

Economic Growth of the Republic of Armenia versus Caucasus region during the Period 2017–2019: A Case Study

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Abstract: The economic development of the Transcaucasian countries of Armenia, Georgia, and Azerbaijan has been determined by a multitude of regional as well as international factors since their independence from the USSR in the early 1990s. Historically, Georgia and Azerbaijan constantly outperformed Armenia in terms of annual nominal GDP growth. This study concentrates on the period 2017–2019 when the reverse process was registered. Nahapetyan (2020) correlated this phenomenon of increased relative growth in Armenia with the Velvet Revolution that took place in 2018, resulting in the displacement of the former government notorious for their levels of corruption. I use data from the World Bank Open Data website and the Statistical Yearbooks of respective countries to conduct a difference-in-differences regression analysis on the change between 2017–2019 and 2010–2016 average growth rates of these countries. Sectoral-level data is utilized to conduct a similar difference-in-differences comparison to reinforce the conclusions reached from examining overall changes in average GDP growth rates between the countries. Contrary to the conclusions reached in previous studies, the higher-than-usual economic growth rates of Armenia in 2017–2019 are largely attributable to the combination of the economic recovery of Russia from its economic crisis in 2014–2017 and the high energy dependence of Armenia on Russia. My findings indicate a clear relationship between the growth rates of the Russian and Armenian economies in 2017–2019 and the one immediately preceding it, which coincided with the Russian Economic Crisis of 2014–2017.

1. Introduction

Economic growth has been obvious and inevitable in the Southern Caucasus region after the dissolution of the Union of Soviet Socialist Republics (USSR). Armenia, one of the three republics of Southern Caucasus, has had such an astonishing economic growth since the declaration of its independence that it has been called “The Caucasian Tiger” (Mitra 2007). Yet even though Armenia was able to overcome the economic misery that dominated the country after the dissolution of the USSR and has achieved moderate economic conditions thus far, it has still lagged behind its neighbors in terms of annual gross domestic product (GDP) growth for much of its existence (International Monetary Fund n.d.). Figure 1 indicates that Armenia is still the smallest economy in the region despite its “Tiger” status (Mitra 2007).

Except for World Bank and International Money Fund (IMF) analyses and a few publications by local economists such as Khan (2011), Kalyoncu, Gürsoy, & Göcen (2013), and Nahapetyan (2020), few studies have been conducted on the economic development of the Transcaucasian region, especially during the past three years. This is unfortunate, as the region is one of the political hotspots of the post-Soviet era, and its economic and geopolitical conditions change yearly. Additionally, the region’s countries have some of the highest annual GDP growth rates among the post-Soviet countries; as an example, Armenia’s GDP growth rate of 7.6% in 2019 was the highest

among all the ex-Soviet states (World Bank n.d.).

This paper’s contribution to the existing literature is to provide a holistic exploration of an economic phenomenon that occurred in the Transcaucasian region in 2017–2019. The Republic of Armenia in this period demonstrated a GDP growth rate that was higher than that of the other two republics in the region—Georgia and Azerbaijan, as demonstrated in Figure 2. Given that this phenomenon covered three consecutive years, it can be said that Armenia performed better in economic terms than its neighbors for an extended period. Such a phenomenon has happened only once before in 2002–2004, when Armenia had exceptionally high growth rates which averaged 13.1% per year (International Monetary Fund n.d.).

Given that Armenia is a landlocked country involved in an ongoing military conflict, it has few natural resources compared to its neighbors and has closed borders from the East and the West. Due to geopolitical circumstances that limit its access to the European Union (EU) markets and oil from the Caspian region (Mitra 2007), it is praiseworthy that the economy was able to perform better than its neighbors. This phenomenon may be explained by an above-average economic performance of Armenia or by a worse-than-usual economic performance of its neighbors, or a combination of both during 2017–2019. The purpose of this paper is to explore the reasons behind this phenomenon and discover the extent to which this occurrence was due to Armenia’s economic merit. If the

phenomenon stems from good economic policies enacted in Armenia, this paper will help identify them and take them as a reference for maintaining sustainable economic growth for the country in the future.

The second section of this paper discusses the sources of data collection and methods used for data analysis as well as the thesis statement of this paper. The third section provides general background information about the region and its economy. The fourth section is the main part of this paper and focuses on the comparative analysis of the economies of the three Caucasian countries, paying attention to 2017–2019. The comparison is first made on a broader and then on a sectoral level. The fifth section summarizes results obtained in the fourth section and connects those results to reach a conclusion about the economic development of the region in 2017–2019. The sixth and final section identifies areas that require further investigation.

2. Data sources, methods of analysis, and the hypothesis

Data were mostly garnered from the World Bank Open Data Website and the IMF Datamapper Website. However, data on these websites were not complete for the purposes of this paper, as they did not include data on all the sectoral levels. For more detailed information, I turned to the Statistical Committee of the Republic of Armenia website, the National Statistics Office of

Georgia website, and the State Statistical Committee of the Republic of Azerbaijan website. I used the annual yearbooks published by these agencies as a resource for data collection. In cases where data was in local currency units (LCU), the annual exchange rates were used to convert data into current United States Dollars (USD). The exchange rates were obtained from the World Bank Open Data website.

2.1 The thesis

My analysis has shown that the main reason for Armenia’s high economic growth rates compared to its neighbors in 2017–2019 was the Russian Federation’s recovery after its economic recession in 2015–2016 caused by the broader Russian Financial Crisis in 2014–2017¹, which will be referred to as “the policy change” throughout the paper. Other events also contributed to the strong growth rates of Armenia in this period, including the Armenian Velvet Revolution of 2018 and the large inflow of direct investments from the UK Bailiwick of Jersey². However, the focus of this paper is the Russian influence on the Armenian economy that led it to have higher average growth rates than those of Georgia and Azerbaijan in 2017–2019.

2.2 Methods of analysis

A basic difference-in-differences (DID) regression model was used to examine the average GDP growth rates of these countries in 2010–2016 and 2017–2019. The generic

¹ The modern Armenian economy is closely connected to that of Russia. Economic trends in Russia thus strongly influence the growth path of the Armenian economy.

² An offshore company called Lydian International registered in Jersey is mainly responsible for the large inflow of investments from this destination.

model can be summarized with the following equation:

$$y = \beta_0 + \beta_1 dB + \delta_0 d2 + \delta_1 d2 \cdot dB + u,$$

where y represents the annual growth rate, $d2$ is a time dummy variable that takes on the value of one if the observation year is 2017–2019 and zero otherwise, and dB is a country dummy variable and equals to one if the country of observation is in the treatment group and zero otherwise. The coefficient of interest δ_1 is the difference-in-differences estimate (Ashenfelter and Card 1985).

The analysis of overall GDP growth rates had to be broadened to include other ex-Soviet states in the control and treatment groups as data from three countries were not enough to conduct a basic DID regression analysis. The “policy change” is theorized to have been the Russian economic recovery after the Financial Crisis in 2014–2017. Hence, the control group for this analysis will include countries that are least dependent on Russian energy imports alongside Georgia and Azerbaijan, and the treatment group will include countries with the highest dependence on Russian oil and/or natural gas alongside Armenia.

Data on the sectoral level will be analyzed visually with graphs as well as in terms of differences between period averages. Graphs will highlight the period under the investigation in a grey color. A difference-in-differences estimate will be calculated and analyzed at the sectoral level

for each sector and some subsectors.

However, regression analysis will not be involved at this level due to the scarcity of data³. Analyzing sectoral growth rates in the DID model enables us to understand whether the change between Armenia’s average growth rates between 2010–2016 and 2017–2019 was significant compared to that of its neighbors.

2.3 GDP calculations and breakdown

Gross Domestic Product (GDP) is defined by the World Bank as “the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products” (World Bank n.d.). Country GDP values give a general picture of the magnitude of production in a country, and its growth rates can be interpreted as how much production increased or decreased during a given amount of time. This paper will extensively compare average GDP growth rates across predefined periods of time with the economic growth of Armenia, Azerbaijan and Georgia during the given period. The overall GDP will be further dissected into sectors. Looking at both the demand and supply, the growth rates of those sectors will also be compared for the three countries. On the demand side, the GDP is calculated by using

$$GDP = C + G + I + NX,$$

where C is the level of private consumption, G is the level of government spending, I is the level of investment, and NX represents the

examination, and data from three countries and ten years is not enough to conduct a DID regression analysis.

³ The sectoral level investigation demands comparison specifically between Armenia, Georgia, and Azerbaijan. Thus, other ex-Soviet countries cannot be included in this

net exports or the difference between exports and imports. Thus, a growth in any of these will result in growth in GDP values. On the supply side, the GDP may be decomposed into sectors of production and can be calculated by using

$$GDP = S + I + A,$$

where S represents the services produced, I represents the industry value, and A represents the value of agricultural goods produced. Growth in any of these could result in a growth in GDP values. As these three sectors are very broad, they may further be divided into subsectors. The paper will be examining the change in average growth rates of these sectors between Armenia, Georgia and Azerbaijan using DID methods in order to reach conclusions about differences in their economic development during 2017–2019.

3. Overview of the region

The region of Southern Caucasus comprises three republics: Armenia, Georgia and Azerbaijan, and they are very ethnically diverse. All three republics were a part of the Soviet Union and gained independence only recently in the early 1990s. Despite the diversity of ethnic groups living in this small region, there have been various attempts to unite Transcaucasia into a single political and economic entity. One of these early examples was the Transcaucasian Democratic Federative Republic, which was created on April 22, 1918, and survived until May 28 of the same year, a little more than a month before Georgia declared its independence, followed by Armenia and Azerbaijan (Hovhannisian 2012). Another example is the

Transcaucasian Socialist Federative Soviet Republic (TSFR), which was comprised of modern Armenia, Georgia, and Azerbaijan. They were united into a single entity by the Soviet invasion of the region in 1922. The TSFSR broke apart in 1936 with the adoption of the new Soviet Constitution (Hovhannisian 2012). After the dissolution of the USSR, these peoples established their own republics in the region, claiming their independence from the Soviet Union. Since that time, the evolution of their economies has been precarious. Various transitions in these countries connected to the changing geopolitical and economic environment—from government-owned planned economies to free-market economies and capitalism, and from public to private property, these new nations have been a kind of “natural experiment.”

4. Data analysis using graphical and DID methods

Table 1 represents the annual and average growth rates of the GDP values of the three Caucasian countries in 2010–2019.

According to Table 1, the Georgian economy performed the best in the last decade with an average growth rate of 4.9%. It was followed closely by Armenia, with an average growth of 4.5%. The economic growth of Azerbaijan was the lowest in the last decade, having demonstrated an average growth of only 1.6% throughout 2010–2019. However, the goal of this paper is to zoom in closely at the period 2017–2019 and try to understand the differing growth rates of the countries in this period.

For this purpose, the decade has been divided into two time intervals, 2010–2016 and 2017–2019, following the basic difference-in-differences regression model, and the countries have been divided into two groups, “control” and “treatment.” It has been assumed that the “policy change” in Armenia has led to this country having higher growth rates than any of its neighbors in 2017–2019. Thus, the treatment group includes Armenia, whereas the other two countries, Georgia and Azerbaijan, have been placed in the control group. However, data for three countries across ten years are not enough to conduct a DID regression analysis. Therefore, I have extended the control and treatment groups to include the countries in Table 2.

4.1 Explanation of the grouping method

The rationale behind the grouping is the following: the paper assumes that the “policy change” was the combination of Armenia’s strong economic dependence on Russia’s economy and the latter’s economic recovery in 2017–2019 that led to Armenia having stronger growth rates than any of its neighbors in this period. Thus, countries that are similarly dependent on Russia will demonstrate similar macroeconomic behavior, while those that are more independent from Russian influences will behave more like Georgia and Azerbaijan. The dependence on Russian energy exports has been selected as the criterion for determining the degree of dependence on the Russian economy. The rationale behind this

selection is the abundance of literature (Stern 2000; Odhiambo 2009; Mohammadi & Modhurima 2015; Esen & Bayrak 2017) attesting to the connection between energy consumption and growth rates. Perhaps the most applicable study to this paper is the work of Mohammadi & Modhurima (2015), which argues there is a “bidirectional short-run causality in output–energy relation,” which means that the short term energy consumption affects growth rates and vice versa⁴.

The countries in the control group are either major exporters of oil or are relatively independent of Russian energy exports. Azerbaijan has its own oil sources in the Caspian Seabed and is a major regional exporter of oil. In 2018, Crude Petroleum, Petroleum Gas and Refined Petroleum accounted for 90.97% of Azerbaijani exports (The Observatory of Economic Complexity n.d.). Azerbaijan’s energy imports are thus negligible due to the abundance of hydrocarbon resources in this country (The Observatory of Economic Complexity n.d.). Central Asian countries, like Kazakhstan, Uzbekistan and Turkmenistan, similarly have considerable oil sources and are energy independent. Kazakhstan’s crude petroleum exports comprised some 59.8% of the exports of the country in 2018, whereas Uzbekistan’s petroleum gas exports comprised 23.3% of overall exports of the country in this year (The Observatory of Economic Complexity n.d.). Turkmenistan’s case is even more extreme; the country’s

⁴ One caveat here is that another measure of economic dependence could be the volume of trade with Russia. Some of these countries, like Kazakhstan, are relatively independent of Russia in terms of energy and thus have

been included in the control group; however their trade volume with Russia is high. Further research should take trade volume as a measure of economic dependence and conduct DID analysis within such a framework.

petroleum gas exports comprised 79.3% of the total exports of the country in 2018 (The Observatory of Economic Complexity n.d.). Due to their large fossil fuel reserves, these countries import insignificant amounts of gas and oil compared to their exports. Georgia's energy dependence on Russia is limited because it has a balanced import schedule. According to the Observatory of the Economic Complexity website, Refined Petroleum imports, standing at \$869M, constituted 9.48% of the overall import subsector in Georgia and were balanced between Romania (21.6%), Russia (20.7%), Turkmenistan (17.4%), Azerbaijan (11.5%), Bulgaria (10.7%) and Greece (10.6%). In addition, Georgia imported \$385M worth of petroleum gas, 93.3% of which came from Azerbaijan (The Observatory of Economic Complexity n.d.). Finally, while Moldova's energy schedule is not as balanced as that of Georgia, it is not dependent on Russian energy imports to a high degree. This country imported \$467M worth of Refined Petroleum from Romania in 2018, compared to just \$93.8M from Russia.

