

Dutch Disease Symptoms in Azerbaijan Economy

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ABSTRACT

The longstanding dominance of the extractive industry in Azerbaijan has created a situation that can be understood with the help of the Dutch disease model. The oil boom period (2008–2011) brought high levels of mineral revenue. The chronic overvaluation of the national currency during the oil boom, coupled with an appreciation of real wages in the mining industry that outperformed other sectors—particularly the manufacturing sector—reflect the first two symptoms of the phenomenon. In Dutch disease economies, the increased share of the services sector in the output (the third symptom of the disease) during unrecovered manufacturing (the fourth symptom) leads to a major slowdown in industrial production—also known as de-industrialization. Azerbaijan has suffered from unregulated investments, untargeted policies, and opportunistic behavior that has meant that mineral revenue has been spent rather than saved or redirected toward rebuilding the country's industrial heritage. This study evaluates the presence of Dutch disease in Azerbaijan using the available statistical data and through comparisons with other resource-rich countries to outline policy recommendations.

ملخص

ساهمت الهيمنة الطويلة الأمد لقطاع الصناعة التعدينية في أذربيجان في خلق وضع يمكن تحليله وفهمه بشكل جيد من خلال اعتماد نموذج المرض الهولندي. فقد نتج عن فترة الطفرة النفطية (2008-2011) مستويات عالية من إيرادات المعادن. ويمثل عاملي التقدير المفرط للعملة الوطنية خلال فترة الطفرة النفطية والزيادة في الأجور الفعلية في مجال الصناعة التعدينية التي تفوقت على باقي القطاعات، لا سيما قطاع التصنيع، أولى أعراض هذه الظاهرة. وفي الاقتصادات المتأثرة بالمرض الهولندي، تؤدي الحصة المرتفعة لقطاع الخدمات في الإنتاج (العرض الثالث للمرض) في مرحلة التصنيع غير المسترد (العرض الرابع) إلى تباطؤ كبير في الإنتاج الصناعي، وهو ما يعرف أيضا بانخفاض الأهمية النسبية للتصنيع. وتتم أذربيجان بمرحلة تتميز بوجود استثمارات غير منظمة وسياسات غير واضحة الأهداف ووسطوة السلوكيات الانتهازية، أي أن عائدات المعادن يتم إنفاقها بدلا من توفيرها أو إعادة توظيفها في إطار إعادة بناء التراث الصناعي للبلد. وهذه الدراسة تقيم مدى وجود المرض الهولندي في أذربيجان من خلال الاعتماد على البيانات الإحصائية المتاحة ومن خلال إجراء مقارنات مع باقي البلدان الغنية بالموارد، وذلك بهدف رسم توصيات متعلقة بالسياسات.

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ABSTRAITE

La domination durable de l'industrie extractive en Azerbaïdjan a créé une situation qui peut être comprise à l'aide du modèle de la maladie hollandaise. La période du boom pétrolier (2008-2011) a apporté des niveaux élevés de revenus miniers. La surévaluation chronique de la monnaie nationale pendant le boom pétrolier, associée à une appréciation des salaires réels dans l'industrie minière qui a dépassé les autres secteurs - en particulier le secteur manufacturier - reflète les deux premiers symptômes du phénomène. Dans les économies touchées par le syndrome hollandais, la part accrue du secteur des services dans la production (le troisième symptôme de la maladie) lors de la fabrication non valorisée (le quatrième symptôme) entraîne un ralentissement majeur de la production industrielle - également appelé désindustrialisation. L'Azerbaïdjan a souffert d'investissements non réglementés, de politiques non ciblées et de comportements opportunistes qui ont fait en sorte que les revenus miniers ont été dépensés plutôt que sauvés ou réorientés vers la reconstruction du patrimoine industriel du pays. Cette étude évalue la présence du syndrome hollandais en Azerbaïdjan en utilisant les données statistiques disponibles et en effectuant des comparaisons avec d'autres pays riches en ressources afin de définir des recommandations politiques.

Keywords: Dutch disease, Azerbaijan, Real effective exchange rate, Real wages, Increased services, Industrial slowdown

JEL Classification: F41, F43, L60, P27, Q33

1. Introduction

Dutch disease occurs when a shift in production factors occurs in the favor of booming export sector(s), leading to increased price levels of non-tradables. These patterns lead to an appreciation in real wages in booming sectors, real effective exchange rate overvaluation, de-industrialization of manufacturing, and eventually to a loss of competitiveness among non-booming sectors. The original theory (Corden and Neary, 1982; Corden, 1984) differentiates between the two effects of resource movement and spending. The resource movement effect is either the withdrawal of the labor force from the lagging tradable sectors into booming sectors (direct de-industrialization) or the luring the labor force out of lagging sectors into non-tradable sectors (indirect de-industrialization). Generally, rapid economic growth based on favorable factor prices runs current account surpluses and as the result of it, government expenditures rise towards the economy attracting labor force out of the lagging sectors into the non-

tradable sectors creating the real appreciation of the national currency (increased price levels).

The presence of Dutch disease in Azerbaijan is elusive in nature. Early concerns held that the institutionally underdeveloped country would experience the phenomenon in the middle and long-term due to a lack of necessary management incentives and revenue mismanagement (Laurila, 1999; Mahnovski, 2003; Kaser, 2003). High dependency on mineral exports and international prices, as well as the polarization of FDIs into the extractive industries triggered an occurrence of Dutch disease (Auty, 2001; Lee, 2005). In fact, Azerbaijan has been considered under the “resource curse” by Gojayev (2010); however, early empirical investigations by Gahramamov and Fan (2002) concluded otherwise². Studies by Hasanov (2010), Hasanov (2011), Hasanov and Hasanli (2011), and Hasanov (2013) conceptualize the effects of Dutch disease, focusing mainly on real effective exchange rate (REER) and inflationary effects and identify a strong relationship between booming and appreciation trends. In contrast, studies by Bayramov and Conway (2010); Şanlısoy and Ekinçi (2019) and Égert (2012) do not find evidence of the Dutch disease phenomenon in Azerbaijan.

The current state of the examination of the Dutch disease symptoms in the Azerbaijan economy is quite ambiguous and focuses only on highly available and aggregate variables like oil GDP, non-oil GDP, oil prices, and employment. While the studies from Laurila (1999), Mahnovski (2003), and Kaser (2003) were concerned with the political economy aspects, Hasanov (2013), Niftiyev (2020) conducted a descriptive evaluation. The employed variables are usually in the form of year-on-year growth, as a percentage share of total or in raw time series. This points to the research gap which can be filled by cumulative variables and new indicators obtained from the organization like SOFAZ (State Oil Fund of the Republic of Azerbaijan). Furthermore, this paper argues about the possible trajectories of the Dutch disease syndrome in a more comparative and critical manner by reconciling the macroeconomic variables of interest in the context of economic policy.

² However, it should be noted that the oil boom was ahead during the research years. In 2002, the adopted methodology was not sufficiently comprehensive to diagnose Dutch disease based on the possible monetary pressure that huge mineral revenue generally brings into the economy.

In this study, the economic performance of Azerbaijan between 1991 and 2018 is analyzed against a background of the Dutch disease model to answer the following research question: did the economy of Azerbaijan experience the main symptoms of Dutch disease, such as REER appreciation alongside the appreciation of real wages, increased role of services and industrial slowdown, as the model originally proposed by Corden and Neary dictates (Corden and Neary, 1982; Corden, 1984)? The paper evaluates new target variables like real wages and employment changes in cumulative growth terms. In comparison to the previously done studies by Gahramanov and Fan (2002), Hasanov (2013), and other similar studies, cumulative growth rates in relation to the main macroeconomic indicators provide better visualization of the dynamics that explain Dutch disease signs. A distinctive characteristic of this paper stands on its comprehensive and systematic descriptive evaluation of the Dutch disease phenomenon in Azerbaijan which also makes the research findings and policy recommendations widely usable and highly functional. The policy recommendations that support the analysis provides the necessary conceptualization of Dutch disease syndrome during the highly cyclical global world economy. This study contributes to the body of literature related to the Azerbaijan economy by directly investigating the Dutch disease symptoms vis-à-vis the macroeconomic dynamics of the country.

