COLLECTION OF THESES

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Identification of Dutch disease by

asymmetrical cointegration in sub-Saharan

African and South American countries

Ph.D. thesis

Supervisor:

Prof. István Magas, Dsc
professor

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Department of World Economics

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Tartalom

Literature review and justification of the topic

Justification of the topic

During the 1950s, the Netherlands discovered large quantities of gas under the North Sea. However, the economic impact of the event was unclear. Common sense, of course, dictates that a resource recovery will enrich the lucky country. However, in the Netherlands, it is not only positive processes that have started.

Foreign inflows of working capital have led to an increase in demand for Dutch gulden on international foreign exchange markets, leading to the appreciation of the currency and a continuous decline in the competitiveness of other export sectors. Unemployment gradually rose, welfare spending in the state increased, and in the meantime economic growth declined (Corden and Neary, 1982).

All of these negative economic changes have since been referred to in the literature as Dutch disease. Dutch disease can occur in a national economy when the

extraction of a natural resource is triggered by new deposits or cheaper extraction methods. At the end of the chain of reasons, the consequence is that the strengthening of the national currency creates competitiveness problems in other export sectors.

The study of the literature has led to the realisation that there are still no suitable statistical methods for clearly identifying Dutch disease. I would like to contribute to the elimination of this literary gap with my thesis. I therefore dedicate the bulk of my thesis to the Dutch disease-centred analysis of sub-Saharan and South American countries, which can be considered as an ideation on the basis of the criteria set out in the future, and then draw general conclusions on the 'diagnosis' of Dutch disease from the results of each case.

Literature review

The Dutch disease is the deindustrialisation of a national economy, which occurs because the international competitiveness of exported products is deteriorating due to the strengthening of the domestic currency due to the influx of foreign capital due to the unexpected discovery of raw materials.

The term comes from the fact that large quantities of gas were discovered under the North Sea in the Netherlands in the late 1950s. The short-term surge in working capital inflows and the surge in gas exports have led to a strengthening of the Dutch gulden and a negative impact on the international competitiveness of the manufacturing and agricultural sectors producing for export. The downturn in these sectors has affected the entire national economy, unemployment has risen dramatically and economic growth has slowed. The government has been forced to radically increase welfare spending.

Although the term was essentially coined in connection with commodity discoveries, in fact a similar process can take play out after any major foreign currency influx. So it can also happen if the world market price of the basic product exported by the country goes up, or the volume of aid from abroad increases dynamically in a country, or if large amounts of working capital or remittances arrive in the country. Economists have used the Dutch disease model to interpret economic history episodes such as the impact of American gold flowing into sixteenth-century

Spain and the impact of the 1850s gold rush on the Australian economy.

Sudden enrichment, or even just the chance of it, can, in a visible way, trigger negative economic developments. Corden and Neary give a theoretical explanation of Dutch disease in their 1982 study, which has since become a classic (Corden and Neary, 1982). Corden and Neary's model distinguishes three sectors in a small, open economy: the booming (extractive) export sector, the lagging export sector and the domestic sector (retail, service, construction, etc.). The thriving extractive industry has a two-channel impact on the domestic economy[1].

The start of exports as a result of the discovery of raw materials, or the increase in the price of the exported raw material, is a shock to the economy and results in a redistribution of production factors. If the extra income from the shock is spent, higher real incomes as a result of the recovery will lead to an increase in consumption.

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[1] Corden and Neary have the following basic presets: world market prices prevail in the two exportable sectors, labour flows freely between sectors, production factors are priced flexibly and there is no international flow of factors.

Demand for exportable and non-exportable products, typically services, is also increasing. The price of exportable products is set by the world market and therefore does not change due to internal factors. However, the price of non-exportable products will rise if demand exceeds domestic supply. The appreciation of the real exchange rate makes exportable products cheaper to bring into the country and their local production is being overshadowed. Labour and capital are released and flowed into the non-exportable goods sector (Van Mil, 2005). This is called indirect deindustrialisation and the channel is called spending effect).

