depending on the habits of asset use. However the lessor cannot control the exhaustion and decay (together deterioration) influencing the value of the asset since the deterioration of the vehicle is determined by the lessee's business practice. Thus he includes the factors influencing the time series depreciation of the asset (deterioration, obsolescence and revaluation) and the related uncertainty in the planning of its financing by trying to get a certain percentage of the future service value produced by the asset advanced by the lessee in the form of downpayment. A deviation can be experienced between the capital calculation of leasing transactions and market depreciation regarding formality, too: capital process can be described by a concave, while depreciation by a convex function. Based on this the capital value process planned according to the calculation of the lessor is not suitable for the planning of depreciation at the lessee, except for the case when the lessee uses the asset with such an intensity that it produces the yield corresponding to capital value function during maturity (the shape of the curves can still be a question in this case, too), so compared to the normal market depreciation it depreciates the asset to a higher extent.

The control of asset use – and at the same time yield producing ability – by the lessor is enabled by the determination of three important transaction parameters: downpayment, residual value and maturity. The **financing practice of the leasing market** was **transformed in the middle of the 2000's** based on these parameters due to increasing competition intensity, outplacements shifted towards transactions with a combination of lower downpayment, higher residual value and slightly growing maturity. This adaptation took place **independently from the change in factors** actually **shaping** the **asset value** beyond, as a consequence of which financing shares increased for the complete maturity. The decrease in downpayment and the increase in residual value in case of constant maturity – interpeting leasing as asset based financing

– implies that the lessee will have the chance to produce a yield above the lease payment for the period by using the leased object (in Figure 2. t_p and t_{max} will be pushed forward and $t_{max}/(t_e-t_p)$ increase). However after the realization of the yield surplus originating from the more intensive asset use his willingness to pay will be lower independently from his ability to pay, so it is realistic that the lessor will face higher asset risk. If compared to the initial situation shown by Figure 32. only the residual value increases caeteris paribus, then t_p will be pushed later in time, and theoretical depreciation will get so close to capital value process, that it will be not worth for the lessee to operate the asset after point t_p further.

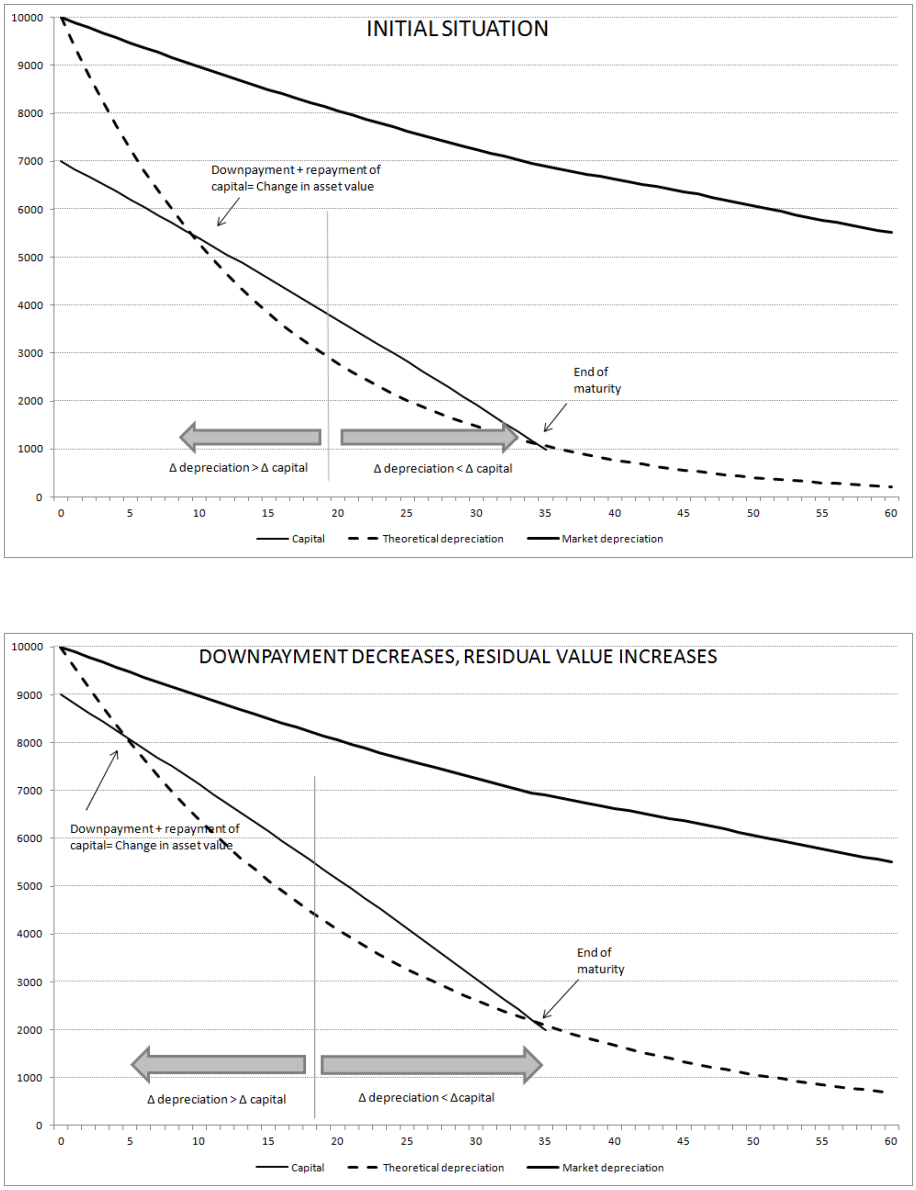

Figure 32. – The relation between capital value function and theoretical depreciation

The empirical examinations of the dissertation pointed out that constructions of **lower maturity and higher residual value** prove to be **riskier** independently from downpayment, while the longer maturity, lower residual value combination predicts better repayment, **without taking the clients' performance ability** into consideration. Thus the financing with higher residual value and lower downpayment realized after 2003 would have been dangerous for the capital maintenance of lessors even if the rendency had been accompanied by a switch towards the financing of transactions of better ability to pay. However since due to the 'asset based' feature of financial lease leasing companies performed the clients' ability to pay primarily in order to fulfill legal provisions, without paying much attention to its content, the effects of their asset risks could not be/cannot be mitigated by a client portfolio of better quality.

It can be concluded that although the profitability of an asset can be usually interpreted in a corporate context, in case of financial lease **the features of asset use and profitability independent of companies can** also **be discovered,** so financial lessors can actively influence the quality of their transactions by the more important parameters of their constructions. In this context the relation between **theoretical depreciation** and **capital value function** prove to be **decisive factor**: where and what distance the difference between the two functions imply in relation to maturity.

All in all, taking the long term sustainability of their operation into consideration during the establishment of their credit policies, the lessors will act the right way if

i) during the foundation of their calculation they follow the development of factors influencing asset value (initial depreciation, useful lifespan, residual value) on the market or

ii) should they differ from it, they do it knowing that this way they control the asset use habit of the lessor to a certain extent and they run an asset risk that cannot be directly controlled by themselves.

Through the development of his financing parameters the lessor can influence the asset use habits of the lessee: through the downpayment-residual value-maturity combination he shapes the amount of gross operating surplus produced by the asset and he defines what saving surplus he leaves for the lessee above the lease payment and in which term. So from the point of view of the transaction's **return and quality of financial performance, and credit risk** the LTV through which the lessor exposes his transactions is not individually **decisive**, but also **the amount of theoretical depreciation the lessor 'forces out' of the lessee and how he divides the yield**

embodied in depreciation between the contracting parties through the transactional parameters. From this aspect the internal lending practice of leasing funders, which was primarily directed at keeping LTV's low – i.e. maintaining the right quantity of collateral buffer can also be finetuned. The same thinking is typical of regulatory views, too, among which Gov. Reg. 361/2009. (XII.30.) regarding the conditions of prudent public loans and the examination of credit market also regulates the maximum of the ratio of exposure value and the motor vehicle's market value regarding leasing at the judgment of credit application (i.e. the initial LTV).

Many further dimensions of the topic chosen for the subject of my dissertation **could constitute the base for further examinations**. These can include e.g. the examination of the relation between the interest income realized by the lessor and asset profitability, the development of repossession risk – covering the value of the asset repossessed as security compared to the existing debit of the lessor –, and the analysis of the function of currency based financing in leasing (and within the framework of asset based financing construction). However, a switch towards the previous directions is limited in space because of the financial crisis that occurred in 2008. A key supplement to the analysis can be the expansion of the examinations towards the practice of further lessors, but also approaching from the lessee's side the research of differences between the habits for use of assets possessed within the frames of financial lease and those of own possession.

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ANNEXES

Annex 1. – The change in factors influencing the value development of fixed assets

a) in case of embodied technological development

Characteristics of assets used for winning water:

1. Draw well

Operates for 10 years, assuming flat rate deterioration

Value of its services gradually decreases progressing in time (because of the lower quality of water brought to the surface)

2. Pumping well

Operates for 10 years ensuring double operating time compared to the draw well

Based on the constant water quality, the value of its services is constant in time

Meaning of the used denotations:

q	amount of asset service	measured in quantity of water brought to the surface or operating time
p	unit price of asset service	due in the end of the period
b	value of asset service	p*q
P(PVs)	asset value	discounted present value of future service value for the beginning of the period

r= 4%

discount rate	1	2	3	4	5	6	7	8	9	10
1	0,9615									
2	0,9246	0,9615								
3	0,8890	0,9246	0,9615							
4	0,8548	0,8890	0,9246	0,9615						
5	0,8219	0,8548	0,8890	0,9246	0,9615					
6	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615				
7	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615			
8	0,7307	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615		
9	0,7026	0,7307	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615	
10	0,6756	0,7026	0,7307	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615

1. Draw well

q	1	2	3	4	5	6	7	8	9	10
1	10	0	0	0	0	0	0	0	0	0
2	9	9	0	0	0	0	0	0	0	0
3	8	8	8	0	0	0	0	0	0	0
4	7	7	7	7	0	0	0	0	0	0
5	6	6	6	6	6	0	0	0	0	0
6	5	5	5	5	5	5	0	0	0	0
7	4	4	4	4	4	4	4	0	0	0
8	3	3	3	3	3	3	3	3	0	0
9	2	2	2	2	2	2	2	2	2	0
10	1	1	1	1	1	1	1	1	1	1
sum	55	45	36	28	21	15	10	6	3	1

p	1	2	3	4	5	6	7	8	9	10
1	100	0	0	0	0	0	0	0	0	0
2	90	90	0	0	0	0	0	0	0	0
3	80	80	80	0	0	0	0	0	0	0
4	70	70	70	70	0	0	0	0	0	0
5	60	60	60	60	60	0	0	0	0	0
6	50	50	50	50	50	50	0	0	0	0
7	40	40	40	40	40	40	40	0	0	0
8	30	30	30	30	30	30	30	30	0	0
9	20	20	20	20	20	20	20	20	20	0
10	10	10	10	10	10	10	10	10	10	10

P (PVs)	1	2	3	4	5	6	7	8	9	10
1	961,54	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	748,89	778,85	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	568,96	591,72	615,38	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	418,85	435,61	453,03	471,15	0,00	0,00	0,00	0,00	0,00	0,00
5	295,89	307,73	320,04	332,84	346,15	0,00	0,00	0,00	0,00	0,00
6	197,58	205,48	213,70	222,25	231,14	240,38	0,00	0,00	0,00	0,00
7	121,59	126,45	131,51	136,77	142,24	147,93	153,85	0,00	0,00	0,00
8	65,76	68,39	71,13	73,97	76,93	80,01	83,21	86,54	0,00	0,00
9	28,10	29,23	30,40	31,61	32,88	34,19	35,56	36,98	38,46	0,00
10	6,76	7,03	7,31	7,60	7,90	8,22	8,55	8,89	9,25	9,62
sum	3413,92	2550,48	1842,50	1276,20	837,24	510,73	281,16	132,41	47,71	9,62

b	1	2	3	4	5	6	7	8	9	10
1	1000	0	0	0	0	0	0	0	0	0
2	810	810	0	0	0	0	0	0	0	0
3	640	640	640	0	0	0	0	0	0	0
4	490	490	490	490	0	0	0	0	0	0
5	360	360	360	360	360	0	0	0	0	0
6	250	250	250	250	250	250	0	0	0	0
7	160	160	160	160	160	160	160	0	0	0
8	90	90	90	90	90	90	90	90	0	0
9	40	40	40	40	40	40	40	40	40	0
10	10	10	10	10	10	10	10	10	10	10

2. Pumping well

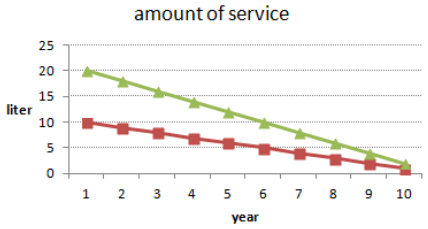
q	1	2	3	4	5	6	7	8	9	10
1	20	0	0	0	0	0	0	0	0	0
2	18	18	0	0	0	0	0	0	0	0
3	16	16	16	0	0	0	0	0	0	0
4	14	14	14	14	0	0	0	0	0	0
5	12	12	12	12	12	0	0	0	0	0
6	10	10	10	10	10	10	0	0	0	0
7	8	8	8	8	8	8	8	0	0	0
8	6	6	6	6	6	6	6	6	0	0
9	4	4	4	4	4	4	4	4	4	0
10	2	2	2	2	2	2	2	2	2	2
sum	110	90	72	56	42	30	20	12	6	2

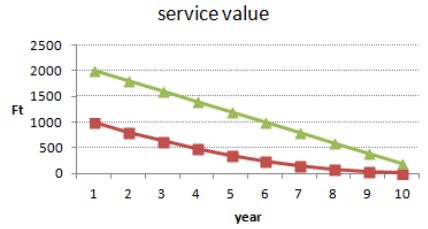
p	1	2	3	4	5	6	7	8	9	10
1	100									
2	100	100								
3	100	100	100							
4	100	100	100	100						
5	100	100	100	100	100					
6	100	100	100	100	100	100				
7	100	100	100	100	100	100	100			
8	100	100	100	100	100	100	100	100		
9	100	100	100	100	100	100	100	100	100	
10	100	100	100	100	100	100	100	100	100	100

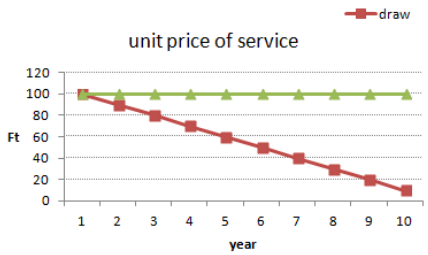
P (PVs)	1	2	3	4	5	6	7	8	9	10
1	1923,08	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	1664,20	1730,77	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	1422,39	1479,29	1538,46	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	1196,73	1244,59	1294,38	1346,15	0,00	0,00	0,00	0,00	0,00	0,00
5	986,31	1025,77	1066,80	1109,47	1153,85	0,00	0,00	0,00	0,00	0,00
6	790,31	821,93	854,80	889,00	924,56	961,54	0,00	0,00	0,00	0,00
7	607,93	632,25	657,54	683,84	711,20	739,64	769,23	0,00	0,00	0,00
8	438,41	455,95	474,19	493,16	512,88	533,40	554,73	576,92	0,00	0,00
9	281,03	292,28	303,97	316,13	328,77	341,92	355,60	369,82	384,62	0,00
10	135,11	140,52	146,14	151,98	158,06	164,39	170,96	177,80	184,91	192,31
sum	9445,52	7823,34	6336,28	4989,73	3789,32	2740,89	1850,52	1124,54	569,53	192,31

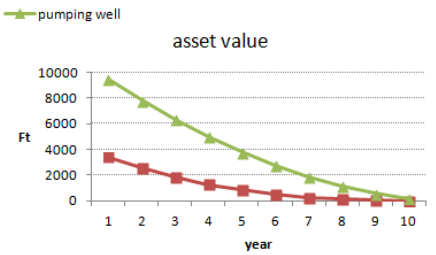
b	1	2	3	4	5	6	7	8	9	10
1	2000	0	0	0	0	0	0	0	0	0
2	1800	1800	0	0	0	0	0	0	0	0
3	1600	1600	1600	0	0	0	0	0	0	0
4	1400	1400	1400	1400	0	0	0	0	0	0
5	1200	1200	1200	1200	1200	0	0	0	0	0
6	1000	1000	1000	1000	1000	1000	0	0	0	0
7	800	800	800	800	800	800	800	0	0	0
8	600	600	600	600	600	600	600	600	0	0
9	400	400	400	400	400	400	400	400	400	0
10	200	200	200	200	200	200	200	200	200	200

q	10	9	8	7	6	5	4	3	2	1
draw	10	9	8	7	6	5	4	3	2	1
pumping	20	18	16	14	12	10	8	6	4	2
p	10	9	8	7	6	5	4	3	2	1
draw	100	90	80	70	60	50	40	30	20	10
pumping	100	100	100	100	100	100	100	100	100	100
b	10	9	8	7	6	5	4	3	2	1
draw	1000	810	640	490	360	250	160	90	40	10
pumping w	2000	1800	1600	1400	1200	1000	800	600	400	200
P (PVs)	10	9	8	7	6	5	4	3	2	1
draw	3413,92	2550,48	1842,50	1276,20	837,24	510,73	281,16	132,41	47,71	9,62
pumping	9445,52	7823,34	6336,28	4989,73	3789,32	2740,89	1850,52	1124,54	569,53	192,31









b) The change in factors influencing the value development of fixed assets in case of disembodied technological development

Characteristics of assets used for winning water:
2. Pumping well
Operates for 10 years ensuring double operating time compared to the draw well
Based on the constant water quality, the value of its services is constant in time
3.Tap
appears on the market after year 5. (its remaining lifespan is simply 10 years)
Based on the constant water quality, the value of its services is constant in time, and it is able to bring the same amount of water to the surface every year

Meaning of the used denotations:

q	amount of asset service	measured in quantity of water brought to the surface or operating time
p	unit price of asset service	due in the end of the period
b	value of asset service	p*q
P(PVs)	asset value	discounted present value of future service value for the beginning of the period

r= 0,04

discount rate	1	2	3	4	5	6	7	8	9	10
1	0,9615									
2	0,9246	0,9615								
3	0,8890	0,9246	0,9615							
4	0,8548	0,8890	0,9246	0,9615						
5	0,8219	0,8548	0,8890	0,9246	0,9615					
6	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615				
7	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615			
8	0,7307	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615		
9	0,7026	0,7307	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615	
10	0,6756	0,7026	0,7307	0,7599	0,7903	0,8219	0,8548	0,8890	0,9246	0,9615

2. Pumping well

q	1	2	3	4	5	6	7	8	9	10
1	20	0	0	0	0	0	0	0	0	0
2	18	18	0	0	0	0	0	0	0	0
3	16	16	16	0	0	0	0	0	0	0
4	14	14	14	14	0	0	0	0	0	0
5	12	12	12	12	12	0	0	0	0	0
6	10	10	10	10	10	10	0	0	0	0
7	8	8	8	8	8	8	8	0	0	0
8	6	6	6	6	6	6	6	6	0	0
9	4	4	4	4	4	4	4	4	4	0
10	2	2	2	2	2	2	2	2	2	2
sum	110	90	72	56	42	30	20	12	6	2

p	1	2	3	4	5	6	7	8	9	10
1	100									
2	100	100								
3	100	100	100							
4	100	100	100	100						
5	100	100	100	100	100					
6	100	100	100	100	100	0				
7	100	100	100	100	100	0	0			
8	100	100	100	100	100	0	0	0		
9	100	100	100	100	100	0	0	0	0	
10	100	100	100	100	100	0	0	0	0	0

P (PVs)	1	2	3	4	5	6	7	8	9	10
1	1923,08	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	1664,20	1730,77	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	1422,39	1479,29	1538,46	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	1196,73	1244,59	1294,38	1346,15	0,00	0,00	0,00	0,00	0,00	0,00
5	986,31	1025,77	1066,80	1109,47	1153,85	0,00	0,00	0,00	0,00	0,00
6	790,31	821,93	854,80	889,00	924,56	0,00	0,00	0,00	0,00	0,00
7	607,93	632,25	657,54	683,84	711,20	0,00	0,00	0,00	0,00	0,00
8	438,41	455,95	474,19	493,16	512,88	0,00	0,00	0,00	0,00	0,00
9	281,03	292,28	303,97	316,13	328,77	0,00	0,00	0,00	0,00	0,00
10	135,11	140,52	146,14	151,98	158,06	0,00	0,00	0,00	0,00	0,00
sum	9445,52	7823,34	6336,28	4989,73	3789,32	0,00	0,00	0,00	0,00	0,00

b	1	2	3	4	5	6	7	8	9	10
1	2000	0	0	0	0	0	0	0	0	0
2	1800	1800	0	0	0	0	0	0	0	0
3	1600	1600	1600	0	0	0	0	0	0	0
4	1400	1400	1400	1400	0	0	0	0	0	0
5	1200	1200	1200	1200	1200	0	0	0	0	0
6	1000	1000	1000	1000	1000	0	0	0	0	0
7	800	800	800	800	800	0	0	0	0	0
8	600	600	600	600	600	0	0	0	0	0
9	400	400	400	400	400	0	0	0	0	0
10	200	200	200	200	200	0	0	0	0	0

3. Tap

q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	20	20	0	0	0	0	0	0	0	0
3	0	0	0	0	0	20	20	20	0	0	0	0	0	0	0
4	0	0	0	0	0	20	20	20	20	0	0	0	0	0	0
5	0	0	0	0	0	20	20	20	20	20	0	0	0	0	0
6	0	0	0	0	0	20	20	20	20	20	20	0	0	0	0
7	0	0	0	0	0	20	20	20	20	20	20	20	0	0	0
8	0	0	0	0	0	20	20	20	20	20	20	20	20	0	0
9	0	0	0	0	0	20	20	20	20	20	20	20	20	20	0
10	0	0	0	0	0	20	20	20	20	20	20	20	20	20	20
sum	0	0	0	0	0	200	180	160	140	120	100	80	60	40	20

p	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1						100									
2						100	100								
3						100	100	100							
4						100	100	100	100						
5						100	100	100	100	100					
6						100	100	100	100	100	100				
7						100	100	100	100	100	100	100			
8						100	100	100	100	100	100	100	100		
9						100	100	100	100	100	100	100	100	100	
10						100	100	100	100	100	100	100	100	100	100

P (PVs)	1	2	3	4	5	6	7	8	9	10
1	1923,08	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	1849,11	1923,08	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	1777,99	1849,11	1923,08	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	1709,61	1777,99	1849,11	1923,08	0,00	0,00	0,00	0,00	0,00	0,00
5	1643,85	1709,61	1777,99	1849,11	1923,08	0,00	0,00	0,00	0,00	0,00
6	1580,63	1643,85	1709,61	1777,99	1849,11	1923,08	0,00	0,00	0,00	0,00
7	1519,84	1580,63	1643,85	1709,61	1777,99	1849,11	1923,08	0,00	0,00	0,00
8	1461,38	1519,84	1580,63	1643,85	1709,61	1777,99	1849,11	1923,08	0,00	0,00
9	1405,17	1461,38	1519,84	1580,63	1643,85	1709,61	1777,99	1849,11	1923,08	0,00
10	1351,13	1405,17	1461,38	1519,84	1580,63	1643,85	1709,61	1777,99	1849,11	1923,08
sum	16221,79	14870,66	13465,49	12004,11	10484,27	8903,64	7259,79	5550,18	3772,19	1923,08

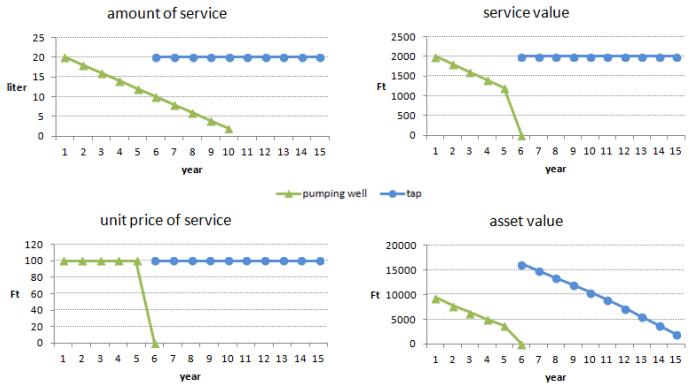
b	1	2	3	4	5	6	7	8	9	10
1	2000	0	0	0	0	0	0	0	0	0
2	2000	2000	0	0	0	0	0	0	0	0
3	2000	2000	2000	0	0	0	0	0	0	0
4	2000	2000	2000	2000	0	0	0	0	0	0
5	2000	2000	2000	2000	2000	0	0	0	0	0
6	2000	2000	2000	2000	2000	2000	0	0	0	0
7	2000	2000	2000	2000	2000	2000	2000	0	0	0
8	2000	2000	2000	2000	2000	2000	2000	2000	0	0
9	2000	2000	2000	2000	2000	2000	2000	2000	2000	0
10	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000

q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
pumping well	20	18	16	14	12	10	8	6	4	2					
tap						20	20	20	20	20	20	20	20	20	20

p	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
pumping well	100	100	100	100	100	0									
tap						100	100	100	100	100	100	100	100	100	100

b	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
pumping well	2000	1800	1600	1400	1200	0									
tap						2000	2000	2000	2000	2000	2000	2000	2000	2000	2000

P (PVs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
pumping well	9445,52	7823,34	6336,28	4989,73	3789,32	0,00									
tap						16221,79	14870,66	13465,49	12004,11	10484,27	8903,64	7259,79	5550,18	3772,19	1923,08



Annex 2. – The accounting of revaluation difference

Let's assume that the recognition value of a tangible asset operating since the 1 January is 10,000 thousand HUF, its useful lifespan is 5 years, in the end of which its residual value is zero and its depreciation is determined linearly. The enterprise evaluates its tangible assets according to the revaluation model, the market value of the asset in the end of the third year following its purchase is 5,000 thousand HUF, previously no accounting of revaluation difference or exceptional depreciation took place, the data taken into consideration during the determination of depreciation do not change as a result of revaluation.

Development of asset value in the recognition value model (thousand HUF)

Determination of annnual depreciation: 10,000 thousand HUF/5 years = 2,000 thousand HUF/year

Year	Gross value	Annual depreciation	Accumulated depreciation	Book value
1	10,000	2,000	2,000	8,000
2	10,000	2,000	4,000	6,000
3	10,000	2,000	6,000	4,000
4	10,000	2,000	8,000	2,000
5	10,000	2,000	10,000	0

Determination of revaluation difference

The book value of the asset in the end of the third year is 4,000 thousand HUF, the arising revaluation difference is (5,000 thousand - 4,000 thousand HUF =) 1,000 thousand HUF, which corrects the asset value and increases the amount of valuation reserve building up a part of equity.

The accounting of revaluation difference in a net way

Gross value		Accumulated depreciation		Valuation reserve	
A 10,000	1) 6,000	1) 6,000	L 6,000		2) 1,000
2) 1,000					

The accounting of revaluation difference in a gross way

1. The revaluation ratio: 5,000 thousand HUF/4,000 thousand HUF = 1.25 → 125%
2. Gross value corrected by revaluation ratio: 10,000 thousand HUF * 0.25 = 2,500 thousand HUF
3. Accounted accumulated depreciation corrected by revaluation ratio: 6,000 thousand HUF * 0.25 = 1,500 thousand HUF

Development of asset value based on market value in the end of the third year (thousand HUF)

Year	Gross value	Annual depreciation	Accumulated depreciation	Book value
1	12,500	2,500	2,500	10,000
2	12,500	2,500	5,000	7,500
3	12,500	2,500	7,500	5,000
4	12,500	2,500	10,000	2,500
5	12,500	2,500	12,500	0

Gross value		Accumulated depreciation		Valuation reserve	
A 10,000			L 6,000	2) 1,500	1) 2,500
1) 2,500			2) 1,500		

In case of the application of the gross method the set of available information is bigger (the amount of originally accounted depreciation is not lost), but should the company choose any of the methods for the accounting of revaluation difference, the book value of the asset will be 5,000 thousand HUF (market value), while the valuation reserve shows the amount of revaluation difference.

The depreciation of the asset based on the revaluation value is 2,500 thousandHUF/year (the residual value and the useful lifespan do not change as a result of revaluation), which exceeds the amount of annual depreciation of the non-revaluated asset by 500 thousandHUF. With the help of the arising difference – should no further value modification take place – the company can cease the revaluation reserve gradually contrary to the increase in profit reserve in the next two years.

Effect on income – Evaluation model of tangible assets, years 4. and 5.