The next section of this study reviews the main literature examples related to Dutch disease and its presence on other post-soviet economies, as well as in Azerbaijan. The second section describes the data via the summary statistics and informs about the constructed variables of interest. The third section outlines the recent trends in the economy of Azerbaijan, mainly during the transition period. The polarized economic structure and its sensitivity to sudden changes in commodity markets, as in 2014–2015, are described to conceptualize the Azerbaijani economy in the context of the booming and lagging sectors. Then, the fourth section of this paper evaluates the Dutch disease symptoms, similar to Dobrynskaya and Turkisch's (2010) examination of Dutch disease in Russia's case, focusing on criteria like the exchange rate, real wages, increased role of services, and industrial slowdown. Lastly, policy recommendations based on the brief evaluation of other countries' experiences shed light on both applied activities and gaps in the context of the Dutch disease

phenomenon in Azerbaijan and the paper concludes with the limitations of the study.

2. Literature Review

2.1. The Presence of Dutch Disease in Post-Soviet Economies

Several resource-rich countries of the world economy like Australia (Corden 2012), Nigeria (Otaha 2012), Indonesia (Pangestu 1990), Mexico (Auty 1991), Colombia (Kamas 1986), Norway (Larsen, 2006), and the United Kingdom (Hutchison 1994) have been considered as “Dutch disease-infected” because of the common characteristics like having a booming sector, undiversified economy (having various lagging sectors), contracted manufacturing due to the dominant sectors and real exchange rate appreciation. Among them, the post-soviet resource-rich countries play a significant role. Despite rapid economic catch-up and modernization since independence, scholars and policymakers still are not sure about the sustainable long-term growth that Dutch disease syndrome endangers among ex-soviet economies. Furthermore, even the precise diagnosis of the Dutch disease effects is highly challenging because of data problems, the pass-through of oil prices to the nominal and real effective exchange rates are highly visible (Égert, 2009). Thus, there is a chief rationale to argue about Dutch disease syndrome among the oil-rich post-soviet countries.

The biggest mineral exporter among post-soviet countries is Russia. Mironov and Petronevich (2015) defended the thesis that Russia has Dutch disease signs because a 1% increase in oil exports had led to the real exchange rate appreciation by 0.2%. The authors argued that the real exchange rate is the main channel for Dutch disease and also mining sector’s output and profitability sky-rocketed, alongside the increased role of services which point to the partial spending effect of Dutch disease. Similar findings come from Algieri (2011) who by applying the VECM framework documented the three cardinal signs of Dutch disease: exchange rate appreciation, oil-led GDP growth, and contracted ratio of manufacturing output over services output. However, Dobrynskaya and Turkisch (2010) argued that despite there was a strong real appreciation in the Russian ruble, real wage increase, manufacturing decrease in employment, and rise in services employment, de-industrialization did not happen. On the contrary, Russia’s case shows increased industrial

production and productivity upheavals. Koomes and Kalcheva's (2007) found similar outcomes like Dobrynskaya and Turkisch (2010).

The other countries that were intensively considered within the Dutch disease hypothesis were Kazakhstan, Uzbekistan, and Ukraine. It is not a secret that the Kazakhstan economy is also highly oil and gas dominated. Kutan and Wyzan (2005) investigated the possibilities of the Dutch disease effects in the Kazakhstan economy and evaluated it as vulnerable to it in the long-term rather than having it during the investigation period. The other research from Égert and Leonard (2008) concluded that because of the absence of the connection between real exchange rate and non-oil manufacturing open sectors in Kazakhstan, oil prices hikes do not negatively influence non-oil exports. The work from Kuralbayeva et al. (2001) approximated the same results and evaluations of the above-mentioned literature examples.

Similarly, having higher productivity and profitability in natural gas and fuel sectors put Uzbekistan's foreign investments in a highly concentrated form in oil tradable sectors expecting certain signs of Dutch disease (Barry, 2009). Lastly, in the case of Ukraine, there are very few studies but the strong emphasis is based on the weak manufacturing sectors that lagged for a long time, without catching up with the pre-soviet levels of production and exports (Bezrukova and Svichkar, 2014).

2.2. Dutch Disease Studies about Azerbaijan Economy

Early studies regarded the actuality of Dutch disease in Azerbaijan was based on the rationalizations from the international experiences of the other resource-rich countries and theory when a booming sector takes over the national economy. Singh and Lauria (1999) pointed to the fact that in the short-term real exchange rate appreciation is not a danger; however in the medium- and long-term it poses serious risks. In the other paper Lauria (1999) strongly mentioned that any delay in the structural reforms and economic mismanagement might harm the economy Azerbaijan. The point of departure of Mahnovski (2003) and Kaser (2003) regarded Dutch disease syndrome in Azerbaijan was the examination of the political regimes and economic diversification level of the Caspian basin countries. They argued that the big role of the state in the economy, the nature of the political regimes, and low level and lack of attention on

the non-oil industrial products sooner or later will bring Dutch disease into the economy.

Then, as the statistical data were collected and the possibility of methodological examinations expanded, new studies examined Dutch disease effects in the Azerbaijan economy. The most fundamental study was from Hasanov (2013). The study concluded that public expenditures exhibited positive and long-run relationships with non-oil GDP which signifies the relevance of spending effect compared to the resource movement effect. Moreover, oil prices had a statistically significant effect on a real appreciation of the exchange rate, and the rise of real wages was due to the spending effect of Dutch disease rather than productivity growth. But earlier, Gahramanov and Fan (2002) concluded that Dutch disease is absent in Azerbaijan because of the lack of monetary evidence of its existence. However, the studies related to the real effective exchange rate, inflation, non-oil exports, non-oil GDP by Huseynov (2009), Hasanov (2010), Hasanov and Samadova (2010), Hasanov (2011) revealed that the most important factor behind the inflation, real exchange rate appreciation, and lagging non-oil sectors is oil prices and the presence of Dutch disease effects.

The cyclicity of the Azerbaijan economy concerning oil prices is quite high (Niftiyev and Namazova, 2020). Various studies examined Dutch disease effects in line with the outcomes of the procyclical developments of the national economy that also sheds light on the presence of Dutch disease. For instance, Zulfugarov and Neuenkirch (2019) applying VAR (Vector Autoregressive Models) between 2002Q1-2018Q1 concluded that Dutch disease hypotheses in Azerbaijan are observable.

To address Dutch disease in the economy, Azerbaijan should fully continue to collect taxes (not solely relying on the royalties and oil sector taxes), to diversify the national economy, to fight dollarization, to increase savings, to strengthen state institutions, etc. (Mahmudov, 2002). Also, institutional regulations should be tightened to overcome Dutch disease-related de-industrialization (Niftiyev, 2020).

3. Data and Methods

This paper employs a descriptive graph analysis of the development of Dutch disease in the Azerbaijan economy. To do so, annual data from the

State Statistical Committee of the Republic of Azerbaijan (SSCRA), Central Bank of Azerbaijan Republic (CBAR), the SOFAZ, the World Bank (WB), the International Monetary Fund (IMF), and others, are used to outline trends in fiscal policy, employment, industrial production, real wages, and tertiary sectors. The sample contains oil and non-oil tradable sectors, as well as, mining, manufacturing, and services to compare and analyze the variables' trajectories. Oil tradable is the total of the mining industry and petroleum and fuel production. Non-oil tradable contains manufacturing activities in the economy which excludes oil or fuel related processes.

