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Structural change and economic growth in South Caucasia

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This paper analyzes the role of structural change on economic growth in post-socialist South Caucasia. I employ the Shift Share Analysis (SSA) to evaluate the direct effect and the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) to measure the overall effect of structural change on economic growth. The result of the SSA shows that within sector is the dominant source of productivity growth, and the reallocation effect is remarkable in Georgia. The manufacturing sector did not experience an expansion; therefore, its reallocation effect is negligible. On the other hand, the expansion of the business services sector and contraction of low-value agricultural employment produced a positive reallocation effect. The results of the FMOLS and DOLS demonstrate that advanced sectors – manufacturing and business services – have a positive effect on economic growth. Expanding high-value-added activities is necessary for further growth in these countries and requires investment in human capital and the development of domestic capacities.

Keywords: structural change, South Caucasia, economic growth

This paper investigates the role of structural change in economic growth in South Caucasia in the post-socialist period. These countries turned from a socialist economic system to a market economy at a radical pace. The change from a centralized command economy to a market way of production produced a substantial level of change in the structure of these economies. Therefore, an analysis of structural change and its effect on economic growth can contribute to the literature on the post-socialist economy. This study contributes to this literature by evaluating the impact of structural change on economic growth in South Caucasian countries.

This study employs the Shift Share Analysis (SSA), Fully Modified OLS (FMOLS), and Dynamic OLS (DOLS) to evaluate the effects of structural change on economic growth. The SSA assesses the direct effect, while the FMOLS and DOLS evaluate the overall effect of structural change on economic growth.

As in the majority of the Commonwealth of Independent States (CIS), the transition shock destroyed a significant part of the manufacturing production of the South Caucasian countries, and a slight positive structural change has been driven by the expansion of business services and contraction of lower productivity agricultural employment. However, the business services sectors are still nascent, and there is an overemployment in the agricultural sector.

The next section introduces the theoretical background of the study and a short review of the empirical literature on structural change and economic growth. Section 2 states the pattern of the structural change and its effect on economic growth in South Caucasian countries. Section 3 gives an econometric evaluation of the impact of structural change on economic growth. Finally, the last section poses some relevant conclusions.

1. Theoretical Background

Structural change, a change in the distribution of inputs and outputs across sectors, plays a crucial role in economic development. Economic activities are classified into two categories, the low-productivity traditional (subsistence) and the high-productivity modern (capitalist) sectors in *Lewis`* (1954) dual economy model. The movement of resources from traditional to modern sectors is one of the drivers of economic development *(Kuznets, 1966; Maddison, 1987; Rodrik and Macmillan, 2011)*. Modern sectors have a higher rate of productivity growth *(Kaldor, 1967; Cornwall, 1977; Timmer et al., 2015; McMillan et al., 2014)*, higher capital intensity and capital accumulation capacity *(Szirmai–Verspagen, 2015; Su–Yao, 2017)*, and a higher potential for technological development *(Szirmai, 2012; Lavopa–Szirmai, 2014, Rodrik, 2016)*, which qualify them as drivers of economic growth. Additionally, technological spillover on the remaining sector through backward and forward linkages can upgrade the productivity of non-modern sectors *(Tregenna, 2011)*.

Manufacturing has been considered the main and only representative of the modern sector. While it is assumed that the service sector has limited productivity growth and was regarded as a secondary, non-tradable activity, its role in economic development is disregarded *(Baumol et al., 1985)*. Nonetheless, the ICT revolution changed the attitude toward the role of services in economic growth. ICT-led technological advancement propelled productivity growth in service activities and boosted the international trade of services *(Lambregts et al., 2017)*. *Bryson et al. (2004)* classify services into consumer (traditional) and producer (modern)

services. Consumer services entail the customer's vicinity and are used in personal usage. Producer services are used in production as inputs; their customers are businesses and do not necessarily require physical closeness to clients. *Ghani and O'Connell (2016)* claim that service activities can be a driver of structural change and economic growth as the manufacturing sector because they have capacities for dynamic productivity growth and international tradability.

Nevertheless, there are many studies that are critical of the service sectors becoming an independent driver of structural change and economic growth. According to *Meglio (2017)*, the development of producer services is driven by the export-oriented manufacturing sector in East Asian countries. *Guerrieri and Meliciani (2005)* and *Lundquist and Olander (2008)* have a similar conclusion that the manufacturing sector is decisive for the development of producer services.