All the countries in the treatment group were heavily dependent on Russian energy imports. Kyrgyzstan imported \$834M Refined Petroleum in 2018, \$693M of which came from Russia (The Observatory of Economic Complexity n.d.). Tajikistan, another ex-Soviet Central Asian country, imported roughly \$199.8M of refined petroleum from Russia in 2018, compared to \$161M of Petroleum Gas from Kazakhstan and Uzbekistan (The Observatory of Economic Complexity n.d.). Belarus lacks its own energy resources and thus reprocesses and refines energy imports mainly from

Russia for domestic consumption as well as reexports. According to the Jamestown Foundation, "Belarus is one of the few countries that lacks oil and natural gas but whose economy revolves around them." (Mammadov 2020). According to this source, "the Moscow-owned pipelines that send Russian oil and gas to and through Belarus have long enabled Russia to be essentially the sole supplier of its neighbor's energy." Consulting the databases of the Observatory of Economic Complexity revealed that Belarus's crude petroleum (\$6.77B) and petroleum gas (\$2.74B) imports comprised 29.5% of Belarus' overall imports and together represented the highest import subsector: virtually 100% of these energy imports came from Russia (The Observatory of Economic Complexity n.d.). Latvia, Lithuania and Estonia, the only ex-Soviet countries to have successfully integrated into the EU, are still heavily dependent on Russian energy imports. Lithuania's crude petroleum imports, standing at 10.5%, were the largest import subsector of the country (The Observatory of Economic Complexity n.d.). Exactly 53.9% of these crude petroleum imports, a value of \$2.25B, came directly from the Russian Federation (The Observatory of Economic Complexity n.d.). Latvia's refined petroleum imports, standing at 12.8% of the overall import sector, were the largest import subsector (The Observatory of Economic Complexity n.d.). About 62% of these refined petroleum imports, or a total value of \$1.75B, came from Russia, while an additional 21.1%, or \$596M,

came from Lithuania⁵ (The Observatory of Economic Complexity n.d.). Estonia imported \$1.82B of Refined Petroleum in 2018 This was the largest subsector of the Estonian imports, standing at 8.69%. Of these refined petroleum imports, 49.2%, or a total value of \$898M, came from the Russian Federation, while another 27.4%, or \$500M came from Lithuania⁶ (The Observatory of Economic Complexity n.d.). Ukraine imported 85.6% of its refined petroleum⁷ from Belarus, Russia and Lithuania, \$2.09B from Belarus, \$2.03B from Russia and \$568M from Lithuania. Given that Belarus itself obtains almost all of its hydrocarbon energy sources from the Russian Federation and that Lithuania's energy dependence on Russia is also significant, we can assert that Russia's energy presence in Ukraine was far more than the \$2.03B that was directly imported from Russia. Lastly, Armenia's case is perhaps as dramatic as that of Belarus. The country imported \$340M of petroleum gas and \$227M of refined petroleum in 2018, 77.7% and 72.4% of which, respectively, came from the Russian Federation (The Observatory of Economic Complexity n.d.). In conclusion, countries in the treatment group had a significant dependence on Russian energy imports, whereas those in the control group had moderate dependence thereon or no dependence at all.

The selection of the ex-Soviet countries is also intentional. Almost a century

of Soviet regime, a collective economy, and a shared culture have drastically divided the world into two "blocks," the West and the East. This is true to a lesser degree about Latvia, Lithuania, and Estonia, which joined a Union eighteen years after its formation. Eastern countries share economic and cultural values and are a better fit for the *ceteris paribus*⁸ assumption than Armenia and France for example. France has had sovereignty for centuries and has developed its own culture towards the economy and public institutions, whereas ex-Soviet countries have been directly influenced by Russian values for almost a century These influences will be visible for generations to come. Although some may argue that the Baltic states share little with the East and are now a part of the West, this argument is overly simplistic. One cannot deny the influence of the Soviet regime that dominated these countries for more than fifty years. For example, according to Sineviciene & Krusinskas (2018), "there is a high correlation between the gross investment rate of non-financial corporations in Baltic states and Russia's GDP growth" and "as a powerful neighbor, Russia may exert political influence over the Baltic states through economic retaliation." In the context of testing for the effects of the Russian crisis and subsequent recovery on the economies of Armenia, Georgia and Azerbaijan, the

⁵ As we already saw, Lithuania itself was heavily dependent on Russian energy imports.

⁶ As already mentioned, Lithuania's energy dependence on Russia has been demonstrated earlier.

⁷ This sector was the largest import sector of Ukraine, standing at 8.87% of all imports in 2018.

⁸ *Ceteris paribus* – translated from Latin literally means "with other conditions remaining the same". Without this assumption, determining causality would be very difficult.

ceteris paribus assumption is highly likely to hold for the rest of the ex-Soviet countries.

Conducting a basic difference-in-differences regression analysis between these control and treatment groups produces the results in Table 3.

This difference-in-differences regression model shows that, at the 5% significance level, there was a significant difference in changes between GDP growth rates in 2010–2016 and 2017–2019 for the treatment and control groups. This provides evidence for the hypothesis that the GDP growth rates in 2017–2019 of ex-Soviet countries which had significant dependence on Russian energy⁹ were unusually higher than those in 2010–2016 of ex-Soviet countries with moderate dependence or no dependence at all on Russian energy¹⁰.

Table 4 demonstrates DID values of 3.2 for Armenia and Georgia and 3.7 for Armenia and Azerbaijan. Both DID values are positive and large compared to the change in the average GDP growth rate of Armenia between 2010–2016 and 2017–2019 of 3.3 percentage points¹¹. This is an indicator that Armenia's growth rate changed noticeably between the two periods as compared to the almost negligible change for the other two countries, which implies that the "policy change" affected the GDP growth rates of Armenia in 2017–2019.

Comparing the economic performance of these three countries in 2017–2019 to the

entire last decade can also provide helpful results.

Table 5 supports the results of the DID analysis. It shows the Georgian economy had stable growth throughout the decade, and its average growth in 2017–2019 was identical to the decade average to one decimal place. It did not demonstrate an above-average economic growth during 2017–2019 compared to its average in the past decade. Azerbaijan's economic growth in 2017–2019 was also very similar to its average growth rate in the past decade, being only approximately 0.3 percentage points below that in 2010–2019. This implies Azerbaijan also maintained its stable growth throughout the decade and demonstrated average economic performance in 2017–2019. However, Armenia saw an increase of 2.3 percentage points of its average growth rate in 2017–2019 compared to the decade average, which is a considerable change compared to the near-nonexistent change in 2017–2019 average growth rates for its neighbors.

Summarizing the analysis conducted in this section, it is evident that Georgia and Azerbaijan stayed close to their past average growth rates in 2017–2019, whereas Armenia performed significantly higher than the average during this period. Thus, I conclude the reason that Armenia's growth rate surpassed that of its neighbors for three consecutive years in 2017–2019 can be explained by the strong economic performance of Armenia itself and not by the

⁹ Armenia belongs to this category.

¹⁰ Azerbaijan and Georgia belong to this category.

¹¹ Both DID values are close to 100% of the change in the average GDP growth rate of Armenia between 2010–2016 and 2017–2019 of 3.3 percentage points.

underperformance of its neighbors during this period. This indicates that the “policy change” greatly affected the economy of Armenia but left those of Georgia and Azerbaijan intact. This paper argues that the “policy change,” as described in the introduction, was the economic recovery of the Russian Federation after its economic crisis in 2015–2016 and the underlying dependence of the Armenian economy on Russian economic trends.

In the next subsection, the emphasis will be on dissecting the economies of these countries at the sectoral level and examining each sector separately. The growth of these sectors will be put in the socioeconomic and political context of the period 2017–2019, which will give a better understanding of the relationship among the economies of these Transcaucasian countries.

4.2 Analysis on the demand side

In this section, I begin the analysis by breaking up the GDP of Armenia in 2010–2019 demand-wise and examining the following sectors and sub-sectors: private consumption, government spending, gross capital formation, exports, imports, and net exports. Data on all of which were collected from the World Bank Open Data website. The growth rates of these sectors and sub-sectors of the economy will be compared to those of the corresponding sectors and sub-sectors of Georgia and Azerbaijan.

Private consumption in Armenia is depicted in Figure 3. This indicator was obtained by subtracting the General Government Final Consumption Expenditure data from the Final Consumption

Expenditure data provided by the World Bank Open Data Website.

The average growth rate of private consumption in 2010–2016 in Armenia was approximately 2.0%, whereas, in 2017–2019, this number was more than six times higher, amounting to 12.3%. Overall, the ratio of private consumption to the GDP has ranged between 77% and 88% in the last decade. Thus, private consumption is the main sector on the demand side of the Armenian GDP, and strong growth in this sector would consequently have a strong impact on the overall Armenian GDP growth. Indeed, as it can be seen from the analysis of the private consumption sector, the growth of this sector was significantly higher in the past three years compared to the past decade. Therefore, it can be deduced that the growth in this sector has had a big impact on the above-average economic performance of the country in 2017–2019. Another important fact is that private consumption declined sharply by more than 17% in 2015 before returning to its average growth rates in 2016 and rising beyond the average in 2017–2019.

According to the Economy section of the Overview webpage of the The World Bank in Armenia (n.d.), which confirms the results obtained above, this increase in private consumption “was fueled by year-on-year increases in real wages and consumer loans of 4.4 and 35 percent, respectively.” More research is needed to see how the banking sector and the labor market performed during this period. Overall, the consumption sector had a huge contribution to Armenia’s sound economic growth in 2017–2019.

Table 6 represents a DID analysis between the private consumption sectors of Armenia, Azerbaijan and Georgia. The DID values of 6.9 and 7.1 percentage points for Armenia and Azerbaijan and Armenia and Georgia show that the change in growth rates of the private consumption sector between periods 2010–2016 and 2017–2019 was significantly larger for Armenia compared to its neighbors. These DID values were 66% and 68%, respectively, and the change in average growth rates of the Armenian economy between 2010–2016 and 2017–2019, which are both large. This shows that the “policy change” in Armenia significantly affected the private consumption sector of Armenia in 2017–2019, which in turn boosted the GDP growth as this sector occupies a significant share of the economy.

The next sector that will be discussed is General Government Expenditure. The annual values and growth rates of this sector of the Armenian economy are represented in Figure 4.

The average growth rate of government spending in 2010–2016 was 4.4%, whereas in 2017–2019 it was 6.7%. It appears that this increase is mainly due to a government spending increase in 2019 of 1.71 billion USD, which was the highest annual level of government spending in the past decade. The share of government spending in the overall GDP of the country has oscillated between 10.9% and 13.4%. Overall, the small proportion in GDP and humble growth rates of government

spending compared to household consumption implies that this sector did not have a significant impact on the higher-than-usual economic growth of Armenia during 2017–2019. However, in 2015, the growth rate of the government spending became negative before bouncing back to a positive value in 2016 and then continuing to stay positive throughout 2017–2019.

Table 7 represents a DID analysis between the government spending sectors of Armenia, Azerbaijan, and Georgia. The DID value for Armenia and Azerbaijan is small because the change in the average growth rates between 2017–2019 and 2010–2016 for the Armenian government spending was very close to that of Azerbaijan. On the other hand, the DID value of 5.5 percentage points for Armenia and Georgia was very high¹² because the change in average growth rates between 2017–2019 and 2010–2016 for Georgia’s government spending sector was negative. The relationship between Armenia’s average growth change and that of each of the members of the control group was not uniform; the DID value was insignificant for one member of the control group (Azerbaijan). Thus, the DID analysis is inconclusive at the sectoral level, and one can infer that the “policy change” did not affect government spending in 2017–2019. This is logical, as external influences usually do not tend to alter the level of government spending; rather, the other sectors of the demand side of the economy, which are

¹² The difference between changes of average GDP growth rates between 2017–2019 and 2010–2016 for Armenia and Georgia was almost 240% of the change in

the average GDP growth rates of Armenia between 2017–2019 and 2010–2016.

related to household preferences, are affected by significantly greater amounts.

The third sector in the examination of the demand side of the Armenian economy is the gross capital formation. This was formerly known as gross domestic investment in World Bank databases and, according to World Bank definition, includes “outlays on additions to the fixed assets of the economy plus net changes in the level of inventories” (World Bank n.d.). The values and growth rates of this sector throughout the last decade are represented in Figure 5.

The average growth rate of the sector was -8.4% in 2010–2016 and 9.3% in 2017–2019. Although 2019 saw a negative growth rate in gross capital formation, the average growth rate of 9.3% in 2017–2019 is nevertheless much higher than the average of -8.4% in 2010–2016. The share of this sector in the GDP accounts has varied tremendously in the past decade. The highest share was recorded in 2010, when gross capital formation accounted for 38.8% of the Armenian GDP. In contrast, this sector had the lowest share of GDP in 2019, when it stood at 17.4%. Additionally, a general trend that was seen in the sectors examined previously can be noticed here as well; the growth rates started to decline in 2015 and continued to do so in 2016, subsequently showing signs of recovery in 2017 and beyond.

Table 8 compares the gross capital formation sector of the economy of Armenia with that of its neighbors using DID values.