The paper heavily uses graph analysis to track the multiple trends alongside the time-series. Table 1 reports the summary statistics and the measurement level of the main variables of interest used throughout the paper. Different indicators cover different periods. That is why the data range and the data sources have been indicated in each figure.³

Table 1: Summary statistics of the main variables of interest

Variable name	Min.	Max.	Mean	St.Dev.	CoV
Employment in Agriculture, thousand persons	1509.40	1769.30	1626.43	78.81	0.048
Employment in Manufacturing, thousand persons	184.50	254.80	211.89	20.62	0.097
Employment in Mining thousand, persons	37.90	44.30	41.26	1.91	0.046
Employment in Services, thousand persons	1948.50	2746.30	2350.00	239.58	0.102
Exports, non-oil tradable sectors, % of total	2.50	34.20	12.81	8.43	0.658
Exports, oil tradable sectors, % of total	65.80	97.50	87.19	8.43	0.097
External debt, % of GDP	0.89	41.73	20.00	10.66	0.533
GDP growth rate, % change of annual real GDP	0.79	37.21	13.76	13.09	95.128
General government total expenditures, % of GDP	18.66	38.38	30.05	5.46	0.182
Government expenditure, % of GNI	18.66	38.38	30.04	5.61	0.187
Non-oil manufacturing growth rate, in %, year-on-year	-49.80	24.60	-1.06	17.62	-16.689

³ Sample size or observation numbers can be easily obtained from the corresponding figures.

Non-oil tradable, industrial production, % of total	0.11	0.83	0.31	0.21	0.670
Oil prices, BRENT trademark, USD per barrel	12.72	111.97	49.59	33.18	0.669
Oil REER/Non-oil REER, ratio	1.00	1.13	1.05	0.04	0.038
Oil tradable, industrial production, % of total	0.12	0.84	0.61	0.22	0.365
Overall manufacturing growth rate, %, year-on-year	-32.80	22.40	-1.61	12.40	-7.700
Real wages in Manufacturing, AZN	101.6	448.4	273.1	114.9	0.421
Real wages in mining, AZN	262.4	2120.4	1119.2	557.8	0.498
Real wages in Services, AZN	103.9	448.0	323.9	120.7	0.373
REER in non-oil sectors, in %. December 2000=100%	73.80	125.60	99.05	15.95	0.161
Share of SOFAZ transfers in the state budget, in %	7.30	58.20	36.41	19.66	0.540
SOFAZ's expenditure, million AZN	0.81	9223.53	3693.86	3107.24	0.841
SOFAZ's revenue, million AZN	221.90	15628.00	7064.97	5490.52	0.777
Total REER, in%. December 2000=100%	74.20	134.60	104.70	19.69	0.188

Note: CoV denotes "coefficient of variation"

4. Recent Trends in the Economy of Azerbaijan

Nuri Aras et al. (2016) describe the Azerbaijani economy during the Soviet Union as a time in which exporting raw materials was cheaper and importing ready products was expensive. The main exports during this period were oil, machine building, weaving, and wine products. The economy was a centrally planned command economy with an industrial production that catered to union-wide demands. Economic growth between 1960 and 1970 was 5.2%, compared to 7.4% in 1970–1980 (Nuri Aras et al., 2016). However, a severe decrease in GDP occurred from 1985 to 1991 (Cornel, 2015). The reason for the slowdown in economic growth was the gradual shift in oil and gas production from Azerbaijan to Siberia and Kazakhstan, leading to labor migration, a decrease in the extractive industry's output, and the withdrawal of investment that was originally channeled to oil and gas sources in Baku near the Caspian Sea (Laurila, 1999).

Azerbaijan underwent a transition period after independence from the Soviet Union. Nuri Aras et al. (2016) divide this period into three stages, which are summarized in Table 2.

Table 2: Main stages of the transition period after the collapse of the USSR in Azerbaijan

	Main developments	Reforms and decisions
<i>1st period after independence 1991–1994</i>	<ul style="list-style-type: none"> - Loss of the common market; - High unemployment and inflation; - Political instability; - War with Armenia and loss of 20% of territories; - Decrease in production; - Deficit in state budget and shortcomings from tax collections. 	<ul style="list-style-type: none"> - Laws on Private Property, Foreign Directed Investments, and Execution-Bankruptcy were enacted; - Manat became the national currency; - Ceasefire with Armenia; - Trade liberalization and privatization.
<i>2nd period after independence 1995–2003</i>	<ul style="list-style-type: none"> - The contract of the century that attracted huge Foreign Directed Investments (FDI) on the oil and gas industry; - Agricultural lands were rapidly privatized and excluded from taxes (with the exception of land tax); - Infrastructural modernization. 	<ul style="list-style-type: none"> - State Program on Poverty Reduction was adopted; - Various laws such as Land Reform and Public Procurement; - Tax code.
<i>3rd period after independence (from 2003)</i>	<ul style="list-style-type: none"> - The oil extraction, refinery, chemical industry, petrochemical and electricity industry gained big share in the economy; - Reconstruction of the energy sector via the privatization; 	<ul style="list-style-type: none"> - The State Program on the Socio-Economic Development of Regions.

Source: Nuri Aras et al. (2016)

The most recent developments in the Azerbaijan economy are the decreased macroeconomic performance and certain economic policy responses of the government to the sharp downturn commodity prices that occurred between 2014 and 2015. The revenue of the SOFAZ fell to 7,721 million AZN in 2015, down from 11,227 million AZN in 2014. This influenced transfers from the sovereign wealth fund to the state budget. The share of the transfers was 50.7% in 2014; however, it fell to 43.5% and 37.1% in 2016 and 2017, respectively. Furthermore, during the oil revenue and output booming period (2008–2011), the average oil and gas GDP was 21,139.05 million AZN in current prices; however, in 2015 it fell to 15,382.2 million AZN and in 2016, it increased its value to 19,552.6 million AZN. Similarly, during the booming period, savings

were 49.4% of GDP, but this fell to 27.5% in 2015. Savings were their lowest value since 2002 in 2016 at 22.08%. Overall, industry value-added dropped to 18.01 billion USD, without considerable improvement until 2018, but it had peak shares of 32.01, 40.71, and 42.31 billion USD in 2008, 2011, and 2013, respectively. In October of 2014, the CBAR had 17.3 billion USD international reserves (the highest level since independence) but this fell to 4.03 billion USD in February 2016 as the devaluation process occurred twice in 2015. Finally, the downward trend in the shadow economy was replaced by an upward trend. The share of the shadow economy increased to 43.7% of GDP in 2015; however, it was 42.2% in 2014, the lowest indicator since the independence.

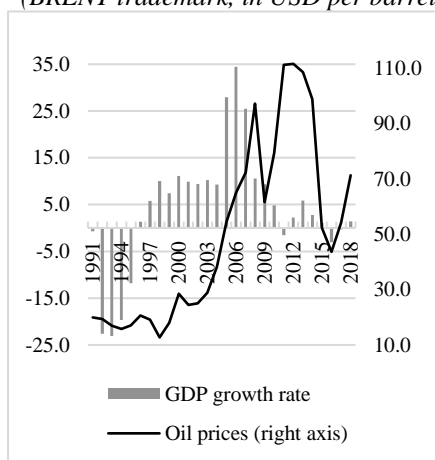
Policy responses to the macroeconomic performance of the economy covered activities like “Cancellation of the Inspections in Entrepreneurship” in 2015, the “Strategic Roadmap of the Azerbaijan Republic on National Economic Perspectives” in 2016, “Establishment of the Legal Entity of Public Law Center for Analysis of Economic Reforms and Communication” in 2016, “Financial Stability Committee” in 2016, “Additional Actions to Investment Promotions” in 2016, and “Additional Measures on Promotion of the Non-oil Products” in 2016 (Ministry of Justice, <http://www.e-qanun.az/>). These interventions aimed to address the current and future challenges brought about by decreased commodity prices. Thus, considering the dependency of the economy on the oil and gas industry, as well as the positive effect of the boom because of higher commodity prices in the international markets, the Dutch disease model can be used to evaluate the structural tendencies.