Harberger (1998) evaluates the relationship between economic structure and growth in the USA and concludes that the shift of resources from lower value-added to higher value-added activities has a positive effect on economic growth. By employing the SSA and Generalized Methods of Moments (GMM), *Peneder (2003)* measures the effect of economic structure on growth in 28 OECD countries and concludes that expansion of higher productivity activities has a positive contribution to economic growth. *Fan et al. (2003)* also conclude that structural change has been an important factor in China's economic growth. According to *McMillan and Rodrik (2011),* the inability to expand the modern sectors is one of the important factors behind the slow economic growth rate in Latin America and Africa, while expansion of these sectors has been a driver of the long-lasting higher rate of growth in East Asia. *Fagerberg (2000)* analyzes the effect of structural change on economic growth in 39 countries and concludes that the shift of resources from lower to higher productivity activities is not the main driver of growth. Instead, the development of the technologically dynamic sector (electronics) is the most important factor responsible for impressive economic performance. By investigating the impact of the reallocation of resources in the manufacturing sector on productivity growth in four Asian countries, *Timmer and Szirmai (2000)* come to a similar conclusion that the reallocation of resources is not an important factor behind productivity growth.

Landesmann (2000) provides a description of the change in the structure of the post-socialist European economies. According to *Havlik (2005)*, the sectoral reallocation of labor does not produce a notable effect on productivity growth in Central Eastern Europe (CEE). *Alam et al. (2008)* reach a similar conclusion that the effect of structural change is negligible in both CEE and CIS. *Kuusk et al. (2016)* found that labor reallocation has not been important for productivity growth in ten CEE countries.

The existing studies evaluate the structural change growth nexus mainly in the context of CEE countries, and research in the context of CIS countries, including

South Caucasia, is extremely limited. The limited number of studies attempt to investigate the structural change phenomenon in the CIS region in the frame of deindustrialization and premature deindustrialization. This study is a *pioneer* in evaluating the effect of structural change on economic growth in South Caucasia. *Taguchi and Elbek (2022)* state that 10 out of 15 CIS countries experience premature deindustrialization, and the comparative disadvantage in manufacturing, Dutch Disease, and lack of appropriate institutions are the main reasons behind it. *Niftiyev (2020)* claims that the Dutch Disease effect of oil rent is behind the deindustrialization process in Azerbaijan.

2. Structural Change and Productivity Growth

2.1 Pattern of Structural Change

The existence of a huge sectoral productivity gap among sectors can be an indicator of underdevelopment *(MacMillan–Rodrik, 2011)*. Table 1 shows that the productivity gap increased in South Caucasia, except in Armenia. Armenia could narrow the productivity gap by achieving considerable productivity growth in agriculture. However, the persistence of low productivity in agriculture is the factor behind the higher productivity gap in Azerbaijan and Georgia.

Table 1

Productivity Diagnosis

Year	Highest productivity		Lowest Productivity		Productivity Gap	Coeff. of Variation of log of Sectoral Productivity
	Sector	Labor Productivity	Sector	Labor Productivity		
Armenia						
2000	Business	35,159	Agriculture	3,932	8.94	0.110
2019	Business	85,837	Agriculture	16,687	5.14	0.064
Azerbaijan						
1999	Mining and Energy	96,815	Agriculture	3,387	28.58	0.191
2019	Mining and Energy	495,654	Agriculture	5,992	82.72	0.314
Georgia						
1998	Construction	32,209	Agriculture	5,614	5.73	0.059
2019	Business	63,846	Agriculture	5,232	26.01	0.137

Source: own construction.

The industry was preferred over services in the socialist period; therefore, these countries had underdeveloped services and large uncompetitive industrial sectors at the beginning of the transition. Industry shrank, and the service sector expanded in the post-socialist period. Industrial production in South Caucasia had a high dependency on the inputs, markets, and finances of the USRR. Therefore, the breakage of the economic linkages with the socialist system due to the collapse of the USSR hit the industrial sector badly in South Caucasia and resulted in a huge output loss in the initial years of transition (Table 2).
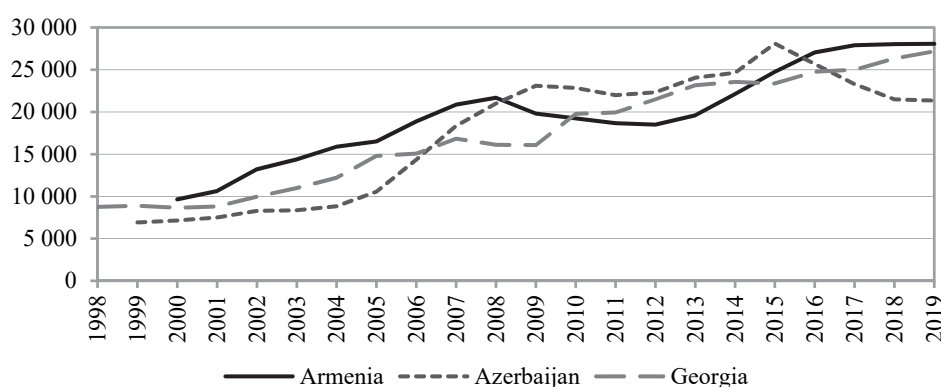
Table 2

GDP per capita (Constant PPP 2017)

Country	1990	1995	2000	2005	2010	2015	2019
Armenia	5,180	3,008	4,048	7,420	9,286	11,321	13,654
Azerbaijan	7,617	2,977	3,999	7,107	14,082	14,853	14,442
Georgia	11,135	3,244	4,919	7,315	9,737	12,605	14,989

Source: World Bank Development Indicators.