The DID analysis indicates a difference in the change in average rates of capital

formation between these countries. The DID value for Azerbaijan is 132% of the change in average rates of capital formation for Armenia; the DID value for Georgia is 204% of the change in average rates of capital formation for Armenia. Therefore, the conclusion is that the “policy change” affected the gross capital formation sector of Armenia in 2017–2019, resulting in higher-than-average growth rates during this period. The fact that this sector is the second largest in the GDP accounts after private consumption implies that these above-average growth rates would positively contribute to the overall GDP growth rates of Armenia in 2017–2019.

Finally, the exports, imports, and net exports sectors will be examined using graphical and DID approaches. Overall, one important fact to notice is that the net exports of the Republic of Armenia since its independence have always been negative (World Bank Open Data Website n.d.), which means it has been running a trade deficit throughout the past decade. However, changes in net export levels can be indicative of some phenomena. As an example, if the net exports became less and less negative throughout the decade, this would mean a positive trend towards eliminating the trade deficit that the country has been running since its formation. However, before examining the net exports of the country, I will examine exports and imports separately. The annual values of these sectors, as well as their growth rates throughout the past decade are shown in Figures 6 and 7.

The average value of exports in 2017–2019 was 65% higher when compared to the

average value in 2010–2016. However, this increase in exports was accompanied by a 35% increase in average import levels between 2010–2016 and 2017–2019. This dynamic movement negates the overall effect on GDP values to almost none. An interesting phenomenon that can be observed here is that, as in all the sectors discussed above, it appears that stagnation occurred in 2015. Figure 7 shows that both exports and imports had their lowest growth rates in 2015, the latter demonstrating a negative growth rate of more than 20%. In fact, 2015 was the only year in the entire decade when the growth rates of both exports and imports turned negative.

Tables 9 and 10 represent the DID analyses between the import and export sectors of Armenia and Georgia, and Azerbaijan.

The DID values for both Armenia & Azerbaijan and Armenia, and Georgia were significant, standing at 19.7 and 12.1 and representing 143% and 88% of the change in the average growth rates of the imports sector of Armenia between 2010–2016 and 2017–2019 respectively. Thus, the “policy change” had an impact on the imports sector of Armenia and boosted its growth rates to above-average levels.

Table 10 represents the DID analysis for the exports sector. The picture is reversed here. Negative values of DID for Armenia and Azerbaijan and Armenia and Georgia indicate that the growth rates of the exports sectors of Azerbaijan and Georgia increased by more

than those of Armenia. In fact, the average growth rate of the sector for Armenia decreased from 2010–2016 to 2017–2019. Thus, the “policy change” had a reversed or negative impact on the growth rates of the export sector of the Armenian economy.

To better understand why this happened, it would be helpful to further investigate the export and import sectors. This requires dissecting the exports and imports of Armenia by country and putting the data in the framework of international economic and geopolitical phenomena in the period discussed. Overall, the largest export partner of Armenia in the past decade was the Russian Federation. On average, the exports to Russia constituted 10.4% of total exports in 2010–2018¹³. Other major export partners included Bulgaria, Germany, Georgia, China and Switzerland. Their average share of Armenian exports in 2010–2018 were, respectively, 5.0%, 4.4%, 2.9%, 2.7% and 2.5% (Statistical Yearbook of Armenia 2019). The largest exports subsectors in 2019 included:

1. Copper Ore - 24.3%, most of which was exported to Bulgaria, Switzerland, and Serbia.
2. Gold – 12.1%, almost all of which was exported to Switzerland.
3. Rolled Tobacco – 9.3%, most of which was exported to Iraq and Syria.
4. Ferroalloys – 6.9%, almost all of which was exported to Netherlands and Germany.

¹³ Trade data by country was available only until 2018 for Armenia.

5. Hard Liquor – 6.8%, most of which was exported to Russia

(The Observatory of Economic Complexity n.d.).

The Russian Federation also had a majority position in the imports sector of the Armenian economy. The average share of imports from Russia constituted 20.2% of the overall imports in 2010–2018. Other major import partners of Armenia included China, Germany, Turkey, Iran and Italy, with their average share of total imports in 2010–2018 being 8.3%, 4.7%, 4.1%, 4.0% and 3.1% respectively. The most imported products of Armenia included:

1. Petroleum gas – 7.1%, most of which was imported from Russia.
2. Refined petroleum – 4.7%, most of which was imported from Russia.
3. Diamonds – 3.7%, most of which came from UAE, Switzerland, and Belgium.
4. Cars – 3.6%, most of which came from Georgia and Germany

(The Observatory of Economic Complexity n.d.).

The gross value of exports and imports from each of the major trade partners would also be particularly helpful for this analysis. The data is represented in Figures 8 and 9.

One important fact that stands out from these graphs is that both imports and exports sharply decreased in 2015 from Armenia’s main trade partner, the Russian Federation. Exports to all other major trade partners decrease in 2015 as well, except for

Georgia and Switzerland, which are both not a part of the EU or the EAEU. Similarly, imports from all other major trade partners decreased in 2015 with the exception of the Islamic Republic of Iran, which is the only major import partner out of the six mentioned that is not in any way affiliated with either the EU or the EAEU. However, after this stagnation in 2015, both export and import volumes to and from the Russian Federation, Armenia’s main trade partner, started to increase. Also, throughout the decade, Russia has been more prevalent in imports than in the exports sector, which can be seen by comparing Figures 8 and 9. This explains why the DID analysis was reversed for the exports sector, and in this case imports would be more influenced by changes in the Russian economy compared to exports.

Having discussed exports and imports separately, it would be wise to also discuss the behavior of net exports in the economy of Armenia in 2010–2019. Figure 10 represents the overall net exports and growth rates thereof in Armenia in 2010–2019. To obtain the results, import values were subtracted from export values and represented graphically (World Bank Open Data Website). Important time periods for the paper are shaded in gray.

Figure 10 shows the value of net exports of Armenia peaked during 2016 and had its highest growth rate in 2015. This can be explained by the fact that both exports and imports in Armenia decreased in value, and imports decreased more than exports. China and Russia are both major importers of Armenia, and Figure 9 shows that the value

of both decreased by a significant amount, whereas on the export side, only the decrease in exports to Russia is significant and obvious. Also, Russia had a more prevalent role in imports than in the exports sector, and the drop in imports from Russia was more significant than the drop in exports in 2015.

Could net exports have had a significant impact on the GDP of Armenia and its above-average economic growth during 2017–2019? Table 11 represents DID analysis for the net exports sectors of the control and treatment groups.

This table confirms the results that were obtained in the DID analysis of exports and imports individually, which showed the “policy change” had caused the imports sector of Armenia to have higher growth rates in 2017–2019 compared to 2016–2019, and the exports sector to have below-average growth rates in 2017–2019 compared to 2010–2016.

The main results of this section were that above-average growth rates were registered for the private consumption and gross capital formation sectors of Armenia, which are the largest contributors to the GDP on the demand side. Such effects were not seen in the respective sectors of Georgia and Azerbaijan. Therefore, the “policy change” positively impacted these sectors of the Armenian economy and thus caused their growth rates to be higher than those of its neighbors. Given that these sectors represented high shares of the overall GDP, their above-average growth rates contributed to the above-average GDP growth rates of Armenia in 2017–2019.

4.3 Analysis of the supply side

Having analyzed the demand sides of the economies of Armenia, Azerbaijan, and Georgia in 2010–2019, I turn my attention to the analysis of the economies on the supply side. The analysis will start with the services sector as it has occupied the largest share in the economy of Armenia throughout the past decade. Figure 11 represents the annual values of the sector as well as its growth rates in the past decade in Armenia.

Some general facts that stand out from the graph are:

- The sector experienced a sharp decrease in value in 2015 and registered its lowest growth rate in that year
- A trend towards growth is obvious in 2016–2019
- The sector registered its highest value of the decade in 2019.

The average growth rate in 2010–2016 was 5.7%, whereas the average in 2017–2019 was 12.1%, indicating significantly better performance. Could the strong performance of this sector have contributed to strong GDP growth rates in 2017–2019? The average share of this sector in the Armenian economy ranged from a low 40.72% in 2010 to a high 54.23% in 2019. The share of this sector in GDP has steadily increased year by year in the past decade. Thus, it comes as no surprise that a strong performance in this sector could have directly brought about high economic growth rates of the overall Armenian economy observed in 2017–2019.

Table 12 represents a comparative DID analysis between the differences in average growth rates of the industry sector in

2010–2016 and 2017–2019. The DID value for Armenia and Azerbaijan was 2.9, or 45% of the change in average growth rates of the industry sector of Armenia between 2010–2016 and 2017–2019. The DID value for Armenia and Georgia is 116% of the change in average growth rates of the industry of Armenia between 2010–2016 and 2017–2019. Based on these percentage values, the DID value for Armenia and Azerbaijan is too small, but that for Armenia and Georgia is much higher and confirms our hypothesis of change for Armenia and Georgia.

To put the growth rates of the services sector in the geopolitical context of the period, it would also be helpful to dive deeper into this sector and examine its subsectors. Emphasis on the growth of the information and communication technologies (ICT) subsector has been a priority of both the old and the new Governments of Armenia. It would be interesting to find out whether this subsector was the main contributor to the growth of the services sector in 2017–2019.

The largest share of the services sector belonged to the wholesale and retail trade subsector. The average share of it in services throughout 2010–2018 amounted to 25%. Other major subsectors included the real estate activities, financial and insurance activities, public administration, healthcare, and ICT sectors, with average shares of 14.5%, 9.1%, 9.1%, 8.2% and 7.4%, respectively. The values of these sectors, as well as their growth rates, are demonstrated in Figures 12 and 13.

The first major conclusion is that all major sectors greatly contracted in 2015, especially the financial and insurance sector, as shown in Figure 13. The largest subsector, wholesale and retail trade, also underwent a sharp decline in value, going from an 8%

growth in 2014 to almost 8% contraction in 2015. The next largest subsector, real estate, went from a 7% growth in 2014 to a 6% contraction in 2015. After this sharp decline in almost every subsector in 2015, the growth rates jumped up again. In 2017–2018, the largest subsectors in the services sector—wholesale and retail trade, real estate, and financial and insurance activities—had positive average growth rates of 12%, 9% and 19.5%, respectively. Growth rates in the ICT subsector, meanwhile, which have recently been under the spotlight of the Government of Armenia, had only meager growth rates. The ICT subsector had the lowest share of the sector in 2017–2018. The conclusion is that the strong growth rate in the services sector in 2017–2019 was caused by strong growth rates in its three most dominant subsectors: wholesale and retail trades, real estate activities, and financial and insurance activities.

The next sector I will examine is the industry sector. The industry sector represents another major part of the Armenian GDP. Its average share in the GDP value over the last decade averaged to 26.9%. Therefore, growth patterns in this sector can greatly influence the growth of the overall GDP value. The annual values and growth rates of this sector in the last decade are represented in Figure 14.

The characteristic pattern observed in all the previous sectors discussed above is present here as well. The sector had a dramatic drop in value in 2015, then recovered to its original value in the subsequent 1–2 years and had stable growth rates in 2017–2019. The average growth rate of the sector in 2010–2016 was -0.3% compared to that of 7.2% in 2017–2019. Given that industry accounted for almost $\frac{1}{4}$ of the GDP of Armenia on average in 2017–

2019, this increase in growth rates could have significantly influenced the economic growth of Armenia relative to its neighbors in this period.

Table 13 represents a DID analysis of the change in average growth rates of the industry sector between 2010–2016 and 2017–2019 for the three countries. The DID value for Armenia and Azerbaijan was negative, indicating that a reverse effect was observed. The average growth rate of the industry sector of Azerbaijan grew by more than that of Armenia between 2010–2016 and 2017–2019. However, the DID value of 6.7 for Armenia and Georgia was significantly large and indicates that the increase in the growth rate of the Armenian industry was higher than that for the Georgian one¹⁴.

It would also be helpful to examine the subsectors of the Armenian industry sector, construction, mining and quarrying, and manufacturing. Figures 15 and 16 represent the values and growth rates of the construction, mining and quarrying, and manufacturing sectors, respectively.

In order to understand the relative importance of these sectors, one must look at the share of the industry sector that each of these subsectors occupies. Overall, Figure 15 shows that the relative importance of the manufacturing sector has increased in Armenia over the last decade. In 2010, the construction sector was the most prevalent sector in the industry, whereas in 2015, construction and manufacturing started to diverge, with manufacturing occupying an increasingly dominant role in industry since that year. The value of the construction subsector has gradually declined over the last decade, with an average growth rate of

almost -7% in 2010–2018, whereas the manufacturing sector has increased in value, with an average growth rate in the past decade of 8.5%. It is also important to note that the manufacturing sector had above-average growth rates in 2017–2019, with an average growth rate of almost 14% in that period compared to 7.0% in 2010–2016. The value of mining has remained at approximately the same level, although a trend towards growth can be noticed after 2017. Overall, we can see that the only significant growth among the subsectors of industry occurred in manufacturing, and as this subsector was the dominant one in industry (with an average share of 45% of industry in 2017–2019), we can correlate the above-average performance of the industry sector with the strong performance of the manufacturing subsector in this period.

The DID analysis for manufacturing in Armenia, Georgia and Azerbaijan is represented in Table 14. The DID values of 3.5 and 0.3 indicate that the manufacturing sector behaved roughly similarly in all countries. There was no significant difference between increases in average growth rates in 2010–2016 and 2017–2019. This means that the “policy change” did not cause the manufacturing subsector of the Armenian economy to perform better than those of its neighbors in 2017–2019.

Table 15 represents DID analysis for the change in average growth rates between 2010–2016 and 2017–2019 for the mining subsectors of the economies of Armenia, Georgia and Azerbaijan. The DID value of -44.6 implies that the increase in average growth rates of the mining sector between 2015–2016 and 2017–2018 of Azerbaijan was much higher than that of Armenia, which

¹⁴ However, it can be noted again that at the sectoral level the analysis is inconclusive.

implies that the argument of the paper cannot be extended to this subsector for Armenia and Azerbaijan. The DID value for Armenia and Georgia is large, indicating that the change in average growth rates between 2010–2016 and 2017–2019 was higher for Armenia than for Georgia.