As the Dutch disease model is only applicable for open systems, it cannot be used to analyze the USSR period. Moreover, compared to the Netherlands, the country in which the model was first considered, Azerbaijan did not discover oil and gas resources after industrialization, so its economy was already based on the extractive industry with the necessary regulations from Moscow. However, the effects of Dutch disease since the independence, such as REER appreciation, the appreciation of real wages, increases in the tertiary sectors, and industrial slowdown as a result of the booming sector feeds into the original model. Thus, starting from the connection between the GDP growth rate and oil prices and the structure of exports the relevant extension of the analysis might be able to argue about the presence of the thesis.

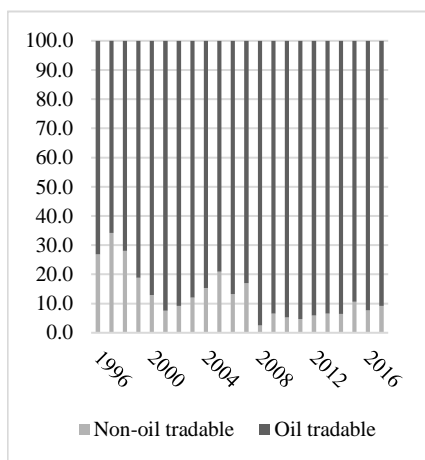
High oil prices in the world market have contributed to economic growth in Azerbaijan, as mineral products have increased the country's share in exports and oil prices have steered large amounts of foreign currency into the economy (Fig. 1 *a* and *b* panels). The GDP growth rate reached impressive levels on the edge of the oil boom, however also immediately responded to the global financial crises (2009) and the recent commodity price slowdowns (2014-2015) which allows to us to underline the strong positive correlation between these two crucial indicators. Dependence on mineral exports can be easily seen in the *b* panel in Figure 1. Starting from 2008, the oil tradable sector gained significant shares, mainly accounting for over 90%, which demonstrates the heavily influence of the oil sector on macroeconomic stability.

Figure 1: As the main source of economic growth, the connection between GDP growth rate and oil prices underscores the dependent nature of the economy of Azerbaijan.

a. GDP growth rate (in %) and oil prices (BRENT trademark, in USD per barrel)



b. Export structure, in %.



Source: World Bank national accounts data, OECD National Accounts data files, SSCRA, and author's own calculations.

5. Dutch Disease Symptoms

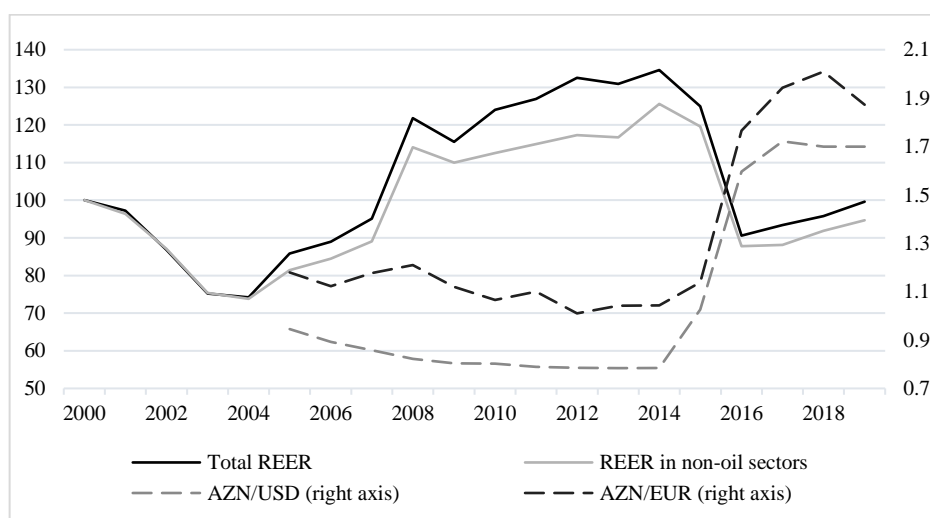
This section provides an evaluation of statistical data regarding the symptoms of Dutch disease, similar to the analysis by Dobrynskaya and Turkisch (2010) of Dutch disease in the Russian economy, which was based on the original theory modeled by Corden and Neary (1982) and Corden (1984). Here, the REER, real wages, increased role of services,

and industrial slowdown are evaluated as signs of Dutch disease based on the available data related to Azerbaijan.

5.1. Exchange Rate

Several studies have shown that oil prices strongly influence the value of the national currency in Azerbaijan (Huseynov, 2009; Hasanov, 2010; Hasanov and Samadova, 2010; Ağazade, 2018; Dikkaya and Doyar, 2017). In the Dutch disease model, the role of REER is highly important and has an impact on the competitiveness of the manufacturing sector. As they are so strongly linked with the value of the national currency, oil price slumps severely impact the economy. Hasanov (2011) shows the negative welfare cost of inflation arising from the booming sector. Similarly, a study by Hasanov and Hasanli (2011) conceptualizes the long-term irrelevance of the money market approach in Azerbaijan and points to the importance of resource dependence in terms of the value of the national currency. Figure 2 shows the appreciation of the national currency during and after the oil boom period (2008–2011) and the inevitable depreciation after the sharp downturn in commodity prices in 2014–2015. The AZN to USD and euro exchange rate increased as the oil price shock eroded the central bank's foreign exchange reserves. The CBAR adopted a fixed exchange rate policy to decrease the monetary risks associated with the huge inflow of foreign currency between 2005 and 2014. As there was low demand for foreign currency by households and firms, the main buyer was CBAR. Transnational Companies (TNCs) that were heavily involved in the oil industry also needed to convert foreign currencies to the local currency to pay taxes and royalties. A high supply of foreign currency coupled with low demand for it increased the reserves of CBAR. Therefore, the CBAR applied a fixed exchange rate regime in an attempt to appreciate the manat. Without this regime, the lagging sectors would have likely experienced an even more drastic collapse due to the overvalued national currency. Even though the years of 2014–2015 were the tipping point of the exchange rate in Azerbaijan, the CBAR continues to apply the fixed exchange rate regime, despite announcing a transition to floating regimes (Statement of the Central Bank of the Republic of Azerbaijan 2015a; 2015b).

Figure 2: The real effective exchange rate and exchange rate of the Azerbaijani manat (AZN) against the USD and euro.



Source: CBAR

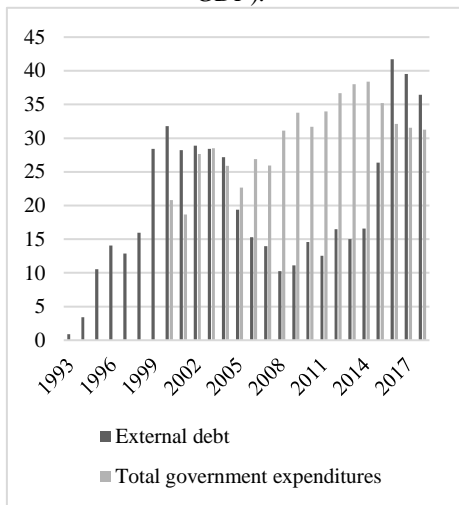
Note: Data for 2019 is based on the available months

During the period in which the national currency appreciated (mainly 2008–2014), government expenditure had higher share of GDP (between 31.1 % and 38.4%), though external debt was low (Fig. 3, panel *a*). The oil price slumps during 2014–2015 increased the external debt from 10% in 2008 to 41.7% in 2016. Moreover, considering the strong connection between REER and industrial output, the number of declining years for non-oil manufacturing sectors was 15 (1991–2017), while the number of declining years in mining was just 7 (Fig. 3, panel *b*), indicating the diminished production of the lagging sectors.