After the transition shock of the early 1990s, economic and productivity growth resumed in this region. Table 2 shows that the output loss of the transition shock has been colossal, and these countries lost half of their national output. In this regard, recovery of output loss is one of the reasons behind rapid growth. In the background of macroeconomic stability and market reforms, South Caucasian countries could utilize their idle capacities and recover rapidly. Additionally, favorable external conditions such as ease of access to international finance, favorable terms of trade, and global technological development promoted economic growth in CIS, including South Caucasia *(Iradian, 2009)*. However, rapid productivity growth came to a halt in the late 2000s, which the deterioration of favorable external conditions can explain. The currency crisis in 2015 worsened overall economic performance and resulted in an acute decline in productivity in Azerbaijan. However, Armenia and Georgia could achieve a stable level of increase in productivity since the mid-2010s.

Figure 1

Labor Productivity Growth (South Caucasia)

Source: own construction.

The share of the agricultural output in the national output declined in Azerbaijan and Georgia, but remained stable in Armenia. The Mining and Energy sector has been a negligible part of total production and has not changed in Armenia and Georgia. However, Azerbaijan has a long history of specialization in oil extraction, and this sector is the largest contributor to national output. A huge amount of investment in oil extraction and transportation also increased its share. As a modern sector, the share of the manufacturing sector in total production did not experience an expansion in South Caucasia, and its share is the smallest in Azerbaijan. On the other hand, these countries experienced an expansion of the share of business services in national output. The expansion of this sector has been remarkable in Armenia, while Azerbaijan is the worst performer.

The share of agriculture in total employment is considerably high; on average, one-third of all jobs are in agriculture. Massive job destruction occurred in the transition period, and there was not an adequate level of creating decent jobs to provide employment for dismissed workers. Additionally, governments in these countries could not provide social assistance. Therefore, agriculture became a last resort of employment for a considerable part of the redundant workers in South Caucasia. Armenia has been able to halve the share of agricultural employment, and a considerable rate of productivity growth in agriculture accompanies it. However, the decline in the share of agricultural employment is negligible in Azerbaijan and Georgia. A persistently low level of productivity in agriculture in these countries indicates the hidden unemployment in this sector.

Figure 2

Sectoral distribution of output
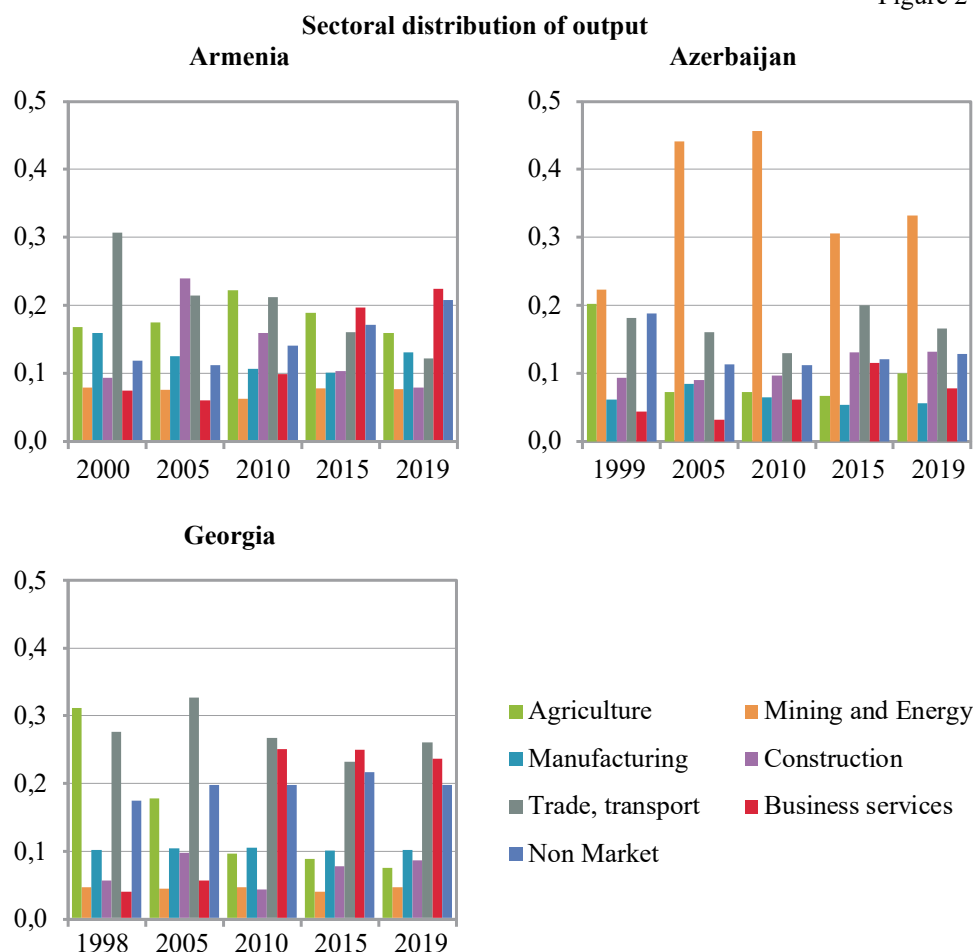
Source: own construction.