The DID analysis for the construction subsector is represented in Table 16. DID values of 16.9 and 19.6 for Armenia and Azerbaijan and Armenia and Georgia, respectively, are substantial; this means that the “policy change” caused the average growth rate of this subsector in Armenia to be higher in 2017–2019 than in 2010–2016 compared to its neighbors.

The last sector to be examined in our discussion of the supply side is the agriculture, forestry, and fishing sector. Overall, the share of this sector in the GDP of Armenia has declined over the last decade. The growth rates and the values of this sector in the last decade are depicted in Figure 17.

The average growth rate of the sector in 2017–2019 was -1.7%, whereas that in 2010–2016 was 3.3%. It can be observed in Figure 17 that the value of the agriculture sector dropped significantly in 2015 and 2016. Although agriculture is the smallest sector in the Armenian economy, its average share in 2017–2019 was 13.6%, so it could still have an impact on the growth of the GDP.

Table 17 shows a DID analysis between the changes in average growth rates in 2010–2016 and 2017–2019. The DID figures for both Armenia and Azerbaijan and Armenia & Georgia are negative. Furthermore, average growth rates decreased in Armenia and Georgia and increased in Azerbaijan from 2010–2016 to 2017–2019. This lack of directionality between control and treatment groups

means that, at the sectoral level, the DID test is inconclusive.

The above-average growth rates of the Armenian economy were correlated to the strong growth rates of its two largest sectors: services and industry. The strong growth of the services sector in turn was determined by the high growth rates of the wholesale & retail trades, real estate activities, and financial & insurance activities subsectors. The DID values for the industry and services sectors for Armenia and Georgia confirmed that there was a substantial difference between average growth rates of these sectors in 2010–2016 and 2017–2019, although the same cannot be claimed for Armenia & Azerbaijan. The agricultural sector, on the other hand, contracted in Armenia during 2017–2019. These conclusions are supported by the World Bank in Armenia Country Overview website (World Bank n.d.).

4.4 Analysis of foreign direct investments

As a final analysis, I will measure the levels of foreign direct investment in Armenia and compare changes in average growth rates thereof with those of Azerbaijan and Georgia using DID analysis. The investments will further be broken down by investing countries for Armenia to place the phenomenon in the geopolitical context of the period. The general levels of FDI in Armenia throughout the last decade are depicted in Figure 18.

Figure 18 demonstrates that FDI levels were much higher in the starting years of the previous decade than those in 2017–2019. The average growth rate of FDI in 2010–2016 was -2.5%, compared to the much lower -7.8% growth rate in 2017–2019. These results imply that FDI growth was

weaker in 2017–2019 compared to previous periods and therefore cannot account for the above-average growth rates of the GDP of Armenia in 2017–2019. However, Figure 18 indicates that FDI values also had a sharp decline in 2015, as was the case in the other sectors already discussed. Therefore, it would be helpful to break down the FDI in Armenia further in terms of its largest investors and try to understand what the reason of this fall in FDI was.

The largest investor in Armenia is the Russian Federation. The average share of FDI of this country in 2010–2018 was more than 26% (Statistical Yearbook of Armenia 2019). Other major investors in the country included Switzerland, Cyprus, Germany, Argentina, France, and the United Kingdom, with average FDI shares of 8.0%, 7.5%, 5.6%, 5.4%, 5.1% and 5.1% respectively (Statistical Yearbook of Armenia 2019). Furthermore, the UK Bailiwick of Jersey started making investments in Armenia in 2017, and its average FDI in Armenia in 2017–2019 equaled more than 37% (Statistical Yearbook of Armenia 2019). These investments come from a single offshore firm called Lydian International registered in Jersey, a British Crown Dependency (Amulsar n.d.). Figure 19 graphically represents the five biggest investors in Armenia in 2017–2018 and the years immediately preceding this period.

An important fact to notice is that investments from Armenia's major investor in the last decade, Russia, sharply declined in 2016 to the point that there was a net outflow of investments from Armenia to Russia. The foreign investments from Russia to Armenia recuperated after 2016 and showed strong positive amounts in 2018. As we saw in the examination of the demand and the supply sides of the economy, there was a general pattern of underperformance,

or occurrence of low growth rates, in 2015–2016 and then subsequent recovery and strong economic performance in 2017–2019 for almost every economic indicator. This pattern of underperformance in 2016 and a subsequent recovery and strong growth rates in 2017–2018 in FDI from Russia thus resembles the general trend in other parts of the economy. Before looking back at the analysis done for the other parts of the economy, however, it would be helpful to first conduct a DID analysis for changes in average FDI growth rates between 2010–2016 and 2017–2019 for Armenia, Georgia, and Azerbaijan (Table 18).

The DID values of 34.0 and 17.8 for Armenia and Azerbaijan, and Armenia and Georgia respectively are extremely high compared to the absolute value of the change in average growth rates of FDI between 2010–2016 and 2017–2019 in Armenia, which is $|-5.3| = 5.3$. However, the average growth rates of FDI declined in 2017–2019 compared to 2010–2016 in Armenia. These two facts imply an interesting phenomenon. While the average growth rate of FDI in 2017–2019 was lower than that in 2010–2016 for each of the three countries, this drop was significantly lower for Armenia than for Azerbaijan and Georgia. There was an obvious difference between the decreases in average growth rates between 2010–2016 and 2017–2019 for Armenia and Azerbaijan & Georgia.

5. Summary and conclusion

At the overall level, the DID regression analysis showed substantial differences between changes in growth rates of the GDP in 2010–2016 and 2017–2019 of the treatment group, which consisted of Armenia, and the control group, which included Azerbaijan and Georgia. At the sectoral level, both the demand and supply sides of the

economies of these three countries were discussed. Six sectors of the demand side of the Armenian economy were examined: the values of private consumption, government spending, gross capital formation, exports, imports, and net exports. The growth rate of private consumption was lowest in 2015 and highest in 2017–2019 (Figure 3). There was a significant difference between the changes in average growth rates of the private consumption in 2010–2016 and 2017–2019 between Armenia and Azerbaijan, and Armenia and Georgia. The average growth rate increased more for Armenia than for its neighbors. The growth rate of gross capital formation in 2016 was the lowest since 2013 as opposed to the growth rates in 2017–2018, which were the highest during the decade. There was also a substantially significant difference between the changes in average growth rates of the gross capital formation sector in 2010–2016 and 2017–2019 between Armenia and Azerbaijan and Armenia and Georgia, and the increase in this sector’s average growth rate for Armenia between the two time periods was higher than that of its neighbors. Exports and imports both endured a sharp decline in 2015 and subsequently took on steadily increasing values, registering the highest average growth rates in 2017–2019. The sharp increase in the value of exports after this 2015 downturn was mainly determined by increased exports to the Russian Federation, Armenia’s main export partner, whereas strong growth in imports after 2015 was mainly determined by increasing amounts of imports to Russia and China after 2015, Armenia’s two major import partners during this period. For the net exports sector, the values of both exports and imports

declined in 2015. However, the value of imports declined by more than that of exports, pushing the value of net exports closer to zero. In 2017–2019, the value of imports increased more than that of exports, so that the value of net exports became more negative, returning to roughly the same amounts as before the 2015–2016 period of “stagnation”.

On the supply side of the economy, the three major sectors were discussed: services, industry, and agriculture. The services sector endured a sharp decline in value in 2015. However, the sector recovered thereafter and showed strong growth rates in 2017–2019 which were significantly higher than the average growth rate in 2010–2016. The growth rates of every major subsector of the services sector declined in 2015, and almost all of them underwent negative growth rates in that year. The drop in the value of the services sector was primarily determined by the sharp decline in the value of its largest subsector, wholesale and retail trade services. The value of the wholesale and retail trade subsector started to recover in 2017, attaining its “pre-recession” levels by 2018¹⁵. Almost every other major subsector, except ICT and public administration, saw high, positive growth rates in 2017–2018 as well. Furthermore, there was a considerably greater increase in average growth rates in this sector for Armenia than for Georgia in 2010–2016 and 2017–2019. The case with the industry sector was similar. The growth rates of the industry sector approached negative 8% in 2015, the lowest in the last decade, before showing signs of recovery in 2016 and demonstrating strong, positive growth rates in 2017–2019 which were significantly higher than the average in

¹⁵ I termed this decline in value in almost every sector and subsector of the Armenia economy in 2015 as a “recession”.

2010–2016. Moreover, there was a considerably greater increase in average growth rates in the industry sector for Armenia than for Georgia in 2010–2016 and 2017–2019. The subsectors of the industry sector, mining and manufacturing, saw highly negative growth rates in 2015, whereas the construction subsector registered one of its lowest growth rates of the decade in 2016 (Figure 13). Both mining and manufacturing subsectors recovered after this drop in their values. The manufacturing sector in particular burgeoned at significantly higher rates in 2017–2019 compared to the average rate in 2010–2016. The DID values for the construction subsector were high, implying that the “policy change” caused the difference between average growth rates in 2010–2016 and 2017–2019 to be higher for the construction sector of the Armenian economy as compared to those of its neighbors. The agriculture sector was an exception to the pattern. It had increasingly negative growth rates starting in 2013.

Now let us connect this pattern to the registered FDI values discussed previously. Russia plays a major part in the Armenian economy; for example, remittances from Armenians living in Russia constitute a major part of the Armenian GDP. According to the World Bank Open Data website, remittances from abroad accounted for 15.5% of the GDP of Armenia on average in the 2010–2019 period. Moreover, the number of Armenians living in Russia was estimated to be 1,130,491 in the 2010 Russian census, according to the website of the Russian Embassy to the United Kingdom (n.d.). The net migration rate of Armenia per 1,000 inhabitants was -5.50 according to the CIA World Factbook. With a total population of

2,957,731, the net number of annual emigrants from Armenia is close to 16,300. Since most of them immigrate to Russia because of familial ties and support there, it can be safely assumed that the number of Armenians in Russia has only increased since the 2010 Russian census. According to *The Moscow Times*, 80% of remittances sent home from Armenians working abroad come from Russia, which are in turn used “to fund a balance of payments deficit of 10% of GDP” (The Moscow Times 2015). Another indicator of the overwhelming Russian presence in the Armenian economy is the net stocks of Russian foreign total investment that have accumulated in Armenia. According to the Statistical Yearbook of Armenia in 2019 published by ARMSTAT, the net stocks of foreign investments by the end of year 2018 were approximately 14.8 billion USD, whereas those of Russia were 2.4 billion USD, or approximately 16.5% of the stocks¹⁶. According to Ashot Aramyan, an Armenian economic analyst, “our [Armenia’s] economy is tied to Russia. There are 1,200 Russian-owned enterprises in Armenia that control strategic sectors – energy, railroad, communications” (Ex-Soviet republics hit by Russian economic crisis 2014). Moreover, I demonstrated in section 4.2 that the Russian Federation was Armenia’s main trade partner. Exports to Russia accounted for 27.6% of overall Armenian exports in 2018, whereas imports to Russia accounted for 25.3% of the imports sector in 2018 (Statistical Yearbook of Armenia 2019). In addition to all of these, Armenia joined the Eurasian Economic Union on January 2, 2015, which made the dependence of the economy of Armenia on that of Russia even stronger. The importance of Russian energy imports on Armenia were demonstrated in

¹⁶ This was also the highest registered number for any individual country.

section 4 when discussing the grouping method for treatment and control groups. All of this is evidence that the Armenian economy has been strongly impacted by the Russian Federation.

Furthermore, Russia was going through difficult geopolitical and economic crises during 2015–2016, exactly when Armenia saw a decline in almost every aspect of the economy. The Russian financial crisis started in 2014 and lasted until 2017 (How the 2014 Economic Crisis Changed Russia's Economy 2018). Its first cause was the Russian-Ukrainian War. Russia invaded Crimea, a Ukrainian peninsula, on February 27, 2014, and subsequently the Western countries started imposing economic sanctions against Russia, which crippled its economy. For example, the US placed sanctions aimed at the banking, energy, and armaments sectors of Russia on July 16, and July 29, 2014, and many others followed both by the US and other Western powers in the following years (A timeline of EU and US sanctions and Russia countersanctions n.d.). The declining oil prices also contributed to the emergence of the Russian Financial Crisis. The prices of oil started to decline in September 2014, hitting their lowest value of the decade in February 2016 (Crude Oil Prices - 70 Year Historical Chart n.d.). Meanwhile, the Russian ruble was greatly hurt, as Russia is the second-largest oil exporter in the world (World's Top 10 oil exporters n.d.). The financial crisis did not come without a recession; it had especially devastating effects on the Russian economy in 2015–2016. According to the World Bank Open Data Website, the Russian economy had a negative growth rate of -1.97% in 2015¹⁷

¹⁷ 2015 was the only year in the past decade during which the Russian Federation saw a negative GDP growth rate.

and a growth rate of almost zero percent (0.19%) in 2016.

Armenia's economy has been historically dependent on that of Russia, and its "easternization" by its accession to the EAEU in 2015 thus made Armenia's economic ties to Russia even closer than before, and anything that happened in Russia would have had a major impact in Armenia as well, both economically and politically. Indeed, the Armenian economy resembled the downturn patterns observed in Russia, stagnation in almost every sector of the economy in 2015–2016 and then an economic recovery afterwards. Moreover, according to Dr. Ricardo Giucci, Armenia, along with other countries who acceded to the EAEU, "took over high Russian external import tariffs" when they joined the EAEU (2018). Thus, Armenia's accession to the EAEU would not only have sent a negative signal to the West that would discourage investment, but tariffs that exist between EAEU and non-EAEU states would have made trade with the West significantly more difficult for Armenia. I thus hypothesize that Armenia's stronger-than-usual economic performance was a result of an underperformance in the years immediately preceding this period (2015–2016), which was in turn determined by the underperformance of the Russian economy and Armenia's accession to the EAEU. It was a so-called "economic recovery" after a period of stagnation in almost every aspect of economy in 2015–2016 which was closely tied to the economic recovery of Russia after the 2014–2017 recession.