No.	Title		Recognition value model	Fair value model, revaluation reserve	
				Traced back	Not traced back
1.	Revenue (financially realized)		10 000	10 000	10 000
2a.	Cost	accompanied by cash flow	3 000	3 000	3 000
2b.		depreciation	2 000	2 500	2 500
3.	Result (1. - 2a. - 2b.)		5 000	4 500	4 500
4.	Cash-flow (1. - 2a.)		7 000	7 000	7 000
5.	Closing balance of revaluation reserve		0	500 000	1 000
6a.	Accumulated profit reserve	opening	0	0	0
6b.		for current period	0	500 000	0
7.	Maximum payable dividend (3. + 6a.		5 000	5 000	4 500

No.	Title		Recognition value model	Fair value model, revaluation reserve	
				Traced back	Not traced back
8.	Revenue (financially realized)		10 000	10 000	10 000
9a.	Cost	accompanied by cash flow	3 000	3 000	3 000
9b.		depreciation	2 000	2 500	2 500
10.	Result (8. - 9a. - 9b.)		5 000	4 500	4 500
11.	Cash-flow (8. - 9a.)		7 000	7 000	7 000
12.	Closing balance of revaluation reserve		0	0	0
13a.	Accumulated profit reserve	opening (3. + 6b.)	5 000	5 000	4 500
13b.		For current period	0	500 000	1 000
14a.	Maximum payable dividend	For current year (10. + 13b.)	5 000	5 000	5 500
14b.		Total (10. + 13a. +13b.)	10 000	10 000	10 000

Annex 3. – The basic statistics of analysed database(s) and t-test of the function fitting annual depreciation

a) Introduction of the analysed database and its basic statistics

DATABASE1 – ASSET DATABASE

Count				Year of Production										
Personal Car_Truck	Car_Category_1	Car_Category_2	Class_code	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	TOTAL
Personal Car	Personal Car	mini cars	A	1						1		1		3
		small cars	B		11	10	12	17	17	2	12	2	5	6	94
		low-mid	C		23	20	20	12	8	17	15	28	15	12	170
		mid	D		14	12	16	9	13	8	10	10	5	9	106
		upper-mid	E			3	2	3	6	2	1		2	2	21
		compact	G					3		1	6	1	2	1	14
		small off-road	H	1	3	3	2								9
		large off-road	I		2		1	4		3	3	3	7	14	34
Subtotal				50	50	53	47	48	30	48	44	44	37	44	451
Truck	small commercial	small commercial	K	12	11	12	6	3	2	6	13	11	12		88
	large small commercial until 3,5 t	large small commercial until 3,5 t	L	38	35	27	5	12	12	8	22	32	11		202
	large commercial from 3,5 t	large commercial from 3,5 t	N		5	6	27	22	28	17	16	12	5		138
	trailers	trailers	T		1	6	11	18	33	15	14	14	9		121
Subtotal				50	52	51	49	55	75	46	65	69	37		549
TOTAL				100	102	104	96	103	105	94	109	106	81		1000

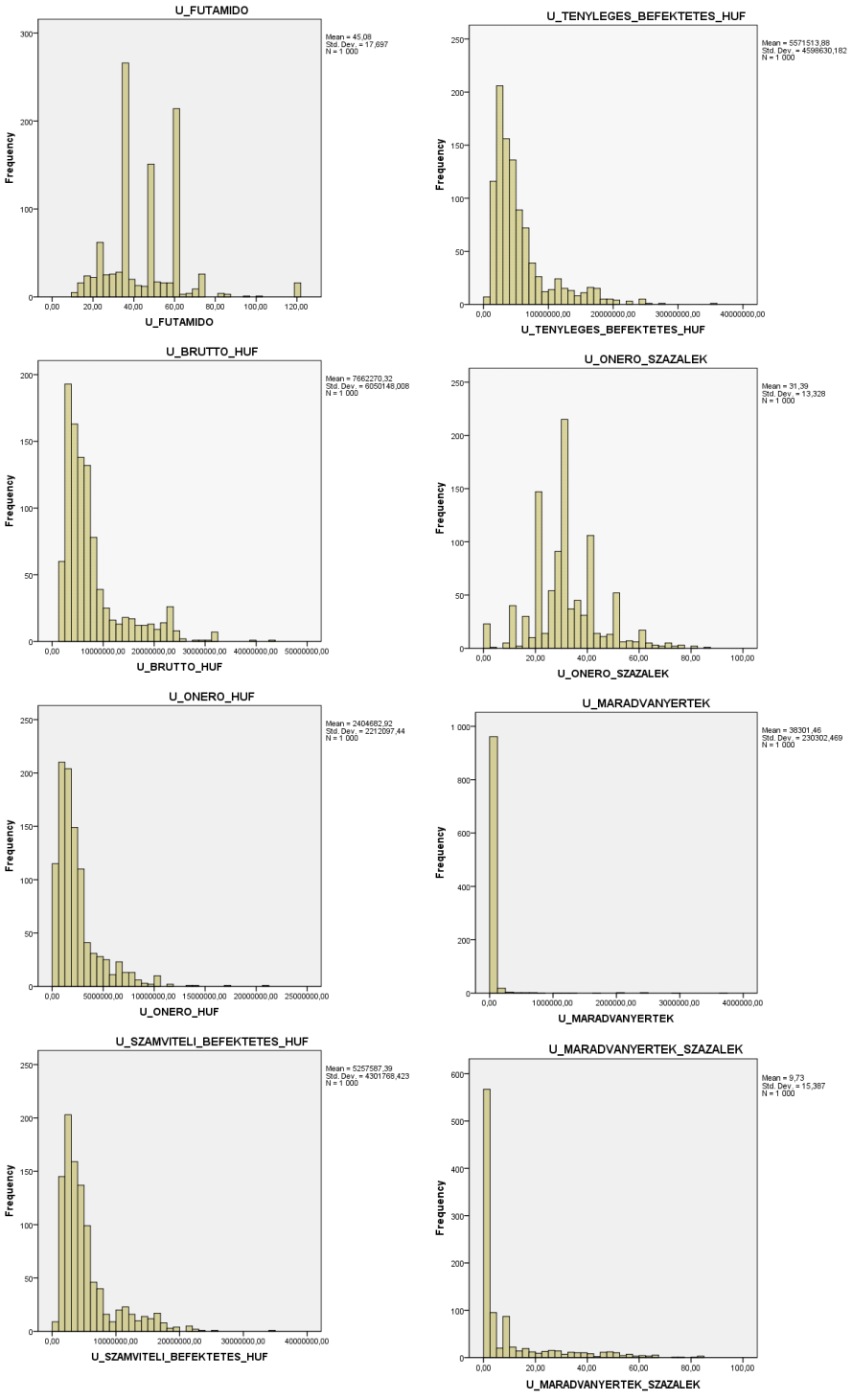
Count				Year of Production										
Personal Car_Truck	Car_Category_1	Car_Category_2	Class_code	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Végösszeg
Personal Car	Personal Car	mini cars	A	1,00%	0,00%	0,00%	0,00%	0,00%	0,00%	1,06%	0,00%	0,94%	0,00%	0,30%
		small cars	B	11,00%	9,80%	11,54%	17,71%	16,50%	1,90%	12,77%	1,83%	4,72%	7,41%	9,40%
		low-mid	C	23,00%	19,61%	19,23%	12,50%	7,77%	16,19%	15,96%	25,69%	14,15%	14,81%	17,00%
		mid	D	14,00%	11,76%	15,38%	9,38%	12,62%	7,62%	10,64%	9,17%	4,72%	11,11%	10,60%
		upper-mid	E	0,00%	2,94%	1,92%	3,13%	5,83%	1,90%	1,06%	0,00%	1,89%	2,47%	2,10%
		compact	G	0,00%	0,00%	0,00%	3,13%	0,00%	0,95%	6,38%	0,92%	1,89%	1,23%	1,40%
		small off-road	H	1,00%	2,94%	2,88%	2,08%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,90%
		large off-road	I	0,00%	1,96%	0,00%	1,04%	3,88%	0,00%	3,19%	2,75%	6,60%	17,28%	3,40%
Subtotal				50,00%	49,02%	50,96%	48,96%	46,60%	28,57%	51,06%	40,37%	34,91%	54,32%	45,10%
Truck	small commercial	small commercial	K	12,00%	10,78%	11,54%	6,25%	2,91%	1,90%	6,38%	11,93%	10,38%	14,81%	8,80%
	large small commercial until 3,5 t	large small commercial until 3,5 t	L	38,00%	34,31%	25,96%	5,21%	11,65%	11,43%	8,51%	20,18%	30,19%	13,58%	20,20%
	large commercial from 3,5 t	large commercial from 3,5 t	N	0,00%	4,90%	5,77%	28,13%	21,36%	26,67%	18,09%	14,68%	11,32%	6,17%	13,80%
	trailers	trailers	T	0,00%	0,98%	5,77%	11,46%	17,48%	31,43%	15,96%	12,84%	13,21%	11,11%	12,10%
Subtotal				50,00%	50,98%	49,04%	51,04%	53,40%	71,43%	48,94%	59,63%	65,09%	45,68%	54,90%
TOTAL				100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

Statistics

Variable/Statistics		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
		Maturity	Gross Asset Value	Downpayment	Accounting Investment (Gross Asset Value - Downpayment)	Accounting Investment +/- charges and fees	Downpayment %	Residual Value	Residual Value %
N	Valid	1 000,00	1 000,00	1 000,00	1 000,00	1 000,00	1 000,00	1 000,00	1 000,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		45,08	7 662 270,32	2 404 682,92	5 257 587,39	5 571 513,88	31,39	38 301,46	9,73
Median		41,87	5 699 312,50	1 760 821,50	3 902 351,00	4 118 261,00	30,00	1 279,40	2,23
Mode		36,06[a]	5 000 000,00	0,00	2 000 000,00	1512678,00[a]	20,00	163,47[a]	1,51[a]
Std. Deviation		17,70	6 050 148,01	2 212 097,44	4 301 768,42	4 598 630,18	13,33	230 302,47	15,39
Variance		313,20	36 604 290 916 797,30	4 893 375 084 953,83	18 505 211 567 880,40	21 147 399 549 956,60	177,64	53 039 227 075,65	236,75
Skewness		1,18	1,98	2,47	2,02	2,06	0,55	10,64	2,28
Std. Error of Skewness		0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08
Kurtosis		3,57	4,15	9,64	4,72	4,93	1,20	128,01	4,79
Std. Error of Kurtosis		0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
Minimum		12,06	1 400 000,00	0,00	696 683,00	738 500,00	0,00	52,52	0,21
Maximum		120,87	42 627 803,75	20 781 899,00	34 102 243,00	35 645 373,00	87,39	3 670 119,08	84,45
Percentiles	25	35,69	3 736 281,25	1 000 000,00	2 423 377,50	2 556 973,50	20,83	450,73	1,57
	50	41,87	5 699 312,50	1 760 821,50	3 902 351,00	4 118 261,00	30,00	1 279,40	2,23
	75	59,77	8 490 975,00	2 877 345,00	5 997 375,00	6 336 187,50	40,00	6 968,97	8,33

a. Multiple modes exist. The smallest value is shown

Histogram



DATABASE2 – DEAL DATABASE

list of variables

U_FUTAMIDO	→	Maturity	U_MARADVANYERTEK	→	Residual Value
U_BRUTTO_HUF	→	Gross Asset Value	U_MARADVANYERTEK_	→	Residual Value %
U_ONERO_HUF	→	Downpayment	U_INDULAS_EV	→	Deal start date
U_SZAMVITELI_ BEFEKTETES_HUF	→	Accounting Investment (Gross Asset Value - Downpayment)	U_FUTAMIDO_RANGE (month)	→	Maturity range (month)
U_TENYLEGES_ BEFEKTETES_HUF	→	Accounting Investment +/- charges and fees	U_ONERO_RANGE (%)	→	Downpayment range (%)
U_ONERO_SZAZALEK	→	Downpayment %	U_MARADVANYERTEK _RANGE (%)	→	Residual value range (%)

Frequencies

Personal Cars

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_ BEFEKTETES_HUF	U_TENYLEGES_ BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK _SZAZALEK
N	Valid	451,00	451,00	451,00	451,00	451,00	451,00	451,00	451,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		44,44	5 740 907,13	1 970 316,63	3 770 590,49	3 936 254,65	32,08	53 085,37	12,66
Median		37,13	4 500 000,00	1 380 000,00	3 073 000,00	3 173 600,00	30,00	1 017,79	2,34
Mode		59,77	5 000 000,00	0,00	1 938 708,00	2 132 577,00	30,00	422,32	1,96
Std. Deviation		19,01	4 170 807,72	2 124 059,63	2 564 515,67	2 689 133,52	14,44	295 167,62	18,23
Variance		361,38	17 395 637 071 143,00	4 511 629 313 593,17	6 576 740 636 402,17	7 231 439 097 202,56	208,56	87 123 922 543,04	332,42
Skewness		1,11	2,32	3,52	2,04	2,09	0,50	8,91	1,69
Std. Error of Skewness		0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11
Kurtosis		2,78	6,14	19,26	4,82	5,06	0,83	87,57	2,00
Std. Error of Kurtosis		0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,23
Minimum		12,06	1 400 000,00	0,00	696 683,00	762 117,00	0,00	52,52	0,21
Maximum		120,87	30 775 000,00	20 781 899,00	16 926 250,00	17 648 343,00	87,39	3 670 119,08	84,45
Percentiles	25	34,32	3 210 724,00	760 500,00	2 030 450,00	2 140 919,00	20,01	397,19	1,59
	50	37,13	4 500 000,00	1 380 000,00	3 073 000,00	3 173 600,00	30,00	1 017,79	2,34
	75	59,84	6 400 000,00	2 308 642,00	4 500 000,00	4 737 962,00	40,00	10 070,97	18,85

Trucks

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_ BEFEKTETES_HUF	U_TENYLEGES_ BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK _SZAZALEK
N	Valid	549,00	549,00	549,00	549,00	549,00	549,00	549,00	549,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		45,60	9 240 657,93	2 761 512,06	6 479 145,87	6 914 868,91	30,82	26 156,56	7,32
Median		47,74	7 114 860,00	2 153 466,00	4 916 400,00	5 239 450,00	30,00	1 446,86	2,14
Mode		35,97	2100000,00[a]	0,00	1470000,00[a]	1512678,00[a]	20,00	163,47[a]	1,51[a]
Std. Deviation		16,54	6 849 129,37	2 221 023,46	5 001 955,71	5 348 335,38	12,32	157 540,83	12,07
Variance		273,59	46 910 573 149 206,60	4 932 945 201 469,45	25 019 560 955 450,70	28 604 691 318 852,50	151,87	24 819 112 557,13	145,75
Skewness		1,29	1,63	1,89	1,58	1,61	0,54	12,02	3,05
Std. Error of Skewness		0,10	0,10	0,10	0,10	0,10	0,10	0,10	0,10
Kurtosis		4,53	2,43	4,96	2,51	2,63	1,50	164,05	10,13
Std. Error of Kurtosis		0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21
Minimum		12,19	1 500 000,00	0,00	713 500,00	738 500,00	0,00	93,19	0,26
Maximum		120,61	42 627 803,75	17 322 950,00	34 102 243,00	35 645 373,00	80,31	2 494 001,66	81,27
Percentiles	25	35,97	4 588 750,00	1 307 225,90	2 935 374,50	3 194 297,00	24,00	532,76	1,55
	50	47,74	7 114 860,00	2 153 466,00	4 916 400,00	5 239 450,00	30,00	1 446,86	2,14
	75	59,71	10 425 000,00	3 302 881,50	7 544 793,00	8 197 723,00	39,27	4 844,44	7,92

Closed-end financial lease

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_ BEFEKTETES_HUF	U_TENYLEGES_ BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK _SZAZALEK
N	Valid	913,00	913,00	913,00	913,00	913,00	913,00	913,00	913,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		45,24	7 179 661,21	2 283 361,25	4 896 299,97	5 170 270,22	31,71	39 159,54	9,78
Median		43,00	5 280 000,00	1 661 250,00	3 600 000,00	3 780 002,00	30,00	982,86	2,06
Mode		36,06[a]	5 000 000,00	0,00	2 000 000,00	1512678,00[a]	20,00	163,47[a]	1,51[a]
Std. Deviation		18,08	5 675 677,15	2 130 311,61	4 035 428,44	4 282 898,15	13,56	231 641,16	16,05
Variance		327,05	32 213 311 135 580,40	4 538 227 566 341,19	16 284 682 695 533,70	18 343 216 556 753,40	183,81	53 657 625 238,20	257,72
Skewness		1,21	2,11	2,75	2,21	2,24	0,57	10,75	2,18
Std. Error of Skewness		0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08
Kurtosis		3,50	5,06	12,30	6,10	6,33	1,04	131,13	4,17
Std. Error of Kurtosis		0,16	0,16	0,16	0,16	0,16	0,16	0,16	0,16
Minimum		12,06	1 400 000,00	0,00	696 683,00	738 500,00	0,00	52,52	0,21
Maximum		120,87	42 627 803,75	20 781 899,00	34 102 243,00	35 645 373,00	87,39	3 670 119,08	84,45
Percentiles	25	35,68	3 611 000,00	970 136,50	2 334 850,00	2 474 268,00	20,09	424,60	1,53
	50	43,00	5 280 000,00	1 661 250,00	3 600 000,00	3 780 002,00	30,00	982,86	2,06
	75	59,77	7 877 500,00	2 744 169,50	5 605 427,00	5 979 558,50	40,00	6 777,37	8,53

a. Multiple modes exist. The smallest value is shown

Open-end financial lease

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_ BEFEKTETES_HUF	U_TENYLEGES_ BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK _SZAZALEK
N	Valid	87,00	87,00	87,00	87,00	87,00	87,00	87,00	87,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		43,38	12 726 892,29	3 677 863,25	9 049 029,03	9 782 266,26	28,02	29 296,48	9,24
Median		37,45	9 128 750,00	2 758 001,00	6 840 000,00	7 312 799,00	28,00	4 073,66	7,98
Mode		37,35	6702388,00[a]	0,00	6032149,00[a]	6267001,00[a]	28,00	4073,66[a]	9,81[a]
Std. Deviation		12,91	7 427 881,32	2 630 663,99	5 132 291,22	5 611 140,26	10,09	216 813,78	4,11
Variance		166,71	55 173 420 948 478,70	6 920 393 016 941,24	26 340 413 215 607,50	31 484 895 010 247,20	101,78	47 008 216 099,18	16,93
Skewness		-0,15	1,31	1,01	1,22	1,27	-0,87	9,32	3,13
Std. Error of Skewness		0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26
Kurtosis		-0,64	0,52	0,21	0,37	0,52	2,36	86,93	11,01
Std. Error of Kurtosis		0,51	0,51	0,51	0,51	0,51	0,51	0,51	0,51
Minimum		13,35	5 762 500,00	0,00	2 934 499,00	3 169 260,00	0,00	1 556,56	2,77
Maximum		62,29	32 301 790,00	10 336 573,00	23 171 670,00	25 501 711,00	60,00	2 027 969,00	27,15
Percentiles	25	36,77	7 400 000,00	2 153 466,00	5 402 700,00	5 830 955,00	25,00	3 128,00	7,89
	50	37,45	9 128 750,00	2 758 001,00	6 840 000,00	7 312 799,00	28,00	4 073,66	7,98
	75	52,81	17 611 092,50	4 931 107,50	12 679 985,00	13 412 452,00	32,80	7 799,85	8,31

a. Multiple modes exist. The smallest value is shown

1999

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		34,89	3 757 257,54	1 454 848,99	2 302 408,54	2 598 772,15	38,31	93 035,10	11,50
Median		35,55	3 567 599,77	1 353 736,50	2 093 537,00	2 184 749,00	40,00	4 519,33	2,45
Mode		24,32[a]	2 100 000,00	630000,00[a]	1 470 000,00	1 512 678,00	40,00	193,35	2,35
Std. Deviation		13,75	1 351 123,79	697 006,96	964 861,04	1 159 887,86	11,05	259 367,64	15,97
Variance		189,03	1 825 535 504 412,68	485 818 706 798,43	930 956 823 326,21	1 345 339 842 672,01	122,00	67 271 572 103,53	254,93
Skewness		0,54	0,73	0,68	1,58	1,19	0,85	4,46	1,55
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		-0,54	0,70	-0,06	4,32	1,78	2,70	21,36	1,06
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		12,06	1 476 000,00	158 416,02	713 500,00	738 500,00	3,08	167,09	0,81
Maximum		60,42	8 463 900,00	3 481 194,00	6 771 120,00	6 771 120,00	80,31	1 683 099,10	55,49
Percentiles	25	24,04	2 975 327,50	914 824,00	1 784 659,00	1 876 867,75	30,00	282,86	1,84
	50	35,55	3 567 599,77	1 353 736,50	2 093 537,00	2 184 749,00	40,00	4 519,33	2,45
	75	36,35	4 409 684,00	1 889 325,00	2 599 557,50	3 243 988,00	40,00	74 583,94	18,58

a. Multiple modes exist. The smallest value is shown

2000

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		46,63	4 867 141,59	1 894 868,77	2 972 272,82	3 036 599,86	38,36	45 129,54	6,21
Median		50,65	4 276 250,00	1 500 000,00	2 603 037,50	2 679 119,50	35,00	430,75	1,81
Mode		59,77	3062375,00[a]	800000,00[a]	1968750,00[a]	2039813,00[a]	30,00	52,52[a]	,21[a]
Std. Deviation		14,41	2 360 146,12	1 136 912,77	1 576 122,58	1 582 527,54	11,54	147 789,14	10,86
Variance		207,66	5 570 289 698 145,07	1 292 570 635 945,67	2 484 162 384 813,22	2 504 393 421 451,21	133,27	21 841 629 736,75	117,92
Skewness		-0,52	1,49	1,48	1,92	1,91	1,43	6,27	3,03
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		-1,25	2,48	2,11	4,69	4,53	1,88	46,22	10,26
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		12,39	1 400 000,00	420 000,00	696 683,00	762 117,00	20,00	52,52	0,21
Maximum		60,58	13 500 000,00	5 700 000,00	9 051 866,00	9 051 866,00	75,95	1 245 935,86	63,46
Percentiles	25	35,43	3 281 937,50	1 106 531,25	1 962 187,50	2 039 813,00	30,00	218,50	1,34
	50	50,65	4 276 250,00	1 500 000,00	2 603 037,50	2 679 119,50	35,00	430,75	1,81
	75	59,94	5 888 437,50	2 358 500,00	3 414 359,00	3 502 625,25	40,00	10 632,75	3,23

a. Multiple modes exist. The smallest value is shown

2001

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		48,86	6 117 236,55	2 293 859,33	3 823 377,22	3 967 080,33	36,33	54 500,91	5,24
Median		48,27	5 279 000,00	1 866 500,00	3 209 500,00	3 325 048,00	35,00	564,41	1,88
Mode		59,84	1849000,00[a]	2 400 000,00	13 926 400,00	13 993 621,00	30,00	1 349,25	1,87
Std. Deviation		12,60	4 278 003,08	1 744 104,97	2 860 096,79	2 897 948,31	12,15	226 119,74	8,81
Variance		158,65	18 301 310 332 549,00	3 041 902 154 813,74	8 180 153 654 765,01	8 398 104 399 438,38	147,65	51 130 138 603,60	77,59
Skewness		-0,31	2,57	1,84	2,95	2,89	0,18	7,55	3,45
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		-0,50	7,85	4,00	9,60	9,35	1,32	64,23	13,74
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		14,84	1 799 000,00	0,00	1 105 900,00	1 172 254,00	0,00	98,63	0,54
Maximum		72,35	24 738 000,00	8 679 937,07	16 821 840,00	17 241 649,00	75,21	2 059 584,01	55,28
Percentiles	25	36,52	3 463 972,50	1 206 297,00	2 255 312,50	2 344 462,00	30,00	290,42	1,44
	50	48,27	5 279 000,00	1 866 500,00	3 209 500,00	3 325 048,00	35,00	564,41	1,88
	75	59,92	7 301 562,00	2 926 250,00	4 333 625,00	4 520 794,75	41,42	10 356,99	3,41

a. Multiple modes exist. The smallest value is shown

2002

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		43,70	7 519 098,48	2 507 946,53	5 011 151,95	5 253 246,33	33,95	15 927,24	7,74
Median		38,02	6 655 000,00	2 076 600,00	4 314 375,00	4 434 553,50	31,38	1 129,45	2,50
Mode		35,77[a]	10 425 000,00	970050,00[a]	2263450,00[a]	2263450,00[a]	20,00	760,26[a]	2,04[a]
Std. Deviation		13,22	5 586 169,79	2 019 401,98	3 932 074,40	4 107 611,38	12,71	54 234,72	11,65
Variance		174,73	31 205 292 882 060,80	4 077 984 338 085,12	15 461 209 057 286,40	16 872 471 238 621,50	161,52	2 941 404 701,28	135,73
Skewness		0,29	2,33	2,37	2,24	2,27	0,92	4,71	2,77
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		-0,70	6,77	6,75	6,27	6,59	1,82	23,28	7,96
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		15,71	1 795 000,00	0,00	1 000 000,00	1 089 998,00	0,00	89,32	0,65
Maximum		72,61	31 410 900,00	10 606 550,00	21 359 413,00	22 844 515,00	82,09	348 933,53	64,73
Percentiles	25	35,68	3 456 500,00	1 285 536,75	2 140 862,50	2 263 450,00	25,76	451,31	1,73
	50	38,02	6 655 000,00	2 076 600,00	4 314 375,00	4 434 553,50	31,38	1 129,45	2,50
	75	53,42	9 500 937,50	2 917 827,50	6 512 148,50	7 056 915,00	40,00	3 741,14	7,93

a. Multiple modes exist. The smallest value is shown

2003

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		45,54	9 714 096,46	3 128 426,36	6 585 670,10	6 931 599,75	30,65	30 830,73	8,48
Median		39,73	6 997 500,00	2 070 000,00	4 695 000,00	4 969 360,00	30,00	1 059,39	2,05
Mode		36,61	2680000,00[a]	,00[a]	1980000,00[a]	2039400,00[a]	20,00	391,18[a]	1,33[a]
Std. Deviation		13,48	7 688 157,64	2 727 140,12	5 357 488,56	5 603 279,86	11,44	248 215,12	13,15
Variance		181,75	59 107 767 871 949,00	7 437 293 241 178,69	28 702 683 672 224,40	31 396 745 213 183,30	130,95	61 610 746 638,74	172,91
Skewness		0,52	1,60	1,39	2,06	2,03	0,64	9,93	2,13
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		-0,68	2,83	2,06	6,15	6,04	1,29	98,99	3,46
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		18,77	2 180 033,00	0,00	1 443 000,00	1 558 441,00	0,00	174,01	0,94
Maximum		73,55	42 627 803,75	13 848 750,00	34 102 243,00	35 645 373,00	62,71	2 482 129,19	53,36
Percentiles	25	35,98	4 778 346,00	1 100 480,00	2 876 871,75	3 225 824,75	21,43	594,40	1,57
	50	39,73	6 997 500,00	2 070 000,00	4 695 000,00	4 969 360,00	30,00	1 059,39	2,05
	75	59,70	13 677 900,00	4 996 773,00	8 325 000,00	8 979 144,75	35,75	3 690,61	7,95

a. Multiple modes exist. The smallest value is shown

1999-2003

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	500,00	500,00	500,00	500,00	500,00	500,00	500,00	500,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		43,93	6 394 966,12	2 255 990,00	4 138 976,13	4 357 459,68	35,52	47 884,70	7,84
Median		39,79	4 825 000,00	1 700 000,00	2 990 240,00	3 208 800,00	32,00	1 005,44	2,18
Mode		59,77	2100000,00[a]	2000000,00[a]	1 470 000,00	1 512 678,00	30,00	193,35	2,35
Std. Deviation		14,29	5 230 159,23	1 887 120,69	3 658 310,76	3 807 243,46	12,10	203 254,87	12,46
Variance		204,15	27 354 565 564 606,00	3 561 224 494 979,31	13 383 237 622 415,00	14 495 102 790 718,40	146,53	41 312 540 561,21	155,24
Skewness		0,02	2,76	2,35	3,08	3,08	0,69	8,01	2,40
Std. Error of Skewness		0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11
Kurtosis		-0,95	9,74	7,20	13,45	13,60	1,55	75,03	5,14
Std. Error of Kurtosis		0,22	0,22	0,22	0,22	0,22	0,22	0,22	0,22
Minimum		12,06	1 400 000,00	0,00	696 683,00	738 500,00	0,00	52,52	0,21
Maximum		73,55	42 627 803,75	13 848 750,00	34 102 243,00	35 645 373,00	82,09	2 482 129,19	64,73
Percentiles	25	35,65	3 259 260,32	1 090 730,00	2 020 060,00	2 126 487,50	30,00	340,68	1,52
	50	39,79	4 825 000,00	1 700 000,00	2 990 240,00	3 208 800,00	32,00	1 005,44	2,18
	75	59,71	7 311 125,00	2 750 000,00	4 697 500,00	4 919 321,00	40,00	7 028,74	7,90

a. Multiple modes exist. The smallest value is shown

2004

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		43,37	11 196 861,40	3 335 579,57	7 861 281,83	8 515 024,70	29,41	5 407,38	9,44
Median		37,39	7 836 025,00	2 418 000,50	5 548 200,00	6 112 682,50	28,00	1 771,34	3,38
Mode		35,84[a]	3 342 600,00	1 403 892,00	1 938 708,00	2 132 577,00	20,00	422,32	1,96
Std. Deviation		13,46	7 887 161,86	2 521 310,04	5 533 648,13	6 101 490,90	7,82	7 824,86	13,73
Variance		181,15	62 207 322 144 778,40	6 357 004 318 135,31	30 621 261 602 821,60	37 228 191 251 814,00	61,18	61 228 372,45	188,50
Skewness		0,01	1,12	1,16	1,12	1,17	0,15	3,08	2,23
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		-0,85	0,21	0,44	0,19	0,42	0,95	13,22	3,87
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		12,39	2 450 000,00	490 000,00	1 874 875,00	1 875 025,00	10,00	353,60	1,17
Maximum		71,71	32 301 790,00	10 336 573,00	23 171 670,00	25 501 711,00	53,76	51 629,31	55,47
Percentiles	25	35,81	5 543 500,00	1 561 662,50	3 989 300,00	4 185 769,50	26,20	758,97	1,85
	50	37,39	7 836 025,00	2 418 000,50	5 548 200,00	6 112 682,50	28,00	1 771,34	3,38
	75	58,93	15 481 603,44	4 464 981,88	11 322 061,75	11 718 335,25	32,34	6 791,05	8,00

a. Multiple modes exist. The smallest value is shown

2005

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		46,52	9 131 177,60	2 555 616,88	6 575 560,72	7 039 425,74	27,49	42 963,37	12,12
Median		46,50	6 494 896,88	1 825 360,00	5 136 727,00	5 461 113,00	28,00	1 114,50	2,10
Mode		36,06	8 377 380,00	0,00	6 031 714,00	6 081 714,00	20,00	172,33[a]	,98[a]
Std. Deviation		22,19	7 474 772,40	2 558 924,70	5 335 167,24	5 777 625,13	12,96	366 570,94	18,33
Variance		492,50	55 872 222 505 668,20	6 548 095 606 778,89	28 464 009 514 434,30	33 380 952 133 533,10	167,94	134 374 256 134,06	335,97
Skewness		1,46	1,63	2,50	1,48	1,53	0,56	9,98	1,71
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		3,13	2,53	10,27	1,66	1,97	1,89	99,78	1,64
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		12,42	1 730 000,00	0,00	900 000,00	1 026 000,00	0,00	112,42	0,69
Maximum		120,87	39 370 340,00	17 322 950,00	25 404 950,00	27 864 148,00	71,57	3 670 119,08	65,90
Percentiles	25	32,79	3 588 475,00	867 750,00	2 652 789,00	2 780 069,75	20,00	575,03	1,55
	50	46,50	6 494 896,88	1 825 360,00	5 136 727,00	5 461 113,00	28,00	1 114,50	2,10
	75	60,00	10 437 500,00	2 922 500,00	7 379 637,50	8 264 443,75	32,00	6 797,11	15,92

a. Multiple modes exist. The smallest value is shown

2006

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		46,38	7 505 073,55	1 999 159,19	5 505 914,36	5 776 796,95	26,41	24 375,30	12,00
Median		47,66	6 100 000,00	1 660 000,00	4 200 783,00	4 381 045,00	25,00	1 121,53	2,29
Mode		36,52[a]	4150000,00[a]	0,00	2 490 000,00	2490000,00[a]	25,00	344,95[a]	1,62[a]
Std. Deviation		21,09	4 983 366,96	1 686 298,07	3 749 703,51	3 949 998,65	15,37	202 501,16	20,48
Variance		444,70	24 833 946 223 486,80	2 843 601 172 110,21	14 060 276 431 257,80	15 602 489 331 332,80	236,35	41 006 719 185,78	419,56
Skewness		1,29	1,79	1,52	1,57	1,57	0,88	9,98	2,32
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		2,98	2,74	2,48	2,10	2,12	1,50	99,76	4,60
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		13,06	2 420 000,00	0,00	1 600 000,00	1 696 000,00	0,00	117,88	0,26
Maximum		120,74	24 335 628,00	8 111 876,00	19 177 236,00	20 199 417,00	75,52	2 027 969,00	84,45
Percentiles	25	35,73	4 098 500,00	791 557,00	3 000 000,00	3 015 907,25	16,67	475,54	1,61
	50	47,66	6 100 000,00	1 660 000,00	4 200 783,00	4 381 045,00	25,00	1 121,53	2,29
	75	59,11	8 194 707,00	2 593 772,50	6 460 398,00	6 774 577,50	33,25	4 263,00	10,00

a. Multiple modes exist. The smallest value is shown

2007

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		46,65	8 545 154,55	2 324 561,72	6 220 592,83	6 568 874,34	26,44	37 878,32	14,35
Median		39,92	6 160 800,00	1 592 800,00	4 589 024,50	4 859 794,50	25,00	2 607,04	2,64
Mode		36,77[a]	5 000 000,00	500 000,00	4500000,00[a]	4162500,00[a]	20,00	18 523,68	27,15
Std. Deviation		23,12	5 722 229,10	2 145 264,53	4 289 948,29	4 599 214,82	13,45	295 535,79	17,95
Variance		534,63	32 743 905 868 309,90	4 602 159 906 367,12	18 403 656 341 609,60	21 152 777 004 667,20	180,90	87 341 400 736,41	322,32
Skewness		1,60	1,31	1,81	1,47	1,51	0,54	9,98	1,48
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		3,26	0,52	3,90	1,36	1,53	0,24	99,68	1,51
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		13,35	2 310 000,00	0,00	1 310 000,00	1 480 300,00	0,00	200,32	0,82
Maximum		120,61	23 191 627,20	11 790 000,00	19 119 380,00	20 497 314,00	64,78	2 961 399,45	74,90
Percentiles	25	34,67	4 809 475,00	819 037,50	3 513 000,00	3 645 787,50	20,00	571,28	1,71
	50	39,92	6 160 800,00	1 592 800,00	4 589 024,50	4 859 794,50	25,00	2 607,04	2,64
	75	59,73	10 184 334,50	2 973 810,85	8 374 486,25	8 765 445,25	33,33	14 304,73	26,96

a. Multiple modes exist. The smallest value is shown

2008

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		48,19	8 269 605,47	2 551 961,88	5 717 643,59	6 027 718,64	26,51	32 966,67	10,23
Median		47,89	6 443 108,00	1 602 720,00	4 733 077,00	4 893 600,00	20,76	985,42	1,97
Mode		37,35	2 800 800,00	560 160,00	2 240 640,00	2 263 046,00	20,00	163,47	1,51
Std. Deviation		21,28	5 633 807,37	3 142 169,51	3 404 922,80	3 652 526,73	15,11	249 789,83	17,01
Variance		452,72	31 739 785 461 662,60	9 873 229 212 600,21	11 593 499 263 767,60	13 340 951 530 191,50	228,29	62 394 958 949,44	289,29
Skewness		1,34	1,24	3,06	1,02	1,06	1,17	9,86	2,24
Std. Error of Skewness		0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Kurtosis		3,28	0,38	12,31	0,10	0,23	1,89	98,03	4,44
Std. Error of Kurtosis		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
Minimum		12,55	2 399 000,00	0,00	1 000 000,00	1 100 000,00	0,00	163,47	0,39
Maximum		120,42	23 781 900,00	20 781 899,00	15 453 000,00	16 793 204,00	87,39	2 494 001,66	81,27
Percentiles	25	36,36	4 391 400,00	670 239,00	3 166 025,00	3 196 546,25	19,04	538,37	1,52
	50	47,89	6 443 108,00	1 602 720,00	4 733 077,00	4 893 600,00	20,76	985,42	1,97
	75	60,35	9 643 072,50	2 928 125,00	7 006 748,50	7 206 080,00	30,00	6 079,78	9,81

2004-2008

Statistics

		U_FUTAMIDO	U_BRUTTO_HUF	U_ONERO_HUF	U_SZAMVITELI_BEFEKTETES_HUF	U_TENYLEGES_BEFEKTETES_HUF	U_ONERO_SZAZALEK	U_MARADVANYERTEK	U_MARADVANYERTEK_SZAZALEK
N	Valid	500,00	500,00	500,00	500,00	500,00	500,00	500,00	500,00
	Missing	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Mean		46,22	8 929 574,51	2 553 375,85	6 376 198,66	6 785 568,07	27,25	28 718,21	11,63
Median		44,31	6 595 000,00	1 800 450,00	4 868 425,00	5 198 377,00	28,00	1 401,45	2,33
Mode		36,52[a]	5 000 000,00	0,00	1938708,00[a]	2132577,00[a]	20,00	163,47[a]	1,51[a]
Std. Deviation		20,50	6 535 198,13	2 488 176,89	4 599 638,31	4 988 818,81	13,22	254 338,67	17,65
Variance		420,23	42 708 814 602 260,90	6 191 024 250 210,36	21 156 672 565 048,50	24 888 313 165 212,60	174,86	64 688 159 327,40	311,55
Skewness		1,43	1,53	2,39	1,49	1,56	0,74	11,80	2,02
Std. Error of Skewness		0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11
Kurtosis		3,51	1,88	9,16	1,76	2,13	1,67	143,70	3,41
Std. Error of Kurtosis		0,22	0,22	0,22	0,22	0,22	0,22	0,22	0,22
Minimum		12,39	1 730 000,00	0,00	900 000,00	1 026 000,00	0,00	112,42	0,26
Maximum		120,87	39 370 340,00	20 781 899,00	25 404 950,00	27 864 148,00	87,39	3 670 119,08	84,45
Percentiles	25	35,81	4 406 400,00	920 000,00	3 166 025,00	3 349 600,00	20,00	583,78	1,61
	50	44,31	6 595 000,00	1 800 450,00	4 868 425,00	5 198 377,00	28,00	1 401,45	2,33
	75	59,90	10 238 708,25	3 037 500,00	7 360 708,25	8 136 568,75	32,06	6 887,65	12,08

a. Multiple modes exist. The smallest value is shown

list of variables

U_FUTAMIDO	→	Maturity
U_BRUTTO_HUF	→	Gross Asset Value
U_ONERO_HUF	→	Downpayment
U_SZAMVITELI_BEFEKTETES_HUF	→	Accounting Investment (Gross Asset Value - Downpayment)
U_TENYLEGES_BEFEKTETES_HUF	→	Accounting Investment +/- charges and fees
U_ONERO_SZAZALEK	→	Downpayment %
U_MARADVANYERTEK	→	Residual Value
U_MARADVANYERTEK_SZAZALEK	→	Residual Value %
U_INDULAS_EV	→	Deal start date
U_FUTAMIDO_RANGE (month)	→	Maturity range (month)
U_ONERO_RANGE (%)	→	Downpayment range (%)
U_MARADVANYERTEK_RANGE (%)	→	Residual value range (%)
E_SZGK_TGK_FLAG	→	Personal Car (SZ)_Truck (T) Flag