After a considerable decline in the 2000s, the share of employment in manufacturing in total employment increased to 10 percent in Armenia, and it is the highest in South Caucasia. However, the share of this sector in total employment is still considerably low in Azerbaijan and Georgia, and it is not congruent with their industrial past and current capacities. The business services sector also expanded its share in total employment, but it is still low at 5–7 percent.

Figure 3

Sectoral distribution of employment
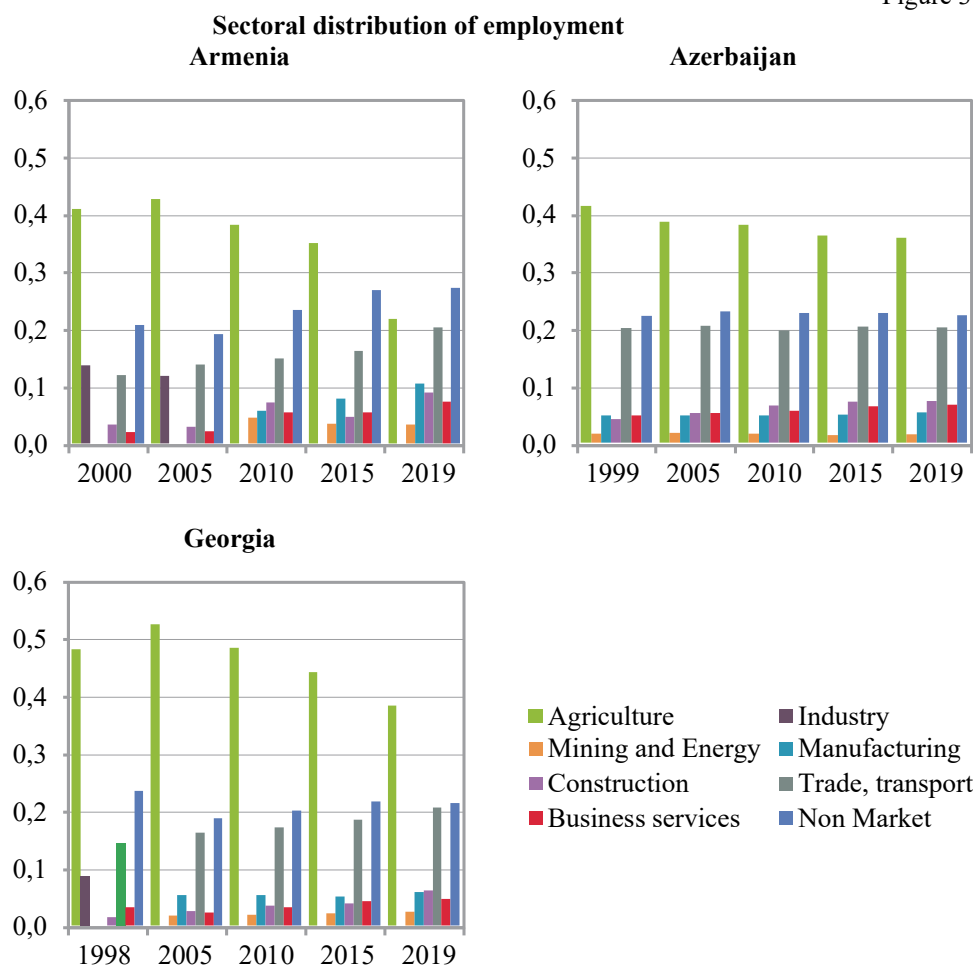
Source: own construction.