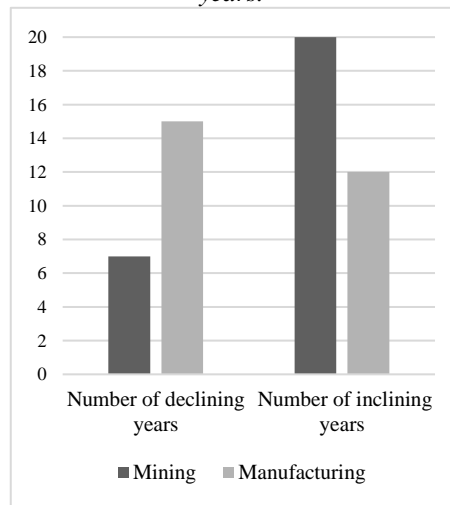
As factor prices have increased rapidly since the early 2000s, the oil sector has created a huge challenge in terms of the appreciation of the local currency, as can be seen from the index depicted in Figure 4. During the oil booming period, the coefficient of total REER over non-oil REER reached 1.13 after the balance levels of 1 and 1.01 between 2000 and 2004. Commodity price slumps then pushed down the appreciating power of the oil industry (which total REER includes) to 1.03 in 2015. The post-2015 period shows an upward increase in the favor of oil industries as well.

Figure 3: The main consequences of REER appreciation as the main channel of Dutch disease syndrome on external debt and on the growth of industrial output.

a. Changes in government expenditure (% of GNI) and external debt (% of GDP).

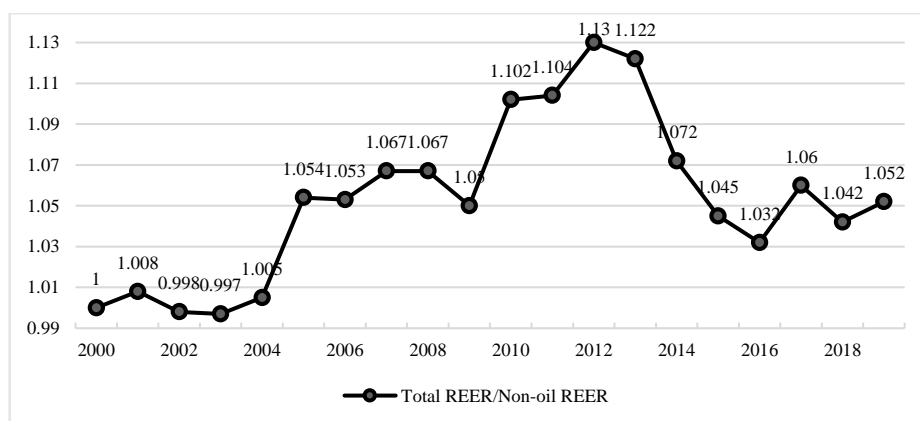


b. The frequency of the growth in industrial output between 1991–2018 in years.



Source: www.theglobaleconomy.com, World Bank, IMF - World Economic Outlook Database, SSCRA.

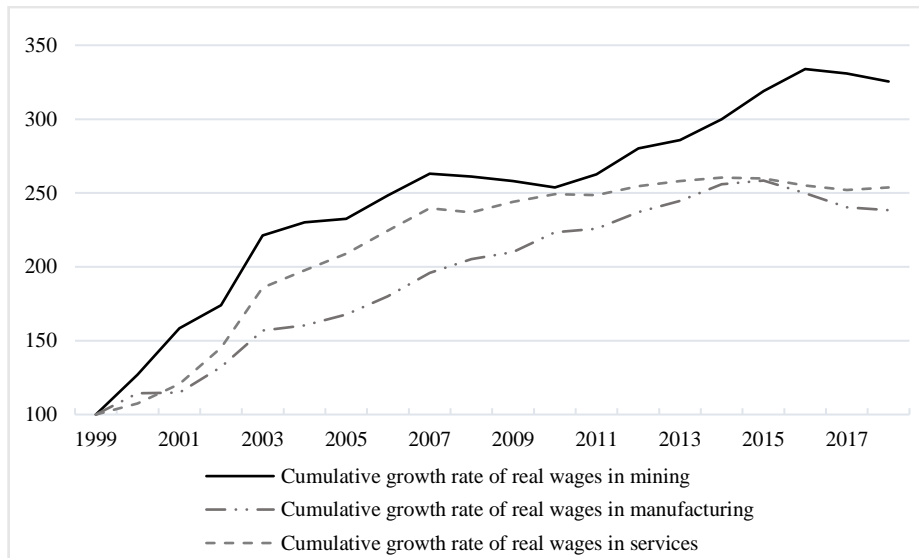
Another challenge for exchange rate stability and predictability is the major share of the informal economy, as discussed by Ahmadov (2016). The higher the share of the informal economy, the higher the probability of tax evasion and untracked household real income and transactions. Consequently, the informal economy is hugely problematic in terms of economic policy, particularly in the context of an undiversified and Dutch disease-experiencing economy. The first symptom of Dutch disease in Azerbaijan is in the trends corresponding to the considerations of the broad literature.

Figure 4: The ratio of total REER over REER in non-oil sectors, 2000–2019.

Source: CBAR, author's calculations.

5.2. Real Wage Trends

The second symptom of Dutch disease is the appreciation of real wages in the booming sector with increased employment (resource movement effect) resulting from the attractive status of the booming sectors. In addition, if the spending effect of Dutch disease is more powerful, the real wages in services can outperform others. Can these trends be seen in the economy of Azerbaijan? As Figure 5 shows, in cumulative growth terms, real wages had their highest appreciation in the mining sector, outperforming services in 2017 almost three-fold compared to 1999. Manufacturing was the worst performing of the three sectors, despite having an upward trend until 2015. As the economy of Azerbaijan is heavily dependent on oil revenues, the tertiary sectors have long been nourished by government expenditures, slightly losing their upward trend as the high oil price era ended in 2014–2015. Mining and manufacturing began to slow after this period. Overall, the cumulative growth rate dynamics of real wages indicate the presence of the second sign of Dutch disease. However, empirical data on the employment dimensions of the theory should be also considered.

Figure 5: Real wage trends in %, 1999=100%, 1999–2018

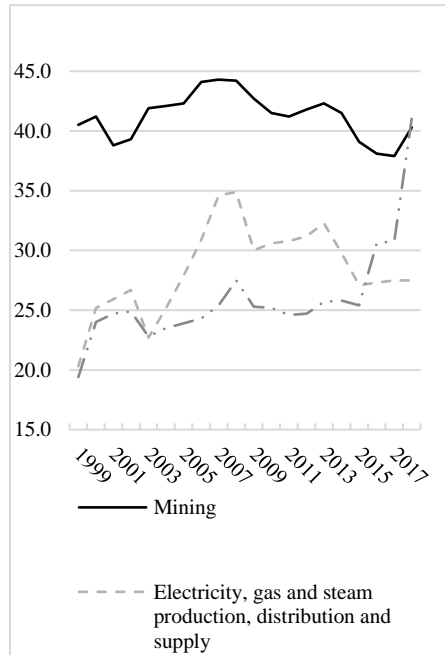
Source: SSCRA, Author's own calculations.

Note: Real wages have been calculated based on CPI-adjusted nominal wages.