Frequencies

		U_FUTAMIDO				U_BRUTTO_HUF				U_ONERO_SZAZALEK				U_MARADVANYERTEK_SZAZALEK			
		Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %
U_INDULAS_EV	1999	34,89	13,75	100	10,0%	3 757 257,54	1 351 123,79	100	10,0%	38,31	11,05	100	10,0%	11,50	15,97	100	10,0%
	2000	46,63	14,41	100	10,0%	4 867 141,59	2 360 146,12	100	10,0%	38,36	11,54	100	10,0%	6,21	10,86	100	10,0%
	2001	48,86	12,60	100	10,0%	6 117 236,55	4 278 003,08	100	10,0%	36,33	12,15	100	10,0%	5,24	8,81	100	10,0%
	2002	43,70	13,22	100	10,0%	7 515 098,48	5 586 169,79	100	10,0%	33,95	12,71	100	10,0%	7,74	11,65	100	10,0%
	2003	45,54	13,48	100	10,0%	9 714 096,46	7 688 157,64	100	10,0%	30,65	11,44	100	10,0%	8,48	13,15	100	10,0%
	2004	43,37	13,46	100	10,0%	11 196 861,40	7 887 161,86	100	10,0%	29,41	7,82	100	10,0%	9,44	13,73	100	10,0%
	2005	46,52	22,19	100	10,0%	9 131 177,60	7 474 772,40	100	10,0%	27,49	12,96	100	10,0%	12,12	18,33	100	10,0%
	2006	46,38	21,09	100	10,0%	7 505 073,55	4 983 366,96	100	10,0%	26,41	15,37	100	10,0%	12,00	20,48	100	10,0%
	2007	46,65	23,12	100	10,0%	8 543 154,55	5 722 229,10	100	10,0%	26,44	13,45	100	10,0%	14,35	17,95	100	10,0%
	2008	48,19	21,28	100	10,0%	8 265 605,47	5 633 807,37	100	10,0%	26,51	15,11	100	10,0%	10,23	17,01	100	10,0%

FUTAMIDŐ

U_FUTAMIDO_RANGE (hó)		Count	Column N %
1	-24	92	9,2%
2	-36	215	21,5%
3	-48	252	25,2%
4	-60	232	23,2%
5	60-	209	20,9%

U_FUTAMIDO_RANGE (hó)		E_SZGK_TGK_FLAG			
		SZ		T	
		Count	Column N %	Count	Column N %
1	-24	55	12,2%	37	6,7%
2	-36	106	23,5%	109	19,9%
3	-48	107	23,7%	145	26,4%
4	-60	83	18,4%	149	27,1%
5	60-	100	22,2%	109	19,9%

U_FUTAMIDO_RANGE (hó)		U_BRUTTO_HUF				U_ONERO_SZAZALEK				U_MARADVANYERTEK_SZAZALEK			
		Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %
1	-24	6 050 003,48	4 175 541,16	92	9,2%	32,31	15,71	92	9,2%	34,21	25,31	92	9,2%
2	-36	7 430 601,43	6 307 703,52	215	21,5%	32,87	14,71	215	21,5%	14,52	17,24	215	21,5%
3	-48	8 646 080,67	6 013 890,19	252	25,2%	31,50	13,86	252	25,2%	7,21	10,05	252	25,2%
4	-60	8 458 934,60	6 844 755,43	232	23,2%	31,83	11,43	232	23,2%	4,71	6,28	232	23,2%
5	60-	6 539 739,39	5 216 956,93	209	20,9%	28,83	11,67	209	20,9%	2,65	3,23	209	20,9%

U_FUTAMIDO_RANGE (hó)		U_INDULAS_EV															
		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
1	-24	25	27,2%	9	9,8%	2	2,2%	3	3,3%	1	1,1%	6	6,5%	12	13,0%	13	14,1%	10	10,9%	11	12,0%
2	-36	42	19,5%	21	9,8%	12	5,6%	28	13,0%	25	11,6%	25	11,6%	17	7,9%	17	7,9%	21	9,8%	7	3,3%
3	-48	12	4,8%	14	5,6%	29	11,5%	27	10,7%	34	13,5%	30	11,9%	24	9,5%	23	9,1%	26	10,3%	33	13,1%
4	-60	15	6,5%	37	15,9%	35	15,1%	21	9,1%	19	8,2%	20	8,6%	22	9,5%	25	10,8%	22	9,5%	16	6,9%
5	60-	6	2,9%	19	9,1%	22	10,5%	21	10,0%	21	10,0%	19	9,1%	25	12,0%	22	10,5%	21	10,0%	33	15,8%

ÖNERŐ

U_ONERO_RANGE (%)		Count	Column N %
0	-10	54	5,4%
1	-20	177	17,7%
2	-30	317	31,7%
3	-40	273	27,3%
4	-50	104	10,4%
5	50-	75	7,5%

U_ONERO_RANGE		E_SZGK_TGK_FLAG			
		SZ		T	
		Count	Column N %	Count	Column N %
0	-10	32	7,1%	22	4,0%
1	-20	75	16,6%	102	18,6%
2	-30	146	32,4%	171	31,1%
3	-40	99	22,0%	174	31,7%
4	-50	54	12,0%	50	9,1%
5	50-	45	10,0%	30	5,5%

U_ONERO_RANGE (%)		U_FUTAMIDO				U_BRUTTO_HUF				U_MARADVANYERTEK_SZAZALEK			
		Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %
0	-10	46,36	24,28	54	5,4%	5 512 246,32	2 540 806,62	54	5,4%	20,56	25,55	54	5,4%
1	-20	46,70	21,74	177	17,7%	7 006 863,74	5 923 627,92	177	17,7%	13,87	20,37	177	17,7%
2	-30	46,49	16,82	317	31,7%	8 256 585,91	5 968 017,18	317	31,7%	10,01	15,01	317	31,7%
3	-40	44,40	16,14	273	27,3%	8 155 926,64	6 781 334,34	273	27,3%	7,14	10,45	273	27,3%
4	-50	42,56	13,87	104	10,4%	7 077 604,11	6 276 442,22	104	10,4%	6,31	9,51	104	10,4%
5	50-	40,28	14,09	75	7,5%	7 258 901,36	4 760 447,60	75	7,5%	5,20	8,01	75	7,5%

U_ONERO_RANGE (%)		U_INDULAS_EV																	
		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008	
		Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %
0	-10	1	1,0%	0	,0%	2	2,0%	1	1,0%	2	2,0%	3	3,0%	8	8,0%	14	14,0%	13	13,0%	10	10,0%
1	-20	2	2,0%	3	3,0%	7	7,0%	17	17,0%	17	17,0%	15	15,0%	27	27,0%	25	25,0%	28	28,0%	36	36,0%
2	-30	27	27,0%	32	32,0%	25	25,0%	29	29,0%	42	42,0%	45	45,0%	31	31,0%	27	27,0%	30	30,0%	29	29,0%
3	-40	46	46,0%	44	44,0%	40	40,0%	27	27,0%	22	22,0%	27	27,0%	22	22,0%	23	23,0%	15	15,0%	7	7,0%
4	-50	12	12,0%	9	9,0%	14	14,0%	16	16,0%	10	10,0%	9	9,0%	7	7,0%	6	6,0%	9	9,0%	12	12,0%
5	50-	12	12,0%	12	12,0%	12	12,0%	10	10,0%	7	7,0%	1	1,0%	5	5,0%	5	5,0%	5	5,0%	6	6,0%

MARADVANYERTEK

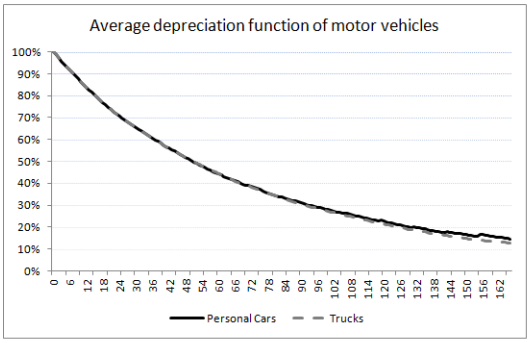
U_MARADVANYERTEK_RANGE (%)		Count	Column N %
0	-2,5	567	56,7%
1	-5	95	9,5%
2	-10	107	10,7%
3	-20	67	6,7%
4	-30	51	5,1%
5	30-	113	11,3%

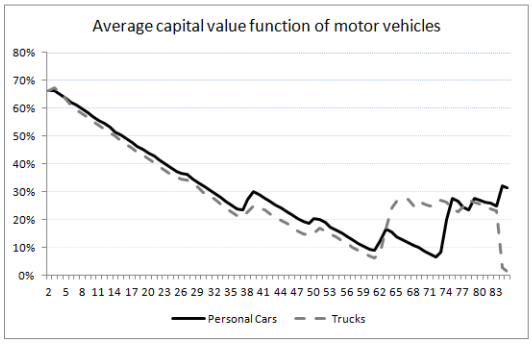
U_MARADVANYERTEK_RANGE		E_SZGK_TGK_FLAG			
		SZ		T	
		Count	Column N %	Count	Column N %
0	-2,5	247	54,8%	320	58,3%
1	-5	41	9,1%	54	9,8%
2	-10	18	4,0%	89	16,2%
3	-20	37	8,2%	30	5,5%
4	-30	30	6,7%	21	3,8%
5	30-	78	17,3%	35	6,4%

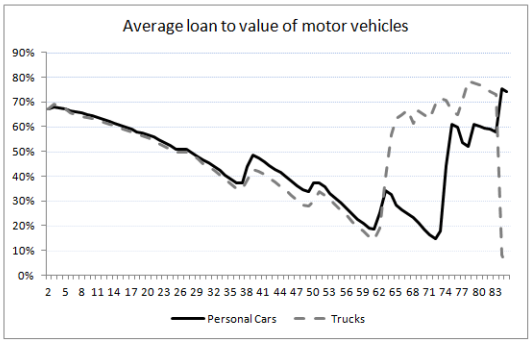
U_MARADVANYERTEK_RANGE (%)		U_FUTAMIDO				U_BRUTTO_HUF				U_ONERO_SZAZALEK			
		Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %	Mean	Standard Deviation	Total N	Column N %
0	-2,5	51,39	17,50	567	56,7%	7 470 683,94	5 768 648,08	567	56,7%	33,26	13,21	567	56,7%
1	-5	36,68	13,96	95	9,5%	6 245 054,72	4 743 906,57	95	9,5%	27,74	14,64	95	9,5%
2	-10	44,18	13,30	107	10,7%	11 152 642,92	8 010 908,30	107	10,7%	31,11	9,87	107	10,7%
3	-20	44,59	13,17	67	6,7%	8 270 872,85	6 616 954,23	67	6,7%	33,22	14,26	67	6,7%
4	-30	34,87	11,49	51	5,1%	6 634 024,92	5 307 947,13	51	5,1%	31,15	14,12	51	5,1%
5	30-	26,21	9,19	113	11,3%	6 613 237,00	4 998 267,27	113	11,3%	24,32	11,82	113	11,3%

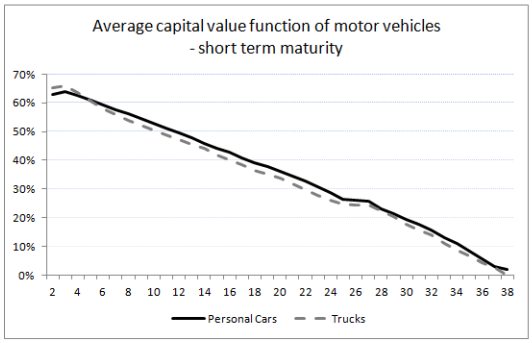
U_MARADVANYERTEK_RANGE (%)		U_INDULAS_EV																	
		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008	
		Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %
0	-2,5	51	51,0%	68	68,0%	68	68,0%	50	50,0%	61	61,0%	48	48,0%	57	57,0%	55	55,0%	49	49,0%	60	60,0%
1	-5	14	14,0%	11	11,0%	10	10,0%	13	13,0%	7	7,0%	9	9,0%	10	10,0%	8	8,0%	4	4,0%	9	9,0%
2	-10	7	7,0%	3	3,0%	9	9,0%	19	19,0%	12	12,0%	23	23,0%	5	5,0%	12	12,0%	8	8,0%	9	9,0%
3	-20	4	4,0%	7	7,0%	5	5,0%	8	8,0%	6	6,0%	6	6,0%	7	7,0%	9	9,0%	10	10,0%	5	5,0%
4	-30	9	9,0%	6	6,0%	5	5,0%	2	2,0%	3	3,0%	4	4,0%	4	4,0%	2	2,0%	12	12,0%	4	4,0%
5	30-	15	15,0%	5	5,0%	3	3,0%	8	8,0%	11	11,0%	10	10,0%	17	17,0%	14	14,0%	17	17,0%	13	13,0%

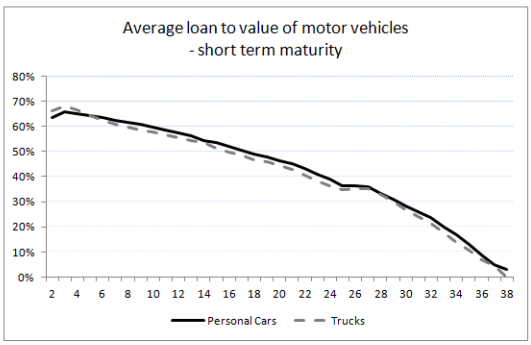
DATABASE3 – CALCULATIONAL&DEPRECIATIONAL DATABASE

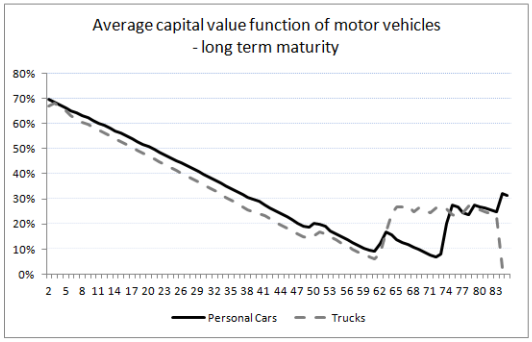


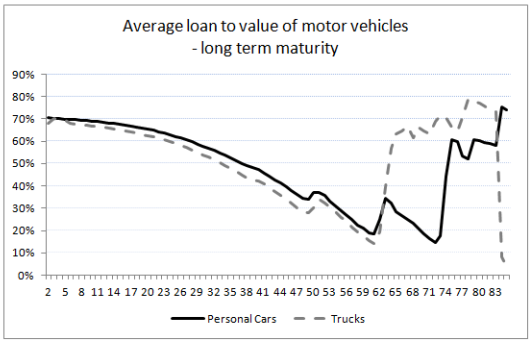












DATABASE5 – EXECUTIONAL (FINANCIAL PERFORMANCE) DATABASE

Frequencies

List of variables

P_RATING_start	→	Customer rating (deal start)	T_FELSZ_CSOD	→	Bankruptcy, liquidation process (flag)
P_RATING_end	→	Customer rating (deal end)	T_KIVEZETES_OSSZEG	→	Write off amount
P_Average_RATING	→	Average customer rating	T_FELMONDASOK SZAMA	→	Count of terminations
P_rating_end-start	→	Customer rating (deal end) - Customer rating (deal start)	T_legnagyobb késedelem aránya	→	Maximum amount of delinquencies (HUF)/Accounting Investment
T_Hányszor esett késedelembe (db)	→	Count of overdue payments	tm arány	→	tmax/(te-tp)
T_Késedelmek átlagos hossza (nap)	→	Average lenght of delinquencies (day)	T_fiz_felsz/hó	→	Count of average monthly payment reminders
T_A legnagyobb összegű késedelem (Ft)	→	Maximum amount of delinquencies (HUF)	T_fiz_felsz_tmax előtt	→	Count of payment reminders before tmax
T_Összes késedelem átlaga (Ft)	→	Average overdue amount	T_fiz_felsz_tmax után	→	Count of payment reminders after tmax
T_ATUTEMEZES SZAMA	→	Count of restructurings	T_fiz_felsz/hó_tmax előtt	→	Count of average monthly payment reminders before tmax
T_FELSZOLITASOK_SZAMA	→	Count of payment reminders	T_fiz_felsz_felsz/hó_tmax után	→	Count of average monthly payment reminders after tmax
T_ESZKOZVISSZAVET	→	Asset repossession (flag)	Csoportkód	→	Group code (H4)

Statistics

		P_RATING_start	P_RATING_end	P_Average_RATING	P_rating_end-start
N	Valid	927	872	926	1000
	Missing	73	128	74	0
Mean		3,214	3,321	3221552785,766	-,08
Median		3,000	3,500	3,750	,00
Mode		3,0	3,0	3,0	0
Std. Deviation		,9475	,9324	4679199566,5236	1,193
Variance		,898	,869	21894908583354800000,000	1,424
Skewness		,024	,003	,764	-1,202
Std. Error of Skewness		,080	,083	,080	,077
Kurtosis		-,552	-,410	-1,419	3,393
Std. Error of Kurtosis		,160	,165	,161	,155
Minimum		,5	,5	1,0	-5
Maximum		5,0	5,0	10010736000,0	4
Percentiles	25	2,500	2,500	3,000	-,50
	50	3,000	3,500	3,750	,00
	75	4,000	4,000	10010541600,000	,50

Frequency Table

P_RATING_start

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0,5	1	,1	,1	,1
	1	10	1,0	1,1	1,2
	1,5	44	4,4	4,7	5,9
	2	92	9,2	9,9	15,9
	2,5	151	15,1	16,3	32,1
	3	202	20,2	21,8	53,9
	3,5	139	13,9	15,0	68,9
	4	161	16,1	17,4	86,3
	4,5	60	6,0	6,5	92,8
	5	67	6,7	7,2	100,0
	Total	927	92,7	100,0	
Missing	System	73	7,3		
Total		1000	100,0		

P_RATING_end

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0,5	1	,1	,1	,1
	1	8	,8	,9	1,0
	1,5	30	3,0	3,4	4,5
	2	67	6,7	7,7	12,2
	2,5	128	12,8	14,7	26,8
	3	188	18,8	21,6	48,4
	3,5	180	18,0	20,6	69,0
	4	126	12,6	14,4	83,5
	4,5	60	6,0	6,9	90,4
	5	84	8,4	9,6	100,0
	Total	872	87,2	100,0	
Missing	System	128	12,8		
Total		1000	100,0		

P_rating_end-start

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-5	6	,6	,6	,6
	-5	1	,1	,1	,7
	-4	18	1,8	1,8	2,5
	-4	9	,9	,9	3,4
	-3	10	1,0	1,0	4,4
	-3	14	1,4	1,4	5,8
	-2	18	1,8	1,8	7,6
	-2	37	3,7	3,7	11,3
	-1	52	5,2	5,2	16,5
	0	98	9,8	9,8	26,3
	0	450	45,0	45,0	71,3
	1	120	12,0	12,0	83,3
	1	62	6,2	6,2	89,5
	2	60	6,0	6,0	95,5
	2	30	3,0	3,0	98,5
	3	12	1,2	1,2	99,7
	3	2	,2	,2	99,9
	4	1	,1	,1	100,0
	Total	1000	100,0	100,0	

Statistics

		T_Hányszor esett késedelembe (db)	T_Késedelmek átlagos hossza (nap)	T_A legnagyobb összegű késedelem (Ft)	T_Összes késedelem átlaga (Ft)	T_ATUTEMEZES SZAMA	T_FELSZOLITASOK_SZAMA	T_KIVEZETES_OSSZEG	T_FELMONDASOK SZAMA
N	Valid	1000	1000	1000	1000	66	652	27	270
	Missing	0	0	0	0	934	348	973	730
Mean		25,68	24,943580	846155,84	208690,97240707600000	1,29	8,07	2027722,56	3,59
Median		25,00	11,539706	307938,00	128682,87308118400000	1,00	4,00	1333290,00	2,00
Mode		27	3,5000	106827[a]	,000000000000[a]	1	1	10[a]	1
Std. Deviation		14,070	54,8661251	1578412,925	271120,032497716000000	,519	9,734	2429773,659	3,513
Variance		197,951	3010,292	2491387361214,150	73506072021,563	,270	94,742	5903800036370,490	12,339
Skewness		,430	9,074	5,219	6,113	1,618	2,109	1,779	2,043
Std. Error of Skewness		,077	,077	,077	,077	,295	,096	,448	,148
Kurtosis		-,335	109,157	38,379	60,451	1,816	5,079	3,647	4,403
Std. Error of Kurtosis		,155	,155	,155	,155	,582	,191	,872	,295
Minimum		0	,0000	0	,000000000000	1	1	10	1
Maximum		75	867,0000	18519734	3752181,704545450000	3	64	10065493	21
Percentiles	25	15,00	6,824964	161924,25	77085,45657467530000	1,00	2,00	61200,00	1,00
	50	25,00	11,539706	307938,00	128682,87308118400000	1,00	4,00	1333290,00	2,00
	75	35,00	22,637279	839240,75	235782,24218750000000	2,00	11,00	3432020,00	4,00

a. Multiple modes exist. The smallest value is shown

		Count
T_ESZKOZVISSZAVET		975
	Y	25
T_FELSZ_CSOD		971
	Y	29

Statistics

		T_legnagyobb késedelem aránya	T_FELSZOLITASOK _SZAMA	tm arány	T_fiz_felsz/hó	T_fiz_felsz_tmax előtt	T_fiz_felsz_tmax után	T_fiz_felsz/hó_tmax előtt	T_fiz_felsz_felsz/hó_tmax után
N	Valid	1000	652	1000	1000	652	652	937	1000
	Missing	0	348	0	0	348	348	63	0
Mean		,144884	8,07	,515746	,119545	3,14	4,77	,085335	,138862
Median		,073545	4,00	,485714	,033898	1,00	2,00	,000000	,035714
Mode		,0477[a]	1	,0000	,0000	0	1	,0000	,0000
Std. Deviation		,1793384	9,734	,2021826	,1890086	5,418	6,056	,1680174	,2332989
Variance		,032	94,742	,041	,036	29,356	36,670	,028	,054
Skewness		3,002	2,109	-,161	2,244	3,137	2,195	2,609	2,382
Std. Error of Skewness		,077	,096	,077	,077	,096	,096	,080	,077
Kurtosis		10,507	5,079	1,799	5,250	14,811	6,189	7,078	6,200
Std. Error of Kurtosis		,155	,191	,155	,155	,191	,191	,160	,155
Minimum		,0000	1	,0000	,0000	0	0	,0000	,0000
Maximum		1,3320	64	1,0000	1,2632	47	40	1,0000	1,5000
Percentiles	25	,053391	2,00	,444444	,000000	,00	1,00	,000000	,000000
	50	,073545	4,00	,485714	,033898	1,00	2,00	,000000	,035714
	75	,142566	11,00	,583333	,142857	4,00	6,00	,075000	,166667

a. Multiple modes exist. The smallest value is shown

for deals whose have maturity expiring in 75% until the end of 2009

Statistics

		T_legnagyobb késedelem aránya	T_FELSZOLITASOK _SZAMA	tm arány	T_fiz_felsz/hó	T_fiz_felsz_tmax előtt	T_fiz_felsz_tmax után	T_fiz_felsz/hó_tmax előtt	T_fiz_felsz_felsz/hó_tmax után
N	Valid	820	524	820	820	524	524	763	820
	Missing	0	296	0	0	296	296	57	0
Mean		,151436	7,17	,513344	,111209	2,69	4,39	,078203	,128916
Median		,073545	4,00	,485714	,033333	1,00	2,00	,000000	,035714
Mode		,0797	1	,0000	,0000	0	1	,0000	,0000
Std. Deviation		,1870049	8,426	,2082451	,1782102	4,533	5,535	,1619415	,2165895
Variance		,035	70,993	,043	,032	20,552	30,641	,026	,047
Skewness		2,907	2,177	-,163	2,423	2,409	2,436	2,749	2,450
Std. Error of Skewness		,085	,107	,085	,085	,107	,107	,089	,085
Kurtosis		9,823	5,351	1,668	6,694	6,849	8,433	7,894	6,841
Std. Error of Kurtosis		,171	,213	,171	,171	,213	,213	,177	,171
Minimum		,0000	1	,0000	,0000	0	0	,0000	,0000
Maximum		1,3320	49	1,0000	1,2632	33	40	1,0000	1,5000
Percentiles	25	,053817	1,00	,448276	,000000	,00	1,00	,000000	,000000
	50	,073545	4,00	,485714	,033333	1,00	2,00	,000000	,035714
	75	,155527	9,00	,573770	,134685	3,00	6,00	,068966	,157484

for deals whose have payment reminder and maturity expiring in 75% until the end of 2009

Statistics

		T_legnagyobb késedelem aránya	T_FELSZOLITASOK _SZAMA	tm arány	T_fiz_felsz/hó	T_fiz_felsz_tmax előtt	T_fiz_felsz_tmax után	T_fiz_felsz/hó_tmax előtt	T_fiz_felsz_felsz/hó_tmax után
N	Valid	524	524	524	524	524	524	489	524
	Missing	0	0	0	0	0	0	35	0
Mean		,159480	7,17	,499944	,174029	2,69	4,39	,122022	,201739
Median		,080042	4,00	,485714	,086335	1,00	2,00	,041667	,105263
Mode		,0797	1	,0000	,0286	0	1	,0000	,0000
Std. Deviation		,1860146	8,426	,1961291	,1969260	4,533	5,535	,1886580	,2423669
Variance		,035	70,993	,038	,039	20,552	30,641	,036	,059
Skewness		2,813	2,177	-,232	1,925	2,409	2,436	2,047	1,896
Std. Error of Skewness		,107	,107	,107	,107	,107	,107	,110	,107
Kurtosis		9,146	5,351	2,124	4,057	6,849	8,433	4,003	3,965
Std. Error of Kurtosis		,213	,213	,213	,213	,213	,213	,220	,213
Minimum		,0187	1	,0000	,0141	0	0	,0000	,0000
Maximum		1,2064	49	1,0000	1,2632	33	40	1,0000	1,5000
Percentiles	25	,059786	1,00	,444444	,038106	,00	1,00	,000000	,041667
	50	,080042	4,00	,485714	,086335	1,00	2,00	,041667	,105263
	75	,165747	9,00	,558836	,232692	3,00	6,00	,159593	,285714

		tm arány
		Mean
Csoportkód	000	,4509
	001	,5267
	010	,4630
	011	,6266
	100	,5379
	101	,4375
	110	,5036
	111	,7344

b) t-test of the function fitting annual depreciation

One-Sample Statistics

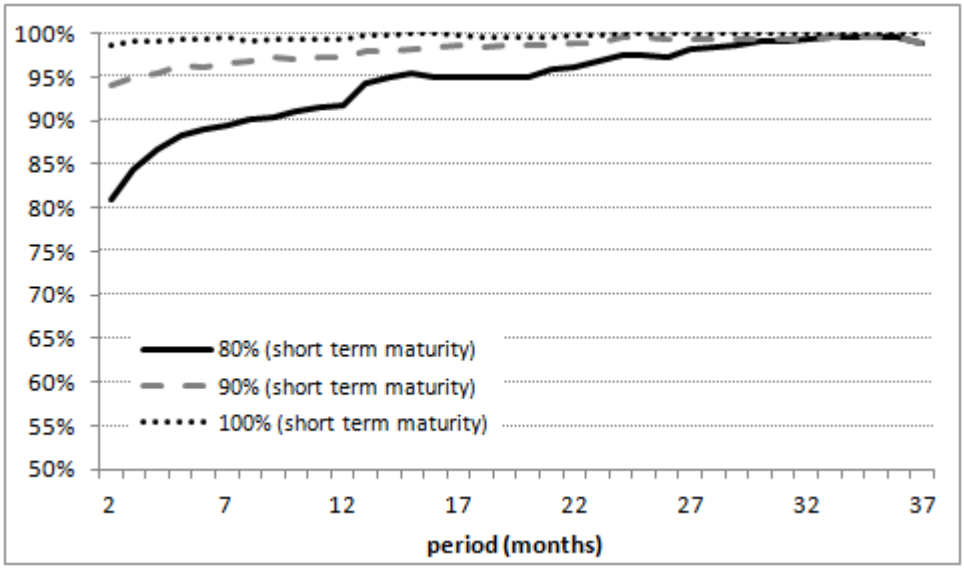
	N	Mean	Std. Deviation	Std. Error Mean
Estimation	114	95,0128	4,79605	,44919

One-Sample Test

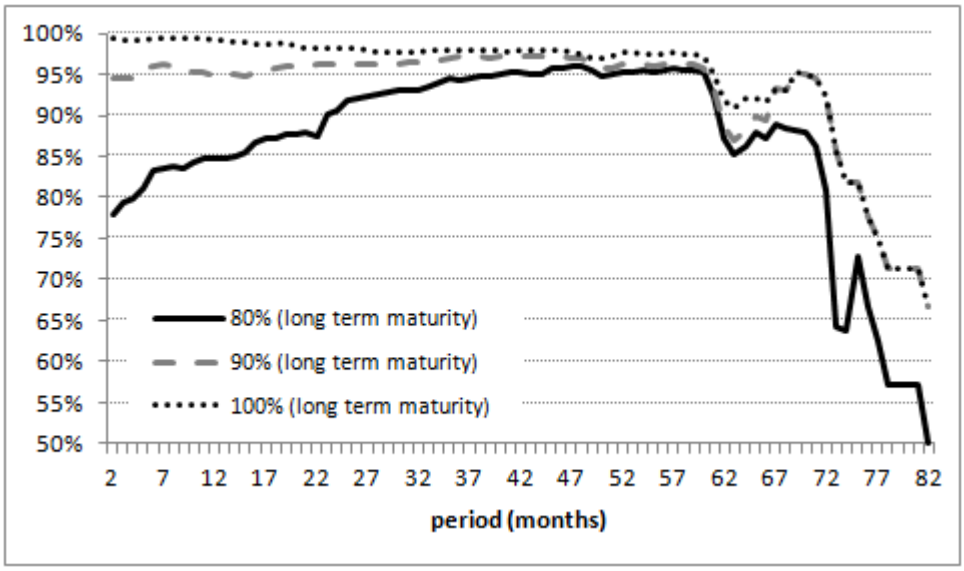
	Test Value = 100					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Estimation	-11,103	113	,000	-4,98720	-5,8771	-4,0973

Annex 4. – The development of LTVs according to maturity (H1)

a) short maturity



b) long maturity



Annex 5. – The correlation between capital value and depreciation function (H2)