2.2 Shift Share Analysis

As a growth accounting method, the SSA separates productivity growth into *within-sector* and *reallocation* effects. The within-sector effect is the productivity growth that occurs due to physical and human capital accumulation and organizational and technological development in the individual sector. The movement of labor from low value-added activities to higher value-added activities contributes to productivity growth in the form of the *reallocation* effect.

Conventional SSAs (static and dynamic) are used in studies to evaluate the effect of structural change on economic growth in post-socialist geography *(Havlik, 2005; 2014; Alam et al., 2008)*. However, conventional SSA methods can only measure the total contribution of labor reallocation to productivity growth. Nevertheless, it is inadequate to estimate the contributions of each sector's reallocation effect to productivity growth. To better explain the shortcomings of conventional SSAs, I present the formulas of traditional SSAs:

Static Shift Share Analysis

$$L_p = \sum S_{t-k,i} \Delta L_{p,i} + \sum L_{p,i} \Delta S_{i,t} \tag{1}$$

Dynamic Shift Share Analysis

$$L_p = \sum S_{t-k,i} \Delta L_{p,i} + \sum L_{p,i} \Delta S_{i,t} + \sum \Delta S_{i,t} \Delta L_{p,i} \tag{2}$$

L_p and L_{pi} represent the total and sectoral productivity, respectively. S_i stands for the share of sector i in the total employment, and Δ symbolizes the change in the employment share and labor productivity between time t-k and t. In both equations, the first term represents the within-sector effect, and the second represents the static shift effect. The third term in Equation 2 stands for the dynamic shift effect, and it is the reallocation effect of the simultaneous change in the employment share and productivity in each sector. According to the static SSA, if a sector expands its share in total employment, then this sector has a positive reallocation effect on overall productivity growth, and this effect is negative if the sector experiences a contraction of its share in total employment. For example, according to the logic of the static SSA, an expansion of the share of agricultural employment in total employment produces a positive reallocation effect, and this finding does not have a meaningful explanation. In dynamic SSA, simultaneous positive productivity growth and expansion of a sector in total employment are considered a positive reallocation of this sector to overall productivity and a negative reallocation in the opposite case. Continuing the same sample, if the agricultural sector experiences productivity growth and expansion of its share in total employment, then expansion of agriculture is accepted as a positive dynamism of the structural change, which again is not theoretically plausible. In conventional SSA, the reference point of the change in productivity in a sector is itself rather than referring to productivity (growth) in other sectors. The CSLS [1] method attempts to overcome the mentioned deficiencies of the conventional SSA *(Reinsdrof–Yuskavage, 2010)*. The CSLS assesses the reallocation effect of each sector concerning changes in average national productivity and productivity growth. The CSLS method is defined in the following formula:

$$L_p = \sum S_{t-k,i} \Delta L_{p,i} + \sum (L_{i,t} - L_{a,t}) \Delta S_{i,t} + \sum ((L_{i,t} - L_{i,t-k}) - (L_{a,t} - L_{a,t-k})) \Delta S_{i,t} \tag{3}$$

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[1] Authors named this method Center for Study of Living Standards (CSLS) at the conference hold by this organization in 2014.

The within-sector effect is the same in both conventional SSA and CSLS. In the static reallocation effect in the CSLS, the labor productivity of sector *i* at time *t* in conventional SSA is replaced by the difference between labor productivity in sector *i* and the national average in period *t*. In the dynamic reallocation effect, the change in labor productivity is replaced by the change in productivity in sector i at period t and the change in national average productivity.

Data entail the aggregate and sectoral labor productivity and the distribution of employment across sectors. The data are sourced from the International Labor Organization (ILO) National Statistical Offices of the South Caucasian countries. The value added in domestic currency at the 2015 price is converted into the 2015 PPP exchange rate for comparability of the data across countries. The time frame of the analysis is 1999–2019. The disaggregation of economic activity into seven sectors is shown in Table 3.

Table 3

Sector Coverage

Sectors	Sub-Sectors	ISIC REV 3
Agriculture	Agriculture	A+B
Mining and Energy	Public Utilities (Electricity, Gas, and Water) and Mining and Quarrying	C+E
Manufacturing	Manufacturing	D
Construction	Construction	F
Trade Food Accommodation	Wholesale and Retail Trade, Hotels and Restaurants Transport, Storage and Communications	G+H+I
Business services	Finance, Insurance, Real Estate and Business Services	J+K
Non-market services	Community, Social, Personal and Government Services	O+P+Q+L+M+N

Source: own construction.