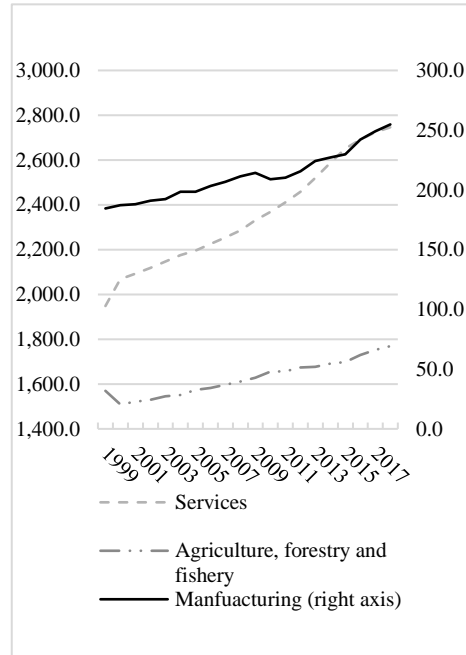
The resource movement effect states that the booming sectors should attract the labor force from the non-booming sectors due to increased marginal product. However, Figure 6, panel *a* shows a decreasing trend in mining employment, pointing to a decreased demand for labor in the mining sectors as the main oil and gas extraction projects were finalized. Other closely associated sectors, such as electricity, gas and steam production, started to employ fewer workers; however, water supply and waste treatment and disposal increased its share twofold between 1999 and 2018. Panel *b* in Figure 6 shows that manufacturing increased its share of the employed labor force from 184.5 to 254.8 thousand people. This is not a noteworthy increase among manufacturing sectors, but still contradicts the resource movement effect of Dutch disease. Services gained an upward trend in the employment and obviously it can be the illumination of the indirect de-industrialization as Corden (1984) documents being the result of spending effect which is the withdrawal of the labour resources from booming sectors and lagging sectors into the non-tradable sectors. Thus, employment data does not support the second symptom while real wages in cumulative terms are compatible with the model.

Figure 6: Distribution of employment in natural value across various sectors.

a. Employment in mining and closely related sectors in thousand persons, 1999–2017.



b. Employment in services, agriculture and manufacturing in thousand persons, 1999–2017.



Source: SSCRA, Author's own calculations.

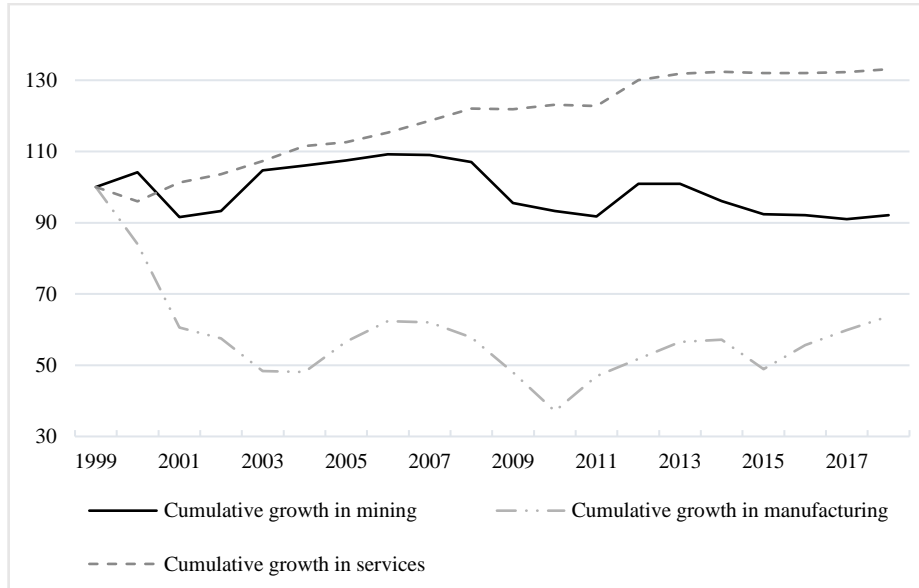
5.3. Increased Role of The Services

The increased role of services is closely related to revenue from the oil boom. Governments of mineral-rich countries or resource owners tend to spend more when favorable oil prices attract huge revenues from international commodity markets. By itself, spending on infrastructure and social projects is not bad in nature; however, without the development of the non-resource tradable sectors, fiscal expansion can harm economic growth in the long-term (Corden and Neary, 1982). Subsequently, compared to the experience of developed countries, in mineral-rich countries, tertiary sectors grow because of mineral exports rather than because of solid industrialization. However, not every mineral-rich country experiences this kind of trend. In fact, as Dobrynskaya and Turkisch (2010) argue, the increased role of services in Russia is a direct consequence of the rapid development of services starting from the mid 1990s, which were underdeveloped during the Soviet period. The authors

note that the elevated employment in services resulted from the increase in the productivity of manufacturing technology that decreased the labor demand and escalated labor force's preference to work in it because of its prestigious status. Therefore, in Russia, the increase in services is not consistent with export revenues, as stipulated in the Dutch disease model.

In Azerbaijan, despite an appreciation of real wages in mining, employment in the booming sectors has not shown any significant upturn in cumulative growth terms (Fig. 7). The manufacturing sectors also have not experienced any major upheaval in employment, which experienced sequential falls particularly during the post-boom period, compared to minor developments during the pre-boom period. The only stable trend that can be observed in services is mainly upwards, indicating the spending effect of the phenomenon, rather than the resource movement effect.

The painful transition process and the government's emphasis on the extractive industry put major pressure on the labor force in the Azerbaijan economy. The role once manufacturing value-added possessed in the Soviet Union regarding labor force disappeared. Furthermore, due to the low employment opportunities in mining, the labor force headed towards services as the government also increased spending from capital accrued from mineral exports. Subsequently, the cumulative growth of employment in services had the most stable upward trend (Fig. 7). After big oil and gas extraction projects were finalized, the mining sector started to employ less. However, the most drastic structural recession in the labor market occurred in manufacturing from 1999 until 2010. The cumulative growth of manufacturing has had a slightly upward trend since 2010, but there has been no noticeable recovery from pre-boom era levels.

Figure 7: Employment trends in %, 1999=100, 1999–2018

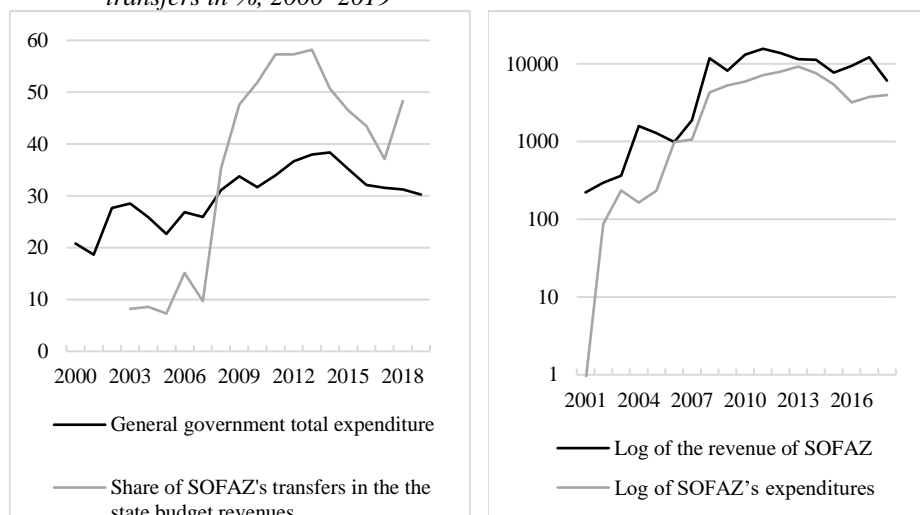
Source: SSCRA, Author's own calculations.

The *a* and *b* panels in Figure 8 show the increasing log of revenue of the SOFAZ and its share of the state budget, as well as the state's decision to spend more during the oil and gas boom. While the shares from the SOFAZ of the state budget increased noticeably, a slightly upward trend can be observed in overall government expenditure. These dynamics overlap with the increased share of services in the total employment, coinciding with the spending effect element of the theory, because the increased demand for labor in services was met with an oversupply of the labor force that was crowded out for a while from the manufacturing or any similar lagging sector. Hasanov et al. (2019) document the statistically significant relationship between the non-tradable sectors and government expenditure and observe that the non-oil tradable sectors benefited less from government spending than the non-tradable sectors, and benefited mainly from infrastructure investment over any other expenditure category. Consequently, as Aliyev and Gasimov (2018) stress, after the downturn in commodity prices, the stable expansionary fiscal policies that the government applied during the oil boom period were replaced by contractionary policies, which undermined the development of the non-oil and the non-tradable sectors and created new challenges for the economy.