Correlations - short maturity															
Year/Category		A	B	C	D	E	G	H	I	K	L	N	T	Absolute min/max; average weighed by number of transactions	Average
1999	Min	1,000	0,995	0,995	0,994			0,810		0,849	0,841			0,8099	0,9263
	Max	1,000	1,000	1,000	1,000			0,810		0,999	1,000			1,0000	0,9726
	Averag	1,000	0,998	0,998	0,997			0,810		0,972	0,978			0,9844	0,9646
2000	Min		0,997	0,995	0,997	0,996		0,996	0,998		0,992	0,999	0,998	0,9920	0,9964
	Max		0,998	0,999	1,000	0,996		0,996	0,998		0,999	0,999	0,998	0,9996	0,9981
	Average		0,997	0,998	0,998	0,996		0,996	0,998		0,995	0,999	0,998	0,9972	0,9973
2001	Min		0,989	0,995	0,995			0,988		0,986	0,982	0,979	0,980	0,9793	0,9869
	Max		0,992	0,998	0,997			0,988		0,990	1,000	0,999	0,985	0,9995	0,9936
	Average		0,990	0,996	0,996			0,988		0,988	0,994	0,986	0,983	0,9908	0,9902
2002	Min		0,986	0,942	0,995	0,990	0,995	0,991		0,984		0,971	0,996	0,9420	0,9834
	Max		0,996	0,999	0,998	0,997	0,997	0,995		0,997		0,999	0,997	0,9993	0,9972
	Average		0,991	0,988	0,997	0,993	0,996	0,993		0,990		0,988	0,997	0,9910	0,9926
2003	Min		0,998	0,997	0,992	0,985				0,993	0,979	0,974	0,982	0,9739	0,9875
	Max		0,999	0,997	0,998	0,996				0,994	0,993	0,999	0,990	0,9993	0,9958
	Average		0,999	0,997	0,995	0,989				0,994	0,987	0,996	0,985	0,9927	0,9927
2004	Min		1,000	0,996	0,994	0,991					0,964	0,908	0,980	0,9084	0,9761
	Max		1,000	0,999	0,998	0,999					0,998	0,999	0,996	0,9996	0,9984
	Average		1,000	0,997	0,996	0,995					0,985	0,979	0,988	0,9889	0,9915
2005	Min		0,984	0,995	0,992	0,991	0,989		0,996	0,980	0,967	0,911	0,981	0,9113	0,9787
	Max		0,999	0,999	0,998	0,991	0,999		0,996	0,987	0,989	0,998	0,995	0,9992	0,9950
	Average		0,989	0,997	0,994	0,991	0,995		0,996	0,983	0,979	0,978	0,991	0,9894	0,9892
2006	Min		0,996	0,983	0,959				0,996	0,989	0,983	0,978	0,629	0,6291	0,9392
	Max		0,996	0,999	0,998				0,996	0,993	0,996	0,999	0,996	0,9990	0,9965
	Average		0,996	0,992	0,990				0,996	0,991	0,992	0,991	0,905	0,9797	0,9814
2007	Min		0,987	0,995	0,994	0,999			0,997	0,986	0,945	0,957	0,971	0,9445	0,9813
	Max		0,988	0,998	1,000	0,999			0,999	0,990	0,999	0,999	1,000	0,9998	0,9968
	Average		0,988	0,996	0,996	0,999			0,998	0,988	0,990	0,990	0,989	0,9908	0,9926
2008	Min		0,938	0,992	0,938				0,993	0,971	0,908	0,968	0,995	0,9083	0,9629
	Max		0,996	0,999	0,994				0,997	0,998	0,997	0,968	0,995	0,9991	0,9931
	Average		0,975	0,995	0,966				0,994	0,988	0,981	0,968	0,995	0,9874	0,9827

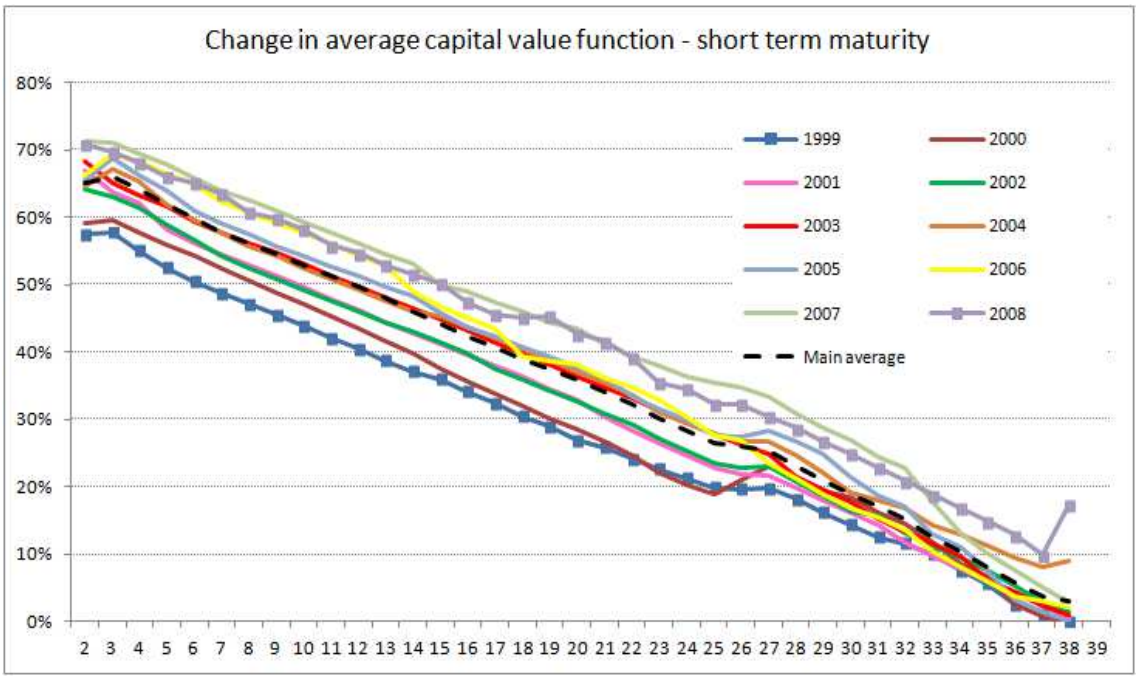
Number of transactions - short maturity													
Year/Category	A	B	C	D	E	G	H	I	K	L	N	T	Total
1999	1	8	16	11	-	-	1	-	9	30	-	-	76
2000	-	4	8	9	1	-	1	1	-	10	2	1	37
2001	-	3	4	6	-	-	1	-	5	5	3	5	32
2002	-	7	9	7	2	2	2	-	2	-	16	2	49
2003	-	8	2	10	4	-	-	-	2	5	9	9	49
2004	-	1	16	2	2	-	-	-	-	5	15	11	52
2005	-	3	9	6	1	5	-	1	3	5	6	8	47
2006	-	1	14	6	-	-	-	1	3	5	8	6	44
2007	-	2	2	3	1	-	-	2	4	15	9	7	45
2008	-	4	9	2	-	-	-	9	4	9	1	5	43

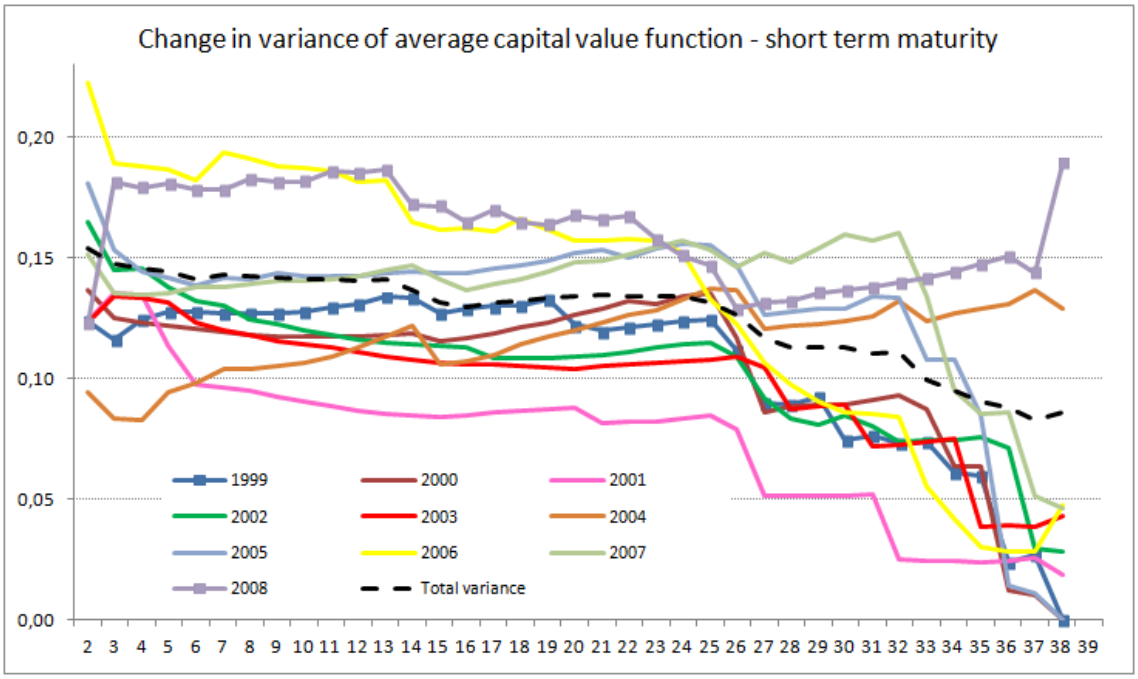
Correlations - long maturity															
Year/Category		A	B	C	D	E	G	H	I	K	L	N	T	Absolute min/max; average weighed by number of transactions	Average
1999	Min		0,987	0,992	0,993					0,968	0,985			0,9684	0,9850
	Max		0,991	0,996	0,998					0,989	0,989			0,9976	0,9925
	Average		0,989	0,994	0,995					0,981	0,987			0,9894	0,9890
2000	Min		0,985	0,990	0,990	0,983		0,990	0,990	0,979	0,967	0,980		0,9673	0,9838
	Max		0,988	0,996	0,997	0,987		0,991	0,990	0,992	0,994	1,000		0,9997	0,9926
	Average		0,987	0,993	0,994	0,985		0,991	0,990	0,986	0,988	0,993		0,9891	0,9896
2001	Min		0,984	0,986	0,985	0,978		0,987		0,970	0,908	0,997	0,984	0,9082	0,9754
	Max		0,990	0,994	0,993	0,983		0,987		0,985	0,988	0,997	0,984	0,9970	0,9891
	Average		0,988	0,991	0,990	0,981		0,987		0,978	0,979	0,997	0,984	0,9846	0,9860
2002	Min		0,985	0,986	0,952	0,984	0,992	0,990	0,983	0,983	0,983	0,971	0,981	0,9524	0,9808
	Max		0,988	0,996	0,986	0,984	0,992	0,990	0,983	0,985	0,990	0,999	0,986	0,9987	0,9891
	Average		0,986	0,993	0,969	0,984	0,992	0,990	0,983	0,985	0,988	0,994	0,984	0,9879	0,9861
2003	Min		0,984	0,979	0,992	0,974			0,980	0,991	0,979	0,918	0,976	0,9180	0,9748
	Max		0,997	0,997	0,994	0,975			0,985	0,991	0,986	0,999	0,986	0,9986	0,9899
	Average		0,992	0,988	0,993	0,974			0,983	0,991	0,984	0,986	0,982	0,9864	0,9859
2004	Min		0,991	0,982	0,985		0,988			0,982	0,979	0,978	0,971	0,9709	0,9820
	Max		0,991	0,982	0,995		0,988			0,982	0,992	0,998	0,985	0,9981	0,9891
	Average		0,991	0,982	0,990		0,988			0,982	0,984	0,991	0,978	0,9845	0,9858
2005	Min	0,977	0,981	0,980	0,982		0,991		0,984	0,976	0,969	0,982	0,971	0,9690	0,9793
	Max	0,977	0,998	0,993	0,993		0,991		0,984	0,977	0,986	0,997	0,984	0,9978	0,9880
	Averag	0,977	0,987	0,989	0,989		0,991		0,984	0,976	0,980	0,992	0,979	0,9858	0,9845
2006	Min		0,986	0,948	0,989		0,997		0,986	0,957	0,975	0,992	0,982	0,9484	0,9792
	Max		0,986	0,990	0,990		0,997		0,990	0,994	0,994	0,996	0,989	0,9972	0,9917
	Average		0,986	0,984	0,989		0,997		0,988	0,976	0,986	0,994	0,986	0,9847	0,9873
2007	Min	0,959	0,983	0,984	0,989	0,984	0,991		0,983	0,962	0,981	0,971	0,973	0,9589	0,9781
	Max	0,959	0,986	0,993	0,989	0,984	0,993		0,994	0,983	0,992	0,996	0,986	0,9955	0,9867
	Averag	0,959	0,984	0,988	0,989	0,984	0,992		0,989	0,971	0,984	0,988	0,980	0,9848	0,9826
2008	Min		0,979	0,980	0,989	0,979	0,988		0,893	0,967	0,977	0,986	0,944	0,8925	0,9680
	Max		0,981	0,992	0,994	0,984	0,988		0,989	0,983	0,985	0,993	0,990	0,9942	0,9879
	Average		0,980	0,987	0,991	0,981	0,988		0,967	0,975	0,980	0,990	0,979	0,9810	0,9819

Number of transactions - long maturity													
Year/Category	A	B	C	D	E	G	H	I	K	L	N	T	Total
1999	-	3	7	3	-	-	-	-	3	8	-	-	24
2000	-	6	12	3	2	-	2	1	11	23	3	-	63
2001	-	9	13	10	2	-	1	-	7	23	2	1	68
2002	-	9	6	2	1	1	1	1	4	6	12	8	51
2003	-	10	6	3	2	-	-	4	1	5	11	9	51
2004	-	1	1	6	-	1	-	-	1	7	13	18	48
2005	1	9	6	4	-	1	-	1	3	4	13	11	53
2006	-	1	13	3	-	1	-	3	10	13	4	8	56
2007	1	2	12	2	1	2	-	5	3	14	6	7	55
2008	-	3	5	8	2	1	-	5	13	10	5	5	57

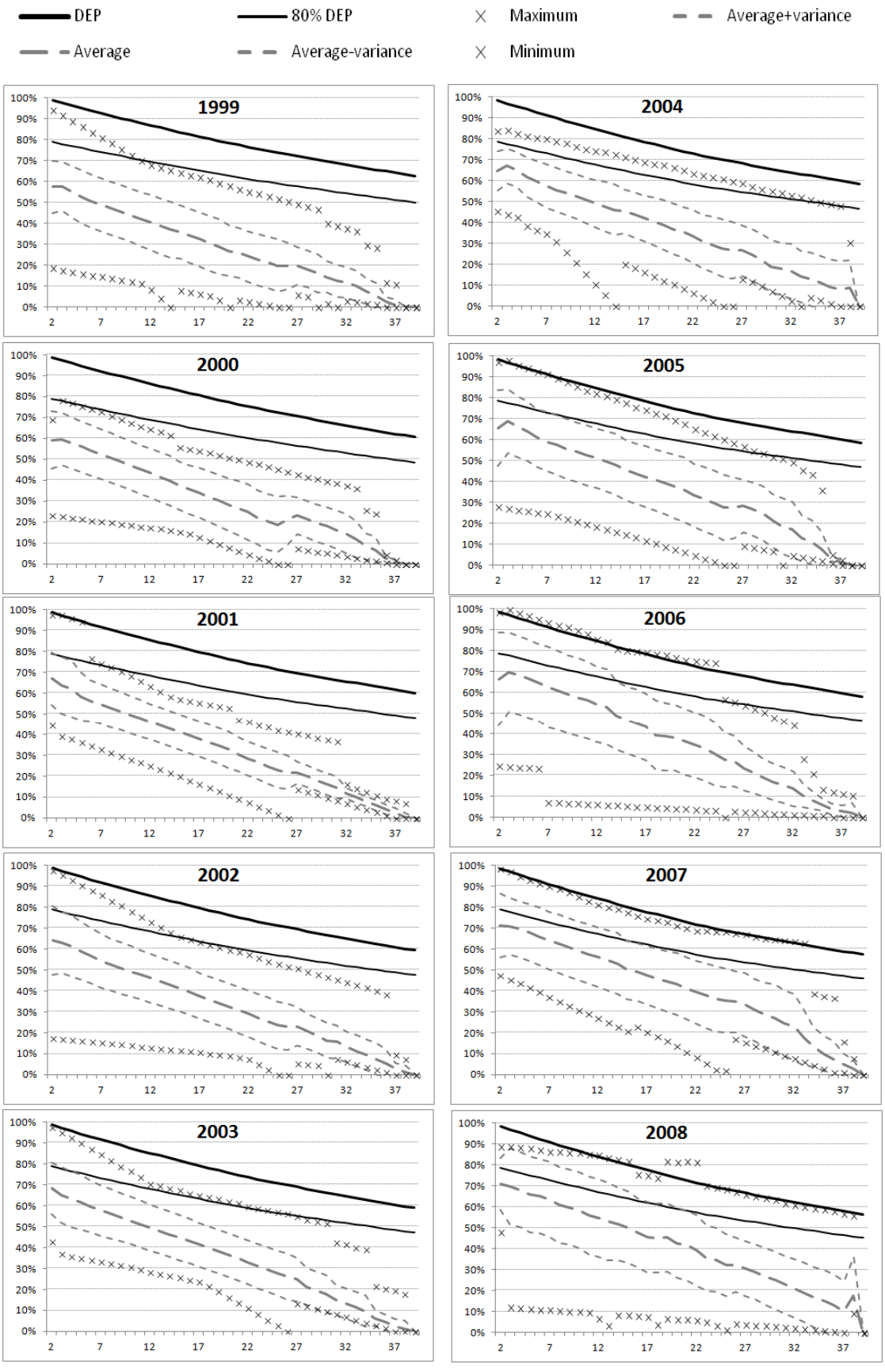
Annex 6. – Change in capital value function – short term maturity (H2)

a) averages and variances



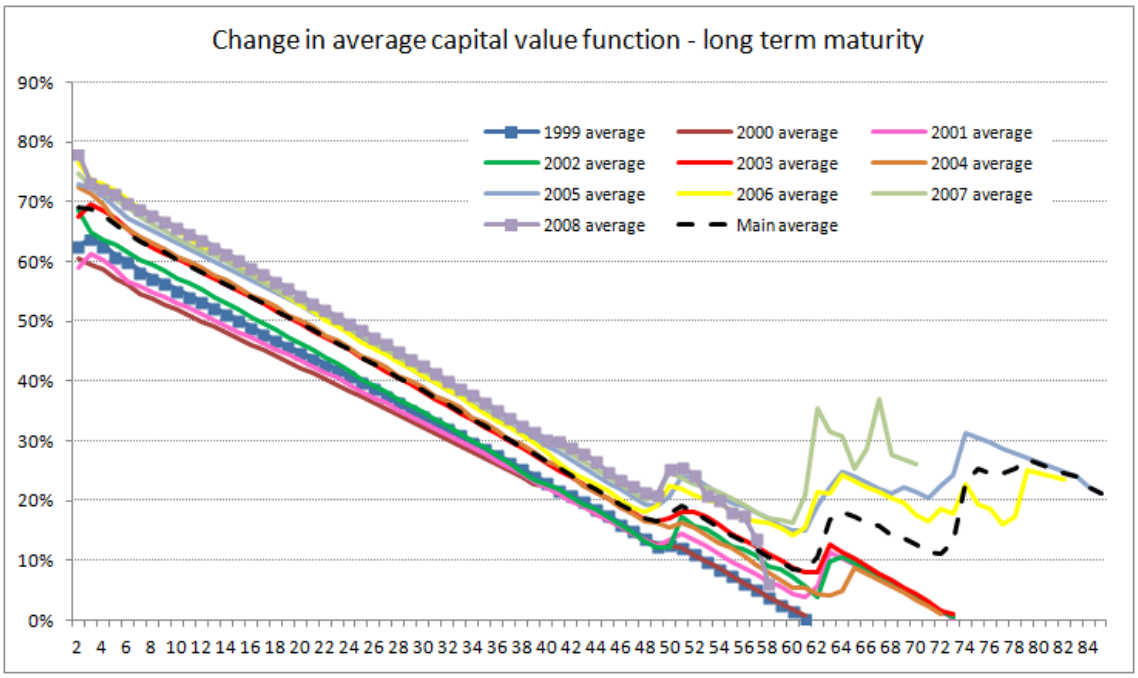


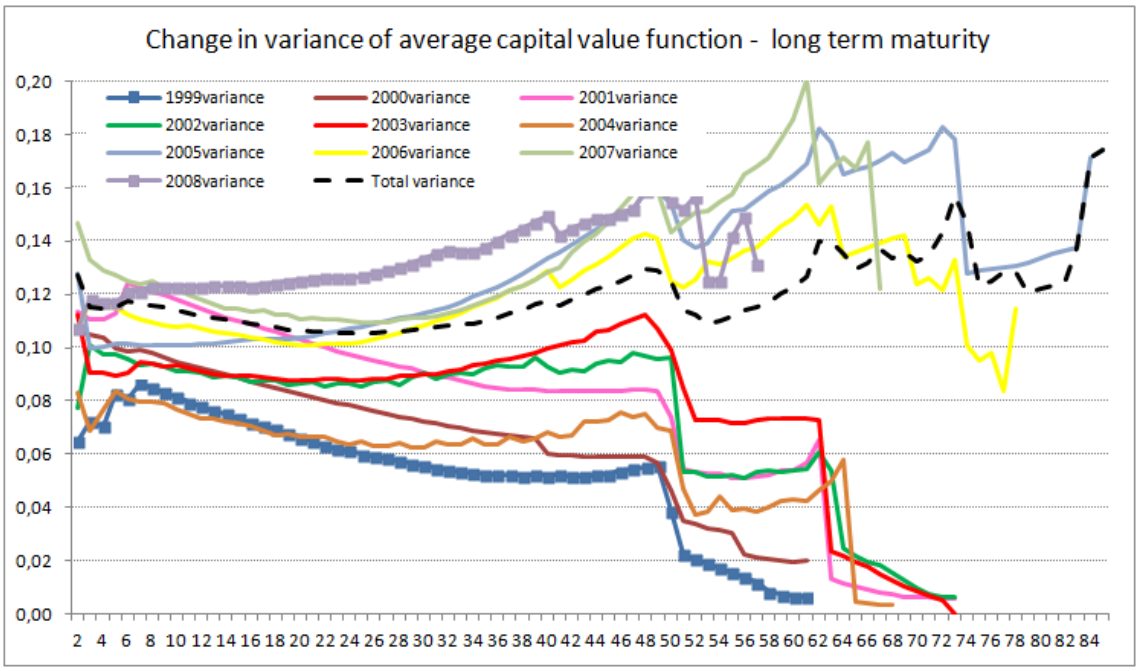
b) The relation between average depreciation and capital value function



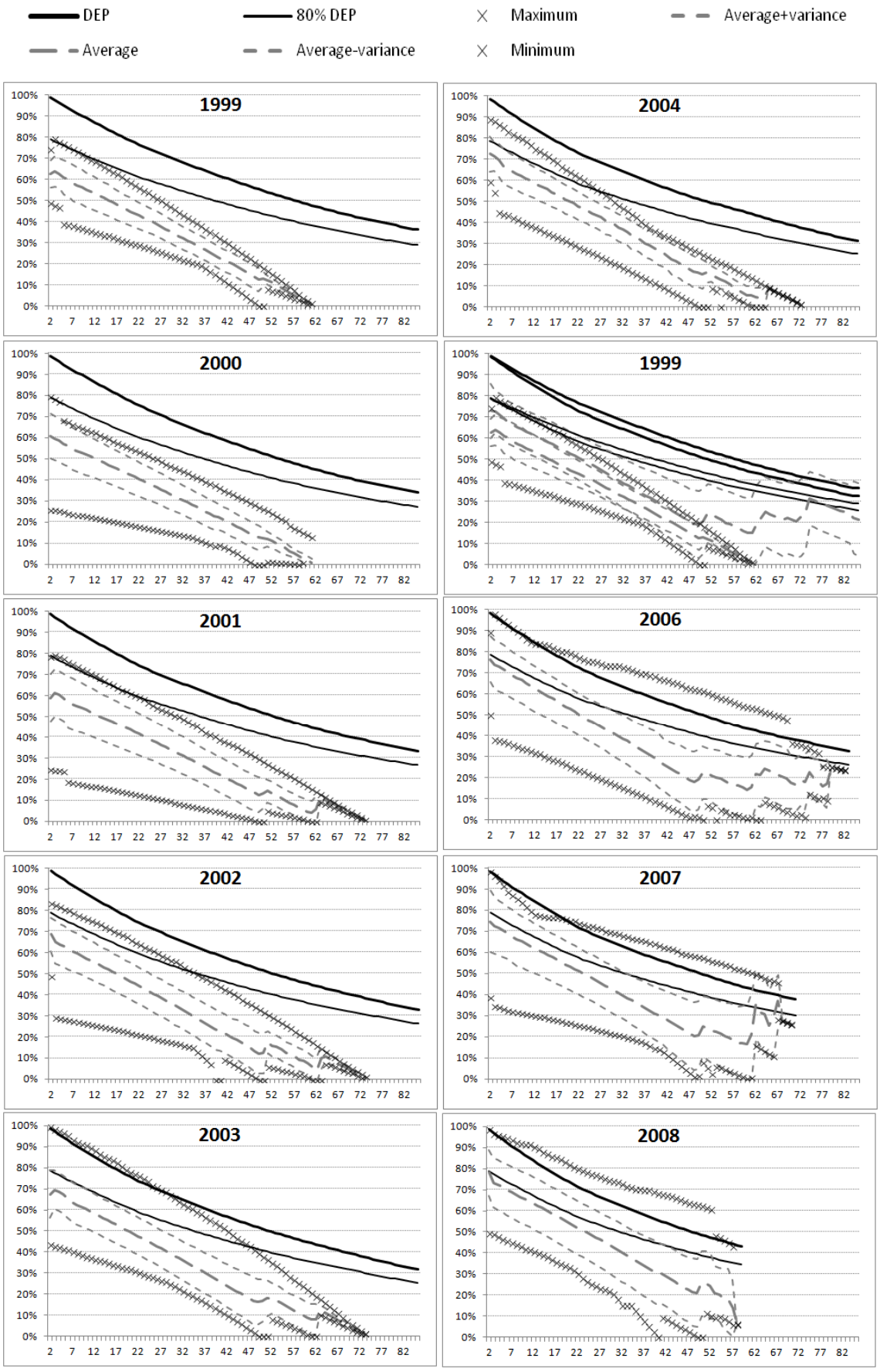
Annex 7. – The change in capital value function – long term maturity (H2)

a) averages and variances





b) The relation of average depreciation and capital value function



Annex 8. – Result tables of variance analysis of H2

a) Result tables of the variance analysis of variables describing the change in capital value function

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Maturity (rounded)	1999	100	34,88	13,742	1,374	32,15	37,61	12	60
	2000	100	46,66	14,511	1,451	43,78	49,54	12	61
	2001	100	48,88	12,663	1,266	46,37	51,39	15	72
	2002	100	43,67	13,196	1,320	41,05	46,29	16	73
	2003	100	45,58	13,522	1,352	42,90	48,26	19	74
	2004	100	43,36	13,459	1,346	40,69	46,03	12	72
	2005	100	46,56	22,243	2,224	42,15	50,97	12	121
	2006	100	46,40	21,092	2,109	42,21	50,59	13	121
	2007	100	46,74	23,146	2,315	42,15	51,33	13	121
	2008	100	48,21	21,286	2,129	43,99	52,43	13	120
	Total	1000	45,09	17,725	,561	43,99	46,19	12	121
Capital value ratio (beginning of maturity)	1999	100	60,136064	10,9895638	1,0989564	57,955496	62,316632	18,7675	94,3111
	2000	100	60,370876	11,3473506	1,1347351	58,119316	62,622437	23,4774	79,5963
	2001	100	62,612600	11,9386685	1,1938669	60,243709	64,981491	24,5675	97,8635
	2002	100	64,491312	12,3958243	1,2395824	62,031711	66,950912	17,5960	97,6540
	2003	100	68,290150	11,3260751	1,1326075	66,042811	70,537489	36,7521	99,0415
	2004	100	69,237615	8,2368122	,8236812	67,603253	70,871977	40,1528	88,8201
	2005	100	71,090441	12,6863116	1,2686312	68,573201	73,607680	27,7443	98,7118
	2006	100	72,552474	15,2892969	1,5289297	69,518745	75,586202	24,3291	99,5305
	2007	100	72,397845	13,3410377	1,3341038	69,750694	75,044996	34,9335	98,5842
	2008	100	72,129095	14,9380978	1,4938098	69,165052	75,093138	12,1525	98,4468
	Total	1000	67,330847	13,2258773	,4182390	66,510119	68,151575	12,1525	99,5305
Capital value ratio (end of maturity)	1999	100	10,645209	15,1537720	1,5153772	7,638372	13,652046	,6530	54,1394
	2000	100	5,711979	10,3445683	1,0344568	3,659392	7,764565	,1904	61,8306
	2001	100	4,752033	8,2009185	,8200919	3,124793	6,379273	,4830	53,1919
	2002	100	7,463464	11,2883377	1,1288338	5,223612	9,703315	,5906	62,8333
	2003	100	8,168123	12,6739035	1,2673904	5,653346	10,682900	,8290	51,7278
	2004	100	10,537713	14,3522491	1,4352249	7,689915	13,385510	1,1263	54,4270
	2005	100	14,117842	18,5240073	1,8524007	10,442277	17,793407	,8187	64,7796
	2006	100	13,943202	21,0098909	2,1009891	9,774384	18,112020	,2542	84,0426
	2007	100	18,460919	20,4685585	2,0468558	14,399513	22,522325	,7974	79,1796
	2008	100	16,924256	18,0454158	1,8045416	13,343654	20,504858	,3849	81,3502
	Total	1000	11,072474	16,1319173	,5101360	10,071413	12,073535	,1904	84,0426
Capital function steepness	1999	100	18,560363	7,6189684	,7618968	17,048594	20,072132	6,3211	50,6592
	2000	100	15,455154	6,0835746	,6083575	14,248041	16,662267	5,1910	34,4561
	2001	100	15,284033	5,4702741	,5470274	14,198612	16,369454	4,8985	32,6249
	2002	100	16,793048	6,0766393	,6076639	15,587311	17,998785	5,6585	37,7468
	2003	100	16,873136	5,4791640	,5479164	15,785951	17,960321	8,5002	37,7560
	2004	100	17,473512	6,7160364	,6716036	16,140904	18,806119	7,9005	50,5212
	2005	100	16,485292	6,5698665	,6569867	15,181688	17,788896	6,6273	37,9127
	2006	100	17,093568	6,9665471	,6966547	15,711254	18,475882	5,7143	46,3360
	2007	100	15,974004	5,4708134	,5470813	14,888476	17,059532	4,5641	28,9543
	2008	100	16,869514	6,9481717	,6948172	15,490846	18,248182	3,9225	43,5803
	Total	1000	16,686162	6,4162833	,2029007	16,288002	17,084323	3,9225	50,6592

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Maturity(rounded)	5,025	9	990	,000
Capital value ratio (beginning of maturity)	4,319	9	990	,000
Capital value ratio(end of maturity)	18,127	9	990	,000
Capital function steepness	1,375	9	990	,195

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Maturity (rounded)	Between Groups	14265,624	9	1585,069	5,238	,000
	Within Groups	299609,540	990	302,636		
	Total	313875,164	999			
Capital value ratio (beginning of maturity)	Between Groups	22518,452	9	2502,050	16,272	,000
	Within Groups	152230,454	990	153,768		
	Total	174748,906	999			
Capital value ratio (end of maturity)	Between Groups	19695,944	9	2188,438	9,017	,000
	Within Groups	240282,573	990	242,710		
	Total	259978,516	999			
Capital function steepness	Between Groups	840,740	9	93,416	2,296	,015
	Within Groups	40286,783	990	40,694		
	Total	41127,523	999			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Maturity(rounded)	Welch	7,738	9	402,482	,000
Capital value ratio (beginning of maturity)	Welch	16,561	9	402,595	,000
Capital value ratio(end of maturity)	Welch	10,353	9	401,251	,000
Capital function steepness	Welch	2,181	9	403,093	,022

a. Asymptotically F distributed.