The within-sector effect has the highest contribution to productivity growth in these countries. Georgia is distinguished for having the highest reallocation effect. This contribution of the reallocation effect on productivity growth is the smallest in Azerbaijan. Regarding the presence of a higher level of productivity gap, this effect would be higher in Azerbaijan. The inflow of oil revenue preempted pressure on the Azerbaijan government to conduct economic policies to upgrade the value structure of the economy. Additionally, Azerbaijan's economy experienced a Dutch Disease syndrome due to the inflow of oil revenue *(Niftiyev, 2021)*. Oil revenue flourished mainly in non-tradable sectors, such as consumer services and construction, while it hampered the competitiveness of tradable manufacturing and producer services.

Table 4

CSLS Shift Share Analysis

Countries	Period	Within sector	Static shift	Dynamic shift	Total
Armenia	2000–2019	8.02	2.36	–0.88	9.50
Azerbaijan	1999–2019	9.46	0.27	0.23	9.96
Georgia	1998–2019	7.21	1.24	1.09	9.54

Source: own construction.

The manufacturing sector does not have a visible reallocation effect. This sector already had a small share in total employment at the beginning of the study period and did not experience an expansion. Due to the legacy of industrial production in the socialist period, South Caucasian countries have the necessary capabilities for manufacturing production. At the same time, they have a pool of cheap labor stuck in agriculture. Despite these advantages, these countries could not develop their manufacturing industry. Manufacturing production, especially in small economies, has become dependent on participation in the Global Value Chains (GVCs) since the late 1980s. However, these countries have been unable to participate in the GVCs of manufacturing production, which may be the main reason for the underdevelopment of this sector. The within-sector effect of the manufacturing industry is not remarkable either. In Armenia and Azerbaijan, the productivity in this sector is lower than the national average.

Table 5

Detailed decomposition of labor productivity growth in South Caucasia

Sectors	Within sector	Static shift	Dynamic shift
	Armenia		
Agriculture	0.489	0.292	0.263
Mining and Energy	0.154	–0.026	–0.27
Manufacturing	0.122	0.009	–0.001
Construction	–0.006	0.21	–0.68
Trade, Transport, Food	–0.069	0.264	–1.242
Business Services	0.074	0.299	1.013
Non-market Services	0.235	–0.048	–0.083

(Table continues on the next page.)

(Continued.)

Sectors	Within sector	Static shift	Dynamic shift
	Azerbaijan		
Agriculture	0.078	0.614	1.969
Mining and Energy	0.464	–0.487	–1.998
Manufacturing	0.05	0.028	–0.005
Construction	0.068	0.887	0.801
Trade, Transport, Food	0.166	–0.001	–0.003
Business Services	0.067	–0.038	0.253
Non-market Services	0.106	–0.002	–0.016
	Georgia		
Agriculture	–0.016	0.16	1.091
Mining and Energy	0.070	0.003	0.007
Manufacturing	0.178	–0.009	–0.026
Construction	0.008	0.555	–0.341
Trade, Transport, Food	0.224	0.253	–0.031
Business Services	0.153	0.013	0.301
Non-market Services	0.384	0.025	0.001

Source: own construction.

Business services have a positive effect on productivity growth in all three countries, but it is notable in Armenia. Both expansions of the share of business services in total employment and productivity growth are noteworthy in Armenia. The productivity of this sector is considerably low in Azerbaijan. The service sector was neglected, and most business service activities did not exist in socialist economies. This sector emerged and developed in the post-socialist South Caucasia; however, its share in employment is still small. One of the reasons for the underdevelopment of the business services sector can be the lack of a strong manufacturing sector. The demand from manufacturing production for business services is an important factor for the development of business services. Therefore, the absence of a strong manufacturing sector to demand business services could explain the underdevelopment and underrepresentation of business service activities in South Caucasia. Armenia had a special place in the computer industry of the USSR, and it acquired capacities for Armenia. As a result, the performance of Armenia in the export of ICT services is remarkable. There is a rising trend of outsourcing ICT services to CIS regions, and Georgia also benefited from it. Despite some achievements in ICT service exports in Armenia and Georgia, other business service activities do not develop in South Caucasia.

The development and expansion of progressive sectors is one side of the coin of structural change, while the contraction of backward activities is another side of it. Agricultural production is the classic representative of low-value-added activities. There was already overemployment in agricultural production in this region in the socialist period. The privatization of the agricultural land turned the kolkhoz workers into the owners of a small plot of land, and commercial farming is not relevant in small-scale farming. There was no effective social protection system in this region; therefore, a huge number of subsistence workers are stuck in agriculture, and it does not allow contraction of the share of this sector in total employment. Additionally, non-agricultural sectors cannot create enough jobs and impede the shift of labor from agriculture to non-agriculture. Nevertheless, Armenia has been successful in halving the share of agricultural employment. At the same time, productivity growth in agriculture is remarkable, and it contributes to the halve of the within-sector effect in Armenia. In contrast to Armenia, the contraction of agricultural employment is considerably small in Azerbaijan and Georgia, but the reallocation effect of this sector is highest in Azerbaijan and Georgia. The productivity in agriculture is extremely low in these countries. Therefore, a slight contraction produces a higher rate of positive reallocation effect.