An interesting question is how appreciation is done in practice. If the exchange rate is fixed, the conversion of the influx of foreign currency into domestic currency will increase the country's money supply and domestic demand pressures will push up prices. This is a real appreciation, since for one unit of foreign currency less goods and services can be taken domestically than before. If the exchange rate is floating, the increased amount of foreign currency available increases the value of the domestic currency, which entails an appreciation of the real exchange rate through the strengthening of the

nominal exchange rate and not through changes in domestic prices. Thus, regardless of whether the domestic currency exchange rate is fixed or floating, the real exchange rate appreciation has a negative impact on the international competitiveness of the traditional (non-raw material) exportable sector and thus causes a decline in this sector (Ebrahim-Zadeh, 2003).

The other channel is theresource movement effect. Due to increased domestic demand, capital and labour flow into the domestic non-exportable sector and the extractive industry. Emissions from export-producing economic activities (agriculture, manufacturing) are decreasing. This is called direct desindustrialization.

The Dutch disease is therefore a sign that the role of manufacturing and agriculture in raw material-based economies is falling too early, especially when compared to non-commodity-based economies which are at a similar stage of their economic development. Due to the degradation of the industrial and service sector, "learning by practice" (Matsuyama, 1992) is lagging behind, which in the long term may lead to lower productivity of society

as a whole and, as a result, a lack of foreign capital investment.

However, we must emphasise a few factors that may require a rethink of the original Corden-Neary model. Due to the nature of the extraction activity, it in many cases acts as an enclave within the country's economy (Nunnenkamp and Spatz, 2003). As it is a less labour intensive industry compared to manufacturing or agriculture, it employs a small part of the total workforce. This is due to the fact that extraction has little connection with the rest of the economy (Di John, 2011), thus missing vertical spill-over effects such as technology transfer, transfer of quality control and stock management expertise (Czibik and Mako, 2009). If the extractive sector, which operates as an enclave and creates few new jobs, displaces the economic activities that have previously ensured mass employment due to the Dutch disease, income inequalities and mass poverty will increase (Shaxson, 2007).

However, the character of the enclave also means that the extractive industry absorbs only a small part of the labour force from other sectors. Moreover, in most of the

developing countries discussed in my dissertation, the workforce is abundant, often characterised by chronically high unemployment in these national economies. So this extraction effect does not necessarily cause labour shortages in other sectors.

The phenomenon of Dutch disease is not unheard of in less developed regions of the world, so it is still a matter of professional interest in the field of development economics whether a national economy produces the symptoms of Dutch disease. After all, the evolution of the exchange rate does not depend solely on the performance of the raw material sector.

Another question is, what are the long-term consequences of this phenomenon? The observations suggest that Dutch disease in developed countries is deserving of export sectors, but in a developing country it can hinder the entire process of industrialisation.

I'll use some descriptive data to show the gravity of the potential problem. For the sake of simplicity , I consider real income growth to be a measure of development[2].

The World Bank's continent-wide data series are available as of 2011. On the basis of these data, annual GDP growth in sub-Saharan Africa fell from 4.5% to 1.2% in the period 2011-2016, while Latin America fell from 4.4% to -0.4% over the same period. By comparison, EU growth has changed from 1.8% to 2% during this time. North America "slowed" from 1.7% to 1.6%.

What makes this sudden slowdown, which is not incidentally recurring in the region (Sachs and Warner, 1995)? The selected period was the period following the so-called commodity supercycle, i.e. the long-term surge in commodity prices, when the prices of most raw materials fell significantly on international markets. From the point of view of commodity exports, the economies of these two continents are at the top of the world

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[2] Of course, the measure chosen is for approximation only. But it's appropriate, because there has to be a link between development and growth. In other cases, the export volume and export diversification of the countries concerned are linked to the quantities of raw materials that can be extracted on their territory.

rankings. Africa, including the Northern Territories, holds 30% of the world's mineral wealth. Looking at crude oil only, this is 12%, while 40% of gold reserves are located on the continent. 57% of the continent's total exports are generated by the export of hydrocarbons. Similarly, South America owns 20% of total crude iron wealth and 25% of copper.