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Maturity (rounded)	1999-2003	500	43,93	14,327	,641	42,68	45,19	12	74
	2004-2008	500	46,25	20,520	,918	44,45	48,06	12	121
	Total	1000	45,09	17,725	,561	43,99	46,19	12	121
Capital value ratio (beginning of maturity)	1999-2003	500	63,180200	11,9499033	,5344159	62,130218	64,230183	17,5960	99,0415
	2004-2008	500	71,481494	13,1481266	,5880021	70,326229	72,636759	12,1525	99,5305
	Total	1000	67,330847	13,2258773	,4182390	66,510119	68,151575	12,1525	99,5305
Capital value ratio (end of maturity)	1999-2003	500	7,348161	11,8947449	,5319492	6,303025	8,393298	,1904	62,8333
	2004-2008	500	14,796786	18,7541322	,8387103	13,148948	16,444625	,2542	84,0426
	Total	1000	11,072474	16,1319173	,5101360	10,071413	12,073535	,1904	84,0426
Capital function steepness	1999-2003	500	16,593147	6,2833407	,2809995	16,041059	17,145235	4,8985	50,6592
	2004-2008	500	16,779178	6,5515018	,2929921	16,203528	17,354828	3,9225	50,5212
	Total	1000	16,686162	6,4162833	,2029007	16,288002	17,084323	3,9225	50,6592

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Maturity(rounded)	13,900	1	998	,000
Capital value ratio (beginning of maturity)	1,614	1	998	,204
Capital value ratio(end of maturity)	113,805	1	998	,000
Capital function steepness	,011	1	998	,917

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Maturity (rounded)	Between Groups	1345,600	1	1345,600	4,297	,038
	Within Groups	312529,564	998	313,156		
	Total	313875,164	999			
Capital value ratio (beginning of maturity)	Between Groups	17227,868	1	17227,868	109,150	,000
	Within Groups	157521,037	998	157,837		
	Total	174748,906	999			
Capital value ratio (end of maturity)	Between Groups	13870,503	1	13870,503	56,247	,000
	Within Groups	246108,013	998	246,601		
	Total	259978,516	999			
Capital function steepness	Between Groups	8,652	1	8,652	,210	,647
	Within Groups	41118,871	998	41,201		
	Total	41127,523	999			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Maturity(rounded)	Welch	4,297	1	892,099	,038
Capital value ratio (beginning of maturity)	Welch	109,150	1	989,024	,000
Capital value ratio(end of maturity)	Welch	56,247	1	844,548	,000
Capital function steepness	Welch	,210	1	996,262	,647

a. Asymptotically F distributed.

b) results of the post-hoc comparison of variances

Multiple Comparisons

Capital residuum ratio (beginning of maturity)
Games-Howell

(I) Starting_year	(J) Indulás_éve	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1999	2000	-,2348120	1,5796610	1,000	-5,290060	4,820436
	2001	-2,4765362	1,6226593	,880	-7,669733	2,716660
	2002	-4,3552477	1,6565838	,211	-9,657474	,946979
	2003	-8,1540857*	1,5781334	,000	-13,204438	-3,103734
	2004	-9,1015507*	1,3733739	,000	-13,500551	-4,702551
	2005	-10,9543766*	1,6784309	,000	-16,326897	-5,581856
	2006	-12,4164095*	1,8829050	,000	-18,449047	-6,383772
	2007	-12,2617809*	1,7284496	,000	-17,795443	-6,728119
	2008	-11,9930311*	1,8545007	,000	-17,933782	-6,052281
2000	1999	,2348120	1,5796610	1,000	-4,820436	5,290060
	2001	-2,2417242	1,6471010	,937	-7,512888	3,029439
	2002	-4,1204357	1,6805321	,302	-9,498908	1,258036
	2003	-7,9192737*	1,6032540	,000	-13,049964	-2,788584
	2004	-8,8667387*	1,4021678	,000	-13,358856	-4,374622
	2005	-10,7195646*	1,7020719	,000	-16,167259	-5,271870
	2006	-12,1815975*	1,9040088	,000	-18,280614	-6,082581
	2007	-12,0269689*	1,7514156	,000	-17,633455	-6,420483
	2008	-11,7582191*	1,8759241	,000	-17,766450	-5,749988
2001	1999	2,4765362	1,6226593	,880	-2,716660	7,669733
	2000	2,2417242	1,6471010	,937	-3,029439	7,512888
	2002	-1,8787115	1,7210121	,985	-7,386337	3,628914
	2003	-5,6775495*	1,6456360	,023	-10,944036	-,411063
	2004	-6,6250144*	1,4504375	,000	-11,273372	-1,976657
	2005	-8,4778403*	1,7420514	,000	-14,052941	-2,902740
	2006	-9,9398732*	1,9398309	,000	-16,151849	-3,727897
	2007	-9,7852447*	1,7902935	,000	-15,515297	-4,055193
	2008	-9,5164949*	1,9122724	,000	-15,639505	-3,393484
2002	1999	4,3552477	1,6565838	,211	-,946979	9,657474
	2000	4,1204357	1,6805321	,302	-1,258036	9,498908
	2001	1,8787115	1,7210121	,985	-3,628914	7,386337
	2003	-3,7988380	1,6790963	,418	-9,172735	1,575059
	2004	-4,7463030	1,4882928	,052	-9,517293	,024687
	2005	-6,5991289*	1,7736938	,010	-12,275290	-,922967
	2006	-8,0611618*	1,9682964	,002	-14,363136	-1,759187
	2007	-7,9065333*	1,8210979	,001	-13,734720	-2,078346
	2008	-7,6377834*	1,9411420	,004	-13,852194	-1,423372
2003	1999	8,1540857*	1,5781334	,000	3,103734	13,204438
	2000	7,9192737*	1,6032540	,000	2,788584	13,049964
	2001	5,6775495*	1,6456360	,023	,411063	10,944036
	2002	3,7988380	1,6790963	,418	-1,575059	9,172735
	2004	-,9474649	1,4004465	1,000	-5,434014	3,539084
	2005	-2,8002908	1,7006542	,823	-8,243474	2,642892
	2006	-4,2623237	1,9027416	,434	-10,357350	1,832703
	2007	-4,1076952	1,7500379	,364	-9,709809	1,494419
	2008	-3,8389454	1,8746379	,567	-9,843121	2,165231
2004	1999	9,1015507*	1,3733739	,000	4,702551	13,500551
	2000	8,8667387*	1,4021678	,000	4,374622	13,358856
	2001	6,6250144*	1,4504375	,000	1,976657	11,273372
	2002	4,7463030	1,4882928	,052	-,024687	9,517293
	2003	,9474649	1,4004465	1,000	-3,539084	5,434014
	2005	-1,8528259	1,5125726	,967	-6,702510	2,996858
	2006	-3,3148588	1,7366856	,663	-8,891851	2,262133
	2007	-3,1602303	1,5678915	,589	-8,189305	1,868844
	2008	-2,8914804	1,7058483	,797	-8,368329	2,585369
2005	1999	10,9543766*	1,6784309	,000	5,581856	16,326897
	2000	10,7195646*	1,7020719	,000	5,271870	16,167259
	2001	8,4778403*	1,7420514	,000	2,902740	14,052941
	2002	6,5991289*	1,7736938	,010	,922967	12,275290
	2003	2,8002908	1,7006542	,823	-2,642892	8,243474
	2004	1,8528259	1,5125726	,967	-2,996858	6,702510
	2006	-1,4620329	1,9867187	,999	-7,822356	4,898290
	2007	-1,3074044	1,8409937	,999	-7,199073	4,584264
	2008	-1,0386545	1,9598196	1,000	-7,312301	5,234992
2006	1999	12,4164095*	1,8829050	,000	6,383772	18,449047
	2000	12,1815975*	1,9040088	,000	6,082581	18,280614
	2001	9,9398732*	1,9398309	,000	3,727897	16,151849
	2002	8,0611618*	1,9682964	,002	1,759187	14,363136
	2003	4,2623237	1,9027416	,434	-1,832703	10,357350
	2004	3,3148588	1,7366856	,663	-2,262133	8,891851
	2005	1,4620329	1,9867187	,999	-4,898290	7,822356
	2007	,1546285	2,0291523	1,000	-6,340375	6,649632
	2008	,4233784	2,1375438	1,000	-6,417174	7,263930
2007	1999	12,2617809*	1,7284496	,000	6,728119	17,795443
	2000	12,0269689*	1,7514156	,000	6,420483	17,633455
	2001	9,7852447*	1,7902935	,000	4,055193	15,515297
	2002	7,9065333*	1,8210979	,001	2,078346	13,734720
	2003	4,1076952	1,7500379	,364	-1,494419	9,709809
	2004	3,1602303	1,5678915	,589	-1,868844	8,189305
	2005	1,3074044	1,8409937	,999	-4,584264	7,199073
	2006	-,1546285	2,0291523	1,000	-6,649632	6,340375
	2008	,2687498	2,0028231	1,000	-6,141561	6,679061
2008	1999	11,9930311*	1,8545007	,000	6,052281	17,933782
	2000	11,7582191*	1,8759241	,000	5,749988	17,766450
	2001	9,5164949*	1,9122724	,000	3,393484	15,639505
	2002	7,6377834*	1,9411420	,004	1,423372	13,852194
	2003	3,8389454	1,8746379	,567	-2,165231	9,843121
	2004	2,8914804	1,7058483	,797	-2,585369	8,368329
	2005	1,0386545	1,9598196	1,000	-5,234992	7,312301
	2006	-,4233784	2,1375438	1,000	-7,263930	6,417174
	2007	-,2687498	2,0028231	1,000	-6,679061	6,141561

*. The mean difference is significant at the 0.05 level.

Multiple Comparisons

Capital value ratio (end of maturity)
Games-Howell

(I) Starting_year	(J) Starting_year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1999	2000	4,9332307	1,8347940	,187	-,947359	10,813820
	2001	5,8931762*	1,7230551	,027	,360176	11,426176
	2002	3,1817456	1,8896121	,803	-2,871019	9,234510
	2003	2,4770861	1,9755117	,962	-3,847158	8,801330
	2004	,1074963	2,0871604	1,000	-6,572003	6,786996
	2005	-3,4726324	2,3932732	,909	-11,134967	4,189702
	2006	-3,2979929	2,5904678	,958	-11,597402	5,001416
	2007	-7,8157100	2,5467601	,073	-15,973742	,342322
	2008	-6,2790466	2,3564249	,196	-13,822596	1,264503
2000	1999	-4,9332307	1,8347940	,187	-10,813820	,947359
	2001	,9599456	1,3200953	,999	-3,267107	5,186998
	2002	-1,7514850	1,5311325	,979	-6,651799	3,148829
	2003	-2,4561445	1,6359643	,890	-7,693921	2,781632
	2004	-4,8257344	1,7691725	,171	-10,493882	,842413
	2005	-8,4058631*	2,1216714	,004	-15,217012	-1,594714
	2006	-8,2312236*	2,3418489	,020	-15,757527	-,704920
	2007	-12,7489406*	2,2934079	,000	-20,117872	-5,380009
	2008	-11,2122773*	2,0800171	,000	-17,888190	-4,536365
2001	1999	-5,8931762*	1,7230551	,027	-11,426176	-,360176
	2000	-,9599456	1,3200953	,999	-5,186998	3,267107
	2002	-2,7114306	1,3952836	,640	-7,181469	1,758607
	2003	-3,4160901	1,5095791	,419	-8,256304	1,424124
	2004	-5,7856799*	1,6530037	,021	-11,091221	-,480139
	2005	-9,3658087*	2,0258181	,000	-15,882417	-2,849201
	2006	-9,1911691*	2,2553726	,003	-16,453611	-1,928728
	2007	-13,7088862*	2,2050328	,000	-20,807782	-6,609990
	2008	-12,1722229*	1,9821506	,000	-18,546945	-5,797501
2002	1999	-3,1817456	1,8896121	,803	-9,234510	2,871019
	2000	1,7514850	1,5311325	,979	-3,148829	6,651799
	2001	2,7114306	1,3952836	,640	-1,758607	7,181469
	2003	-,7046595	1,6972165	1,000	-6,136873	4,727553
	2004	-3,0742493	1,8259617	,803	-8,921360	2,772862
	2005	-6,6543781	2,1692520	,074	-13,613090	,304334
	2006	-6,4797385	2,3850411	,176	-14,138965	1,179488
	2007	-10,9974556*	2,3374954	,000	-18,502278	-3,492633
	2008	-9,4607923*	2,1285291	,001	-16,287404	-2,634180
2003	1999	-2,4770861	1,9755117	,962	-8,801330	3,847158
	2000	2,4561445	1,6359643	,890	-2,781632	7,693921
	2001	3,4160901	1,5095791	,419	-1,424124	8,256304
	2002	,7046595	1,6972165	1,000	-4,727553	6,136873
	2004	-2,3695898	1,9147190	,965	-8,498096	3,758917
	2005	-5,9497185	2,2444747	,203	-13,143234	1,243797
	2006	-5,7750790	2,4536572	,361	-13,646796	2,096638
	2007	-10,2927961*	2,4074670	,001	-18,014660	-2,570933
	2008	-8,7561327*	2,2051414	,004	-15,822282	-1,689984
2004	1999	-,1074963	2,0871604	1,000	-6,786996	6,572003
	2000	4,8257344	1,7691725	,171	-,842413	10,493882
	2001	5,7856799*	1,6530037	,021	,480139	11,091221
	2002	3,0742493	1,8259617	,803	-2,772862	8,921360
	2003	2,3695898	1,9147190	,965	-3,758917	8,498096
	2005	-3,5801287	2,3433435	,879	-11,084595	3,924337
	2006	-3,4054892	2,5444107	,943	-11,560388	4,749410
	2007	-7,9232063	2,4998979	,055	-15,933963	,087550
	2008	-6,3865429	2,3056975	,155	-13,769457	,996371
2005	1999	3,4726324	2,3932732	,909	-4,189702	11,134967
	2000	8,4058631*	2,1216714	,004	1,594714	15,217012
	2001	9,3658087*	2,0258181	,000	2,849201	15,882417
	2002	6,6543781	2,1692520	,074	-,304334	13,613090
	2003	5,9497185	2,2444747	,203	-1,243797	13,143234
	2004	3,5801287	2,3433435	,879	-3,924337	11,084595
	2006	,1746395	2,8009898	1,000	-8,790623	9,139902
	2007	-4,3430775	2,7606172	,859	-13,178532	4,492377
	2008	-2,8064142	2,5860701	,986	-11,082351	5,469522
2006	1999	3,2979929	2,5904678	,958	-5,001416	11,597402
	2000	8,2312236*	2,3418489	,020	,704920	15,757527
	2001	9,1911691*	2,2553726	,003	1,928728	16,453611
	2002	6,4797385	2,3850411	,176	-1,179488	14,138965
	2003	5,7750790	2,4536572	,361	-2,096638	13,646796
	2004	3,4054892	2,5444107	,943	-4,749410	11,560388
	2005	-,1746395	2,8009898	1,000	-9,139902	8,790623
	2007	-4,5177171	2,9332191	,874	-13,904598	4,869164
	2008	-2,9810537	2,7695713	,986	-11,846474	5,884367
2007	1999	7,8157100	2,5467601	,073	-,342322	15,973742
	2000	12,7489406*	2,2934079	,000	5,380009	20,117872
	2001	13,7088862*	2,2050328	,000	6,609990	20,807782
	2002	10,9974556*	2,3374954	,000	3,492633	18,502278
	2003	10,2927961*	2,4074670	,001	2,570933	18,014660
	2004	7,9232063	2,4998979	,055	-,087550	15,933963
	2005	4,3430775	2,7606172	,859	-4,492377	13,178532
	2006	4,5177171	2,9332191	,874	-4,869164	13,904598
	2008	1,5366633	2,7287340	1,000	-7,197329	10,270655
2008	1999	6,2790466	2,3564249	,196	-1,264503	13,822596
	2000	11,2122773*	2,0800171	,000	4,536365	17,888190
	2001	12,1722229*	1,9821506	,000	5,797501	18,546945
	2002	9,4607923*	2,1285291	,001	2,634180	16,287404
	2003	8,7561327*	2,2051414	,004	1,689984	15,822282
	2004	6,3865429	2,3056975	,155	-,996371	13,769457
	2005	2,8064142	2,5860701	,986	-5,469522	11,082351
	2006	2,9810537	2,7695713	,986	-5,884367	11,846474
	2007	-1,5366633	2,7287340	1,000	-10,270655	7,197329

*. The mean difference is significant at the 0.05 level.

c) test results of the normality examination of dependant variables

Tests of Normality 1999-2003

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Maturity (rounded)	,172	500	,000	,942	500	,000
Capital residuum ratio (beginning of maturity)	,110	500	,000	,946	500	,000
Capital residuum ratio (end of maturity)	,318	500	,000	,586	500	,000
Capital function steepness	,123	500	,000	,911	500	,000

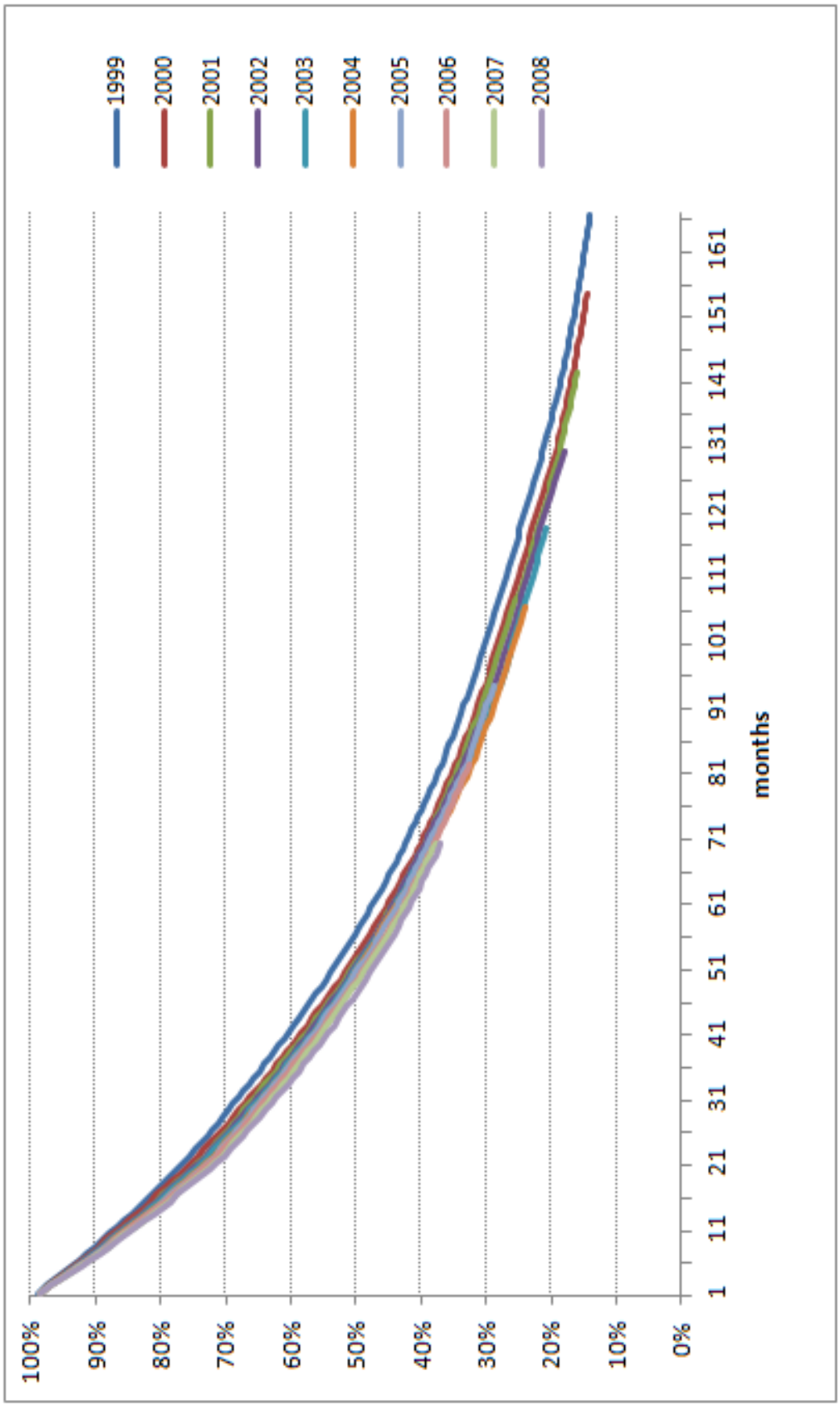
a. Lilliefors Significance Correction

Tests of Normality 2004-2008

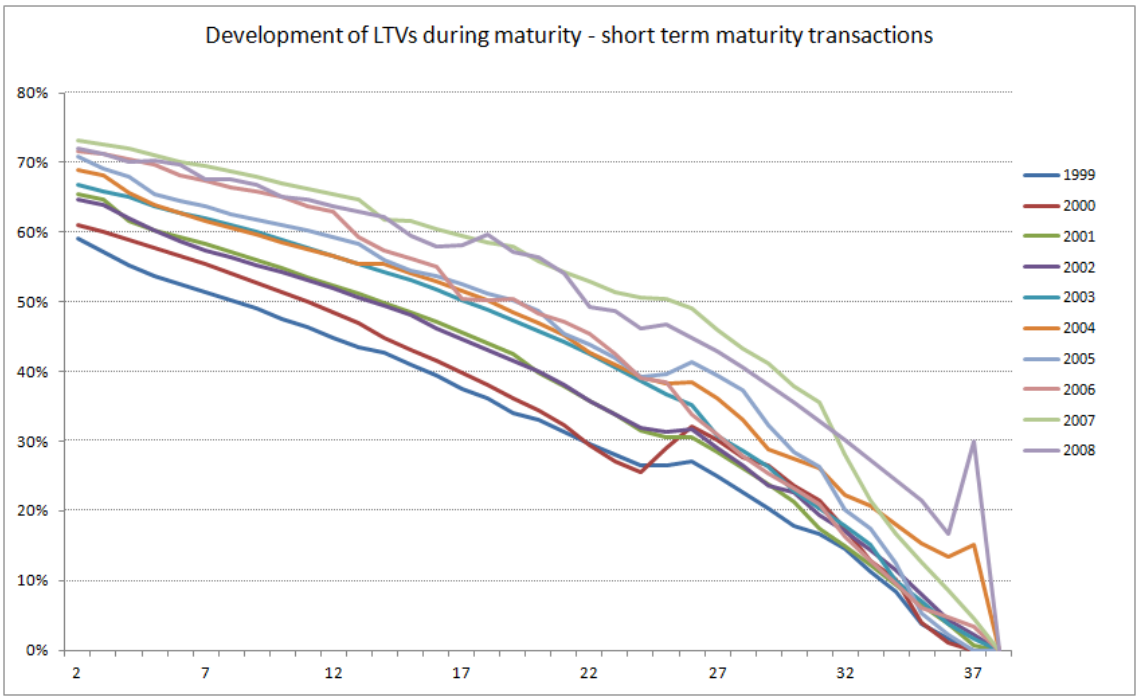
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Maturity (rounded)	,136	500	,000	,879	500	,000
Capital residuum ratio (beginning of maturity)	,101	500	,000	,958	500	,000
Capital residuum ratio (end of maturity)	,226	500	,000	,748	500	,000
Capital function steepness	,107	500	,000	,933	500	,000

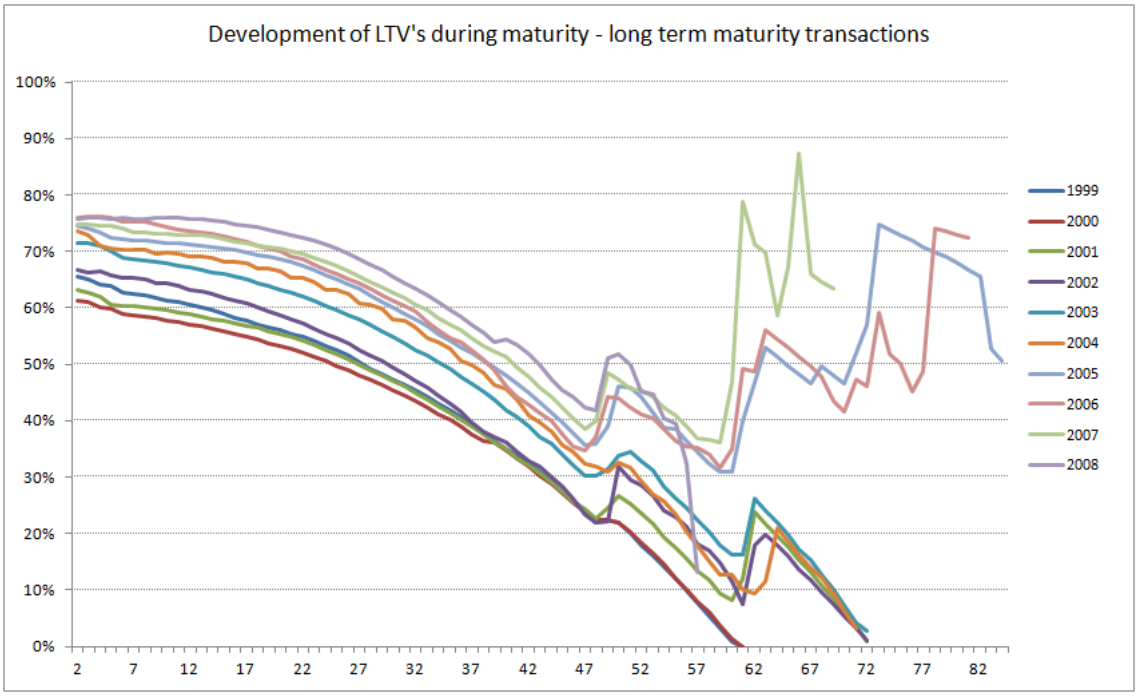
a. Lilliefors Significance Correction

Annex 9. – Average depreciation function of individual motor vehicle year groups (H3)



Annex 10. – Development of average LTV's (H3)





Annex 11. – Results of t-tests connected to H3

a) short term maturity[85]

Groups 1-2. @maturity (months)		for Equality of Variances		Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Confidence Interval of the	
									Lower	Upper
@1	Equal variances assumed	,440	0,5087	-2,681	104	0,0085	-,07474	,02788	-,12101	-,02847
	Equal variances not			-2,553	64,255	,013	-,07474	,02928	-,12360	-,02588
@2	Equal variances assumed	2,792	0,0964	-2,712	191	0,0073	-,05208	,01920	-,08382	-,02035
	Equal variances not			-2,637	152,071	,009	-,05208	,01975	-,08477	-,01940
@3	Equal variances assumed	1,341	0,2483	-3,110	192	0,0022	-,06152	,01978	-,09422	-,02882
	Equal variances not			-3,046	158,753	,003	-,06152	,02020	-,09494	-,02810
@4	Equal variances assumed	,044	0,8335	-2,778	192	0,0060	-,05381	,01937	-,08583	-,02180
	Equal variances not			-2,771	170,950	,006	-,05381	,01942	-,08593	-,02170
@5	Equal variances assumed	1,038	0,3095	-2,761	192	0,0063	-,05255	,01903	-,08401	-,02109
	Equal variances not			-2,788	178,219	,006	-,05255	,01885	-,08371	-,02138
@6	Equal variances assumed	1,540	0,2162	-2,665	192	0,0084	-,05084	,01908	-,08237	-,01931
	Equal variances not			-2,694	178,873	,008	-,05084	,01887	-,08204	-,01964
@7	Equal variances assumed	2,703	0,1018	-2,678	192	0,0080	-,05081	,01897	-,08216	-,01946
	Equal variances not			-2,723	181,744	,007	-,05081	,01866	-,08166	-,01995
@8	Equal variances assumed	3,404	0,0666	-2,755	192	0,0064	-,05243	,01903	-,08388	-,02097
	Equal variances not			-2,807	182,989	,006	-,05243	,01868	-,08330	-,02155
@9	Equal variances assumed	4,256	0,0405	-2,777	191	0,0060	-,05326	,01917	-,08495	-,02156
	Equal variances not			-2,839	184,269	,005	-,05326	,01876	-,08427	-,02224
@10	Equal variances assumed	5,784	0,0171	-2,913	192	0,0040	-,05652	,01940	-,08858	-,02445
	Equal variances not			-2,995	186,831	,003	-,05652	,01887	-,08771	-,02532
@11	Equal variances assumed	6,824	0,0097	-2,947	192	,004	-,05786	,01963	-,09032	-,02541
	Equal variances not			-3,041	188,101	0,0027	-,05786	,01903	-,08932	-,02641
@12	Equal variances assumed	7,966	0,0053	-3,011	192	,003	-,06026	,02001	-,09334	-,02718
	Equal variances not			-3,121	189,470	0,0021	-,06026	,01931	-,09218	-,02834
@13	Equal variances assumed	9,014	0,0030	-3,056	190	,003	-,06170	,02019	-,09508	-,02832
	Equal variances not			-3,164	188,423	0,0018	-,06170	,01950	-,09394	-,02946
@14	Equal variances assumed	8,326	0,0044	-3,111	188	,002	-,06180	,01987	-,09464	-,02896
	Equal variances not			-3,197	185,697	0,0016	-,06180	,01933	-,09376	-,02985
@15	Equal variances assumed	9,601	0,0022	-3,244	187	,001	-,06589	,02031	-,09947	-,03231
	Equal variances not			-3,339	185,625	0,0010	-,06589	,01974	-,09851	-,03326
@16	Equal variances assumed	10,924	0,0011	-3,117	185	,002	-,06462	,02073	-,09889	-,03035
	Equal variances not			-3,232	183,909	0,0015	-,06462	,01999	-,09767	-,03157
@17	Equal variances assumed	11,074	0,0011	-3,198	184	,002	-,06766	,02116	-,10264	-,03268
	Equal variances not			-3,315	183,299	0,0011	-,06766	,02041	-,10140	-,03392
@18	Equal variances assumed	11,580	0,0008	-3,105	183	,002	-,06752	,02174	-,10347	-,03157
	Equal variances not			-3,221	182,720	0,0015	-,06752	,02096	-,10217	-,03287
@19	Equal variances assumed	8,632	0,0037	-3,272	177	,001	-,07075	,02162	-,10650	-,03500
	Equal variances not			-3,352	176,833	0,0010	-,07075	,02111	-,10565	-,03584
@20	Equal variances assumed	8,866	0,0033	-2,904	174	,004	-,06361	,02191	-,09984	-,02739
	Equal variances not			-2,974	173,950	0,0034	-,06361	,02139	-,09898	-,02824
@21	Equal variances assumed	9,162	0,0028	-2,818	173	,005	-,06360	,02257	-,10091	-,02628
	Equal variances not			-2,885	173,000	0,0044	-,06360	,02204	-,10005	-,02715
@22	Equal variances assumed	8,587	0,0039	-2,739	170	,007	-,06340	,02315	-,10169	-,02511
	Equal variances not			-2,805	169,884	0,0056	-,06340	,02260	-,10078	-,02602
@23	Equal variances assumed	8,140	0,0049	-2,562	168	,011	-,06118	,02388	-,10069	-,02168
	Equal variances not			-2,619	167,999	0,0096	-,06118	,02336	-,09982	-,02255
@24	Equal variances assumed	6,877	0,0095	-2,280	165	,024	-,05581	,02448	-,09630	-,01532
	Equal variances not			-2,323	164,871	0,0214	-,05581	,02403	-,09555	-,01607
@25	Equal variances assumed	1,725	0,1911	-1,516	148	0,1317	-,03550	,02342	-,07427	,00326
	Equal variances not			-1,524	147,503	,130	-,03550	,02329	-,07405	,00305
@26	Equal variances assumed	,615	0,4342	-1,278	131	0,2034	-,02533	,01981	-,05815	,00749
	Equal variances not			-1,277	127,893	,204	-,02533	,01983	-,05819	,00753
@27	Equal variances assumed	1,490	0,2245	-1,010	129	0,3143	-,01989	,01969	-,05252	,01273
	Equal variances not			-1,009	122,617	,315	-,01989	,01973	-,05259	,01280
@28	Equal variances assumed	2,226	0,1382	-1,041	127	0,2998	-,02103	,02020	-,05450	,01244
	Equal variances not			-1,039	117,615	,301	-,02103	,02024	-,05459	,01253
@29	Equal variances assumed	,691	0,4074	-,611	121	0,5422	-,01220	,01996	-,04529	,02088
	Equal variances not			-,607	114,096	,545	-,01220	,02011	-,04555	,02115
@30	Equal variances assumed	,830	0,3640	-1,189	118	0,2368	-,02400	,02018	-,05745	,00946
	Equal variances not			-1,181	110,649	,240	-,02400	,02031	-,05769	,00970
@31	Equal variances assumed	3,879	0,0514	-,146	113	0,8841	-,00278	,01901	-,03430	,02874
	Equal variances not			-,145	96,758	,885	-,00278	,01919	-,03464	,02909
@32	Equal variances assumed	2,489	0,1175	-,308	111	0,7587	-,00580	,01882	-,03701	,02542
	Equal variances not			-,305	98,699	,761	-,00580	,01897	-,03730	,02571
@33	Equal variances assumed	,161	0,6890	-1,027	109	0,3068	-,01728	,01683	-,04520	,01064
	Equal variances not			-1,023	105,801	,309	-,01728	,01689	-,04532	,01075
@34	Equal variances assumed	,136	0,7130	-,932	106	0,3535	-,01594	,01711	-,04433	,01245
	Equal variances not			-,929	103,471	,355	-,01594	,01716	-,04443	,01254
@35	Equal variances assumed	5,333	0,0230	-2,889	99	0,0047	-,03500	,01211	-,05511	-,01489
	Equal variances not			-2,995	69,958	,004	-,03500	,01169	-,05448	-,01552
@36	Equal variances assumed	3,160	0,0791	-3,073	85	0,0028	-,02622	,00853	-,04042	-,01203
	Equal variances not			-3,099	82,450	,003	-,02622	,00846	-,04030	-,01215
@37	Equal variances assumed	4,913	0,0335	-1,006	34	0,3213	-,01355	,01346	-,03631	,00921
	Equal variances not			-1,903	27,000	,068	-,01355	,00712	-,02568	-,00142

[85] Should the significance level belonging to F be high (>0.1), then we accept the zero hypothesis related to the equality of variance of the two groups and we evaluate the result of two sample t-test based on the significance belonging to the given row: if its significance is <0.1, then we reject our assumption related to the equality of averages, i.e. the two groups significantly differ from each other regarding the LTV of the given month.