6. Areas requiring further research

There were some ambiguous results obtained in this project that require further

research. Most importantly, there were some major sectors in which the difference between changes in average growth rates in 2010–2016 and 2017–2019 for Armenia and Azerbaijan or Armenia and Georgia was not substantial, even though the change in average growth rates between 2010–2016 and 2017–2019 for Armenia was notable. These included the manufacturing and mining subsectors of industry, as well as the industry sector overall. In contrast, there were sectors where the “policy change” had a reversed effect; that is, the average growth rate had decreased from 2010–2016 to 2017–2019 in Armenia, whereas it had increased for Azerbaijan and/or Georgia. This included the agricultural sector on the supply side and the net exports sector on the demand side. Further research is required to understand the causes of these deviations from the characteristic patterns observed in this paper. Another important area that was not discussed in this paper is what the DID analysis would result in if, as a measure of economic dependence on Russia, we were to choose trade volume and not energy dependence and divide countries into control and treatment groups by this criterion. Thus, further inquiry into this phenomenon should focus on trade volume as the criterion of economic dependence.

Other factors could also have contributed to the strong growth rates seen in 2017–2019 – and these factors could be further investigated as potential reasons for the observed differential growth rates between these countries during the given period. For example, there was a significant amount of investment from Lydian International, an international offshore company registered in Jersey. These investments were in the Amulsar gold mining project and were a major part of the economy in 2017–2019 (Amulsar n.d.). As shown in

Figure 19, an overwhelmingly major part of FDIs in 2017 came from Jersey. In fact, the share of Jersey’s FDI in overall FDI in Armenia in 2017 was an astounding 89% (Statistical Yearbook of Armenia 2019). Another beneficial event was the Velvet Revolution of Armenia in 2018. The previous government, headed by President Serzh Sargsyan, drained the government budget by corruption and underhanded schemes. The business sector was in shackles and many privileged individuals demanded shares of profits earned by businesses in order to “allow them to operate” (Derluguian 2018). Tired of this corrupt politico economic environment, the people of Armenia revolted and thwarted the previous government without any hostilities through peaceful protests at the center of the capital city. The leader of the opposition, Nikol Pashinyan, was appointed Prime Minister of Armenia by the Parliament under the pressure of the protesters. Nikol Pashinyan is said to have organized a host of reforms aimed at cleaning the country from corruption and ameliorating the business sector of the country (Derluguian 2018). The Velvet Revolution could also have contributed positively to greater confidence in the economy and have had a positive impact on the GDP in the second half of 2018 and 2019. Indeed, using Convolutional Neural Network models, Nahapetyan (2020) found that Armenia’s GDP gained an additional 850 million Euros in value as a result of the Velvet Revolution. A series of such beneficial economic events, as well as Russia’s economic recovery in 2017–2019, the benefits Armenia received from this because of being a part of the EAEU, and because of Russia having a big influence in the Armenian economy, could have accounted for the strong growth rates of the Armenian GDP observed in 2017–2019 as compared to its neighbors Azerbaijan and Georgia, which

were not as dependent on the Russian economy and were not influenced by the economic cycles of this country and therefore demonstrated average economic growth rates in 2017–2019.

Supplements

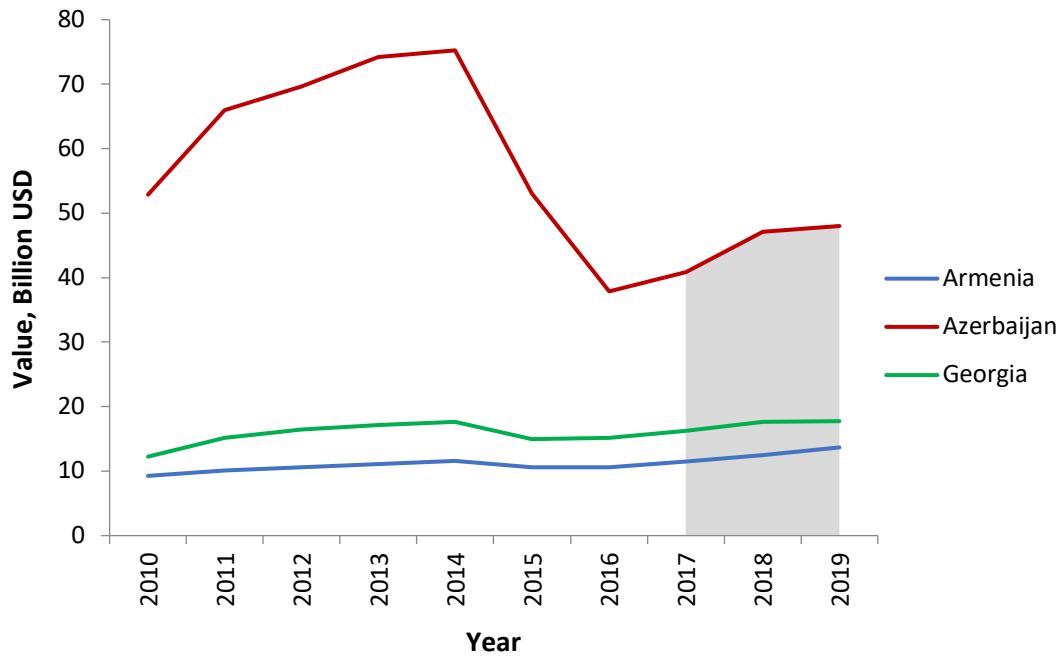


Figure 1. GDP values of the three Caucasian countries in 2010–2019. Armenia's economy was the smallest in the region as of 2019. Period under the investigation is highlighted in grey. Dollar values in current USD. Data obtained from the World Bank Open Data website.

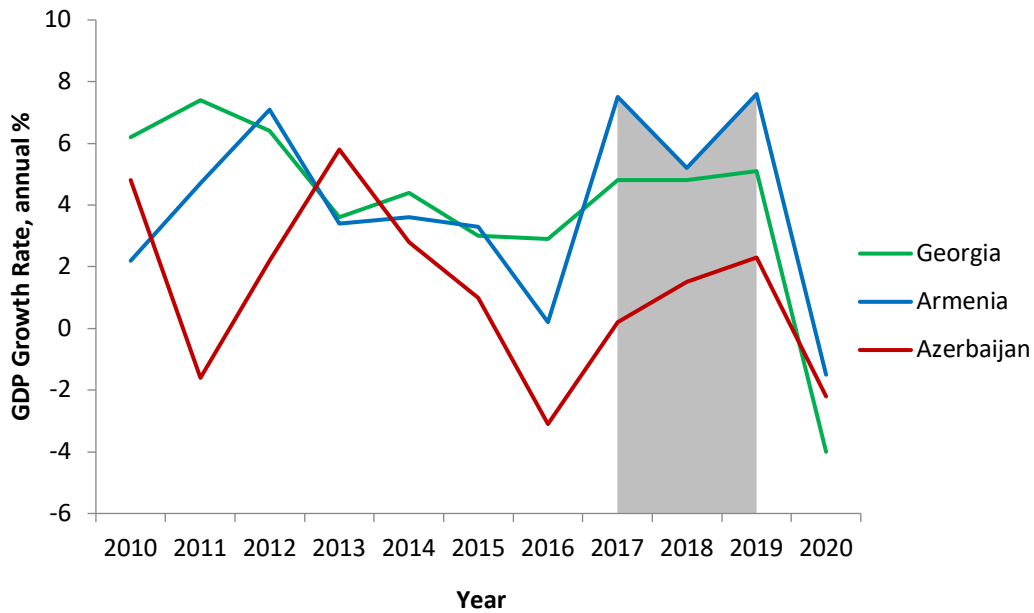


Figure 2. The growth rates of GDP values of the three Caucasian countries in 2010–2019. Armenia's GDP growth rates stood above those of the other two Caucasian countries for three consecutive years. Period under the investigation is highlighted in grey. Data obtained from the IMF DataMapper website.

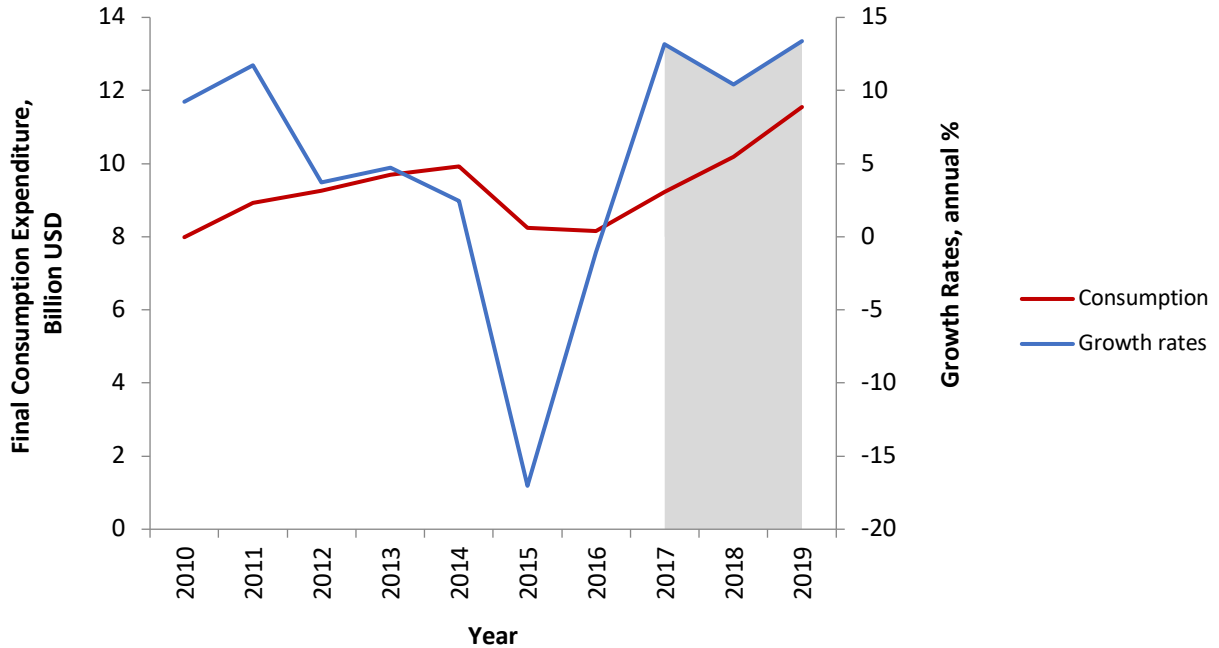


Figure 3. Private consumption in Armenia in 2010–2019. Dollar values in current USD. Data obtained from the World Bank Open Data website and the World Bank World Development Indicators website.

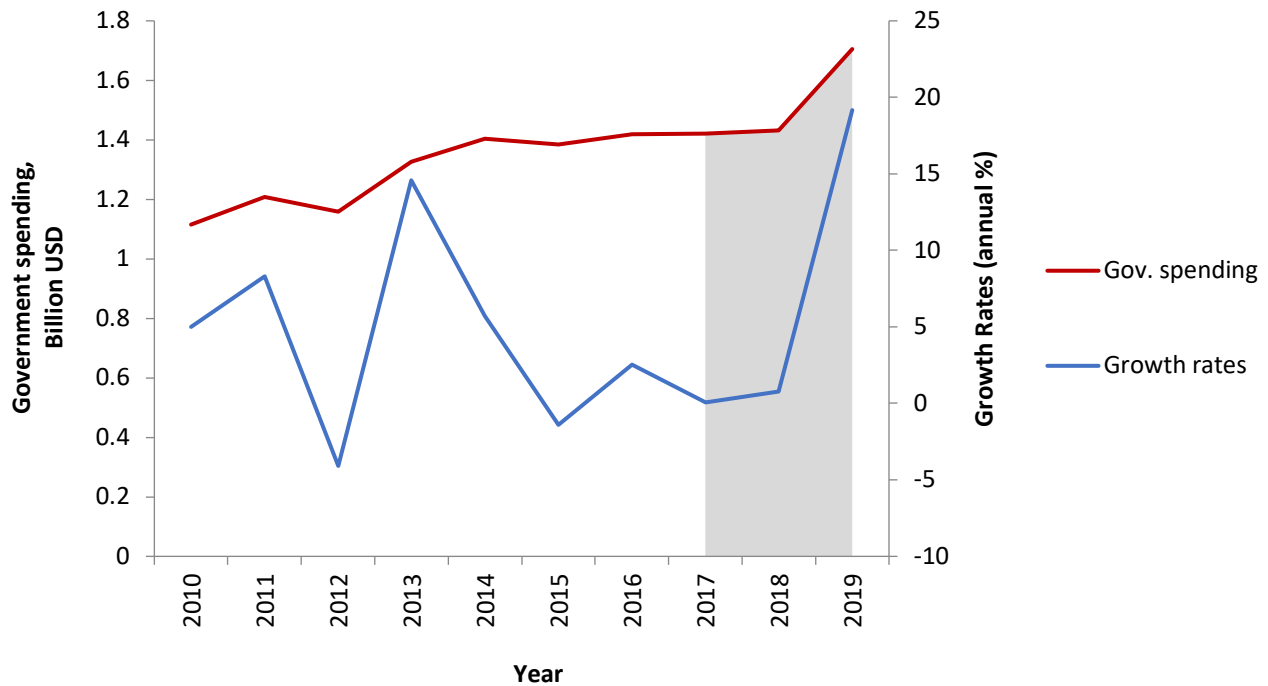


Figure 4. Government spending in Armenia in 2010–2019. Dollar values in current USD. Data obtained from the World Bank Open Data website.