On the basis of the above, it can be seen that fluctuations in commodity prices could fundamentally shake the development of the continents under consideration. The gravity of the problem is that, according to World Bank data for 2018, South America has a population of 0.64 billion people - compared with about 1.08billion in sub-Saharan Africa - or about a quarter of the world's population.

Methods used

As a methodological starting point for my thesis, I chose an analysis written by the authors Jahan-Parvar and Mohammadi (2011). The study examines the real effective exchange rates (REER) of oil exporting

countries through co-integration and seeks to answer the question of whether the real oil price will have a long-term impact on the development of the REER[3].

If so, the country suffers from Dutch disease, as volatility in world prices affects the performance of its entire export sector.

My research introduces two innovations to the literature in the wake of the authors:

- **To use RER instead of REER:** A REER is a weighted average of different real exchange rates in a given country, where the weights are given by the volume of trade with partners. From the point of view of detecting dutch disease, this means that there are two time series available for each country - one REER and one commodity price - and exchange rates can be interpreted as one index. The problem with this approach -

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[3] This article examines this issue by co-integration testing of autoregressive split-latency models to successfully address a small sample of data shortages. A more in-detail analysis of co-intervention would only be possible with the help of vector error correction models, but this multiequal procedure uses so many freedoms that in many cases it is impossible to make an estimate.

which Jahan-Parvar and Mohammadi apply - is that it can blur the unique relationships of trade relations and thus may not identify an existing statistical relationship.

On the other hand, in my dissertation, I examine each significant trade relation individually using a simple real exchange rate (RER) – i.e. correcting the nominal exchange rate in proportion to the inflation rate of the partners – thus leaving room for the possibility that in some cases the relationship exists and in other cases it does not. This approach has been named with my co-authors Zsuzsánna Biedermann and László Szalai as a partial Dutch disease (Barczikay, Biedermann and Szalai, 2020).

- **Taking into account asymmetry when examining rising exchange rates:** In addition to the application of individual time series, my analysis is also innovative in that, contrary to the quantitative literature referred to in the methodological relevance sub-heading, it uses nonlinear models in estimates. It is therefore possible to examine whether the effect of price

skraes of the same magnitude but with different signs will cause the same change in exchange rates in the world market price of the exported raw material. This raises the problem that, due to fluctuating commodity prices, even if world prices are adjusted continuously and to the same extent, commodity exporting countries may experience a deterioration in exchange rates. Where asymmetry can be detected, the deterioration of the competitiveness and exchange rate of exporting countries of raw materials can be demonstrated or refuted (Prebisch 1950; Singer 1950).

In conclusion, I would like to highlight the following significant configurations: in my thesis, I introduce the concept of partial Dutch disease, which I examine using asymmetrical models that work well with low battery numbers. Furthermore, the monthly data used are up to date and produced on the basis of the latest IMF quality standards.

Results of the treatise

With the help of the six countries examined, I made the following findings on my research questions. The question was whether the procedure is suitable for detecting Dutch disease at a partial level? In this connection, I have come to the conclusion that nardl models can be used to easily identify the phenomenon of the dutch partial disease. I have also extended this by finding that, if the effect can be detected in the REER model, it will most likely also be in the RER model (second question), i.e. there is no *'blurring effect'.* Asymmetry of the phenomenon was found only in Peru, but this should be treated with reservations, because in the global and partial models, long-term parameter estimates were in conflicting relation (question three). Finally, as an open question, I asked what factors might influence the development and severity of Dutch disease? In this connection, my view is that the depth of the problem cannot be explained solely for commercial or political/institutional reasons. Different economic policy mixes and conscious monitoring of the phenomenon may be solutions to damage reduction. Monetary policy plays a major role in the

economic policy mix, based on the countries examined. In addition to economic reasons, it is worth avoiding excessive unilateral dependence on other countries, as they can transform their dominance into political power.

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List of co-authored publications on this topic

Barczikay, T. - Biedermann, Z. - Szalai, L. (2020): An investigation of a partial dutch disease in Botswana. *Resources Policy*, 67pp.