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THE INTERRELATIONSHIP OF GROWTH, POVERTY AND INEQUALITY IN ARMENIA

Poverty alleviation is among the most studied topics in the academic literature. Remarkably, the research on this topic made Amartya Sen a Nobel Prize Laureate in Economics. However, in spite of abundance of the research papers poverty was, is and continues to be a major issue and in many countries like Armenia poverty rate has recorded an increasing tendency. It once again proves that the case of each country is unique and in order to figure out the relationship among growth, poverty and inequality it's more provident to carry out a thorough case study on every country rather than implement policies based upon the existing perceptions in the scholarly literature. To put it simply the case of no country is generalizable.

In the analysis below I'll try to answer the following research question - "What is the relationship between economic growth and income/wealth distribution in Armenia?"

Key words: *poverty, inequality, economic growth, Gini index.*

JEL: O4, O15, I3

Literature review

The conviction that inequality creates favorable conditions for GDP growth is predicated upon so-called Kuznets hypothesis.¹ The gist of Kuznets hypothesis is that in early periods of growth the gap among different societal strata increases, while in the subsequent periods it decreases. On the whole Kuznets states that inequality and GDP growth are positively correlated.² This finding is supported by Kaldor³ and Mireles⁴. The former states that the

¹ **Simon Kuznets**, "Economic Growth and Income Inequality," *The American Economic Review*, 1955.

² *Ibid.*

³ James A. Mirrlees, "The Optimal Structure of Incentives and Authority within an Organization", *The Bell Journal of Economics*, 1976.

marginal propensity to save is higher in case of rich people vis-a-vis the poor.⁵ Furthermore, he notes that investment is linked with high transaction costs that are affordable only to rich people.⁶ Mireles in his turn argues that the main source of the working class income is the salary which is relatively stable and discourages the employees to produce/create more and more. Furthermore, having a stable income, according to Mireles, employees have less incentive to invest.⁷ To solve the issue Mireles suggests flexible and optimal tax mechanisms.

Notably, the vast majority of the reviewed literature proves that scholars are more inclined to think that the nexus between inequality and growth is negative. The proponents of this view are Alesina and Rodrik⁸, Persson and Tabellini⁹, Roberto Perotti¹⁰ and many other scholars.

Alesina and Rodrik showed the righteousness of their predispositions on the correlation between Gini coefficient and the distribution of the lands.¹¹ Persson and Tabellini came to the similar conclusion based upon times series analysis. However, I'd like to mention that their range of countries under consideration was relatively small (9 developed countries).¹² The methodology used in this article will also be applicable in my research. Perotti arrived at the same conclusion based on a larger sample.

Some scholars derive the inequality and subsequent GDP growth from political reasons. In particular, Javid et al show that the lack of democracy entails bigger budget deficit hence less money goes to the social sphere reducing consumption and consequently economic growth.¹³ This was shown based on a quantitative analysis on Pakistani case. However, the research fails to consider other intervening variables affecting the redistribution apart from state funds. Alesina and Rodrik argue that income and wealth inequality is a reason behind the victory of socialist political parties.¹⁴ They aver that citizens are more prone to vote for those parties who promise more equal distribution of income. Once the promises are implemented the GDP starts to grow.¹⁵ Perotti tested the arguments of Alesina and Rodrik and found that not always the dependence of economic growth on political factors is significant.¹⁶ In some

⁴ Ibid.

⁵ **Nancy Birdsall, David Ross and Richard Sabot**, "Inequality and Growth Reconsidered: Lessons from East Asia", *The World Bank Economic Review* 9, no. 3 (1996): 479–500.

⁶ Ibid.

⁷ Mirrlees

⁸ **Alberto Alesina and Dani Rodrik**, "Distributive Politics and Economic Growth" (National Bureau of Economic Research, 1991).

⁹ **Torsten Persson and Guido Tabellini**, "Is Inequality Harmful for Growth? Theory and Evidence" (National Bureau of Economic Research, 1991).

¹⁰ **Roberto Perotti**, "Growth, Income Distribution, and Democracy: What the Data Say", *Journal of Economic Growth* 1, no. 2 (1996): 149–87.

¹¹ **Alesina and Rodrik**, "Distributive Politics and Economic Growth".

¹² **Persson and Tabellini**, "Is Inequality Harmful for Growth? Theory and Evidence".

¹³ **Attiya Y Javid, Umaima Arif and Asma Arif**, "Economic, Political and Institutional Determinants of Budget Deficits Volatility in Selected Asian Countries", *The Pakistan Development Review*, 2011, 650.

¹⁴ **Alberto Alesina and Roberto Perotti**, "Income Distribution, Political Instability, and Investment," *European Economic Review* 40, no. 6 (1996): 1203–28.

¹⁵ Ibid.