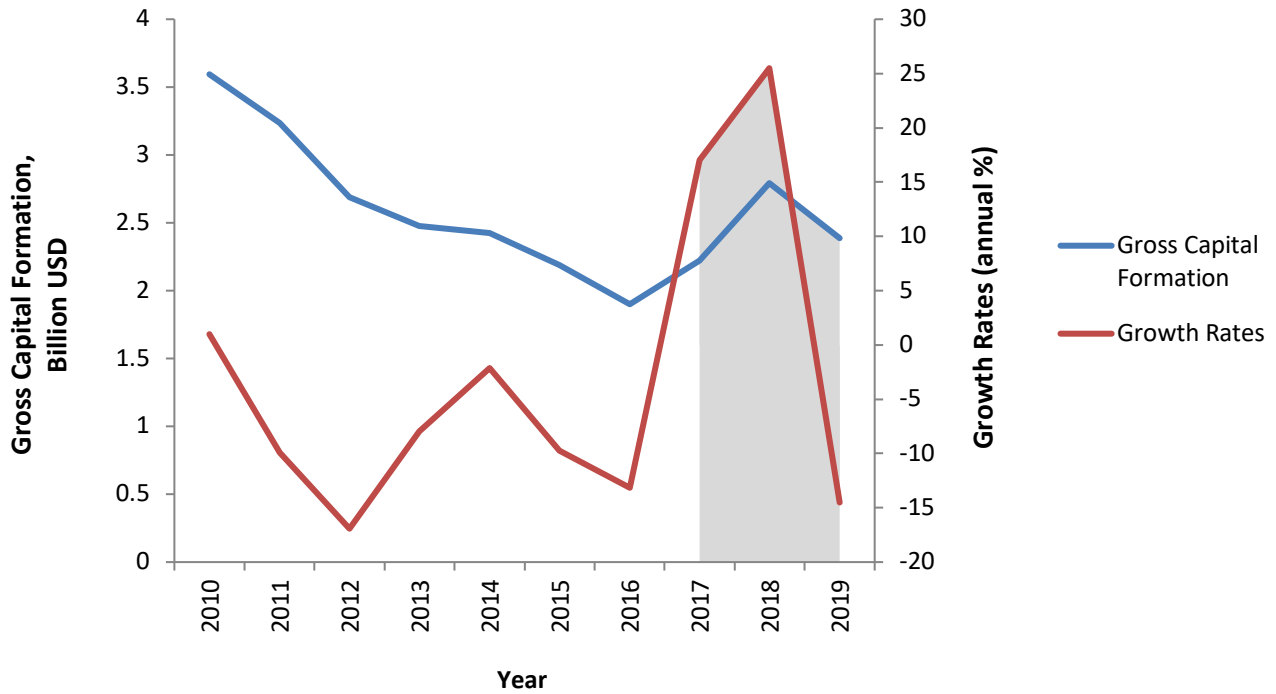


Figure 5. Gross capital formation in Armenia in 2010–2019. Dollar values in current USD. Data obtained from the World Bank Open Data.

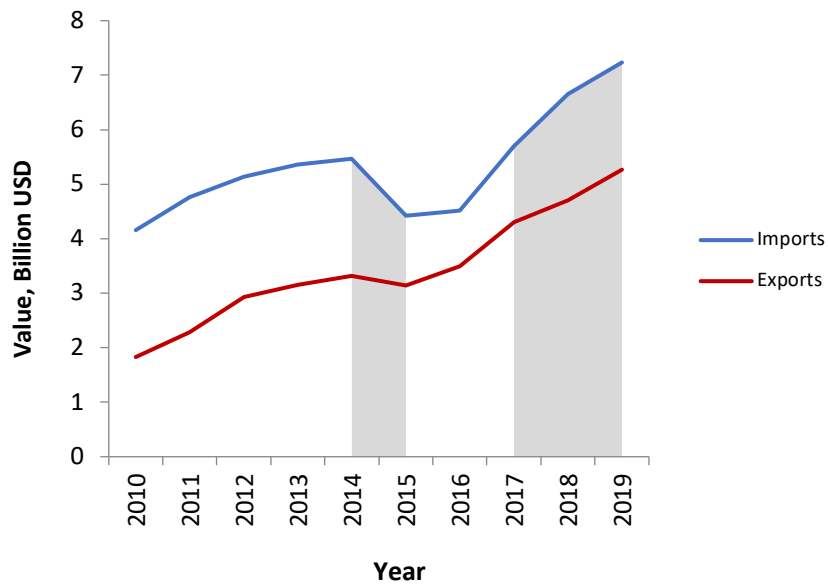


Figure 6. Imports and exports of Armenia in 2010–2019, current USD. Data obtained from the World Bank Open Data website.

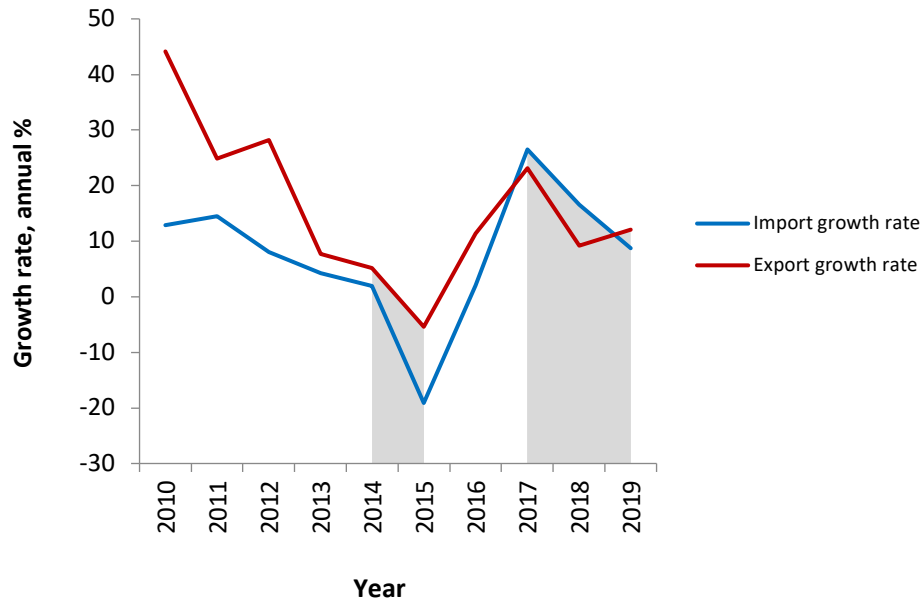


Figure 7. Import and export growth rates in Armenia in 2010–2019.

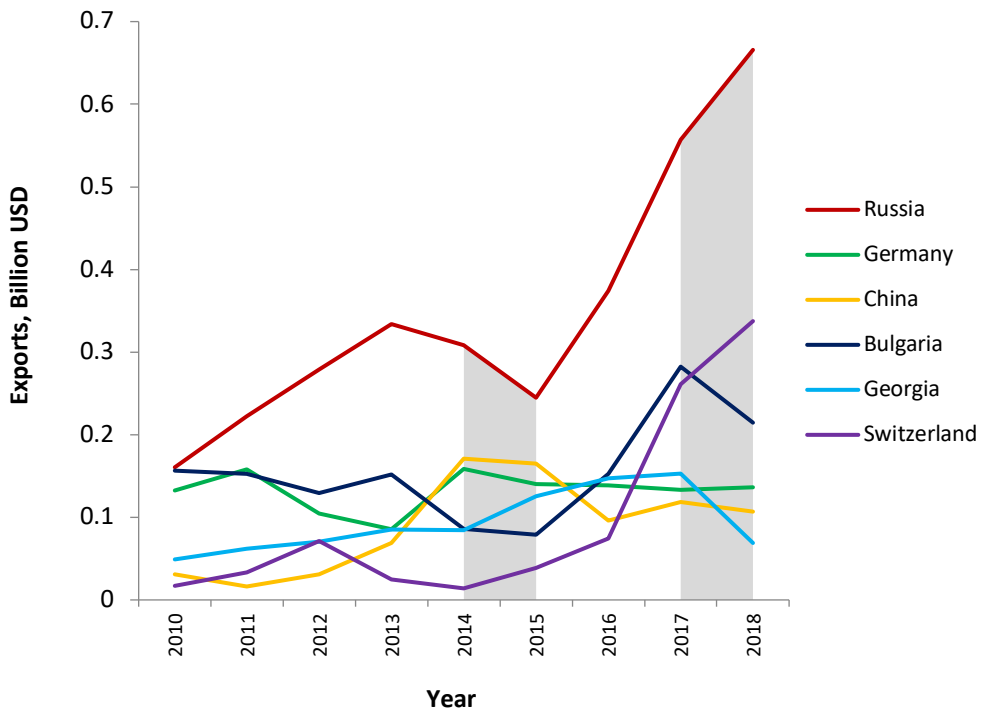


Figure 8. Exports of Armenia by country in 2010–2018, current USD. Data collected from ARMSTAT databases, Statistical Yearbooks of Armenia 2013–2019.

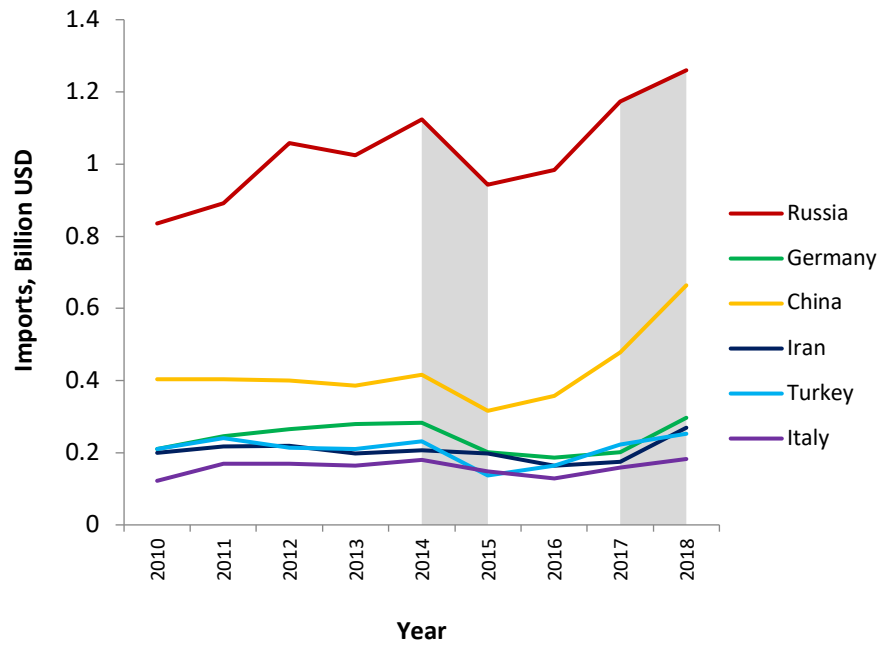


Figure 9. Imports of Armenia by country in 2010–2018, current USD. Data collected from ARMSTAT databases, Statistical Yearbooks of Armenia 2013–2019.

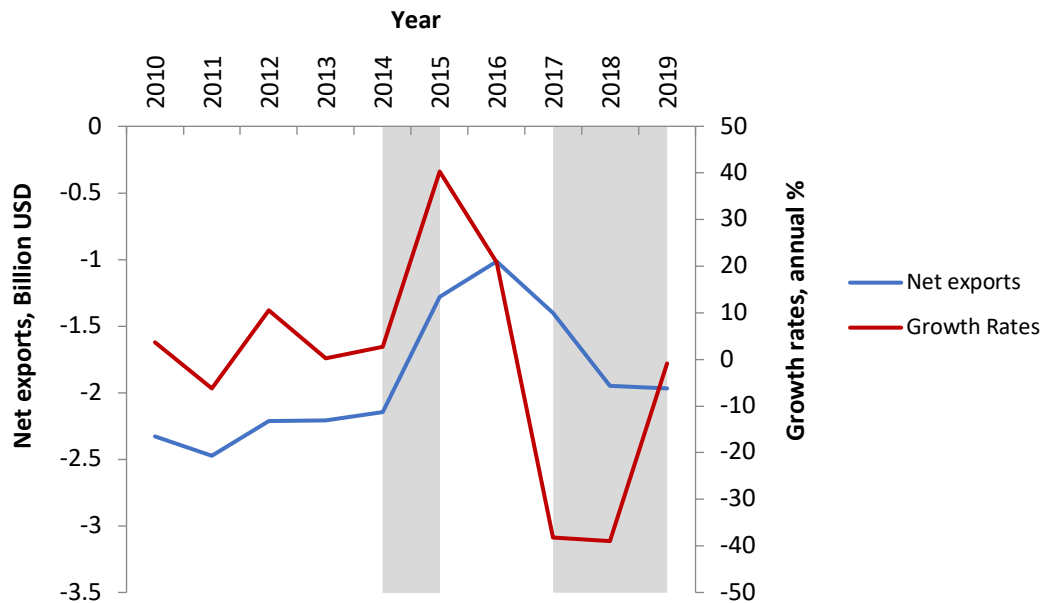


Figure 10. Net exports of Armenia in 2010–2019. Dollar values in current USD. Data obtained from the World Bank Open Data website.