3. Econometric Analysis of Structural Change and Economic Growth

As a decomposition method, the CSLS can only measure the direct effect of structural change. However, the contribution of the progressive sector to economic growth surpasses the direct reallocation effect. The SSAs are not able to measure the growth effect due to technological spillovers from modern sectors. Therefore, I use an econometric test to measure the overall effect of advanced sectors on economic growth in South Caucasia.

Business services and *manufacturing* exports represent advanced activities. The business services variable is the share of business service output in total output, and manufacturing exports are the share of manufacturing exports in total exports.

$$BSO_i = \frac{Output^{business\ services}}{Output^{total}} \quad MEx_i = \frac{HTM_{exports}}{Total_{exports}}$$

The models are described in the following formulas:

$$\Delta Y = \alpha + \beta_1 INV + \beta_2 RENT_{i,t} + \beta_3 \frac{Y_{i,t}}{Y_{USD}} + \beta_4 MEx_{i,t} + \beta_5 EDU_{i,t} + \beta_6 INST_{i,t} \, \mu_{i,t}$$ Model 1

$$\Delta Y = \alpha + \beta_1 INV + \beta_2 RENT_{i,t} + \beta_3 \frac{Y_{i,t}}{Y_{USD}} + \beta_4 BSO_{i,t} + \beta_5 EDU_{i,t} + \beta_6 INST_{i,t} + \mu_{i,t}$$ Model 2

ΔY is the dependent variable, and it is the growth rate of the GDP per capita. INV stands for investment, and it is expressed as the ratio of gross fixed capital formation to GDP. Oil exports and remittances provide a considerable amount of foreign currency for Azerbaijan and Armenia and Georgia, respectively. They play a positive role in the economic growth of these countries *(Ibadoghlu and Niftiyev, 2022; Ahmadov, 2022)*. The RENT is the sum of the remittance to GDP and oil revenue to GDP ratios. The convergence hypothesis states that countries grow faster at lower levels of income *(Salai-Martin, 1966)*. These countries shifted from low-income to upper-middle-income groups in the last two decades. Therefore, being at different stages of development can have a different effect on the rate of growth. $Y_{i,t}/Y_{USA}$ measures this effect and represents the ratio of the GDP per capita in country *i* to the US level. The EDU represents the educational variable and is expressed as a ratio of tertiary enrollment to total enrollment. INST is a variable for institutional quality. A line of literature mentions the importance of high-quality institutions for economic growth *(Rodrik et al., 2004)*. I use the Rule of Law as an institutional variable. The BSO and MEx represent the progressive sectors and are the main explanatory variables. The data source for per capita growth, gross fixed capital accumulation, oil rent, remittance, and tertiary enrollment is the World Bank Development Indicators. The rule of law data are from World Bank Governance Indicators. The data for manufacturing exports are sourced from the World Integrated Trade Solution (WITS). The National Statistics Office is the source of the data for the business service output.

I use the FMOLS and DOLS models. The size of the panel dataset of this study is small, and the suitability of these models to a small sample is their first advantage. The second advantage is that they allow for cross-sectional heterogeneity; therefore, they enable less biased estimators. Third, these models are dynamic and can handle the endogeneity problem *(Pedroni, 2001; Mercan–Gocer, 2013)*.

The Panel Unit Root Tests diagnose the stationarity of the panel series. I apply the *Breitung (1999)* and *Im et al. (2003)* tests. The main strength of these tests is the better estimation of the small sample. All series are nonstationary at level but stationary at the first difference.

After the stationarity test, I test the cointegrating relationship among variables in each model. I employ the Pedroni Residuals Cointegration test *(Pedroni, 1999)*. The assumption of the Pedroni Residuals Cointegration test is that the sections are homogenous, while the assumption of the Group Statistics is that the sections are heterogeneous. The null hypothesis is that there is no cointegration among the variables. The null hypothesis is rejected in four of the seven cointegration tests in both models. Therefore, by the rule of the majority, we can say there is cointegration among the variables.