Groups 2-3. @maturity (months)		Test for Equality of		Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Confidence Interval	
									Lower	Upper
@1	Equal variances assumed	,003	,960	-,362	103	0,718	-,01063	,02937	-,05938	,03811
	Equal variances not			-,354	69,186	,725	-,01063	,03007	-,06076	,03949
@2	Equal variances assumed	1,372	,243	-2,096	222	0,037	-,03940	,01880	-,07045	-,00835
	Equal variances not			-2,035	149,518	,044	-,03940	,01937	-,07146	-,00735
@3	Equal variances assumed	2,172	,142	-1,896	223	0,059	-,03530	,01862	-,06605	-,00456
	Equal variances not			-1,825	147,923	,070	-,03530	,01934	-,06732	-,00329
@4	Equal variances assumed	,068	,795	-2,403	224	0,017	-,04376	,01821	-,07383	-,01369
	Equal variances not			-2,380	160,808	,019	-,04376	,01839	-,07418	-,01334
@5	Equal variances assumed	,051	,821	-2,335	227	0,020	-,04111	,01761	-,07019	-,01203
	Equal variances not			-2,344	166,676	,020	-,04111	,01754	-,07012	-,01211
@6	Equal variances assumed	,480	,489	-2,447	227	0,015	-,04391	,01795	-,07355	-,01427
	Equal variances not			-2,480	171,270	,014	-,04391	,01771	-,07319	-,01463
@7	Equal variances assumed	1,032	,311	-2,587	227	0,010	-,04617	,01785	-,07565	-,01669
	Equal variances not			-2,646	175,742	,009	-,04617	,01745	-,07502	-,01731
@8	Equal variances assumed	1,498	,222	-2,591	227	0,010	-,04683	,01808	-,07669	-,01698
	Equal variances not			-2,671	179,833	,008	-,04683	,01753	-,07582	-,01785
@9	Equal variances assumed	2,047	,154	-2,675	227	0,008	-,04864	,01818	-,07866	-,01861
	Equal variances not			-2,774	182,699	,006	-,04864	,01753	-,07762	-,01965
@10	Equal variances assumed	2,765	,098	-2,724	227	,007	-,05003	,01837	-,08037	-,01970
	Equal variances not			-2,846	186,592	0,005	-,05003	,01758	-,07909	-,02098
@11	Equal variances assumed	3,412	,066	-2,769	227	,006	-,05158	,01863	-,08235	-,02081
	Equal variances not			-2,913	190,022	0,004	-,05158	,01771	-,08085	-,02231
@12	Equal variances assumed	4,112	,044	-2,822	227	,005	-,05356	,01898	-,08490	-,02221
	Equal variances not			-2,990	193,683	0,003	-,05356	,01791	-,08316	-,02395
@13	Equal variances assumed	4,753	,030	-2,848	227	,005	-,05508	,01934	-,08702	-,02313
	Equal variances not			-3,037	196,892	0,003	-,05508	,01813	-,08505	-,02511
@14	Equal variances assumed	4,013	,046	-2,984	223	,003	-,05631	,01887	-,08747	-,02514
	Equal variances not			-3,134	190,703	0,002	-,05631	,01797	-,08601	-,02661
@15	Equal variances assumed	4,172	,042	-2,923	222	,004	-,05595	,01914	-,08758	-,02433
	Equal variances not			-3,071	191,497	0,002	-,05595	,01822	-,08607	-,02584
@16	Equal variances assumed	5,584	,019	-3,116	220	,002	-,06155	,01975	-,09418	-,02892
	Equal variances not			-3,323	192,489	0,001	-,06155	,01852	-,09216	-,03093
@17	Equal variances assumed	6,289	,013	-3,132	219	,002	-,06354	,02029	-,09705	-,03002
	Equal variances not			-3,351	194,421	0,001	-,06354	,01896	-,09488	-,03220
@18	Equal variances assumed	6,556	,011	-3,160	219	,002	-,06572	,02080	-,10008	-,03137
	Equal variances not			-3,391	195,788	0,001	-,06572	,01938	-,09775	-,03369
@19	Equal variances assumed	6,509	,011	-3,121	216	,002	-,06672	,02138	-,10205	-,03140
	Equal variances not			-3,348	196,731	0,001	-,06672	,01993	-,09966	-,03379
@20	Equal variances assumed	7,566	,006	-3,300	214	,001	-,07269	,02203	-,10908	-,03631
	Equal variances not			-3,571	197,661	0,000	-,07269	,02036	-,10633	-,03905
@21	Equal variances assumed	6,502	,011	-3,090	211	,002	-,06895	,02232	-,10582	-,03208
	Equal variances not			-3,319	195,400	0,001	-,06895	,02078	-,10328	-,03461
@22	Equal variances assumed	6,414	,012	-3,040	206	,003	-,07072	,02326	-,10916	-,03229
	Equal variances not			-3,275	191,320	0,001	-,07072	,02160	-,10642	-,03503
@23	Equal variances assumed	6,822	,010	-3,030	206	,003	-,07264	,02397	-,11224	-,03303
	Equal variances not			-3,268	191,853	0,001	-,07264	,02223	-,10937	-,03590
@24	Equal variances assumed	6,697	,010	-2,968	205	,003	-,07282	,02453	-,11335	-,03228
	Equal variances not			-3,200	191,972	0,002	-,07282	,02275	-,11042	-,03521
@25	Equal variances assumed	9,094	,003	-2,882	198	,004	-,07105	,02465	-,11179	-,03031
	Equal variances not			-3,150	185,955	0,002	-,07105	,02255	-,10834	-,03377
@26	Equal variances assumed	17,710	,000	-2,978	184	,003	-,06720	,02256	-,10450	-,02990
	Equal variances not			-3,357	181,223	0,001	-,06720	,02002	-,10030	-,03411
@27	Equal variances assumed	17,412	,000	-2,800	178	,006	-,06301	,02250	-,10021	-,02580
	Equal variances not			-3,176	177,688	0,002	-,06301	,01984	-,09581	-,03020
@28	Equal variances assumed	18,338	,000	-2,717	175	,007	-,06247	,02299	-,10049	-,02445
	Equal variances not			-3,104	174,999	0,002	-,06247	,02012	-,09574	-,02919
@29	Equal variances assumed	11,026	,001	-2,169	171	,031	-,05022	,02315	-,08851	-,01192
	Equal variances not			-2,430	170,921	0,016	-,05022	,02067	-,08439	-,01604
@30	Equal variances assumed	9,635	,002	-1,574	164	,117	-,03684	,02341	-,07556	,00188
	Equal variances not			-1,778	163,999	0,077	-,03684	,02072	-,07112	-,00256
@31	Equal variances assumed	17,171	,000	-2,198	160	,029	-,05262	,02394	-,09224	-,01301
	Equal variances not			-2,618	155,533	0,010	-,05262	,02010	-,08589	-,01936
@32	Equal variances assumed	10,836	,001	-1,716	156	,088	-,03847	,02241	-,07555	-,00138
	Equal variances not			-1,996	155,000	0,048	-,03847	,01927	-,07035	-,00658
@33	Equal variances assumed	12,247	,001	-1,785	154	,076	-,04111	,02304	-,07924	-,00299
	Equal variances not			-2,070	152,056	0,040	-,04111	,01986	-,07398	-,00824
@34	Equal variances assumed	7,266	,008	-1,340	149	,182	-,02903	,02167	-,06490	,00683
	Equal variances not			-1,528	148,941	0,129	-,02903	,01900	-,06048	,00242
@35	Equal variances assumed	6,012	,015	-1,133	144	,259	-,02376	,02097	-,05848	,01095
	Equal variances not			-1,312	143,952	0,192	-,02376	,01812	-,05376	,00623
@36	Equal variances assumed	10,998	,001	-1,379	125	,170	-,03205	,02324	-,07057	,00647
	Equal variances not			-1,776	103,297	0,079	-,03205	,01805	-,06201	-,00209
@37	Equal variances assumed	11,216	,001	-1,472	68	,146	-,04082	,02773	-,08707	,00543
	Equal variances not			-1,759	49,156	0,085	-,04082	,02321	-,07973	-,00191

3-4. csoport @maturity (months)		Test for Equality of		Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Confidence Interval	
									Lower	Upper
@1	Equal variances	1,720	,192	-1,048	114	0,297	-,03084	,02944	-,07966	,01798
	Equal variances not			-1,006	85,720	,317	-,03084	,03066	-,08182	,02014
@2	Equal variances	12,212	,001	-1,805	272	,072	-,03319	,01839	-,06354	-,00284
	Equal variances not			-1,779	237,323	0,077	-,03319	,01866	-,06400	-,00238
@3	Equal variances	13,700	,000	-2,190	271	,029	-,04016	,01834	-,07043	-,00990
	Equal variances not			-2,153	231,753	0,032	-,04016	,01865	-,07096	-,00936
@4	Equal variances	13,832	,000	-2,569	274	,011	-,04776	,01859	-,07843	-,01708
	Equal variances not			-2,530	235,929	0,012	-,04776	,01888	-,07893	-,01658
@5	Equal variances	15,313	,000	-3,251	277	,001	-,05991	,01843	-,09033	-,02950
	Equal variances not			-3,188	232,946	0,002	-,05991	,01879	-,09095	-,02888
@6	Equal variances	15,000	,000	-3,132	276	,002	-,05998	,01915	-,09159	-,02837
	Equal variances not			-3,066	229,210	0,002	-,05998	,01956	-,09229	-,02767
@7	Equal variances	17,461	,000	-2,999	277	,003	-,05817	,01940	-,09019	-,02616
	Equal variances not			-2,937	229,041	0,004	-,05817	,01981	-,09089	-,02546
@8	Equal variances	16,059	,000	-3,156	277	,002	-,06201	,01965	-,09444	-,02958
	Equal variances not			-3,092	230,997	0,002	-,06201	,02005	-,09512	-,02889
@9	Equal variances	15,663	,000	-3,211	276	,001	-,06404	,01994	-,09695	-,03113
	Equal variances not			-3,142	228,500	0,002	-,06404	,02038	-,09770	-,03038
@10	Equal variances	15,835	,000	-3,075	276	,002	-,06257	,02035	-,09615	-,02898
	Equal variances not			-3,008	228,012	0,003	-,06257	,02080	-,09692	-,02822
@11	Equal variances	13,997	,000	-3,144	276	,002	-,06477	,02060	-,09877	-,03076
	Equal variances not			-3,078	229,965	0,002	-,06477	,02104	-,09952	-,03002
@12	Equal variances	13,202	,000	-3,139	275	,002	-,06627	,02111	-,10112	-,03143
	Equal variances not			-3,070	228,471	0,002	-,06627	,02159	-,10192	-,03063
@13	Equal variances	9,680	,002	-2,878	272	,004	-,06019	,02092	-,09471	-,02567
	Equal variances not			-2,818	231,497	0,005	-,06019	,02136	-,09547	-,02491
@14	Equal variances	10,127	,002	-2,494	263	,013	-,05205	,02087	-,08650	-,01759
	Equal variances not			-2,430	216,322	0,016	-,05205	,02142	-,08743	-,01666
@15	Equal variances	7,671	,006	-2,513	259	,013	-,05270	,02097	-,08731	-,01808
	Equal variances not			-2,448	214,290	0,015	-,05270	,02153	-,08826	-,01714
@16	Equal variances	7,100	,008	-2,385	261	,018	-,05142	,02156	-,08701	-,01583
	Equal variances not			-2,330	219,426	0,021	-,05142	,02207	-,08787	-,01496
@17	Equal variances	6,487	,011	-2,082	258	,038	-,04645	,02231	-,08327	-,00962
	Equal variances not			-2,032	215,630	0,043	-,04645	,02286	-,08421	-,00868
@18	Equal variances	5,848	,016	-2,684	255	,008	-,06150	,02292	-,09934	-,02367
	Equal variances not			-2,612	210,569	0,010	-,06150	,02354	-,10040	-,02260
@19	Equal variances	5,453	,020	-2,829	249	,005	-,06704	,02369	-,10616	-,02792
	Equal variances not			-2,755	206,206	0,006	-,06704	,02433	-,10724	-,02684
@20	Equal variances	4,452	,036	-2,703	245	,007	-,06600	,02442	-,10631	-,02569
	Equal variances not			-2,631	202,164	0,009	-,06600	,02509	-,10746	-,02454
@21	Equal variances	4,740	,030	-2,778	238	,006	-,06985	,02515	-,11138	-,02833
	Equal variances not			-2,693	191,991	0,008	-,06985	,02594	-,11272	-,02698
@22	Equal variances	3,648	,057	-2,529	235	,012	-,06428	,02542	-,10625	-,02231
	Equal variances not			-2,472	199,151	0,014	-,06428	,02600	-,10725	-,02131
@23	Equal variances	2,404	,122	-2,502	232	0,013	-,06492	,02595	-,10779	-,02206
	Equal variances not			-2,448	196,750	,015	-,06492	,02652	-,10876	-,02109
@24	Equal variances	1,004	,318	-2,419	225	0,016	-,06355	,02627	-,10694	-,02016
	Equal variances not			-2,377	190,709	,018	-,06355	,02674	-,10774	-,01935
@25	Equal variances	,659	,418	-2,845	218	0,005	-,07335	,02578	-,11594	-,03076
	Equal variances not			-2,818	189,114	,005	-,07335	,02603	-,11638	-,03032
@26	Equal variances	1,940	,165	-1,883	206	0,061	-,04780	,02538	-,08974	-,00586
	Equal variances not			-1,836	169,665	,068	-,04780	,02604	-,09087	-,00473
@27	Equal variances	1,982	,161	-2,000	198	0,047	-,05137	,02569	-,09383	-,00891
	Equal variances not			-1,953	165,071	,053	-,05137	,02630	-,09488	-,00786
@28	Equal variances	2,027	,156	-1,823	192	0,070	-,04871	,02673	-,09289	-,00454
	Equal variances not			-1,774	155,779	,078	-,04871	,02746	-,09415	-,00328
@29	Equal variances	4,118	,044	-2,282	188	,024	-,06211	,02722	-,10710	-,01711
	Equal variances not			-2,219	153,782	0,028	-,06211	,02798	-,10842	-,01580
@30	Equal variances	4,417	,037	-2,339	181	,020	-,06455	,02760	-,11018	-,01893
	Equal variances not			-2,275	147,806	0,024	-,06455	,02838	-,11153	-,01758
@31	Equal variances	3,926	,049	-2,094	180	,038	-,05951	,02843	-,10651	-,01251
	Equal variances not			-2,041	149,230	0,043	-,05951	,02916	-,10778	-,01124
@32	Equal variances	2,672	,104	-1,863	175	0,064	-,04893	,02627	-,09237	-,00549
	Equal variances not			-1,818	146,055	,071	-,04893	,02692	-,09349	-,00437
@33	Equal variances	,482	,488	-1,219	169	0,224	-,03178	,02606	-,07489	,01132
	Equal variances not			-1,205	148,106	,230	-,03178	,02637	-,07543	,01187
@34	Equal variances	1,925	,167	-1,580	164	0,116	-,04002	,02533	-,08192	,00188
	Equal variances not			-1,539	134,609	,126	-,04002	,02600	-,08309	,00304
@35	Equal variances	4,144	,043	-1,683	159	,094	-,04318	,02565	-,08563	-,00074
	Equal variances not			-1,614	120,011	0,109	-,04318	,02675	-,08752	,00115
@36	Equal variances	,608	,437	-1,319	131	0,190	-,03763	,02853	-,08490	,00964
	Equal variances not			-1,282	96,478	,203	-,03763	,02936	-,08639	,01113
@37	Equal variances	,818	,370	-1,815	54	0,075	-,09595	,05285	-,18441	-,00750
	Equal variances not			-1,419	16,218	,175	-,09595	,06763	-,21393	,02202

b) long term maturity

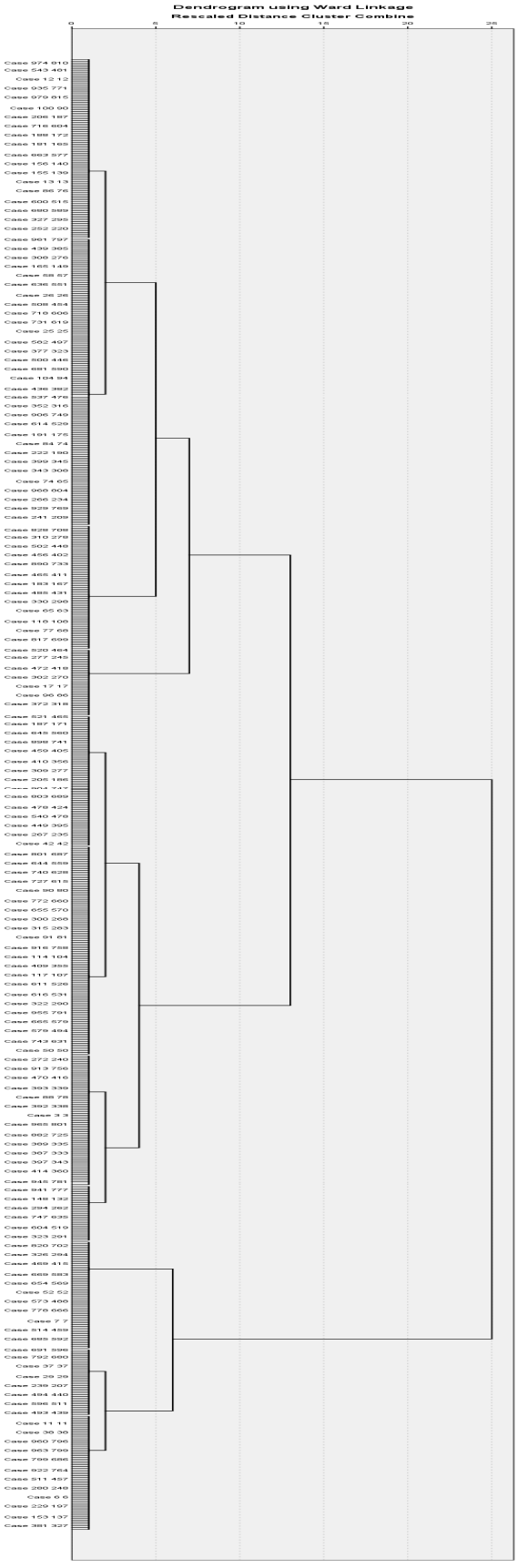
Groups 1-2. @ maturity months		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	90% Confidence Interval of the	
									Lower	Upper
@1	Equal variances assumed	,419	,518	-5,549	151	0,0000	-,09277	,01672	-,12044	-,06510
	Equal variances not assumed			-5,635	135,196	0,0000	-,09277	,01646	-,12004	-,06550
@2	Equal variances assumed	3,248	,073	-6,719	295	0,0000	-,07841	,01167	-,09767	-,05916
	Equal variances not assumed			-6,755	294,615	0,0000	-,07841	,01161	-,09757	-,05926
@3	Equal variances assumed	2,423	,121	-6,654	300	0,0000	-,07752	,01165	-,09675	-,05830
	Equal variances not assumed			-6,673	299,086	0,0000	-,07752	,01162	-,09669	-,05835
@4	Equal variances assumed	2,981	,085	-6,676	299	0,0000	-,07903	,01184	-,09857	-,05950
	Equal variances not assumed			-6,699	297,957	0,0000	-,07903	,01180	-,09850	-,05957
@5	Equal variances assumed	3,812	,052	-6,540	299	0,0000	-,08005	,01224	-,10024	-,05985
	Equal variances not assumed			-6,575	295,068	0,0000	-,08005	,01218	-,10014	-,05996
@6	Equal variances assumed	3,511	,062	-6,406	303	0,0000	-,07871	,01229	-,09898	-,05844
	Equal variances not assumed			-6,425	297,239	0,0000	-,07871	,01225	-,09892	-,05849
@7	Equal variances assumed	3,037	,082	-6,485	299	0,0000	-,08055	,01242	-,10104	-,06006
	Equal variances not assumed			-6,516	296,038	0,0000	-,08055	,01236	-,10094	-,06015
@8	Equal variances assumed	2,586	,109	-6,474	299	0,0000	-,08044	,01242	-,10094	-,05994
	Equal variances not assumed			-6,504	296,550	0,0000	-,08044	,01237	-,10085	-,06003
@9	Equal variances assumed	2,335	,128	-6,480	303	0,0000	-,07962	,01229	-,09989	-,05935
	Equal variances not assumed			-6,496	299,053	0,0000	-,07962	,01226	-,09985	-,05940
@10	Equal variances assumed	1,972	,161	-6,575	299	0,0000	-,08145	,01239	-,10189	-,06101
	Equal variances not assumed			-6,603	297,117	0,0000	-,08145	,01234	-,10180	-,06110
@11	Equal variances assumed	1,841	,176	-6,591	299	0,0000	-,08150	,01236	-,10190	-,06110
	Equal variances not assumed			-6,618	297,280	0,0000	-,08150	,01231	-,10181	-,06118
@12	Equal variances assumed	1,611	,205	-6,549	303	0,0000	-,08023	,01225	-,10044	-,06002
	Equal variances not assumed			-6,564	299,988	0,0000	-,08023	,01222	-,10039	-,06006
@13	Equal variances assumed	1,217	,271	-6,645	299	0,0000	-,08230	,01239	-,10273	-,06186
	Equal variances not assumed			-6,669	297,991	0,0000	-,08230	,01234	-,10266	-,06194
@14	Equal variances assumed	1,032	,310	-6,662	299	0,0000	-,08266	,01241	-,10313	-,06219
	Equal variances not assumed			-6,684	298,288	0,0000	-,08266	,01237	-,10307	-,06226
@15	Equal variances assumed	,842	,360	-6,636	303	0,0000	-,08147	,01228	-,10173	-,06122
	Equal variances not assumed			-6,648	301,428	0,0000	-,08147	,01226	-,10170	-,06125
@16	Equal variances assumed	,573	,450	-6,686	299	0,0000	-,08305	,01242	-,10355	-,06256
	Equal variances not assumed			-6,704	298,706	0,0000	-,08305	,01239	-,10349	-,06261
@17	Equal variances assumed	,348	,556	-6,672	299	0,0000	-,08298	,01244	-,10350	-,06246
	Equal variances not assumed			-6,689	298,847	0,0000	-,08298	,01241	-,10345	-,06251
@18	Equal variances assumed	,160	,689	-6,533	303	0,0000	-,08052	,01233	-,10086	-,06019
	Equal variances not assumed			-6,541	302,367	0,0000	-,08052	,01231	-,10084	-,06021
@19	Equal variances assumed	,017	,895	-6,559	299	0,0000	-,08193	,01249	-,10254	-,06132
	Equal variances not assumed			-6,571	299,000	0,0000	-,08193	,01247	-,10251	-,06136
@20	Equal variances assumed	,011	,917	-6,459	299	0,0000	-,08115	,01256	-,10188	-,06042
	Equal variances not assumed			-6,467	298,897	0,0000	-,08115	,01255	-,10186	-,06045
@21	Equal variances assumed	,072	,788	-6,360	303	0,0000	-,07938	,01248	-,09997	-,05879
	Equal variances not assumed			-6,363	302,999	0,0000	-,07938	,01248	-,09996	-,05880
@22	Equal variances assumed	,233	,630	-6,381	299	0,0000	-,08070	,01265	-,10156	-,05983
	Equal variances not assumed			-6,384	298,356	0,0000	-,08070	,01264	-,10155	-,05984
@23	Equal variances assumed	,407	,524	-6,323	299	0,0000	-,08000	,01265	-,10088	-,05912
	Equal variances not assumed			-6,323	298,013	0,0000	-,08000	,01265	-,10088	-,05912
@24	Equal variances assumed	,653	,420	-6,160	303	0,0000	-,07751	,01258	-,09827	-,05675
	Equal variances not assumed			-6,160	302,545	0,0000	-,07751	,01258	-,09827	-,05675
@25	Equal variances assumed	1,092	,297	-6,259	299	0,0000	-,07981	,01275	-,10085	-,05877
	Equal variances not assumed			-6,253	296,719	0,0000	-,07981	,01276	-,10087	-,05875
@26	Equal variances assumed	1,427	,233	-6,241	298	0,0000	-,08027	,01286	-,10149	-,05905
	Equal variances not assumed			-6,232	294,367	0,0000	-,08027	,01288	-,10153	-,05902
@27	Equal variances assumed	1,845	,175	-6,073	303	0,0000	-,07776	,01280	-,09889	-,05664
	Equal variances not assumed			-6,067	300,614	0,0000	-,07776	,01282	-,09891	-,05662
@28	Equal variances assumed	2,483	,116	-6,104	298	0,0000	-,07967	,01305	-,10121	-,05813
	Equal variances not assumed			-6,088	291,868	0,0000	-,07967	,01309	-,10126	-,05808
@29	Equal variances assumed	3,595	,059	-6,005	296	0,0000	-,07940	,01322	-,10122	-,05759
	Equal variances not assumed			-5,981	286,602	0,0000	-,07940	,01328	-,10131	-,05749
@30	Equal variances assumed	4,250	,040	-5,767	301	0,0000	-,07592	,01316	-,09764	-,05420
	Equal variances not assumed			-5,753	293,755	0,0000	-,07592	,01320	-,09770	-,05415
@31	Equal variances assumed	5,189	,023	-5,769	298	0,0000	-,07720	,01338	-,09927	-,05512
	Equal variances not assumed			-5,744	286,645	0,0000	-,07720	,01344	-,09937	-,05502
@32	Equal variances assumed	6,183	,013	-5,643	299	0,0000	-,07620	,01350	-,09848	-,05392
	Equal variances not assumed			-5,618	286,331	0,0000	-,07620	,01356	-,09859	-,05382
@33	Equal variances assumed	7,431	,007	-5,401	303	0,0000	-,07316	,01355	-,09552	-,05081
	Equal variances not assumed			-5,386	291,133	0,0000	-,07316	,01358	-,09558	-,05075
@34	Equal variances assumed	8,498	,004	-5,369	299	0,0000	-,07425	,01383	-,09707	-,05143
	Equal variances not assumed			-5,339	281,465	0,0000	-,07425	,01391	-,09720	-,05130
@35	Equal variances assumed	9,687	,002	-5,209	299	0,0000	-,07304	,01402	-,09617	-,04991
	Equal variances not assumed			-5,177	279,104	0,0000	-,07304	,01411	-,09632	-,04976
@36	Equal variances assumed	11,194	,001	-4,883	303	0,0000	-,06903	,01414	-,09235	-,04570
	Equal variances not assumed			-4,866	284,926	0,0000	-,06903	,01419	-,09244	-,04562

Groups 1-2. (cont.) @ maturity months		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	90% Confidence Interval of the	
									Lower	Upper
@37	Equal variances assumed	12,390	,000	-4,770	299	0,0000	-,06877	,01442	-,09257	-,04498
	Equal variances not assumed			-4,737	276,092	0,0000	-,06877	,01452	-,09274	-,04481
@38	Equal variances assumed	14,256	,000	-4,479	299	0,0000	-,06637	,01482	-,09082	-,04192
	Equal variances not assumed			-4,444	272,317	0,0000	-,06637	,01493	-,09101	-,04172
@39	Equal variances assumed	17,175	,000	-4,144	298	0,0000	-,06153	,01485	-,08603	-,03703
	Equal variances not assumed			-4,128	273,503	0,0000	-,06153	,01490	-,08612	-,03693
@40	Equal variances assumed	16,727	,000	-4,235	292	0,0000	-,06362	,01502	-,08842	-,03883
	Equal variances not assumed			-4,198	264,129	0,0000	-,06362	,01516	-,08864	-,03860
@41	Equal variances assumed	17,301	,000	-4,018	290	0,0001	-,06170	,01536	-,08704	-,03636
	Equal variances not assumed			-3,989	263,630	0,0001	-,06170	,01547	-,08724	-,03617
@42	Equal variances assumed	20,589	,000	-3,505	291	0,0005	-,05496	,01568	-,08083	-,02909
	Equal variances not assumed			-3,489	265,687	0,0006	-,05496	,01575	-,08096	-,02896
@43	Equal variances assumed	23,191	,000	-3,413	281	0,0007	-,05579	,01634	-,08276	-,02881
	Equal variances not assumed			-3,360	242,766	0,0009	-,05579	,01660	-,08320	-,02837
@44	Equal variances assumed	24,106	,000	-3,328	279	0,0010	-,05573	,01675	-,08337	-,02809
	Equal variances not assumed			-3,267	237,083	0,0012	-,05573	,01706	-,08391	-,02756
@45	Equal variances assumed	25,435	,000	-3,117	284	0,0020	-,05299	,01700	-,08105	-,02494
	Equal variances not assumed			-3,083	248,723	0,0023	-,05299	,01719	-,08137	-,02462
@46	Equal variances assumed	27,290	,000	-3,043	280	0,0026	-,05344	,01756	-,08243	-,02446
	Equal variances not assumed			-2,994	238,391	0,0030	-,05344	,01785	-,08292	-,02397
@47	Equal variances assumed	29,346	,000	-2,617	278	0,0094	-,04694	,01794	-,07655	-,01734
	Equal variances not assumed			-2,574	235,616	0,0107	-,04694	,01824	-,07706	-,01682
@48	Equal variances assumed	21,933	,000	-2,946	266	0,0035	-,05336	,01811	-,08326	-,02347
	Equal variances not assumed			-2,891	224,113	0,0042	-,05336	,01846	-,08385	-,02287
@49	Equal variances assumed	28,625	,000	-2,744	230	0,0065	-,04957	,01806	-,07940	-,01974
	Equal variances not assumed			-2,664	176,068	0,0084	-,04957	,01861	-,08033	-,01880
@50	Equal variances assumed	12,979	,000	-6,515	196	0,0000	-,09062	,01391	-,11361	-,06763
	Equal variances not assumed			-6,209	142,716	0,0000	-,09062	,01459	-,11478	-,06646
@51	Equal variances assumed	12,320	,001	-7,598	193	0,0000	-,09806	,01291	-,11939	-,07673
	Equal variances not assumed			-7,361	154,779	0,0000	-,09806	,01332	-,12010	-,07601
@52	Equal variances assumed	14,748	,000	-7,669	189	0,0000	-,10083	,01315	-,12256	-,07909
	Equal variances not assumed			-7,390	146,852	0,0000	-,10083	,01364	-,12341	-,07824
@53	Equal variances assumed	17,956	,000	-7,252	188	0,0000	-,09827	,01355	-,12067	-,07587
	Equal variances not assumed			-6,960	142,910	0,0000	-,09827	,01412	-,12164	-,07489
@54	Equal variances assumed	21,155	,000	-7,399	185	0,0000	-,09749	,01318	-,11927	-,07571
	Equal variances not assumed			-7,129	143,727	0,0000	-,09749	,01368	-,12013	-,07485
@55	Equal variances assumed	28,276	,000	-7,696	182	0,0000	-,10134	,01317	-,12311	-,07957
	Equal variances not assumed			-7,351	134,738	0,0000	-,10134	,01378	-,12417	-,07851
@56	Equal variances assumed	31,364	,000	-7,291	177	0,0000	-,09886	,01356	-,12129	-,07644
	Equal variances not assumed			-6,872	122,202	0,0000	-,09886	,01439	-,12271	-,07502
@57	Equal variances assumed	35,615	,000	-6,703	174	0,0000	-,09438	,01408	-,11767	-,07110
	Equal variances not assumed			-6,362	124,464	0,0000	-,09438	,01484	-,11897	-,06980
@58	Equal variances assumed	37,569	,000	-6,272	165	0,0000	-,09375	,01495	-,11848	-,06902
	Equal variances not assumed			-5,974	120,097	0,0000	-,09375	,01569	-,11976	-,06774
@59	Equal variances assumed	37,738	,000	-6,082	164	0,0000	-,09322	,01533	-,11857	-,06786
	Equal variances not assumed			-5,803	120,283	0,0000	-,09322	,01606	-,11984	-,06659
@60	Equal variances assumed	34,213	,000	-5,984	148	0,0000	-,09883	,01651	-,12616	-,07149
	Equal variances not assumed			-5,790	115,749	0,0000	-,09883	,01707	-,12713	-,07052
@61	Equal variances assumed	6,826	,011	-2,026	79	0,0461	-,05891	,02908	-,10731	-,01052
	Equal variances not assumed			-2,138	60,191	0,0366	-,05891	,02755	-,10494	-,01289
@62	Equal variances assumed	6,658	,015	,984	28	0,3336	,045	,045	-,033	,122
	Equal variances not assumed			1,709	26,141	0,0993	,045	,026	,000	,089
@63	Equal variances assumed	1,749	,198	,334	24	0,7411	,012	,035	-,048	,071
	Equal variances not assumed			,516	21,989	0,6109	,012	,022	-,027	,050
@64	Equal variances assumed	,185	,671	-,601	22	0,5538	-,011	,018	-,042	,020
	Equal variances not assumed			-,710	12,024	0,4915	-,011	,015	-,038	,016
@65	Equal variances assumed	,149	,703	-,629	22	0,5360	-,010	,016	-,038	,018
	Equal variances not assumed			-,730	11,585	0,4796	-,010	,014	-,035	,015
@66	Equal variances assumed	,221	,643	-,532	20	0,6003	-,008	,015	-,034	,018
	Equal variances not assumed			-,612	12,269	0,5516	-,008	,013	-,031	,015
@67	Equal variances assumed	,000	,997	-,789	19	0,4398	-,010	,013	-,033	,012
	Equal variances not assumed			-,855	11,065	0,4109	-,010	,012	-,032	,011
@68	Equal variances assumed	,004	,949	-,877	18	0,3921	-,010	,011	-,029	,010
	Equal variances not assumed			-,922	10,691	0,3771	-,010	,011	-,029	,009
@69	Equal variances assumed	,123	,730	-,698	17	0,4949	-,007	,010	-,025	,011
	Equal variances not assumed			-,672	6,639	0,5245	-,007	,011	-,028	,013
@70	Equal variances assumed	,392	,540	-,599	17	0,5570	-,005	,008	-,020	,010
	Equal variances not assumed			-,546	6,106	0,6041	-,005	,009	-,023	,013
@71	Equal variances assumed	1,634	,219	-,187	16	0,8538	-,001	,007	-,014	,011
	Equal variances not assumed			-,163	5,813	0,8757	-,001	,008	-,017	,015
@72	Equal variances assumed	,180	,683	-,881	8	0,4040	-,008	,010	-,026	,009
	Equal variances not assumed			-,800	3,188	0,4792	-,008	,010	-,033	,016