¹⁶ **Perotti Roberto**, "Growth, income distribution, and democracy: what the data say." *Journal of Economic growth* 1, no. 2 (1996).

cases the regression coefficient was very small and in some cases even negative. In particular, he regressed the tax rate and the economic growth.¹⁷

However, not all scholars support this argument. Carlos and Pons-Vignon, for instance, aver that aid has a vital importance for both the existence and the development of the African states.¹⁸ Haan and Wermerdam¹⁹ state that the influence of aid on the linkage of aid and development is blurry. They argue that we do not (yet) know **enough** about the specific impact of aid on specific elements of state capacity and “governance” as it is manifested in policies, institutions, and processes (laws, bureaucracy, elections, business regulation).²⁰

Methodology

To find out the nexus between growth, poverty and inequality a correlation-regression analysis has been carried out. The %-wise poverty rate is the dependent variable. The analysis is entirely based upon World Bank data (from 2004 to 2014) and has been conducted through “Statistical package for the social science (SPSS)” software. In particular, I have measured strength and dependence between my dependent and independent variables. Prior to choosing the type of correlation, I have checked the heteroscedasticity. Afterwards, I’ve checked the colinearity among independent variables (multicollinearity) in order not to include already correlated variables in the regression model.

Correlation-regression analysis

Now, I’ll show the strength between poverty rate and GDP growth and at the same time controlling the other predicting variables. Based upon the case studies discussed in the “literature review” I assume that the following independent variables have the highest impact on the poverty rate change: GDP growth, rate change of the personal remittances, the concentration of income (measured by Gini index), GNI per capita, interest payments of the state debt, inflation rate and unemployment rate. I have done my calculations based upon the changes of their rates. I have calculated Palma index by dividing the consumption of the richest 20 percentile over the poorest 40. I used not only Gini, but also Palma index to find out the strength between inequality and poverty. A number of case studies conducted by the prominent economist Palma prove that in most countries, the middle class consumes almost the half of the GDP, hence inequality is more expedient to calculate based upon the difference of the expenditures of the poor and the rich.²¹ The relevant data is illustrated in the table below.

¹⁷ Ibid.

¹⁸ Oya Carlos and Nicolas Pons-Vignon, “9 Aid, development and the state in Africa”. The Political Economy of Africa (2010), 172.

¹⁹ Arjan De Haan and Ward Wermerdam, The Politics of Aid Revisited: A Review of Evidence on State Capacity and Elite Commitment, 2012.

²⁰ Ibid.

²¹ Cobham Alex, Andy Sumner, Andrea Cornia, Stefan Dercon, Lars Engberg-pedersen, Martin Evans, Nick Lea et al. “Putting the Gini back in the bottle? The Palma as a policy-relevant measure of inequality”, (2013).

Table 1

Factors affecting the change of the poverty rate²²

Year	GDP per (annual %)	Change ²³ of the poverty rate, (% annual)	Personal remittances change (annual, %)	Gini index (Change annual, %)	GNI per capita change (annual, %)	Change of the inflation rate, (annual, %)	Palma index change (% annual)	Unemployment rate change, total (annual, %)
2000	2.6					2.49		
2001	3.65	1.01	-0.67	-0.85	6.7	-2.08	-0.066	17.6
2002	3.62	-2.29	1.05	-0.59	4.0	3.66	-0.073	-8.1
2003	0.8	-2.45	0.46	-1.75	-0.2	2.23	-0.168	0.8
2004	-3.57	-3.28	6.17	4.48	-3.6	-6.31	0.402	4.99
2005	3.39	-3.31	6.52	-1.52	5.1	2.25	-0.151	-5.79
2006	-0.66	-1.09	-0.36	-3.5	-1	1.51	-0.29	0.8
2007	0.553	0.46	-0.45	-2.66	0.6	4.54	-0.181	-0.2
2008	-6.84	-2.4	-1.53	0.88	-7	-5.54	0.058	-12
2009	-21.04	0.7	0.32	-1.13	-23.1	4.7	-0.083	2.3
2010	16.	1.13	1.37	1.49	18.8	-0.5	0.103	0.29
2011	2.4	-0.34	-0.29	0.25	0.1	-5.0938	0.014	-0.6
2012	2.5	-0.45	0.298	-0.84	4.38	3.23	-0.04	-1.10
2013	-3.93	0.15	1.678	1.06	-3.55	-2.81	0.08	-1.0
2014	0.2		-1.8		-0.6	-2.98		0.8

Firstly, I will check the righteousness of the Kuznets hypothesis on the Armenian example. I'll use Spearman correlation to find out the strength and the direction between poverty rate change and GDP growth. The explanation of choosing particularly Spearman correlation is illustrated in the appendix part.