Table 6

Panel Unit Root Tests

Variables		Breitung t-stat	Im, Pesaran and Shin T-stat
Level	GROWTH	–1.16	–1.66**
	MEX	–0.24	–2.98**
	BSO	1.45	0.49
	INVESTMENT	–0.59	–0.93
	RENT	–0.75	–0.23
	INST	–1.29	–1.67**
First Difference	ΔGROWTH	–7.03***	–5.22***
	ΔHTEX	–2.78***	–3.80***
	ΔBSO	–2.26**	–2.69***
	ΔINVESTMENT	–3.71***	–3.16***
	ΔRENT	–2.81***	–1.43*
	INST	–1.78**	–3.19***

The results of the FMOLS and DOLS show the long-run relationship between economic growth and explanatory variables. The effect of investment on growth is positive in the FMOLS in both models, while it is negative in the DOLS of Model 1 and still positive in Model 2. The *RENT* has a positive effect in both models. The economic growth in this region was in hand with oil revenue inflows (Azerbaijan) and worker remittances (Armenia and Georgia), which explains the positive association between rent and economic growth. Except for the DOLS of Model 1, institutional quality shows a negative association with growth, which could be explained by the fact that the protection of property rights is not the main binding constraint on economic growth in these countries.

Table 7

Panel Cointegration Test
Model 1

Methods					
Within-dimension (panel statistics) (homogeneous)			Between-dimension (heterogeneous)		
Test	Statistics	Probability	Test	Statistics	Probability
Pedroni Residual Cointegration					
Panel v-Statistic	–0.81	0.7919	Group rho-Statistic	3.69	0.9999
Panel rho-Statistic	2.94	0.9744	Group PP-Statistic	–10.30	0.0000
Panel PP-Statistic	–2.42	0.0014	Group ADF-Statistic	–4.35	0.0000
Panel ADF-Statistic	–3.37	0.0004			

Model 2

Methods					
Within-dimension (panel statistics) (homogeneous)			Between-dimension (heterogeneous)		
Test	Statistics	Probability	Test	Statistics	Probability
Pedroni Residual Cointegration					
Panel v-Statistic	–0.74	0.7715	Group rho-Statistic	3.45	0.9997
Panel rho-Statistic	2.92	0.9983	Group PP-Statistic	–10.05	0.0000
Panel PP-Statistic	–1.92	0.0272	Group ADF-Statistic	–4.37	0.0000
Panel ADF-Statistic	–3.32	0.0004			

Consistent with expectations, the progressive sectors of manufacturing exports and business services production have a positive contribution to economic growth. These sectors could contribute to the improvement of the technological capacity of other sectors. Additionally, progressive sectors can pay competitive salaries, which can spur demand for the goods and services of nontradable goods and consequently contribute to economic growth.

Table 8

Results

Model 1

	FMOLS		DOLS	
	Coefficient	T-statistics	Coefficient	T-statistics
MEX	31.5***	26.9	15.6**	6.16
INVESTMENT	0.18**	2.33	–0.33***	–5.14
RENT	0.31***	2.98	7.41***	4.71
INST	–5.82***	90.5	4.16*	6.94

Model 2

	FMOLS		DOLS	
	Coefficient	T-statistics	Coefficient	T-statistics
BSO	0.59***	4.65	18.04***	3.22
INVESTMENT	0.11***	1.11	2.86***	8.05
RENT	0.63***	5.17	11.1***	7.51
INST	–5.07***	–61.1	–22.54***	–3.94

4. Conclusion

In this paper, I analyze the role of structural change in economic growth in South Caucasia. The CSLS method is used to evaluate the direct effect of the reallocation of labor across sectors on productivity. Within-sector productivity is the driving force of productivity growth. Georgia is distinguished for the highest level of the reallocation effect, while this effect is the smallest in Azerbaijan. The manufacturing sector stayed smaller, and its inability to expand resulted in a negligible reallocation effect. Even though its share is still smaller, the business service sector expanded and produced a positive reallocation effect in all three countries, but its effect is remarkable in Armenia. Armenia could halve the share of agricultural employment in total employment, but the contraction of agricultural employment is small in other countries. The productivity of agriculture is extremely small in Azerbaijan and Georgia. Therefore, its slight contraction has a considerable reallocation effect.

I employ the FMOLS and DOLS to measure the overall effect of the progressive sector on economic growth. The results show that both manufacturing and business services have a positive effect on economic growth in South Caucasia.

The reduction in the rigidity of the economic system inherited from the socialist period and the favorable external environment has been behind the rapid economic growth between the late 1990s and mid-2010s in South Caucasia. However, the value structure of South Caucasian economies did not upgrade in this growth period. This growth method exhausted its potential and could not provide further growth. One feasible option to upgrade these small economies' value structure could be integration into the GVC, and hosting MNCs can facilitate it. To attract MNCs and encourage domestic companies in higher value activities, domestic technological capacities and investment in human capital should be increased, and a supportive institutional environment should be provided. A significant part of the sectoral reallocation of labor occurred in the early transition period, and there are no data for that period. Therefore, it limits this study to give a full picture of the effect of the structural change in post-socialist South Caucasia.

A potential direction for future studies on the topic of structural change and economic growth in this region is the analysis of the effect of capacity building on the development of higher-value sectors in South Caucasia.

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