Groups 2-3. @ maturity months		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	90% Confidence Interval of the	
									Lower	Upper
@1	Equal variances assumed	3,889	0,0505	-3,347	142	,001	-,06371	,01904	-,09523	-,03219
	Equal variances not assumed			-3,473	141,402	0,001	-,06371	,01835	-,09409	-,03333
@2	Equal variances assumed	11,004	0,0010	-4,012	355	,000	-,04813	,01199	-,06791	-,02835
	Equal variances not assumed			-4,222	345,815	0,000	-,04813	,01140	-,06693	-,02933
@3	Equal variances assumed	10,172	0,0015	-4,342	364	,000	-,05167	,01190	-,07130	-,03205
	Equal variances not assumed			-4,548	354,809	0,000	-,05167	,01136	-,07041	-,03294
@4	Equal variances assumed	10,376	0,0014	-4,717	365	,000	-,05674	,01203	-,07658	-,03691
	Equal variances not assumed			-4,952	354,193	0,000	-,05674	,01146	-,07564	-,03785
@5	Equal variances assumed	10,733	0,0012	-4,883	365	,000	-,05937	,01216	-,07942	-,03932
	Equal variances not assumed			-5,142	356,005	0,000	-,05937	,01155	-,07841	-,04033
@6	Equal variances assumed	10,417	0,0014	-5,162	369	,000	-,06290	,01219	-,08299	-,04281
	Equal variances not assumed			-5,415	362,483	0,000	-,06290	,01162	-,08206	-,04375
@7	Equal variances assumed	12,057	0,0006	-4,910	364	,000	-,06147	,01252	-,08211	-,04082
	Equal variances not assumed			-5,173	356,207	0,000	-,06147	,01188	-,08106	-,04187
@8	Equal variances assumed	12,088	0,0006	-5,047	365	,000	-,06363	,01261	-,08442	-,04284
	Equal variances not assumed			-5,323	356,982	0,000	-,06363	,01195	-,08334	-,04392
@9	Equal variances assumed	14,086	0,0002	-5,236	368	,000	-,06603	,01261	-,08683	-,04524
	Equal variances not assumed			-5,516	364,171	0,000	-,06603	,01197	-,08578	-,04629
@10	Equal variances assumed	15,094	0,0001	-5,055	365	,000	-,06500	,01286	-,08621	-,04380
	Equal variances not assumed			-5,354	359,166	0,000	-,06500	,01214	-,08502	-,04498
@11	Equal variances assumed	15,807	0,0001	-5,157	365	,000	-,06674	,01294	-,08809	-,04540
	Equal variances not assumed			-5,471	359,920	0,000	-,06674	,01220	-,08686	-,04663
@12	Equal variances assumed	16,454	0,0001	-5,435	369	,000	-,07030	,01293	-,09162	-,04897
	Equal variances not assumed			-5,757	366,710	0,000	-,07030	,01221	-,09043	-,05016
@13	Equal variances assumed	15,828	0,0001	-5,331	365	,000	-,07039	,01320	-,09216	-,04862
	Equal variances not assumed			-5,667	360,784	0,000	-,07039	,01242	-,09087	-,04991
@14	Equal variances assumed	16,178	0,0001	-5,373	365	,000	-,07179	,01336	-,09382	-,04976
	Equal variances not assumed			-5,719	361,274	0,000	-,07179	,01255	-,09249	-,05109
@15	Equal variances assumed	17,533	0,0000	-5,597	369	,000	-,07469	,01334	-,09669	-,05268
	Equal variances not assumed			-5,947	367,612	0,000	-,07469	,01256	-,09540	-,05398
@16	Equal variances assumed	17,988	0,0000	-5,398	365	,000	-,07387	,01369	-,09644	-,05131
	Equal variances not assumed			-5,764	362,444	0,000	-,07387	,01282	-,09501	-,05274
@17	Equal variances assumed	18,277	0,0000	-5,382	365	,000	-,07450	,01384	-,09732	-,05167
	Equal variances not assumed			-5,754	362,858	0,000	-,07450	,01295	-,09585	-,05315
@18	Equal variances assumed	19,326	0,0000	-5,589	369	,000	-,07750	,01387	-,10037	-,05463
	Equal variances not assumed			-5,965	368,548	0,000	-,07750	,01299	-,09892	-,05608
@19	Equal variances assumed	18,325	0,0000	-5,439	365	,000	-,07734	,01422	-,10079	-,05389
	Equal variances not assumed			-5,828	363,503	0,000	-,07734	,01327	-,09922	-,05546
@20	Equal variances assumed	17,607	0,0000	-5,458	365	,000	-,07888	,01445	-,10271	-,05504
	Equal variances not assumed			-5,850	363,556	0,000	-,07888	,01348	-,10111	-,05664
@21	Equal variances assumed	19,076	0,0000	-5,581	369	,000	-,08118	,01454	-,10516	-,05719
	Equal variances not assumed			-5,970	368,818	0,000	-,08118	,01360	-,10360	-,05876
@22	Equal variances assumed	18,649	0,0000	-5,397	365	,000	-,08065	,01494	-,10529	-,05601
	Equal variances not assumed			-5,802	364,197	0,000	-,08065	,01390	-,10357	-,05773
@23	Equal variances assumed	18,726	0,0000	-5,396	365	,000	-,08145	,01510	-,10634	-,05656
	Equal variances not assumed			-5,806	364,357	0,000	-,08145	,01403	-,10458	-,05831
@24	Equal variances assumed	19,370	0,0000	-5,568	369	,000	-,08421	,01513	-,10915	-,05927
	Equal variances not assumed			-5,972	368,985	0,000	-,08421	,01410	-,10747	-,06096
@25	Equal variances assumed	18,658	0,0000	-5,306	365	,000	-,08245	,01554	-,10808	-,05683
	Equal variances not assumed			-5,717	364,572	0,000	-,08245	,01442	-,10624	-,05867
@26	Equal variances assumed	18,544	0,0000	-5,168	364	,000	-,08195	,01586	-,10809	-,05580
	Equal variances not assumed			-5,578	363,474	0,000	-,08195	,01469	-,10617	-,05772
@27	Equal variances assumed	19,442	0,0000	-5,311	369	,000	-,08453	,01592	-,11078	-,05829
	Equal variances not assumed			-5,707	368,992	0,000	-,08453	,01481	-,10896	-,06011
@28	Equal variances assumed	18,597	0,0000	-4,975	364	,000	-,08201	,01648	-,10919	-,05482
	Equal variances not assumed			-5,380	363,706	0,000	-,08201	,01524	-,10714	-,05687
@29	Equal variances assumed	17,503	0,0000	-4,814	362	,000	-,08137	,01690	-,10924	-,05350
	Equal variances not assumed			-5,218	361,326	0,000	-,08137	,01559	-,10708	-,05565
@30	Equal variances assumed	18,258	0,0000	-4,975	367	,000	-,08456	,01700	-,11259	-,05653
	Equal variances not assumed			-5,371	366,993	0,000	-,08456	,01574	-,11052	-,05860
@31	Equal variances assumed	17,473	0,0000	-4,725	364	,000	-,08265	,01749	-,11149	-,05380
	Equal variances not assumed			-5,120	363,894	0,000	-,08265	,01614	-,10926	-,05603
@32	Equal variances assumed	17,185	0,0000	-4,671	365	,000	-,08304	,01778	-,11236	-,05373
	Equal variances not assumed			-5,055	364,962	0,000	-,08304	,01643	-,11014	-,05595
@33	Equal variances assumed	17,999	0,0000	-4,678	368	,000	-,08402	,01796	-,11363	-,05440
	Equal variances not assumed			-5,036	367,783	0,000	-,08402	,01668	-,11153	-,05651
@34	Equal variances assumed	17,392	0,0000	-4,409	364	,000	-,08203	,01860	-,11271	-,05135
	Equal variances not assumed			-4,771	363,999	0,000	-,08203	,01719	-,11039	-,05368
@35	Equal variances assumed	17,458	0,0000	-4,314	364	,000	-,08240	,01910	-,11390	-,05090
	Equal variances not assumed			-4,673	363,991	0,000	-,08240	,01763	-,11148	-,05332
@36	Equal variances assumed	18,316	0,0000	-4,502	368	,000	-,08760	,01946	-,11968	-,05552
	Equal variances not assumed			-4,863	367,274	0,000	-,08760	,01801	-,11730	-,05789

Groups 2-3. (cont) @ maturity months		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	90% Confidence Interval of the	
									Lower	Upper
@37	Equal variances assumed	17,777	0,0000	-4,315	364	,000	-,08706	,02018	-,12034	-,05379
	Equal variances not assumed			-4,692	363,731	0,000	-,08706	,01856	-,11766	-,05647
@38	Equal variances assumed	16,739	0,0001	-4,238	364	,000	-,08825	,02082	-,12258	-,05391
	Equal variances not assumed			-4,603	363,869	0,000	-,08825	,01917	-,11986	-,05663
@39	Equal variances assumed	18,540	0,0000	-4,163	363	,000	-,08878	,02133	-,12395	-,05362
	Equal variances not assumed			-4,517	361,122	0,000	-,08878	,01966	-,12120	-,05637
@40	Equal variances assumed	17,221	0,0000	-4,070	353	,000	-,08790	,02160	-,12351	-,05228
	Equal variances not assumed			-4,433	352,264	0,000	-,08790	,01983	-,12060	-,05520
@41	Equal variances assumed	18,199	0,0000	-3,927	350	,000	-,08776	,02235	-,12462	-,05091
	Equal variances not assumed			-4,276	348,038	0,000	-,08776	,02052	-,12161	-,05391
@42	Equal variances assumed	18,300	0,0000	-4,002	349	,000	-,09205	,02300	-,12999	-,05412
	Equal variances not assumed			-4,337	344,823	0,000	-,09205	,02123	-,12706	-,05704
@43	Equal variances assumed	15,649	0,0001	-3,712	338	,000	-,09055	,02439	-,13079	-,05031
	Equal variances not assumed			-4,075	337,513	0,000	-,09055	,02222	-,12720	-,05390
@44	Equal variances assumed	15,005	0,0001	-3,446	334	,001	-,08705	,02526	-,12871	-,04539
	Equal variances not assumed			-3,790	333,579	0,000	-,08705	,02297	-,12493	-,04916
@45	Equal variances assumed	16,454	0,0001	-3,400	339	,001	-,08724	,02566	-,12956	-,04492
	Equal variances not assumed			-3,707	335,986	0,000	-,08724	,02353	-,12606	-,04842
@46	Equal variances assumed	15,526	0,0001	-3,170	333	,002	-,08512	,02685	-,12941	-,04083
	Equal variances not assumed			-3,471	331,081	0,001	-,08512	,02452	-,12557	-,04467
@47	Equal variances assumed	16,820	0,0001	-3,269	325	,001	-,09165	,02804	-,13791	-,04540
	Equal variances not assumed			-3,568	320,227	0,000	-,09165	,02569	-,13403	-,04928
@48	Equal variances assumed	16,194	0,0001	-3,738	303	,000	-,10846	,02901	-,15633	-,06059
	Equal variances not assumed			-4,070	294,530	0,000	-,10846	,02665	-,15243	-,06449
@49	Equal variances assumed	17,883	0,0000	-5,702	246	,000	-,17044	,02989	-,21980	-,12109
	Equal variances not assumed			-6,053	234,190	0,000	-,17044	,02816	-,21694	-,12394
@50	Equal variances assumed	47,540	0,0000	-4,700	211	,000	-,14305	,03043	-,19332	-,09277
	Equal variances not assumed			-5,363	185,379	0,000	-,14305	,02667	-,18714	-,09895
@51	Equal variances assumed	57,260	0,0000	-4,482	202	,000	-,13798	,03079	-,18886	-,08711
	Equal variances not assumed			-5,088	160,298	0,000	-,13798	,02712	-,18285	-,09312
@52	Equal variances assumed	55,075	0,0000	-4,238	190	,000	-,13405	,03163	-,18633	-,08176
	Equal variances not assumed			-4,732	147,514	0,000	-,13405	,02833	-,18093	-,08716
@53	Equal variances assumed	53,152	0,0000	-4,290	183	,000	-,14081	,03282	-,19507	-,08655
	Equal variances not assumed			-4,671	137,176	0,000	-,14081	,03014	-,19073	-,09089
@54	Equal variances assumed	56,241	0,0000	-4,031	178	,000	-,13866	,03440	-,19553	-,08179
	Equal variances not assumed			-4,362	125,841	0,000	-,13866	,03179	-,19133	-,08599
@55	Equal variances assumed	59,257	0,0000	-3,959	172	,000	-,14326	,03618	-,20310	-,08342
	Equal variances not assumed			-4,262	119,020	0,000	-,14326	,03362	-,19899	-,08753
@56	Equal variances assumed	53,913	0,0000	-3,815	164	,000	-,14540	,03811	-,20845	-,08235
	Equal variances not assumed			-4,160	116,067	0,000	-,14540	,03495	-,20335	-,08745
@57	Equal variances assumed	55,064	0,0000	-3,998	156	,000	-,15774	,03945	-,22303	-,09246
	Equal variances not assumed			-4,163	102,388	0,000	-,15774	,03789	-,22063	-,09485
@58	Equal variances assumed	55,853	0,0000	-3,996	149	,000	-,16794	,04202	-,23750	-,09839
	Equal variances not assumed			-4,148	96,872	0,000	-,16794	,04049	-,23518	-,10070
@59	Equal variances assumed	60,189	0,0000	-4,042	146	,000	-,17662	,04370	-,24895	-,10429
	Equal variances not assumed			-4,131	91,987	0,000	-,17662	,04275	-,24766	-,10558
@60	Equal variances assumed	58,965	0,0000	-4,761	126	,000	-,22510	,04728	-,30345	-,14675
	Equal variances not assumed			-4,523	69,823	0,000	-,22510	,04977	-,30806	-,14214
@61	Equal variances assumed	62,095	0,0000	-6,911	89	,000	-,38096	,05513	-,47259	-,28933
	Equal variances not assumed			-5,948	41,933	0,000	-,38096	,06405	-,48869	-,27323
@62	Equal variances assumed	34,288	0,0000	-4,168	54	,000	-,321	,077	-,450	-,192
	Equal variances not assumed			-4,710	38,047	0,000	-,321	,068	-,436	-,206
@63	Equal variances assumed	37,813	0,0000	-4,769	46	,000	-,367	,077	-,496	-,238
	Equal variances not assumed			-5,551	31,396	0,000	-,367	,066	-,478	-,255
@64	Equal variances assumed	43,688	0,0000	-4,148	43	,000	-,330	,080	-,464	-,196
	Equal variances not assumed			-5,068	27,147	0,000	-,330	,065	-,441	-,219
@65	Equal variances assumed	43,458	0,0000	-4,221	42	,000	-,345	,082	-,483	-,208
	Equal variances not assumed			-5,070	25,807	0,000	-,345	,068	-,461	-,229
@66	Equal variances assumed	37,410	0,0000	-4,081	39	,000	-,365	,089	-,516	-,214
	Equal variances not assumed			-5,103	24,665	0,000	-,365	,072	-,487	-,243
@67	Equal variances assumed	34,228	0,0000	-3,791	37	,001	-,347	,092	-,502	-,193
	Equal variances not assumed			-4,805	23,458	0,000	-,347	,072	-,471	-,224
@68	Equal variances assumed	31,205	0,0000	-3,971	35	,000	-,376	,095	-,536	-,216
	Equal variances not assumed			-5,107	22,329	0,000	-,376	,074	-,502	-,250
@69	Equal variances assumed	33,183	0,0000	-4,050	35	,000	-,373	,092	-,528	-,217
	Equal variances not assumed			-5,212	22,231	0,000	-,373	,072	-,495	-,250
@70	Equal variances assumed	33,012	0,0000	-3,898	34	,000	-,374	,096	-,536	-,212
	Equal variances not assumed			-4,908	21,122	0,000	-,374	,076	-,505	-,243
@71	Equal variances assumed	34,344	0,0000	-4,484	29	,000	-,458	,102	-,632	-,285
	Equal variances not assumed			-5,299	17,053	0,000	-,458	,087	-,609	-,308
@72	Equal variances assumed	24,525	0,0001	-3,414	21	,003	-,497	,146	-,748	-,247
	Equal variances not assumed			-5,225	15,080	0,000	-,497	,095	-,664	-,330
@73	Equal variances assumed	9,444	0,0097	-3,119	12	,009	-,669	,214	-1,051	-,287
	Equal variances not assumed			-7,900	11,000	0,000	-,669	,085	-,821	-,517

Annex 12. – Results of cluster analysis (H4)



Cluster		Maturity			Residual value (%)		Downpayment (%)		Number of notices/month		Ratio of greatest delay (%)	
		Count	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Ward Method	1	100	37,56	5,71	,03	,03	,42	,05	,07	,11	,12	,10
	2	64	26,41	6,08	,32	,09	,38	,09	,10	,20	,30	,28
	3	73	61,86	5,28	,03	,03	,39	,04	,09	,13	,08	,07
	4	189	56,24	6,42	,04	,04	,28	,05	,12	,17	,10	,10
	5	60	22,08	7,08	,56	,11	,19	,09	,18	,26	,27	,35
	6	160	31,94	6,90	,05	,04	,30	,05	,09	,15	,15	,19
	7	37	31,43	7,05	,03	,03	,63	,07	,03	,09	,14	,16
	8	37	45,68	5,98	,25	,07	,27	,06	,20	,26	,17	,19
	9	69	38,78	6,62	,04	,06	,15	,08	,17	,24	,19	,14
	10	31	54,97	6,62	,02	,04	,56	,08	,06	,08	,08	,11
Ward Method	1	100	37,56	5,71	,03	,03	,42	,05	,07	,11	,12	,10
	2	64	26,41	6,08	,32	,09	,38	,09	,10	,20	,30	,28
	3	104	59,81	6,50	,02	,03	,44	,10	,08	,12	,08	,08
	4	189	56,24	6,42	,04	,04	,28	,05	,12	,17	,10	,10
	5	60	22,08	7,08	,56	,11	,19	,09	,18	,26	,27	,35
	6	160	31,94	6,90	,05	,04	,30	,05	,09	,15	,15	,19
	7	37	31,43	7,05	,03	,03	,63	,07	,03	,09	,14	,16
	8	37	45,68	5,98	,25	,07	,27	,06	,20	,26	,17	,19
	9	69	38,78	6,62	,04	,06	,15	,08	,17	,24	,19	,14
Ward Method	1	260	34,10	7,01	,04	,04	,35	,08	,08	,14	,14	,17
	2	64	26,41	6,08	,32	,09	,38	,09	,10	,20	,30	,28
	3	104	59,81	6,50	,02	,03	,44	,10	,08	,12	,08	,08
	4	189	56,24	6,42	,04	,04	,28	,05	,12	,17	,10	,10
	5	60	22,08	7,08	,56	,11	,19	,09	,18	,26	,27	,35
	6	37	31,43	7,05	,03	,03	,63	,07	,03	,09	,14	,16
	7	37	45,68	5,98	,25	,07	,27	,06	,20	,26	,17	,19
	8	69	38,78	6,62	,04	,06	,15	,08	,17	,24	,19	,14
Ward Method	1	260	34,10	7,01	,04	,04	,35	,08	,08	,14	,14	,17
	2	101	33,47	11,10	,30	,09	,34	,10	,14	,23	,25	,25
	3	104	59,81	6,50	,02	,03	,44	,10	,08	,12	,08	,08
	4	189	56,24	6,42	,04	,04	,28	,05	,12	,17	,10	,10
	5	60	22,08	7,08	,56	,11	,19	,09	,18	,26	,27	,35
	6	37	31,43	7,05	,03	,03	,63	,07	,03	,09	,14	,16
	7	69	38,78	6,62	,04	,06	,15	,08	,17	,24	,19	,14
Ward Method	1	260	34,10	7,01	,04	,04	,35	,08	,08	,14	,14	,17
	2	101	33,47	11,10	,30	,09	,34	,10	,14	,23	,25	,25
	3	293	57,51	6,66	,03	,03	,33	,10	,11	,15	,10	,09
	4	60	22,08	7,08	,56	,11	,19	,09	,18	,26	,27	,35
	5	37	31,43	7,05	,03	,03	,63	,07	,03	,09	,14	,16
	6	69	38,78	6,62	,04	,06	,15	,08	,17	,24	,19	,14
Ward Method	1	329	35,09	7,18	,04	,04	,31	,11	,10	,17	,15	,16
	2	101	33,47	11,10	,30	,09	,34	,10	,14	,23	,25	,25
	3	293	57,51	6,66	,03	,03	,33	,10	,11	,15	,10	,09
	4	60	22,08	7,08	,56	,11	,19	,09	,18	,26	,27	,35
	5	37	31,43	7,05	,03	,03	,63	,07	,03	,09	,14	,16
Ward Method	1	329	35,09	7,18	,04	,04	,31	,11	,10	,17	,15	,16
	2	161	29,22	11,22	,39	,16	,28	,12	,15	,24	,26	,29
	3	293	57,51	6,66	,03	,03	,33	,10	,11	,15	,10	,09
	4	37	31,43	7,05	,03	,03	,63	,07	,03	,09	,14	,16
Ward Method	1	366	34,72	7,24	,04	,04	,34	,15	,09	,16	,15	,16
	2	161	29,22	11,22	,39	,16	,28	,12	,15	,24	,26	,29
	3	293	57,51	6,66	,03	,03	,33	,10	,11	,15	,10	,09
Főátlag			**41,78**		**0,11**		**0,33**		**0,11**		**0,15**	

Annex 13. – Results of variance analysis (H4)

Descriptives - for every transaction being 75% over until the end of 2009

Group code		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Number of group equalities
						Lower Bound	Upper Bound			
Ratio of greatest delay (%)	000	133	,1454	,17258	,01496	,1158	,1750	,02	1,16	3
	001	115	,2595	,30498	,02844	,2031	,3158	,02	1,33	1
	010	168	,1061	,10460	,00807	,0901	,1220	,03	,77	0
	011	29	,1362	,12073	,02242	,0902	,1821	,02	,39	3
	100	167	,1401	,13300	,01029	,1198	,1605	,00	,78	3
	101	53	,2908	,28867	,03965	,2113	,3704	,03	1,09	1
	110	143	,0880	,08605	,00720	,0737	,1022	,03	,53	0
	111	12	,1526	,14240	,04111	,0621	,2430	,02	,44	3
	Total	**820**	**,1514**	**,18700**	**,00653**	**,1386**	**,1643**	**,00**	**1,33**	-
Number of notices/month	000	133	,0984	,17134	,01486	,0690	,1277	,00	,89	1
	001	115	,1849	,25327	,02362	,1381	,2317	,00	1,26	0
	010	168	,1463	,20673	,01595	,1148	,1778	,00	,94	1
	011	29	,1285	,12974	,02409	,0791	,1779	,00	,51	1
	100	167	,0750	,12431	,00962	,0560	,0940	,00	,62	2
	101	53	,0800	,17587	,02416	,0315	,1285	,00	1,00	4
	110	143	,0782	,10723	,00897	,0605	,0960	,00	,58	2
	111	12	,0492	,08178	,02361	-,0027	,1012	,00	,27	1
	Total	**820**	**,1112**	**,17821**	**,00622**	**,0990**	**,1234**	**,00**	**1,26**	-

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Ratio of greatest delay (%)	41,936	7	812	,000
Number of notices/month	14,561	7	812	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Ratio of greatest delay (%)	Between Groups	3,327	7	,475	15,247	,000
	Within Groups	25,314	812	,031		
	Total	28,641	819			
Number of notices/month	Between Groups	1,334	7	,191	6,273	,000
	Within Groups	24,676	812	,030		
	Total	26,011	819			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Ratio of greatest delay (%)	Welch	10,050	7	126,958	,000
Number of notices/month	Welch	5,347	7	132,953	,000

a. Asymptotically F distributed.

Descriptives - only for transactions with payment notice being 75% over until the end of 2009

Group code		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Number of group equalities
						Lower	Upper			
Ratio of greatest delay (%)	000	84	,1737	,20346	,02220	,1295	,2178	,03	1,16	3
	001	68	,3066	,31407	,03809	,2306	,3826	,03	1,21	0
	010	131	,1173	,11171	,00976	,0980	,1366	,04	,77	1
	011	24	,1354	,12138	,02478	,0842	,1867	,02	,39	4
	100	92	,1532	,13560	,01414	,1251	,1813	,04	,76	2
	101	22	,2256	,24077	,05133	,1189	,3324	,04	,86	1
	110	96	,0954	,09202	,00939	,0768	,1141	,04	,53	0
	111	7	,1840	,16463	,06222	,0318	,3363	,04	,44	3
	Total	**524**	**,1595**	**,18601**	**,00813**	**,1435**	**,1754**	**,02**	**1,21**	-
Number of notices/month	000	84	,1557	,19402	,02117	,1136	,1978	,02	,89	4
	001	68	,3127	,26190	,03176	,2493	,3761	,03	1,26	0
	010	131	,1876	,21699	,01896	,1501	,2252	,01	,94	3
	011	24	,1553	,12710	,02594	,1016	,2089	,02	,51	4
	100	92	,1361	,14063	,01466	,1070	,1652	,03	,62	3
	101	22	,1927	,23201	,04946	,0899	,2956	,03	1,00	3
	110	96	,1165	,11259	,01149	,0937	,1393	,02	,58	1
	111	7	,0844	,09382	,03546	-,0024	,1711	,02	,27	0
	Total	**524**	**,1740**	**,19693**	**,00860**	**,1571**	**,1909**	**,01**	**1,26**	-

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Ratio of greatest delay (%)	25,153	7	516	,000
Number of notices/month	8,551	7	516	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Ratio of greatest delay (%)	Between Groups	2,233	7	,319	10,378	,000
	Within Groups	15,863	516	,031		
	Total	18,097	523			
Number of notices/month	Between Groups	1,882	7	,269	7,538	,000
	Within Groups	18,400	516	,036		
	Total	20,282	523			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Ratio of greatest delay (%)	Welch	6,357	7	72,396	,000
Number of notices/month	Welch	5,921	7	75,702	,000

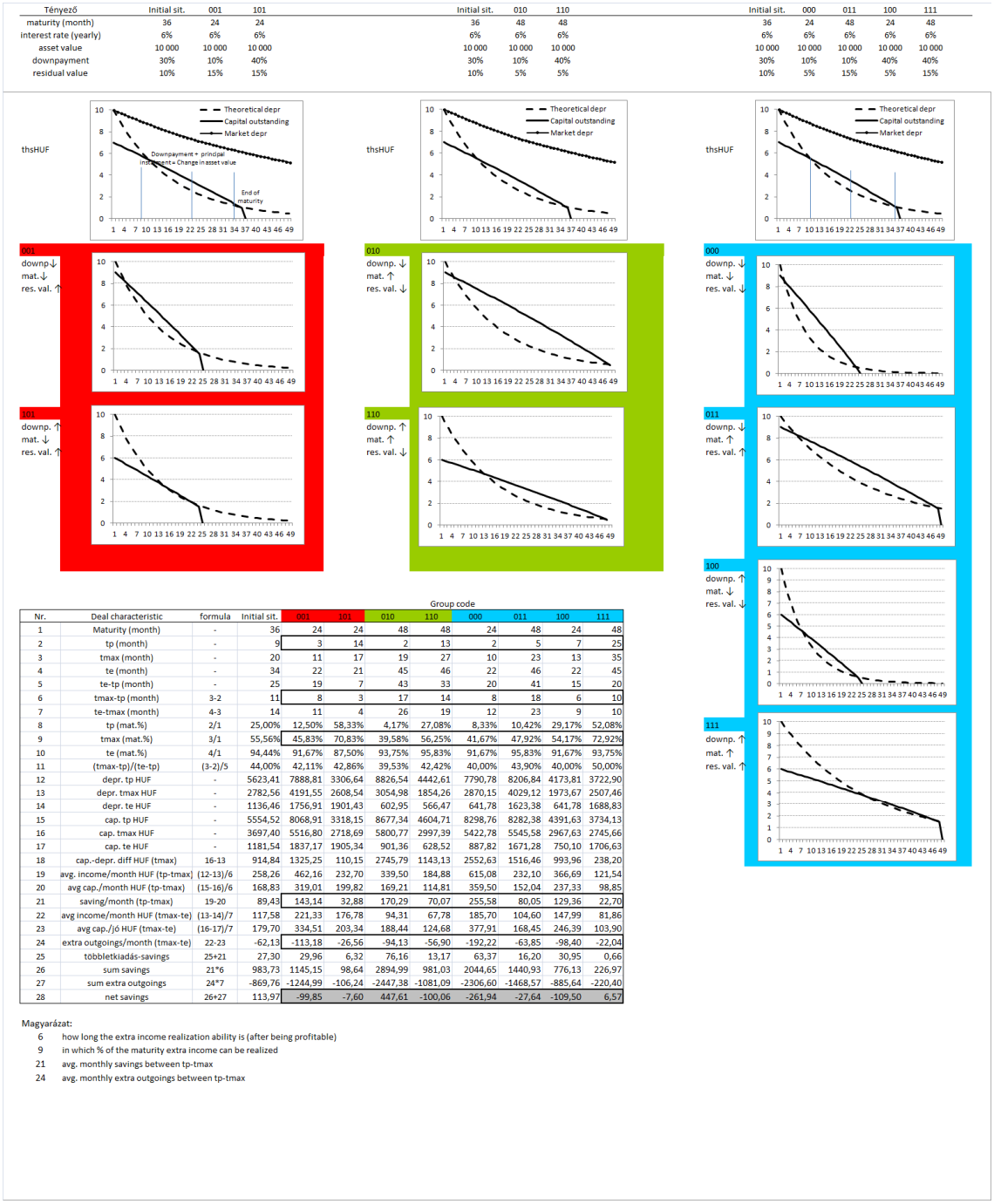
a. Asymptotically F distributed.