Table 2

Correlation between GDP growth rate change and poverty rate change
Correlations

			Change of Poverty gap at \$3.10 a day (2011 PPP) (%)	GDP growth (annual %)
Spearman's rho	Change of Poverty gap at \$3.10 a day (2011 PPP) (%)	Correlation Coefficient	1.000	-.621 [*]
		Sig. (1-tailed)		.012
		N	13	13
	GDP growth (annual %)	Correlation Coefficient	-.621 [*]	1.000
		Sig. (1-tailed)	.012	
		N	13	15

From the table above it is evident that $r=-6.21$, $P<0.05$, $N=13$ (see table 4), hence there is a strong negative and statistically significant correlation between poverty rate change and GDP growth. Now, I'll do multiple correlation analysis for two purposes: 1. to find out the association of poverty rate change with other independent variables, 2. to find out the multi-collinearity among the independent variables and exclude the respective variables from the regression analysis. The multiple correlation analysis is illustrated in the table below.

²² All the data (except Palma index) were compiled from the official webpage of the World Bank, for further information http://databank.worldbank.org/data/reports.aspx?Code=NY.GNP.PCAP.CD&id=af3ce82b&report_name=Popular_indicators&populartype=series&ispopular=y#, last access 6 May 2016

²³ Poverty gap at \$3.10 a day (2011 PPP) (%)

Table 3

Multiple correlation analysis

			Correlations							
			GDP growth rate change (annual %)	Change of Poverty gap at \$3.10 a day (2011 PPP) (%)	Palma index change (annual %)	Personal remittances, received current USD (annual %)	Change of GNI growth (annual %)	Change of GNI index (World Bank estimate)	Change of Unemployment, total (% of total labor force)	Change of Inflation, consumer prices (annual %)
Spearman's rho	GDP growth rate change (annual %)	Correlation Coefficient	1.000	-.621*	-.632*	.749**	.240	-.604*	-.119	.118
		Sig. (1-tailed)		.012	.010	.001	.205	.014	.343	.338
		N	15	13	13	15	14	13	14	15
	Change of Poverty gap at \$3.10 a day (2011 PPP) (%)	Correlation Coefficient	-.621*	1.000	.110	-.588*	.258	.060	-.338	.187
		Sig. (1-tailed)	.012		.360	.017	.197	.422	.129	.271
		N	13	13	13	13	13	13	13	13
	Palma index change (annual %)	Correlation Coefficient	-.632*	.110	1.000	-.154	-.049	.984**	-.066	-.681**
		Sig. (1-tailed)	.010	.360		.308	.436	.000	.415	.005
		N	13	13	13	13	13	13	13	13
	Personal remittances, received current USD (annual %)	Correlation Coefficient	.749**	-.588*	-.154	1.000	.160	-.077	-.172	-.093
		Sig. (1-tailed)	.001	.017	.308		.292	.401	.279	.371
		N	15	13	13	15	14	13	14	15
	Change of GNI growth (annual %)	Correlation Coefficient	.240	.258	-.049	.160	1.000	-.071	-.130	.257
		Sig. (1-tailed)	.205	.197	.436	.292		.408	.329	.187
		N	14	13	13	14	14	13	14	14
Change of GNI index (World Bank estimate)	Correlation Coefficient	-.604*	.060	.984**	-.077	-.071	1.000	-.138	-.643*	
	Sig. (1-tailed)	.014	.422	.000	.401	.408		.327	.009	
	N	13	13	13	13	13	13	13	13	
Change of Unemployment, total (% of total labor force)	Correlation Coefficient	-.119	.338	-.066	-.172	-.130	-.138	1.000	-.119	
	Sig. (1-tailed)	.343	.129	.415	.279	.329	.327		.343	
	N	14	13	13	14	14	13	14	14	
Change of Inflation, consumer prices (annual %)	Correlation Coefficient	.118	.187	-.681**	-.093	.257	-.643*	-.119	1.000	
	Sig. (1-tailed)	.338	.271	.005	.371	.187	.008	.343		
	N	15	13	13	15	14	13	14	15	

Poverty rate change has the strongest association with the GDP rate change ($r=0.621$, $p=0.012$, $N=13$). GNI rate change and would not be included in the regression model to avoid multi-collinearity as it is strongly correlated with GDP growth on a statistically significant level ($r=0.969$, $P<0.05$ (in fact it is less than 0.01), $N=14$). As it was expected the rate changes Palma and Gini indices are perfectly correlated. From them I'll include only Palma index rate change in the regression model. The correlation between Gini (as well as Plama) index and GDP rate change is not only extremely low, but also statistically insignificant. Hence, it is impossible to make any inference regarding economic growth and equal distribution predicating upon that correlation coefficient. In my model I'll use GDP per capita change instead of growth rate change of GDP to adjust the impact of population change.