Public services also rose following higher state financing. In 2007, the Public Service Index provided by the Fund for Peace was 6, but it has fallen to 4.8 in 2019 at a stable pace over an 11 year timescale, indicating the increased share of public services ([Fragile States Index](#))⁴.

Figure 8: Expenditure patterns and its source from the perspective of the mineral revenue coming from the SOFAZ.

a. General government total expenditures, % of GDP, 2000–2018 and share of SOFAZ transfers in %, 2000–2019 *b. Log of the revenue and expenditures of SOFAZ, in million AZN, 2001–2018*



Source: Author's own calculations based on the reports of the State Oil Fund of the Republic of Azerbaijan.

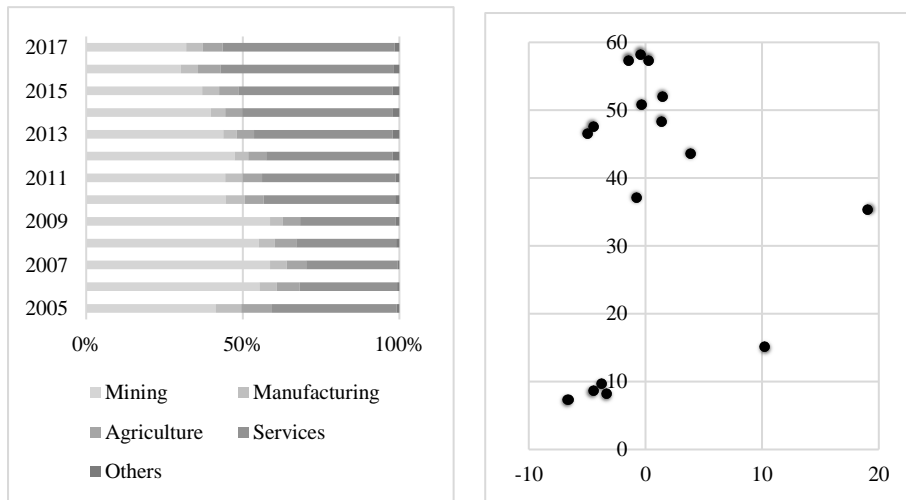
Finally, the decomposition of the real GDP reveals the increased role of services in the economy of Azerbaijan (Fig. 9, panel *a*) alongside the high shares of SOFAZ in the state budget, despite the very small increases or even negative growth in exports of mineral products (Fig. 7, panel *b*). It is also worth mentioning that compared to countries like Canada and the Netherlands, in Azerbaijan, the incongruousness of the resource movement effect means that the source of the spending effect is not the income of households in the booming sectors, but is in fact government expenditure. Thus, the increased role of services is clearly observable as the third symptom of Dutch disease.

⁴ Lower indicator means a higher share of public services.

Figure 9: The increased role of services in the real GDP and its main source as increased shares of SOFAZ in the state budget.

a. Decomposition of real GDP value-added, chain-linking method in %.

b. Change in the exports of the mineral products (X-axis), in %, Share of the transfers from SOFAZ in the state budget (Y-axis) in %, 2003–2018.



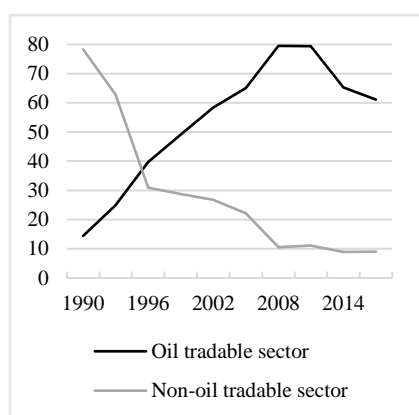
Source: SSCRA, Annual Reports of State Oil Fund of the Republic of Azerbaijan, author's own calculations.

5.4. Slowdown of Industrial Production

When it comes to the composition of production activities, the available data indicate that the oil tradable sector gained a major share, while the non-oil sectors in the economy of Azerbaijan show the opposite trend since independence (panel *a* of Fig. 10). The striking feature of the dispersion of the industrial structure is that the slowdown of non-oil industrial production occurred while the extractive industries and petroleum or fuel production leveraged their share up to 80% in 2008–2011 (the oil boom period). A considerable proportion of the growth of non-oil tradables only occurred in recent years (2014–2017) (Fig. 10, panel *b*). However, it is also necessary to consider the effect of devaluation of the national currency on the value of production, as a depreciated national currency stimulates an increase in industrial production and exports due to the increase in the price competitiveness.

Figure 10: Share of the sectors in the industrial products and year on year growth rate dynamics.

a. Oil and non-oil tradable sectors, % of total industrial products, selected years between 1990–2017.



b. The average growth rate of the selected periods of overall manufacturing and non-oil manufacturing between 1991–2017, in %.

Periods	Overall manufacturing growth rate	Non-oil tradable manufacturing growth rate
1991-1996	-6.95	-19.36
1997-2002	-9.53	-13.93
2003-2008	-8.68	-13.32
2009-2013	0.16	0.78
2014-2017	6.5	9.38

Source: SSCRA, author's own calculations.

The slowdown of non-oil tradable sectors in the 1990s is understandable in post-soviet and transition countries. However, it is interesting that after overcoming several major challenges and applying numerous reforms, the non-oil tradable sector did not show any noticeable recovery during the huge influx in oil revenue in Azerbaijan. This was a problem for the government as the mineral tradable sectors had a very limited employment capacity. The average number employed in the mining sector was 36.96 thousand persons between 1998 and 2018. The increased role of services provided steady employment in the tertiary sectors; however, the non-oil manufacturing sectors had a greater opportunity to provide employment.

Other resource-rich countries have experienced similar slowdowns and have been examined based on the Dutch disease hypotheses. For example, based on the Vector Autoregression (VAR) model for the years 1993–2016, research from Taguchi and Ganzorig (2018) shows that the Mongolian economy experienced Dutch disease as the manufacturing sectors shrank while the mining sectors dominated.

In contrast to the previously discussed symptoms of Dutch disease, industrial slowdown within a Dutch disease framework differs from

country to country. Despite being resource-rich, Canada and Russia have not shown any collapse in manufacturing comparable to Azerbaijan. According to Mackdonald (2007), durable goods production rose by 4.8% while non-durable goods production fell by 3.4% during the high oil prices (2003–2006) in Canada. A similar study on Canadian case by Petrunia and Matteo (2016) argues that manufacturing is flat or growing at a low rate compared to G7 countries, so the presence of the Dutch disease cannot be directly observed. Similarly, Dobrynskaya and Turkisch (2010) clearly show that Russia exhibited a steady increase in its manufacturing output, without showing any major signs of Dutch disease. In addition, Shafiullah et. al (2019) reveal that Australia does not suffer from Dutch disease in all regions of the country. However, the abovementioned countries are large countries in terms of their geographical area and have strong economic potential. Small, transitional, and institutionally underdeveloped countries like Azerbaijan better fit the Dutch disease hypotheses and show all signs of it, including manufacturing slowdown. This is why de-industrialization in small oil exporting countries should be considered separately from big, developed countries.

6. Policy Recommendations

When it comes to policy design in booming economies general characteristics of resource exporting countries have to be considered as a starting point. Oil-exporting countries experience severe challenges during low oil prices. Ismail (2010) identifies four main patterns among them: (1) oil price shocks lower the output of non-oil sectors, (2) especially in countries where capital markets are more open to foreign investment. (3) The relative factor price of labor to capital and capital intensity rises due to windfall increases, and finally, (4) if the manufacturing sector is capital-intensive rather than labor-intensive, price volatility in the international commodity markets may have less of an effect. Thus, resource-rich developing countries with Dutch disease should adopt policies that minimize the damage of a boom followed by a bust. This supports the example of Azerbaijan, because a fall in oil prices and oil GDP decreased the output of the non-oil sectors that heavily depend on government subsidies and protection, while the same challenges were not seen in the mining sector, which is dominated by foreign investment. A lack of data on labor costs prevents us from concluding the third finding of Ismail (2010). However, based on the

historical patterns, manufacturing in Azerbaijan has for a long time been labor-intensive in nature rather than capital-intensive, and it is not wrong to assume that price volatility impacts non-oil sectors severely.