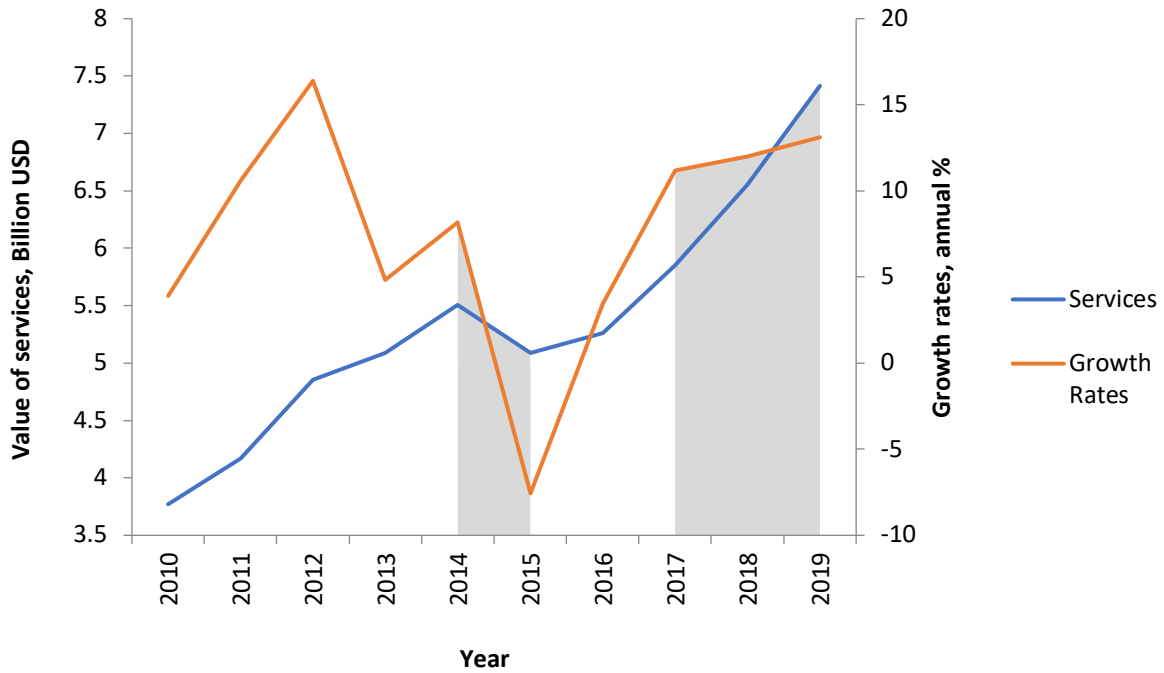


Figure 11. Services sector in Armenia in 2010–2019. Dollar values in current USD. Data obtained from the Statista website and the 2013 Statistical Yearbook of Armenia.

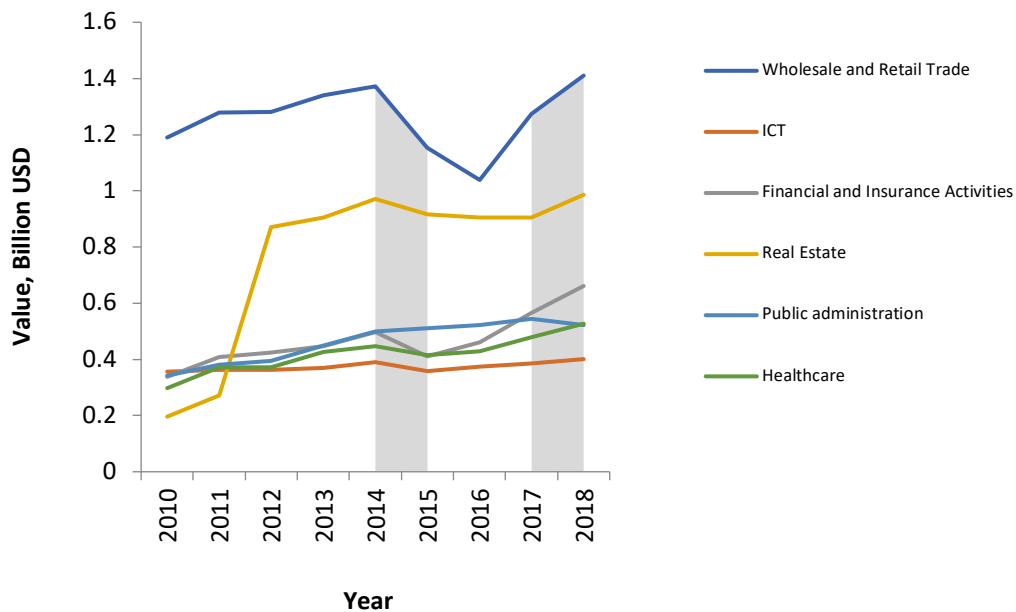


Figure 12. Subsectors in the services sector of Armenia in 2010–2018, current USD. Data obtained from 2014 and 2016–2019 Statistical Yearbooks of Armenia.

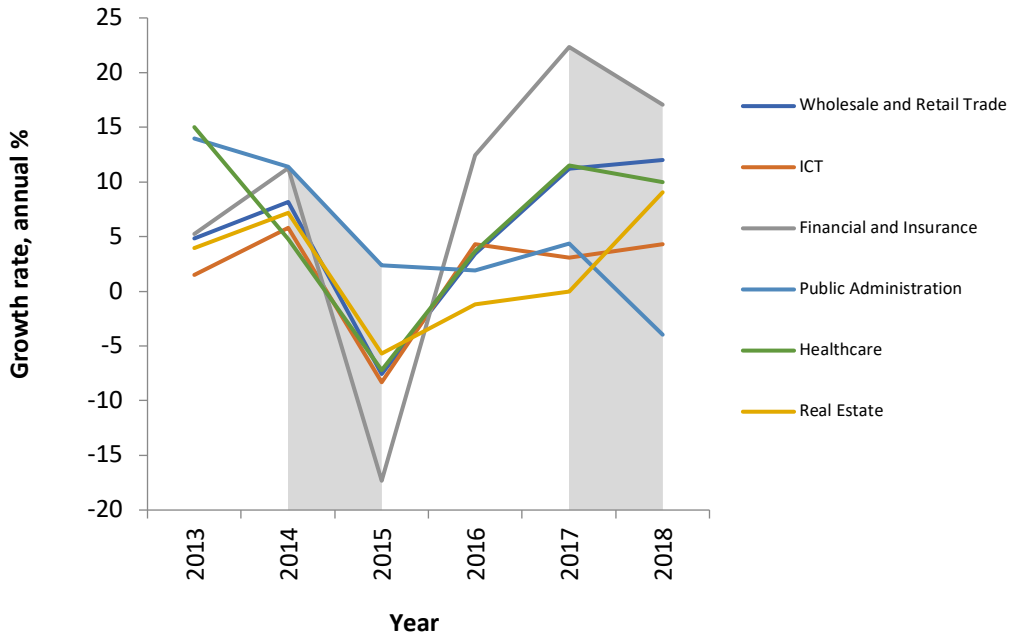


Figure 13. Growth rates of subsectors in the services sector of Armenia in 2013–2018. Data obtained from 2014 and 2016–2019 Statistical Yearbooks of Armenia.

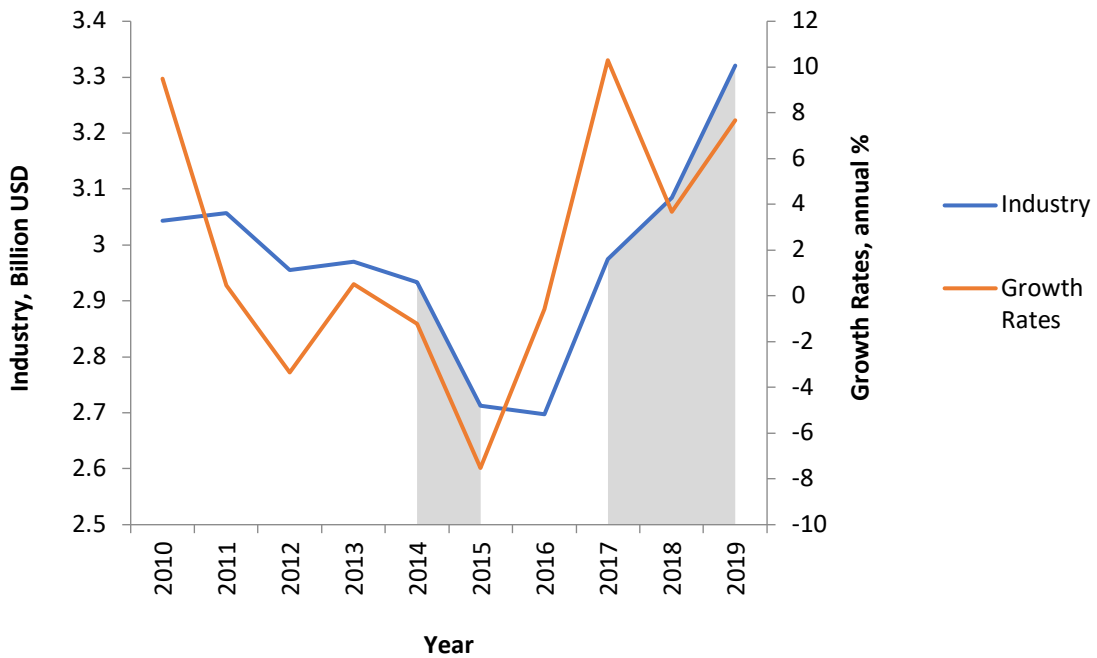


Figure 14. Industry value and growth rates thereof in Armenia, 2010–2019. Dollar amounts in current USD. Data obtained from the World Bank Open Data Website and the 2013 Statistical Yearbook of Armenia.

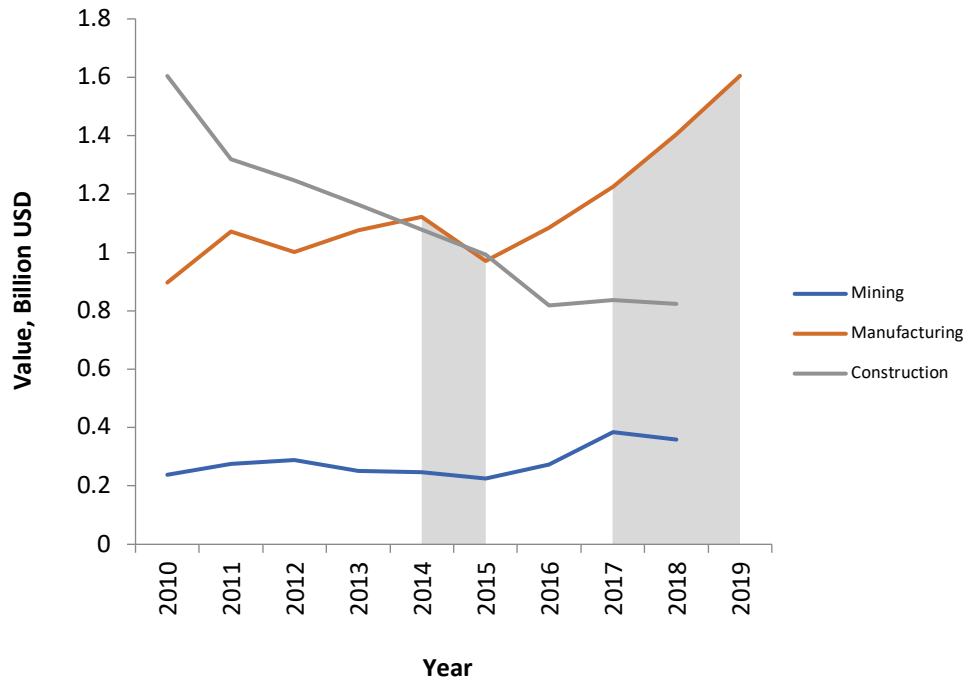


Figure 15. Subsectors of industry in Armenia in 2010–2019, current USD. Data obtained from the World Bank Open Data website and the 2014 and 2016–2019 Statistical Yearbooks of Armenia.

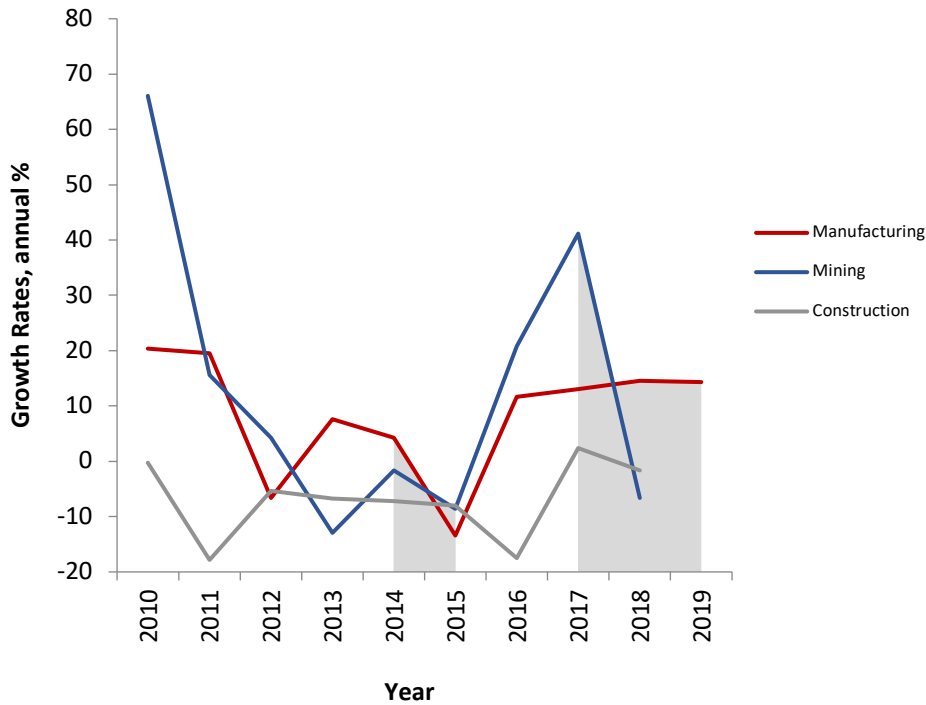


Figure 16. Growth Rates of the subsectors of industry in Armenia in 2010–2019. Data obtained from the World Bank Open Data website and 2014 and 2016–2019 Yearbooks of Armenia.



Figure 17. The agricultural sector and its growth rates in Armenia in 2010–2019. Dollar values in current USD. Data obtained from the World Bank Open Data website and the 2013 Statistical Yearbook of Armenia.