Annex 14. – The connection between theoretical depreciation and capital value function in case of different transaction-parameter combinations (H4)

t_p and t_e denoted by yellow background, t_{max} by red letter colour

Month	Market depr%	Market depr	Capital outstanding	Theoretical depr	001 - cap.	001 - depr.	101 - cap.	101 - depr.	010 - cap.	010 - depr.	110 - cap.	110 - depr.	000 - cap.	000 - depr.	011 - cap.	011 - depr.	100 - cap.	100 - depr.	111 - cap.	111 - depr.
0	100,00	10000,00	7000,00	10000,00	9000,00	10000,00	6000,00	10000,00	9000,00	10000,00	6000,00	10000,00	9000,00	10000,00	9000,00	10000,00	6000,00	10000,00	6000,00	10000,00
1	98,54	9854,21	6842,58	9380,42	8691,18	9239,97	5814,59	9239,97	8839,07	9394,97	5895,85	9394,97	8650,25	8826,54	8857,90	9612,48	5773,66	8826,54	5914,69	9612,48
2	97,11	9710,61	6684,37	8799,23	8380,82	8537,70	5628,25	8537,70	8677,34	8826,54	5791,18	8826,54	8298,76	7790,78	8715,10	9239,97	5546,18	7790,78	5828,94	9239,97
3	95,69	9569,15	6525,36	8254,04	8068,91	7888,81	5440,98	7888,81	8514,79	8292,50	5685,99	8292,50	7945,50	6876,56	8571,58	8881,90	5317,57	6876,56	5742,78	8881,90
4	94,30	9429,82	6365,57	7742,64	7755,44	7289,23	5252,77	7289,23	8351,44	7790,78	5580,28	7790,78	7590,49	6069,62	8427,34	8537,70	5087,82	6069,62	5656,18	8537,70
5	92,93	9292,57	6204,97	7262,92	7440,40	6735,23	5063,62	6735,23	8187,27	7319,41	5474,03	7319,41	7233,69	5357,38	8282,38	8206,84	4856,91	5357,38	5569,14	8206,84
6	91,57	9157,38	6043,57	6812,92	7123,78	6223,33	4873,52	6223,33	8022,27	6876,56	5367,25	6876,56	6875,11	4728,71	8136,69	7888,81	4624,85	4728,71	5481,67	7888,81
7	90,24	9024,20	5881,37	6390,80	6805,58	5750,34	4682,48	5750,34	7856,46	6460,50	5259,94	6460,50	6514,74	4173,81	7990,28	7583,10	4391,63	4173,81	5393,77	7583,10
8	88,93	8893,02	5718,35	5994,84	6485,80	5313,29	4490,48	5313,29	7689,81	6069,62	5152,09	6069,62	6152,57	3684,03	7843,14	7289,23	4157,25	3684,03	5305,42	7289,23
9	87,64	8763,80	5554,52	5623,41	6164,41	4909,47	4297,52	4909,47	7522,33	5702,39	5043,71	5702,39	5788,58	3251,72	7695,26	7006,76	3921,69	3251,72	5216,63	7006,76
10	86,37	8636,51	5389,87	5275,00	5841,41	4536,33	4103,59	4536,33	7354,01	5357,38	4934,78	5357,38	5422,78	2870,15	7546,64	6735,23	3684,96	2870,15	5127,40	6735,23
11	85,11	8511,11	5224,40	4948,17	5516,80	4191,55	3908,70	4191,55	7184,85	5033,24	4825,30	5033,24	5055,15	2533,35	7397,27	6474,22	3447,04	2533,35	5037,73	6474,22
12	83,88	8387,59	5058,09	4641,59	5190,57	3872,98	3712,83	3872,98	7014,85	4728,71	4715,28	4728,71	4685,68	2236,07	7247,16	6223,33	3207,93	2236,07	4947,60	6223,33
13	82,66	8265,91	4890,96	4354,00	4862,71	3578,62	3515,98	3578,62	6843,99	4442,61	4604,71	4442,61	4314,36	1973,67	7096,30	5982,16	2967,63	1973,67	4857,02	5982,16
14	81,46	8146,05	4722,99	4084,24	4533,20	3306,64	3318,15	3306,64	6672,28	4173,81	4493,59	4173,81	3941,18	1742,07	6944,69	5750,34	2726,12	1742,07	4766,00	5750,34
15	80,28	8027,97	4554,18	3831,19	4202,05	3055,32	3119,32	3055,32	6499,71	3921,28	4381,91	3921,28	3566,14	1537,65	6792,32	5527,50	2483,41	1537,65	4674,51	5527,50
16	79,12	7911,65	4384,53	3593,81	3869,25	2823,11	2919,51	2823,11	6326,28	3684,03	4269,67	3684,03	3189,22	1357,21	6639,18	5313,29	2239,49	1357,21	4582,57	5313,29
17	77,97	7797,06	4214,03	3371,15	3534,77	2608,54	2718,69	2608,54	6151,98	3461,14	4156,87	3461,14	2810,42	1197,95	6485,28	5107,39	1994,34	1197,95	4490,17	5107,39
18	76,84	7684,18	4042,68	3162,28	3198,63	2410,29	2516,87	2410,29	5976,82	3251,72	4043,51	3251,72	2429,73	1057,37	6330,61	4909,47	1747,97	1057,37	4397,31	4909,47
19	75,73	7572,98	3870,47	2966,35	2860,81	2227,10	2314,04	2227,10	5800,77	3054,98	3929,58	3054,98	2047,13	933,29	6175,17	4719,21	1500,37	933,29	4303,98	4719,21
20	74,63	7463,43	3697,40	2782,56	2521,30	2057,83	2110,20	2057,83	5623,84	2870,15	3815,08	2870,15	1662,62	823,77	6018,95	4536,33	1251,53	823,77	4210,18	4536,33
21	73,56	7355,51	3523,46	2610,16	2180,08	1901,43	1905,34	1901,43	5446,03	2696,49	3700,01	2696,49	1276,19	727,11	5861,95	4360,54	1001,44	727,11	4115,92	4360,54
22	72,49	7249,19	3348,65	2448,44	1837,17	1756,91	1699,45	1756,91	5267,34	2533,35	3584,36	2533,35	887,82	641,78	5704,16	4191,55	750,10	641,78	4021,19	4191,55
23	71,58	7157,50	3172,97	2296,74	1492,54	1623,38	1492,54	1623,38	5087,74	2380,07	3468,14	2380,07	497,51	566,47	5545,58	4029,12	497,51	566,47	3925,98	4029,12
24	70,67	7067,01	2996,42	2154,43	0,00	1500,00	0,00	1500,00	4907,25	2236,07	3351,33	2236,07	0,00	500,00	5386,22	3872,98	0,00	500,00	3830,29	3872,98
25	69,78	6977,69	2818,97	2020,95		1386,00		1386,00	4725,86	2100,78	3233,94	2100,78		441,33	5226,05	3722,90		441,33	3734,13	3722,90
26	68,90	6889,55	2640,65	1895,74		1280,66		1280,66	4543,56	1973,67	3115,96	1973,67		389,54	5065,08	3578,62		389,54	3637,49	3578,62
27	68,03	6802,55	2461,43	1778,28		1183,32		1183,32	4360,35	1854,26	2997,39	1854,26		343,83	4903,31	3439,94		343,83	3540,36	3439,94
28	67,17	6716,69	2281,31	1668,10		1093,39		1093,39	4176,22	1742,07	2878,23	1742,07		303,48	4740,73	3306,64		303,48	3442,75	3306,64
29	66,32	6631,95	2100,29	1564,75		1010,28		1010,28	3991,17	1636,67	2758,48	1636,67		267,87	4577,34	3178,50		267,87	3344,65	3178,50
30	65,48	6548,31	1918,37	1467,80		933,50		933,50	3805,20	1537,65	2638,12	1537,65		236,44	4413,13	3055,32		236,44	3246,06	3055,32
31	64,66	6465,77	1735,54	1376,86		862,55		862,55	3618,29	1444,61	2517,16	1444,61		208,69	4248,10	2936,92		208,69	3146,97	2936,92
32	63,84	6384,29	1551,79	1291,55		796,99		796,99	3430,46	1357,21	2395,60	1357,21		184,20	4082,25	2823,11		184,20	3047,39	2823,11
33	63,04	6303,88	1367,13	1211,53		736,42		736,42	3241,68	1275,09	2273,43	1275,09		162,59	3915,56	2713,71		162,59	2947,32	2713,71
34	62,25	6224,52	1181,54	1136,46		680,45		680,45	3051,96	1197,95	2150,65	1197,95		143,51	3748,04	2608,54		143,51	2846,74	2608,54
35	61,43	6143,48	995,02	1066,05		628,73		628,73	2861,29	1125,47	2027,26	1125,47		126,67	3579,69	2507,46		126,67	2745,66	2507,46
36	60,64	6063,54	0,00	1000,00		580,95		580,95	2669,67	1057,37	1903,25	1057,37		111,80	3410,49	2410,29		111,80	2644,07	2410,29
37	59,85	5984,67		938,04		536,79		536,79	2477,08	993,40	1778,62	993,40		98,68	3240,45	2316,88		98,68	2541,98	2316,88
38	59,07	5906,86		879,92		496,00		496,00	2283,54	933,29	1653,36	933,29		87,10	3069,55	2227,10		87,10	2439,37	2227,10
39	58,30	5830,09		825,40		458,30		458,30	2089,03	876,83	1527,48	876,83		76,88	2897,80	2140,79		76,88	2336,26	2140,79
40	57,54	5754,35		774,26		423,47		423,47	1893,55	823,77	1400,97	823,77		67,86	2725,20	2057,83		67,86	2232,62	2057,83
41	56,80	5679,63		726,29		391,28		391,28	1697,08	773,93	1273,83	773,93		59,90	2551,73	1978,08		59,90	2128,47	1978,08
42	56,06	5605,91		681,29		361,54		361,54	1499,64	727,11	1146,05	727,11		52,87	2377,39	1901,43		52,87	2023,80	1901,43
43	55,33	5533,18		639,08		334,06		334,06	1301,21	683,12	1017,63	683,12		46,66	2202,18	1827,74		46,66	1918,60	1827,74
44	54,61	5461,43		599,48		308,67		308,67	1101,79	641,78	888,57	641,78		41,19	2026,09	1756,91		41,19	1812,88	1756,91
45	53,91	5390,63		562,34		285,21		285,21	901,36	602,95	758,87	602,95		36,36	1849,13	1688,83		36,36	1706,63	1688,83
46	53,21	5320,79		527,50		263,54		263,54	699,94	566,47	628,52	566,47		32,09	1671,28	1623,38		32,09	1599,85	1623,38
47	52,51	5250,80		494,82		243,51		243,51	497,51	532,20	497,51	532,20		28,32	1492,54	1560,47		28,32	1492,54	1560,47
48	51,82	5181,78		464,16		225,00		225,00	0,00	500,00	0,00	500,00		25,00	0,00	1500,00		25,00	0,00	1500,00

Tényező	Initial sit.	001	101	Initial sit.	010	110	Initial sit.	000	011	100	111
maturity (month)	36	24	24	36	48	48	36	24	48	24	48
interest rate (yearly)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
asset value	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000
downpayment	30%	10%	40%	30%	10%	40%	30%	10%	10%	40%	40%
residual value	10%	15%	15%	10%	5%	5%	10%	5%	15%	5%	15%



Group code

Nr.	Deal characteristic	formula	Initial sit.	001	101	010	110	000	011	100	111
1	Maturity (month)	-	36	24	24	48	48	24	48	24	48
2	tp (month)	-	9	3	14	2	13	2	5	7	25
3	tmax (month)	-	20	11	17	19	27	10	23	13	35
4	te (month)	-	34	22	21	45	46	22	46	22	45
5	te-tp (month)	-	25	19	7	43	33	20	41	15	20
6	tmax-tp (month)	3-2	11	8	3	17	14	8	18	6	10
7	te-tmax (month)	4-3	14	11	4	26	19	12	23	9	10
8	tp (mat.%)	2/1	25,00%	12,50%	58,33%	4,17%	27,08%	8,33%	10,42%	29,17%	52,08%
9	tmax (mat.%)	3/1	55,56%	45,83%	70,83%	39,58%	56,25%	41,67%	47,92%	54,17%	72,92%
10	te (mat.%)	4/1	94,44%	91,67%	87,50%	93,75%	95,83%	91,67%	95,83%	91,67%	93,75%
11	(tmax-tp)/(te-tp)	(3-2)/5	44,00%	42,11%	42,86%	39,53%	42,42%	40,00%	43,90%	40,00%	50,00%
12	depr. tp HUF	-	5623,41	7888,81	3306,64	8826,54	4442,61	7790,78	8206,84	4173,81	3722,90
13	depr. tmax HUF	-	2782,56	4191,55	2608,54	3054,98	1854,26	2870,15	4029,12	1973,67	2507,46
14	depr. te HUF	-	1136,46	1756,91	1901,43	602,95	566,47	641,78	1623,38	641,78	1688,83
15	cap. tp HUF	-	5554,52	8068,91	3318,15	8677,34	4604,71	8298,76	8282,38	4391,63	3734,13
16	cap. tmax HUF	-	3697,40	5516,80	2718,69	5800,77	2997,39	5422,78	5545,58	2967,63	2745,66
17	cap. te HUF	-	1181,54	1837,17	1905,34	901,36	628,52	887,82	1671,28	750,10	1706,63
18	cap.-depr. diff HUF (tmax)	16-13	914,84	1325,25	110,15	2745,79	1143,13	2552,63	1516,46	993,96	238,20
19	avg. income/month HUF (tp-tmax)	(12-13)/6	258,26	462,16	232,70	339,50	184,88	615,08	232,10	366,69	121,54
20	avg cap./month HUF (tp-tmax)	(15-16)/6	168,83	319,01	199,82	169,21	114,81	359,50	152,04	237,33	98,85
21	saving/month (tp-tmax)	19-20	89,43	143,14	32,88	170,29	70,07	255,58	80,05	129,36	22,70
22	avg income/month HUF (tmax-te)	(13-14)/7	117,58	221,33	176,78	94,31	67,78	185,70	104,60	147,99	81,86
23	avg cap./jó HUF (tmax-te)	(16-17)/7	179,70	334,51	203,34	188,44	124,68	377,91	168,45	246,39	103,90
24	extra outgoings/month (tmax-te)	22-23	-62,13	-113,18	-26,56	-94,13	-56,90	-192,22	-63,85	-98,40	-22,04
25	többletkiadás-savings	25+21	27,30	29,96	6,32	76,16	13,17	63,37	16,20	30,95	0,66
26	sum savings	21*6	983,73	1145,15	98,64	2894,99	981,03	2044,65	1440,93	776,13	226,97
27	sum extra outgoings	24*7	-869,76	-1244,99	-106,24	-2447,38	-1081,09	-2306,60	-1468,57	-885,64	-220,40
28	net savings	26+27	113,97	-99,85	-7,60	447,61	-100,06	-261,94	-27,64	-109,50	6,57

Magyarázat:

6	how long the extra income realization ability is (after being profitable)
9	in which % of the maturity extra income can be realized
21	avg. monthly savings between tp-tmax
24	avg. monthly extra outgoings between tp-tmax

During the calculation of transactional parameters of the table denoted by numbers 19-28. I disregarded the non-linear feature of capital function and theoretical depreciation function and I approached the indices assuming linear function and the net saving (and its factors) do not include the discount effect based on the time value principle.

Annex 15. – The effect analysis of transaction parameter combinations for the repayment of transactions as a function of the clients' creditworthiness (H5)

a) Further analysis carried out for the second cluster of H4 (basic statistics and variance analysis)

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Number of notices/month	2	14	,2421	,34728	,09281	,0415	,4426	,00	1,00
	3	26	,2179	,33074	,06486	,0843	,3514	,00	1,26
	4	27	,2661	,25668	,04940	,1645	,3676	,00	1,00
	Total	67	,2423	,30267	,03698	,1685	,3162	,00	1,26
Ratio of greatest delay (%)	2	14	,1504	,27744	,07415	-,0098	,3106	,03	1,09
	3	26	,1668	,25747	,05049	,0628	,2708	,02	1,02
	4	27	,2845	,29130	,05606	,1692	,3997	,03	1,11
	Total	67	,2108	,27831	,03400	,1429	,2787	,02	1,11

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Number of notices/month	,993	2	64	,376
Ratio of greatest delay (%)	1,444	2	64	,244

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Number of notices/month	Between	,031	2	,015	,164	,849
	Within	6,016	64	,094		
	Total	6,046	66			
Ratio of greatest delay (%)	Between	,248	2	,124	1,631	,204
	Within	4,864	64	,076		
	Total	5,112	66			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Number of	Welch	,173	2	32,307	,842
Ratio of greatest delay (%)	Welch	1,532	2	34,522	,230

a. Asymptotically F distributed.

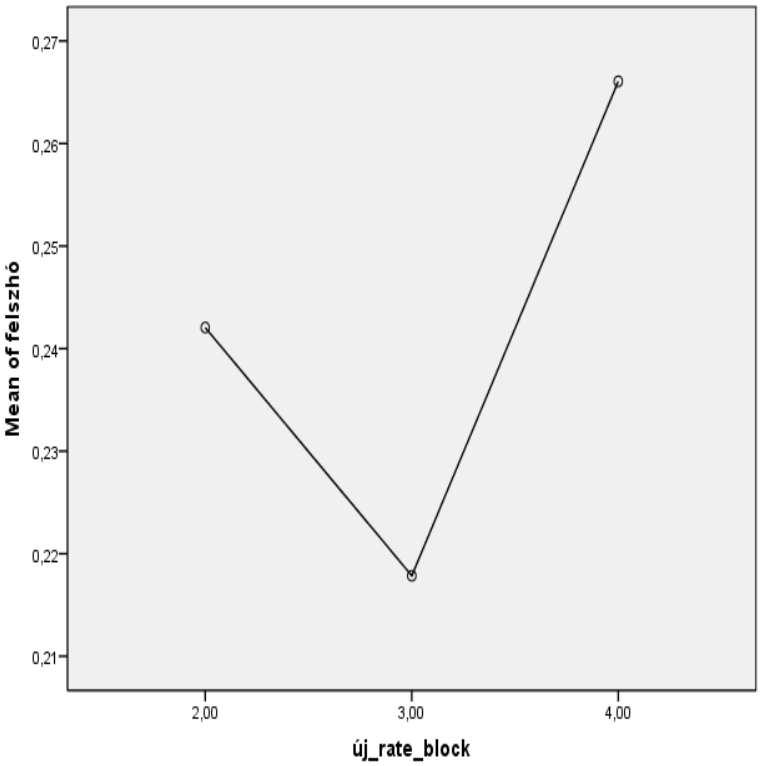
Post Hoc Tests

Multiple Comparisons

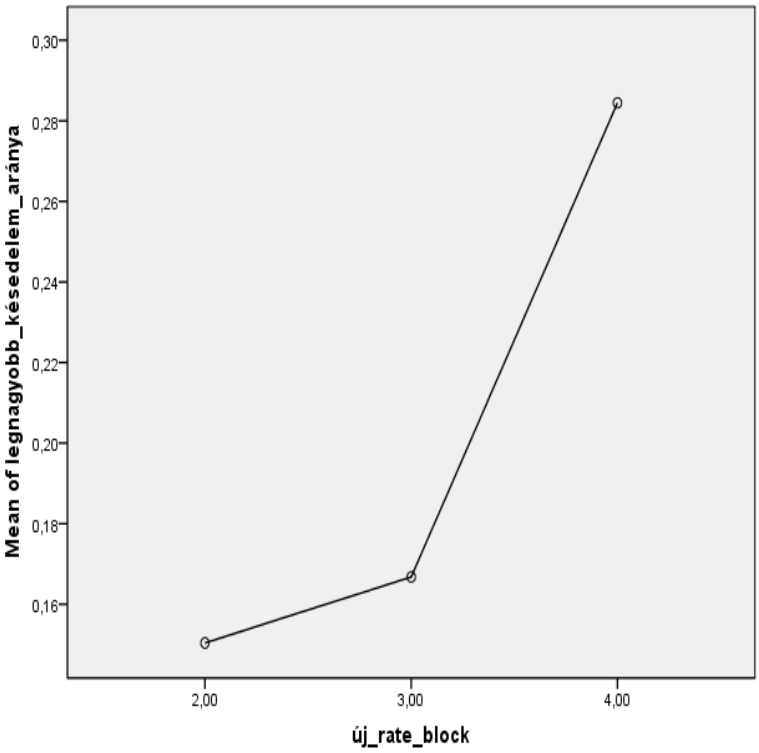
Dependent Variable		(I) Client rating block	(J) Client rating block	Mean Difference (I-J)	Std. Error	Sig.	90% Confidence	
							Lower Bound	Upper Bound
Number of notices/month	LSD	2	3	,02420	,10163	,813	-,1454	,1938
			4	-,02401	,10097	,813	-,1925	,1445
		3	2	-,02420	,10163	,813	-,1938	,1454
			4	-,04821	,08424	,569	-,1888	,0924
		4	2	,02401	,10097	,813	-,1445	,1925
			3	,04821	,08424	,569	-,0924	,1888
	Tamhane	2	3	,02420	,11323	,995	-,2286	,2770
			4	-,02401	,10514	,994	-,2620	,2140
		3	2	-,02420	,11323	,995	-,2770	,2286
			4	-,04821	,08153	,913	-,2257	,1293
		4	2	,02401	,10514	,994	-,2140	,2620
			3	,04821	,08153	,913	-,1293	,2257
Ratio of greatest delay (%)	LSD	2	3	-,01639	,09139	,858	-,1689	,1361
			4	-,13407	,09079	,145	-,2856	,0175
		3	2	,01639	,09139	,858	-,1361	,1689
			4	-,11768	,07575	,125	-,2441	,0088
		4	2	,13407	,09079	,145	-,0175	,2856
			3	,11768	,07575	,125	-,0088	,2441
	Tamhane	2	3	-,01639	,08971	,997	-,2170	,1842
			4	-,13407	,09296	,408	-,3408	,0727
		3	2	,01639	,08971	,997	-,1842	,2170
			4	-,11768	,07545	,330	-,2816	,0462
		4	2	,13407	,09296	,408	-,0727	,3408
			3	,11768	,07545	,330	-,0462	,2816

Means Plots

Number of notices/month



Ratio of greatest delay (%)



b) results of the variance analysis carried out for client rating blocks (with basic statistics)

Parameter group	Client rating block	Number of notices/month			Ratio of greatest delay (%)
		Count	Column N %	Mean	Mean
1	1	4	5,5%	,13	,13
	2	27	37,0%	,14	,11
	3	31	42,5%	,16	,12
	4	11	15,1%	,13	,20
2	1	7	6,8%	,09	,11
	2	48	46,6%	,09	,15
	3	31	30,1%	,15	,15
	4	17	16,5%	,19	,21
3	1	3	3,8%	,22	,10
	2	19	23,8%	,20	,19
	3	29	36,3%	,22	,17
	4	29	36,3%	,27	,31
Total	1	14	5,5%	,13	,12
	2	94	36,7%	,13	,15
	3	91	35,5%	,18	,14
	4	57	22,3%	,22	,26

Parameter group	Client rating block	Number of notices/month			Ratio of greatest delay (%)
		Count	Column N %	Mean	Mean
1	1	4	5,5%	,13	,13
	2	27	37,0%	,14	,11
	3	31	42,5%	,16	,12
	4	11	15,1%	,13	,20
	Total	73	100,0%	,15	,13
2	1	7	6,8%	,09	,11
	2	48	46,6%	,09	,15
	3	31	30,1%	,15	,15
	4	17	16,5%	,19	,21
	Total	103	100,0%	,12	,16
3	1	3	3,8%	,22	,10
	2	19	23,8%	,20	,19
	3	29	36,3%	,22	,17
	4	29	36,3%	,27	,31
	Total	80	100,0%	,24	,23

Descriptives

Parameter group	Client rating block		N	Mean	Std. Deviation	Std. Error	95% Confidence Lower Bound	95% Confidence Upper Bound	Minimum	Maximum	Number of group equalities
1	Number of notices/month	1	4	,1323	,14328	,07164	-,0957	,3603	,05	,35	4
		2	27	,1447	,19852	,03821	,0662	,2232	,00	,71	4
		3	31	,1618	,21563	,03873	,0827	,2409	,00	,78	3
		4	11	,1341	,15072	,04544	,0329	,2354	,00	,48	4
		Total	73	,1497	,19427	,02274	,1044	,1950	,00	,78	
	Ratio of greatest delay (%)	1	4	,1329	,12678	,06339	-,0688	,3347	,05	,32	4
		2	27	,1088	,09354	,01800	,0718	,1458	,03	,34	3
		3	31	,1155	,09574	,01720	,0804	,1506	,03	,42	3
		4	11	,2019	,24219	,07302	,0392	,3646	,04	,77	2
		Total	73	,1270	,12975	,01519	,0967	,1573	,03	,77	
2	Number of notices/month	1	7	,0925	,13387	,05060	-,0313	,2163	,00	,33	4
		2	48	,0862	,14056	,02029	,0454	,1270	,00	,63	1
		3	31	,1491	,17204	,03090	,0860	,2122	,00	,62	4
		4	17	,1930	,22293	,05407	,0784	,3076	,00	,71	3
		Total	103	,1232	,16847	,01660	,0903	,1561	,00	,71	
	Ratio of greatest delay (%)	1	7	,1149	,11371	,04298	,0098	,2201	,05	,36	3
		2	48	,1546	,19002	,02743	,0994	,2098	,00	,99	3
		3	31	,1463	,21615	,03882	,0670	,2256	,02	1,13	4
		4	17	,2065	,19540	,04739	,1060	,3069	,04	,76	3
		Total	103	,1580	,19415	,01913	,1200	,1959	,00	1,13	
3	Number of notices/month	1	3	,2184	,34883	,20140	-,6481	1,0849	,00	,62	4
		2	19	,2029	,30833	,07073	,0543	,3515	,00	1,00	4
		3	29	,2249	,32031	,05948	,1030	,3467	,00	1,26	3
		4	29	,2740	,25272	,04693	,1779	,3701	,00	1,00	2
		Total	80	,2372	,29085	,03252	,1725	,3019	,00	1,26	
	Ratio of greatest delay (%)	1	3	,0983	,06839	,03948	-,0716	,2682	,05	,18	2
		2	19	,1930	,30378	,06969	,0466	,3395	,03	1,09	3
		3	29	,1735	,24127	,04480	,0818	,2653	,02	1,02	1
		4	29	,3122	,31357	,05823	,1929	,4314	,03	1,11	0
		Total	80	,2256	,28503	,03187	,1622	,2890	,02	1,11	

Test of Homogeneity of Variances

Parameter group		Levene Statistic	df1	df2	Sig.
1	Number of notices/month			69	,708
	Ratio of greatest delay (%)	4,896	3	69	,004
2	Number of notices/month			99	,093
	Ratio of greatest delay (%)	,263	3	99	,852
3	Number of notices/month			76	,749
	Ratio of greatest delay (%)	2,126	3	76	,104

ANOVA

Parameter group			Sum of Squares	df	Mean Square	F	Sig.
1	Number of notices/month	Between Groups	,009	3	,003	,077	,972
		Within Groups	2,708	69	,039		
		Total	2,717	72			
	Ratio of greatest delay (%)	Between Groups	,075	3	,025	1,516	,218
		Within Groups	1,137	69	,016		
		Total	1,212	72			
2	Number of notices/month	Between Groups	,176	3	,059	2,136	,100
		Within Groups	2,719	99	,027		
		Total	2,895	102			
	Ratio of greatest delay (%)	Between Groups	,058	3	,019	,503	,681
		Within Groups	3,787	99	,038		
		Total	3,845	102			
3	Number of notices/month	Between Groups	,067	3	,022	,257	,856
		Within Groups	6,616	76	,087		
		Total	6,683	79			
	Ratio of greatest delay (%)	Between Groups	,365	3	,122	1,526	,215
		Within Groups	6,053	76	,080		
		Total	6,418	79			

Robust Tests of Equality of Means

Parameter group			Statistica	df1	df2	Sig.
1	Number of notices/month			3	13,798	,968
	Ratio of greatest delay (%)	Welch	,484	3	11,770	,700
2	Number of notices/month			3	23,525	,190
	Ratio of greatest delay (%)	Welch	,665	3	27,250	,581
3	Number of notices/month			3	9,306	,858
	Ratio of greatest delay (%)	Welch	2,914	3	18,569	,062

If the significance level of the Levene-test is >0.05, then the variance homogeneity related to the groups is fulfilled and accordingly the data of the ANOVA table are to be followed during the analysis (judgment of group equalities), while should the result of the Levene-test not be significant (variance heterogentiy can be observed), then group equality has to be tested by Welch-test. Accordingly in the first case among post-hoc tests in case of variance heterogenity LSD, in case of variance heterogeneity Tamhane test is to be followed.

Post Hoc Tests

Multiple Comparisons

Parameter group	Dependent Variable		(I) Client rating block	(J) Client rating block	Mean Difference (I-J)	Std. Error	Sig.	90% Confidence Interval	
								Lower Bound	Upper Bound
1	Number of notices/month	LSD	1	2	-,01240	,10614	,907	-,1894	,1646
				3	-,02946	,10526	,780	-,2049	,1460
				4	-,00180	,11568	,988	-,1947	,1911
			2	1	,01240	,10614	,907	-,1646	,1894
				3	-,01706	,05215	,745	-,1040	,0699
				4	,01061	,07087	,881	-,1075	,1288
			3	1	,02946	,10526	,780	-,1460	,2049
				2	,01706	,05215	,745	-,0699	,1040
				4	,02766	,06953	,692	-,0883	,1436
			4	1	,00180	,11568	,988	-,1911	,1947
				2	-,01061	,07087	,881	-,1288	,1075
				3	-,02766	,06953	,692	-,1436	,0883
		Tamhane	1	2	-,01240	,08119	1,000	-,2985	,2737
				3	-,02946	,08144	1,000	-,3148	,2559
				4	-,00180	,08484	1,000	-,2843	,2807
			2	1	,01240	,08119	1,000	-,2737	,2985
				3	-,01706	,05440	1,000	-,1504	,1163
				4	,01061	,05937	1,000	-,1408	,1621
			3	1	,02946	,08144	1,000	-,2559	,3148
				2	,01706	,05440	1,000	-,1163	,1504
				4	,02766	,05971	,998	-,1243	,1796
			4	1	,00180	,08484	1,000	-,2807	,2843
				2	-,01061	,05937	1,000	-,1621	,1408
				3	-,02766	,05971	,998	-,1796	,1243
	Ratio of greatest delay (%)	LSD	1	2	,02416	,06878	,726	-,0905	,1388
				3	,01742	,06821	,799	-,0963	,1311
				4	-,06898	,07496	,361	-,1940	,0560
			2	1	-,02416	,06878	,726	-,1388	,0905
				3	-,00673	,03380	,843	-,0631	,0496
				4	-,09314*	,04592	,046	-,1697	-,0166
			3	1	-,01742	,06821	,799	-,1311	,0963
				2	,00673	,03380	,843	-,0496	,0631
				4	-,08641*	,04506	,059	-,1615	-,0113
			4	1	,06898	,07496	,361	-,0560	,1940
				2	,09314*	,04592	,046	,0166	,1697
				3	,08641*	,04506	,059	,0113	,1615
		Tamhane	1	2	,02416	,06590	1,000	-,2560	,3043
				3	,01742	,06568	1,000	-,2643	,2992
				4	-,06898	,09670	,983	-,3410	,2030
			2	1	-,02416	,06590	1,000	-,3043	,2560
				3	-,00673	,02489	1,000	-,0678	,0543
				4	-,09314	,07521	,809	-,3026	,1164
			3	1	-,01742	,06568	1,000	-,2992	,2643
				2	,00673	,02489	1,000	-,0543	,0678
				4	-,08641	,07502	,853	-,2957	,1229
			4	1	,06898	,09670	,983	-,2030	,3410
				2	,09314	,07521	,809	-,1164	,3026
				3	,08641	,07502	,853	-,1229	,2957

Multiple Comparisons

Parameter group	Dependent Variable		(I) Client rating block	(J) Client rating block	Mean Difference (I-J)	Std. Error	Sig.	90% Confidence Interval	
								Lower	Upper Bound
2	Number of notices/month	LSD	1	2	,00631	,06705	,925	-,1050	,1176
				3	-,05661	,06935	,416	-,1718	,0585
				4	-,10051	,07443	,180	-,2241	,0231
			2	1	-,00631	,06705	,925	-,1176	,1050
				3	-,06292	,03819	,103	-,1263	,0005
				4	-,10682*	,04677	,025	-,1845	-,0292
			3	1	,05661	,06935	,416	-,0585	,1718
				2	,06292	,03819	,103	-,0005	,1263
				4	-,04389	,05002	,382	-,1269	,0392
			4	1	,10051	,07443	,180	-,0231	,2241
				2	,10682*	,04677	,025	,0292	,1845
				3	,04389	,05002	,382	-,0392	,1269
		Tamhane	1	2	,00631	,05451	1,000	-,1562	,1689
				3	-,05661	,05929	,931	-,2224	,1091
				4	-,10051	,07405	,720	-,2939	,0929
			2	1	-,00631	,05451	1,000	-,1689	,1562
				3	-,06292	,03696	,448	-,1536	,0277
				4	-,10682	,05775	,388	-,2561	,0425
			3	1	,05661	,05929	,931	-,1091	,2224
				2	,06292	,03696	,448	-,0277	,1536
				4	-,04389	,06227	,982	-,2018	,1140
			4	1	,10051	,07405	,720	-,0929	,2939
				2	,10682	,05775	,388	-,0425	,2561
				3	,04389	,06227	,982	-,1140	,2018
	Ratio of greatest delay (%)	LSD	1	2	-,03966	,07913	,617	-,1711	,0917
				3	-,03135	,08185	,702	-,1673	,1045
				4	-,09156	,08784	,300	-,2374	,0543
			2	1	,03966	,07913	,617	-,0917	,1711
				3	,00831	,04507	,854	-,0665	,0831
				4	-,05189	,05520	,349	-,1435	,0398
			3	1	,03135	,08185	,702	-,1045	,1673
				2	-,00831	,04507	,854	-,0831	,0665
				4	-,06020	,05903	,310	-,1582	,0378
			4	1	,09156	,08784	,300	-,0543	,2374
				2	,05189	,05520	,349	-,0398	,1435
				3	,06020	,05903	,310	-,0378	,1582
		Tamhane	1	2	-,03966	,05098	,973	-,1809	,1015
				3	-,03135	,05792	,996	-,1835	,1208
				4	-,09156	,06398	,670	-,2582	,0751
			2	1	,03966	,05098	,973	-,1015	,1809
				3	,00831	,04753	1,000	-,1080	,1247
				4	-,05189	,05476	,926	-,1905	,0867
			3	1	,03135	,05792	,996	-,1208	,1835
				2	-,00831	,04753	1,000	-,1247	,1080
				4	-,06020	,06126	,911	-,2129	,0925
			4	1	,09156	,06398	,670	-,0751	,2582
				2	,05189	,05476	,926	-,0867	,1905
				3	,06020	,06126	,911	-,0925	,2129

Multiple Comparisons

Parameter group	Dependent Variable		(I) Client rating block	(J) Client rating block	Mean Difference (I-J)	Std. Error	Sig.	90% Confidence Interval	
								Lower	Upper Bound
3	Number of notices/month	LSD	1	2	,01548	,18330	,933	-,2897	,3207
				3	-,00648	,17893	,971	-,3044	,2915
				4	-,05562	,17893	,757	-,3536	,2423
			2	1	-,01548	,18330	,933	-,3207	,2897
				3	-,02196	,08708	,802	-,1670	,1230
				4	-,07110	,08708	,417	-,2161	,0739
			3	1	,00648	,17893	,971	-,2915	,3044
				2	,02196	,08708	,802	-,1230	,1670
				4	-,04914	,07748	,528	-,1782	,0799
			4	1	,05562	,17893	,757	-,2423	,3536
				2	,07110	,08708	,417	-,0739	,2161
				3	,04914	,07748	,528	-,0799	,1782
		Tamhane	1	2	,01548	,21346	1,000	-1,1867	1,2177
				3	-,00648	,21000	1,000	-1,2756	1,2626
				4	-,05562	,20679	1,000	-1,3999	1,2886
			2	1	-,01548	,21346	1,000	-1,2177	1,1867
				3	-,02196	,09242	1,000	-,2513	,2074
				4	-,07110	,08489	,957	-,2836	,1414
			3	1	,00648	,21000	1,000	-1,2626	1,2756
				2	,02196	,09242	1,000	-,2074	,2513
				4	-,04914	,07576	,988	-,2351	,1368
			4	1	,05562	,20679	1,000	-1,2886	1,3999
				2	,07110	,08489	,957	-,1414	,2836
				3	,04914	,07576	,988	-,1368	,2351
	Ratio of greatest delay (%)	LSD	1	2	-,09475	,17534	,591	-,3867	,1972
				3	-,07523	,17116	,662	-,3602	,2098
				4	-,21386	,17116	,215	-,4989	,0711
			2	1	,09475	,17534	,591	-,1972	,3867
				3	,01951	,08330	,815	-,1192	,1582
				4	-,11912	,08330	,157	-,2578	,0196
			3	1	,07523	,17116	,662	-,2098	,3602
				2	-,01951	,08330	,815	-,1582	,1192
				4	-,13863*	,07412	,065	-,2620	-,0152
			4	1	,21386	,17116	,215	-,0711	,4989
				2	,11912	,08330	,157	-,0196	,2578
				3	,13863*	,07412	,065	,0152	,2620
		Tamhane	1	2	-,09475	,08010	,827	-,3067	,1172
				3	-,07523	,05972	,805	-,2474	,0969
				4	-,21386*	,07035	,048	-,4017	-,0260
			2	1	,09475	,08010	,827	-,1172	,3067
				3	,01951	,08285	1,000	-,1881	,2272
				4	-,11912	,09082	,732	-,3445	,1063
			3	1	,07523	,05972	,805	-,0969	,2474
				2	-,01951	,08285	1,000	-,2272	,1881
				4	-,13863	,07347	,331	-,3190	,0418
			4	1	,21386*	,07035	,048	,0260	,4017
				2	,11912	,09082	,732	-,1063	,3445
				3	,13863	,07347	,331	-,0418	,3190

*. The mean difference is significant at the 0.10 level.