The end of the commodity super cycle that began in the early 2000s and ended toward the end of 2014 and beginning of 2015 shows the lack of preparedness of the monetary system in the Azerbaijan economy. Recent trends following the sharp commodity price slumps of 2014–2015 are summarized by Ahmadov (2016):

- a) The strengthening of financial security and predictability that achieved stability in the exchange markets, in addition to the establishment of a new entity named the Financial Market Control Chamber (in November 2019, this organization was closed down and its responsibilities transferred to the Central Bank).
- b) The liberalization of the economy and improvements to its entrepreneurship capabilities to reduce dependence on the extractive industry. The president signed several decrees to enforce non-oil exports alongside customs reforms and to ensure the simplification of grants of licensing and permits.
- c) Non-oil sector improvements based on the institutional arrangements—these measures mainly relate to the continuation of the privatization process that slowed during the oil boom period.

The question is what the government of Azerbaijan should do based on the successful and failed examples of countries that have fought Dutch disease. A study by Usui (1997) shows the difference in the approaches of Mexico and Indonesia to overcoming the effects of Dutch disease. For example, as the fourth symptom examined in this study, a slowdown in manufacturing did not occur to a great extent in Indonesia, while Mexico was not able to avoid this. The share of the public sector rose in Mexico, as did heavy investment in the oil sector, without any policies directed toward the tradable sectors. The case of Mexico is reminiscent of the economy of Azerbaijan and the challenges faced by the non-oil manufacturing sectors. However, as Usui (1997) documents, agriculture and related activities were heavily subsidized by the Indonesian government to use oil revenue more efficiently to defend this sector from “lagging” status. Moreover, the case of Indonesia supports policy instruments like the devaluation of 1978 and the running of budget surpluses to successfully overcome Dutch disease, because currency

devaluation and budget surpluses were able to reverse real exchange rate appreciation and increase the output of the tradable sectors (Usui 1996).

Gurbanov and Merkel (2009) discuss the example of Norway, where successful policies minimized Dutch disease effects, leading to better economic structures. Norway neutralized the resource movement effect of the Dutch disease via the formation of a highly centralized wage system and income coordination that prevented low real wages in the manufacturing sector. Subsequently, through fiscal discipline, the Norwegian government spent resource revenues abroad rather than injecting them directly into the economy, which allowed for an escape from chronic real exchange rate appreciation, as well as increased price levels in non-tradable sectors. All these examples indicate that Dutch disease can be overcome or decreased through well-designed policies.

In Azerbaijan, as Hasanov et al. (2019) note, expansionary fiscal policy was replaced by contractionary policy in 2015, which negatively influenced the non-oil tradable sectors. Government spending must be made more efficient, and investment should be made in non-oil sectors to improve their competitiveness. Hasanov et al. (2019) argue that the labor force shifted to non-oil tradable sectors from other sectors following heavy investments. This indicates that if the necessary amount of attention is dedicated to the non-oil tradable sectors, human capital can be attracted to reinforce production and innovation.

Among the important policy considerations for avoiding Dutch disease are monetary regulations that can stabilize exchange rate fluctuations. Hasanov and Samadova (2010) state that exchange rate appreciation prevents the exports of non-oil sectors, discouraging the production of the value-added in Azerbaijan. The devaluation of the national currency in 2015 and the CBAR's announcement that AZN was under the floating exchange rate regime (Statement of the Central Bank of the Republic of Azerbaijan 2015a; 2015b) cannot be proven empirically (Fig. 2). This is why the Strategic Roadmap of Azerbaijan adopts "the transition to the fully floating regime" of AZN until 2020, which serves to fulfill priority number 1.3—the application of efficient monetary policy under a new economic model (the Strategic Roadmap of Azerbaijan). Some experts argue that the floating exchange rate regime is an important step toward sustainable development, while the others highlight the serious risks associated with a heavy dependency on mineral exports (ARB24). Similar

events have also occurred in Russia and Kazakhstan—other post-soviet resource-rich countries that are heavily dependent on mineral exports, but which have not experienced Dutch disease as severely as Azerbaijan thanks to the greater diversification of their economies. Mironov (2015) argues that devaluation alone is not a solution to every challenge souring from Dutch disease signs and in Russia's case, he argues, it does not mean that the economic recession because of the recent decrease in commodity prices cannot be considered defeated. It has been argued that the lack of a floating exchange rate regime distorts prices, creating a welfare cost (ARB24). The lack of a comprehensive monetary policy framework to regulate the exchange rate signs of Dutch disease represents a major obstacle in overcoming this phenomenon in the Azerbaijan economy.

7. Conclusion and Limitations

This study aimed to outline the main symptoms of Dutch disease in the context of Azerbaijan since independence based on the original theory modelled by Corden and Neary (1982) and Corden (1984). The main intention was to answer the following research question via the statistical analysis of the collected annual data from various sources like SSCRA, the SOFAZ, the WB and etc.: did the economy of Azerbaijan experience the main signs of Dutch disease, such as REER appreciation alongside the appreciation of real wages, increased role of services and industrial slowdown between 1991 – 1998?

The main findings indicate the fact that there is a high dependency on mineral exports meaning the economy of Azerbaijan has high growth rates during favorable commodity prices, but decreased macroeconomic performance after a super cycle ends. The oil boom period brought huge amounts of foreign currency into the economy, appreciating the local currency, decreasing the competitiveness of the manufacturing sector, and increasing the tertiary sectors resulting from government expenditure, all of which point to the first sign of Dutch disease. The second sign of the model is also apparent in Azerbaijan, because real wages appreciated in mining, while the performance of manufacturing as a lagging sector suffered. Even if in year on year terms, employment in the manufacturing and agriculture sectors did not fall, in cumulative terms, the worst performer was the manufacturing sector, while services have increased their role (the third sign). This is mainly due to increased and unregulated government expenditure from transfers from the SOFAZ. The last sign

that was clarified by this study is decreased and unrecovered non-oil production. Interestingly, despite having had a moderately an upward trend in the overall industry (in year on year terms), the non-oil sectors have not caught up with pre-2000 indicators in terms of industrial products.

However, several potential limitations of this study should be mentioned too. Generally, Dutch disease studies provide more insightful knowledge when a model approach is adopted to describe the crucial casualty between explanatory variables and dependent variables. Excessive reliance on the descriptive analysis narrows down the precise diagnosis of Dutch disease in Azerbaijan but still using cumulative growth rates and contrasting year on year term indicators in this research allowed to have a comparative perspective in line with the main trends of the economy. Some time-series tools like VAR (Vector Autoregression), SVAR (Structural Autoregression), or VECM (Vector Error Correction) models might be insightful to test the long-term casual relationship among the variables of interest. Then, further studies of Dutch disease symptoms in Azerbaijan should address the subsectoral scope of the phenomenon regarded agriculture and manufacturing to outline the consequences at the individual level. Aggregated sectoral data might be biased because a decrease in one manufacturing sector may be crowded out by an increase from other subsector and vice versa. At the same time, it is very important to separate the transition effect, political reasons and global financial crises, otherwise, it is difficult to clarify Dutch disease effects from other macroeconomic trends.

Policymakers and decision-makers should acknowledge the presence of Dutch disease creating the necessary incentives to construct proper measurement tools to measure it in a better way. The data and the statistical analysis show that the economy of Azerbaijan sounds with the original model exhibiting several overlapping symptoms of the phenomenon. However, further research should employ such indicators as return on capital in different sectors of the economy and unit labor costs in specific sectors in Azerbaijan which currently are not comprehensively provided by officials. Upcoming Dutch disease research should also incorporate institutional aspects, as well as human capital and political economy challenges to have more complete picture of the syndrome.

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