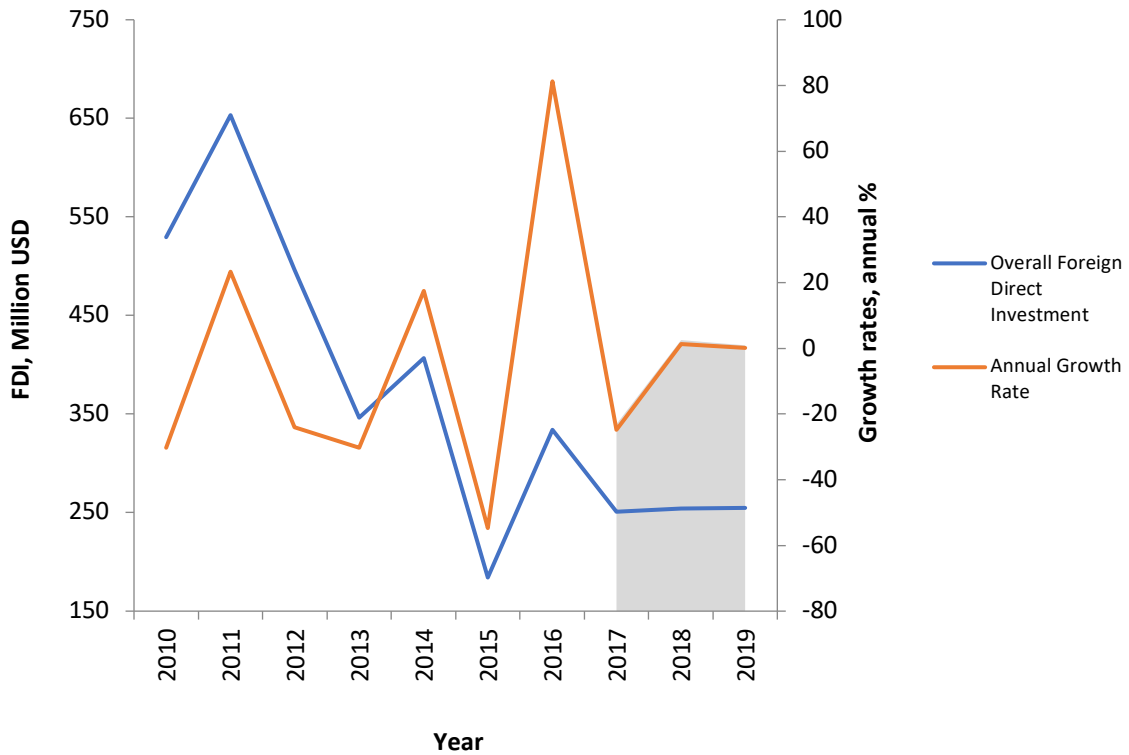


Figure 18. Overall foreign direct investment in Armenia in 2010–2019. Dollar values in current USD. Data obtained from the 2014, 2016, 2018 and 2019 Statistical Yearbooks of Armenia.

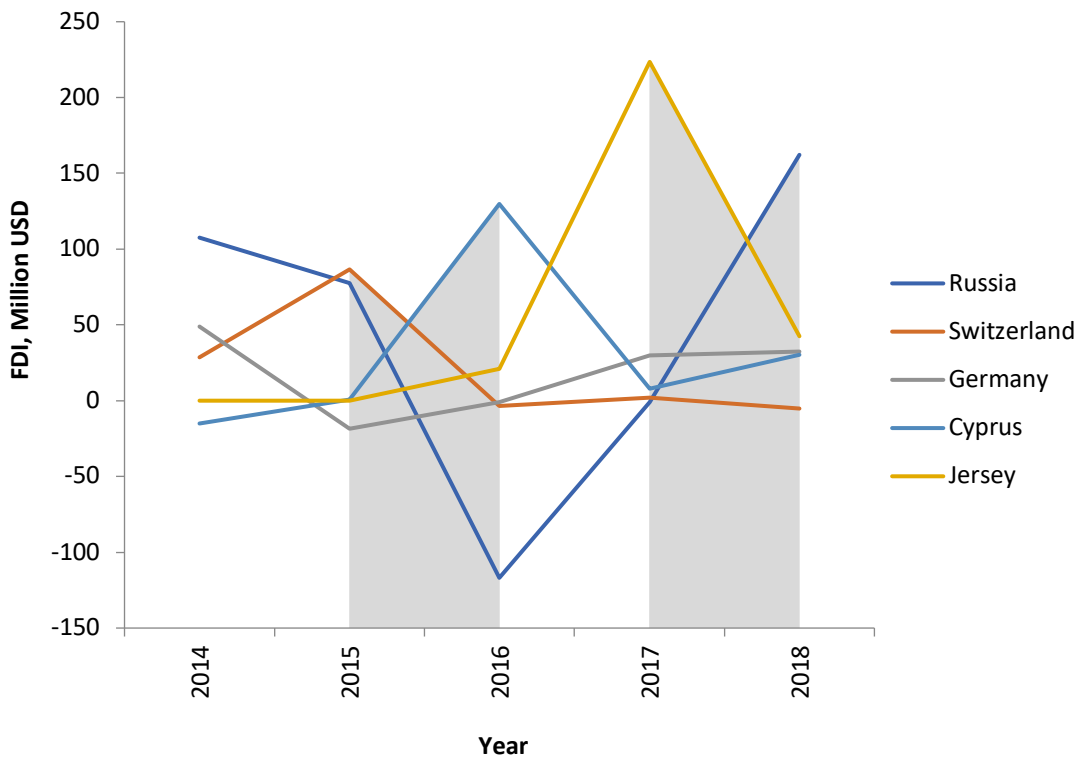


Figure 19. Foreign direct investment in Armenia by country of origin in 2014–2018, current USD. Data obtained from the 2014, 2018, and 2019 Statistical Yearbooks of Armenia.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average growth rate in 2010–2019
Armenia	2.2%	4.7%	7.1%	3.4%	3.6%	3.3%	0.2%	7.5%	5.2%	7.6%	4.5%
Azerbaijan	4.8%	-1.6%	2.2%	5.8%	2.8%	1%	-3.1%	0.2%	1.5%	2.3%	1.6%
Georgia	6.2%	7.4%	6.4%	3.6%	4.4%	3%	2.9%	4.8%	4.8%	5.1%	4.9%

Table 1. Annual and decade-average GDP growth rates of Caucasian countries in 2010–2019. Data obtained from the IMF DataMapper website.

Control Group	Treatment Group
<u>Azerbaijan</u>	<u>Armenia</u>
<u>Georgia</u>	Belarus
Kazakhstan	Estonia
Uzbekistan	Latvia
Turkmenistan	Lithuania
Moldova	Ukraine
	Kyrgyzstan
	Tajikistan

Table 2. Countries in the Control and Treatment groups.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	5.40952	0.49150	11.00607	0.00000	4.43755	6.38150	4.43755	6.38150
Country Dummy	-2.39702	0.65020	-3.68660	0.00033	-3.68283	-1.11122	-3.68283	-1.11122
Year Dummy	-1.06508	0.89736	-1.18690	0.23733	-2.83966	0.70950	-2.83966	0.70950
C*T dummy	2.53175	1.18709	2.13273	0.03474	0.18420	4.87930	0.18420	4.87930

Table 3. DID Analysis of the average 2010–2016 and 2017–2019 GDP growth rates between the control and treatment groups. Cell highlighted in red indicates a result that is significant at the 5% level.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average in 2010–2016	3.5	1.7	4.8
Average in 2017–2019	6.8	1.3	4.9
Difference between average growth rates in 2017–2019 and 2010–2016	3.3	-0.4	0.1
DID values for Armenia & Azerbaijan and Armenia & Georgia		3.7	3.2

Table 4. DID values for the average growth rates of Armenia & Azerbaijan and Armenia & Georgia pairs between 2010–2016 and 2017–2019. Data obtained from the IMF DataMapper Databases. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Average growth rate in 2010–2019	Average growth rate in 2017–2019
Armenia	4.5	6.8
Azerbaijan	1.6	1.3
Georgia	4.9	4.9

Table 5. Average growth rates of the three Caucasian countries in 2010–2019 and 2017–2019. Data obtained from the IMF DataMapper Databases. The cell highlighted in red indicates an important result discussed in the paper.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average growth rate in 2010–2016	2.0	3.5	2.0
Average growth rate in 2017–2019	12.3	7.0	5.2
Difference in average growth rates between 2010–2016 and 2017–2019	10.4	3.5	3.2
DID values for Armenia & Azerbaijan and Armenia & Georgia		6.9	7.1

Table 6. Difference-in-differences analysis for the private consumption sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website and the World Bank World Development Indicators website. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average growth rate in 2010–2016	4.4	1.2	2.6
Average growth rate in 2017–2019	6.7	2.4	-0.6
Difference in average growth rates between 2010–2016 and 2017–2019	2.3	1.2	-3.2
DID values for Armenia & Azerbaijan and Armenia & Georgia		1.0	5.5

Table 7. Difference-in-differences analysis for the government spending sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	-8.4	5.5	20.0
Average Growth Rate in 2017–2019	9.3	-0.1	1.6
Difference in average growth rates between 2010–2016 and 2017–2019	17.7	-5.6	-18.4
DID values for Armenia & Azerbaijan and Armenia & Georgia		23.3	36.1

Table 8. Difference-in-differences analysis for the gross capital formation sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	3.5	8.3	8.0
Average Growth Rate in 2017–2019	17.3	2.3	10.0
Difference in average growth rates between 2010–2016 and 2017–2019	13.8	-5.9	1.7
DID values for Armenia & Azerbaijan and Armenia & Georgia		19.7	12.1

Table 9. Difference-in-differences analysis for the imports sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	16.6	-1.2	11.0
Average Growth Rate in 2017–2019	14.8	11.3	16.0
Difference in average growth rates between 2010–2016 and 2017–2019	-1.8	12.5	4.9
DID values for Armenia & Azerbaijan and Armenia & Georgia		-14.3	-6.7

Table 10. Difference-in-differences analysis for the exports sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	10.3	-15.3	4.6
Average Growth Rate in 2017–2019	-26.0	106.8	-11.2
Difference in average growth rates between 2010–2016 and 2017–2019	-36.3	122.1	-15.8
DID values for Armenia & Azerbaijan and Armenia & Georgia		-158.4	-20.5

Table 11. Difference-in-differences analysis for the net exports sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website. Cells highlighted in red indicate large DID values.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	5.7	3.4	5.8
Average Growth Rate in 2017–2019	12.1	6.9	4.9
Difference in average growth rates between 2010–2016 and 2017–2019	6.4	3.5	-0.9
DID values for Armenia & Azerbaijan and Armenia & Georgia		2.9	7.4

Table 12. Difference-in-differences analysis for the services sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website, the Statista website, and the 2013 Statistical Yearbook of Armenia. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010-2016	-0.3	-1.5	0.4
Average Growth Rate in 2017-2019	7.2	9.7	1.2
Difference in average growth rates between 2010-2016 and 2017-2019	7.5	11.2	0.8
DID values for Armenia & Azerbaijan and Armenia & Georgia		-3.7	6.7

Table 13. Difference-in-differences analysis for the industry sector between Treatment (Armenia) and Control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data Website and the 2013 Statistical Yearbook of Armenia. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	6.2	-2.3	2.6
Average Growth Rate in 2017–2019	14.0	9.0	10.0
Difference in average growth rates between 2010–2016 and 2017–2019	7.8	11.3	7.4
DID values for Armenia & Azerbaijan and Armenia & Georgia		-3.5	0.3

Table 14. Difference-in-differences analysis for the manufacturing subsector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website and the 2014 and 2016–2019 Statistical Yearbooks of Armenia. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2015–2016 ¹⁸	6.1	-31.3	16.4
Average Growth Rate in 2017–2018	17.2	24.4	5.3
Difference in average growth rates between 2010–2016 and 2017–2019	11.1	55.7	-11.1
DID values for Armenia & Azerbaijan and Armenia & Georgia		-44.6	22.2

Table 15. Difference-in-differences analysis for the mining subsector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the 2014 and 2016–2019 Statistical Yearbooks of Armenia, the 2015 Statistical Yearbook of Georgia, and from the databases of the “Gross Domestic Product of Production Method” web document from the website of AZSTAT. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

¹⁸ Data for Georgia was available for years 2015–2018

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2011–2016 ¹⁹	-10.5	3.1	12.6
Average Growth Rate in 2017–2018	0.3	-3.0	3.8
Difference in average growth rates between 2010–2016 and 2017–2019	10.8	-6.1	-8.8
DID values for Armenia & Azerbaijan and Armenia & Georgia		16.9	19.6

Table 16. Difference-in-differences analysis for the construction subsector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from 2014 and 2016–2019 Yearbooks of Armenia, 2015–2019 Yearbooks of Georgia, and “Gross Domestic Product of Production Method” web document from the website of AZSTAT. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	0.0	-1.8	4.8
Average Growth Rate in 2017–2018	-9.8	9.0	0.7
Difference in average growth rates between 2010–2016 and 2017–2019	-9.8	10.8	-4.1
DID values for Armenia & Azerbaijan and Armenia & Georgia		-20.6	-5.7

Table 17. Difference-in-differences analysis for the agriculture sector between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data website, the 2013 Statistical Yearbook of Armenia, and the World Bank Open Data Website. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

¹⁹ Data for Azerbaijan available only for 2011–2018

	Treatment Group	Control Group	
	Armenia	Azerbaijan	Georgia
Average Growth Rate in 2010–2016	-2.5	12.7	17.5
Average Growth Rate in 2017–2018	-7.8	-26.7	-5.6
Difference in average growth rates between 2010–2016 and 2017–2019	-5.3	-39.4	-23.1
DID values for Armenia & Azerbaijan and Armenia & Georgia		34.0	17.8

Table 18. Difference-in-differences analysis for FDI between treatment (Armenia) and control (Azerbaijan and Georgia) groups. Data obtained from the World Bank Open Data Website. Cells highlighted in red indicate large DID values. The cell in green is the change in growth rates for Armenia.

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