Table 4

Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.884 ^a	.782	.626	.99639034

From the table above it is inferred that the choice of the independent variables is correct, as R^2 is quite high - 78%. It means that the independent variables in aggregate cause 78% of change of the values of the dependent variable. The R value is the correlation coefficient poverty rate change and all the other independent variables. And finally the impact of the error is less than 5%. The adjusted R^2 adjusts the bias of the R^2 ; however, this index replaces the R^2 only when the number of the cases (in our case years) is too big. In our case we investigate just 15-year time span, hence predicating upon R^2 is more than reasonable.

Table 5

The Significance of the Statistical Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.925	5	4.985	5.021	.028 ^a
	Residual	6.950	7	.993		
	Total	31.874	12			

From the table above it becomes clear that our model is significant with statistical significance lower than 0.05. Furthermore, it also becomes clear that the regression is of a much higher variance than the residual. If there is no relationship between the dependent variable which is poverty rate change in % and the independent variables the F would be close to 1. In this case we have significantly different from 2. R is the correlation coefficient between the dependent variable which is poverty rate change in our model and all the independent variables in aggregate. In our case the correlation is very strong (R=0.884).

Table 6

Regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.005	.388		-.012	.991
	Personal remittances, received current USD (annual, %)	-.025	.007	-.738	-3.735	.007
	Change of Unemployment, total (% of total labor force)	.103	.041	.443	2.490	.042
	Change of Inflation, consumer prices (annual %)	.032	.122	.078	.265	.799
	GDP per capita growth (annual %)	-.045	.041	-.228	-1.099	.308
	Palma index change (annual, %)	1.558	2.898	.165	.537	.608

And finally, with the help of the data in the 9th table it is possible to have the regression model and gauge the impact of the individual independent variables on the poverty rate change in %. The value of the intercept is - 0.005. The B column provides us with information regarding the coefficients of the independent variables. Hence, our regression model would be:

Poverty rate change = - 0.005 - 0.025 personal remittances + 0.103 unemployment rate change + 0.032 inflation rate change - 0.045 GDP per capita change +1.558 Palma index

The Beta coefficients show the impact of each of the dependent variable, i.e. how the change of each dependent variable would affect poverty rate change. The t value enables to see how significant the contribution of each variable is. The contribution is significant when t is essentially different from zero, i.e. either higher or lower. As it is inferred from the Beta coefficients the poverty growth change is sensitive to the change of personal remittances (with high statistical significance), rate of unemployment (with high statistical

significance) and GDP per capita change (in %). The impact of inflation rate change is neither high, nor statistically significant. However, the sample size is quite small (15 years, for some indicators even 14), hence the model is to be double checked once data are available in the World Bank website for a longer time period. Moreover, the independent variables (taken into consideration in the reviewed literature) mentioned above have overall 78% impact and further research should be carried out to find out which independent variables had 22% on the poverty rate change for 2000-2014 time period.

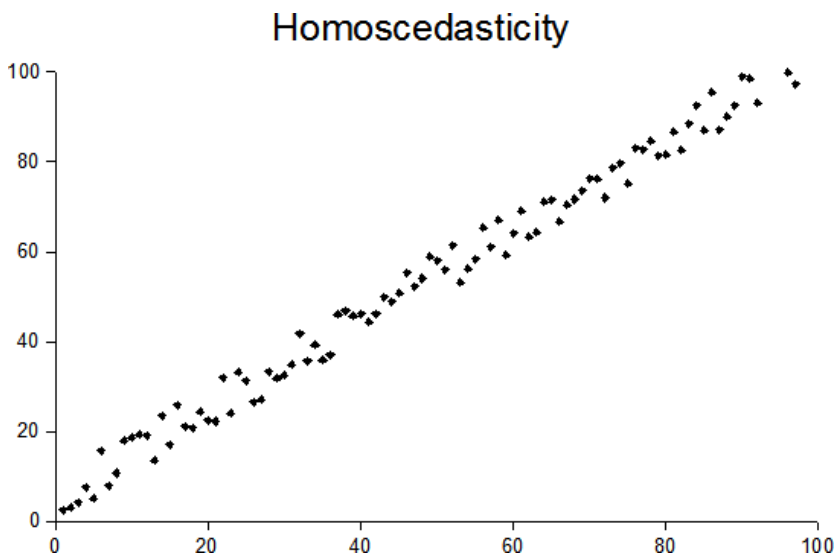
Conclusion

The regression model shows that higher inequality (higher Palma index) leads to higher poverty. Although the sample size is not very big (15 years), it once more shows that the Kuznets hypothesis, i.e. more inequality more growth should be reconsidered. As it is shown above inequality leads to more poverty and, meanwhile poverty rate change and the rate change of GDP growth are negatively correlated.

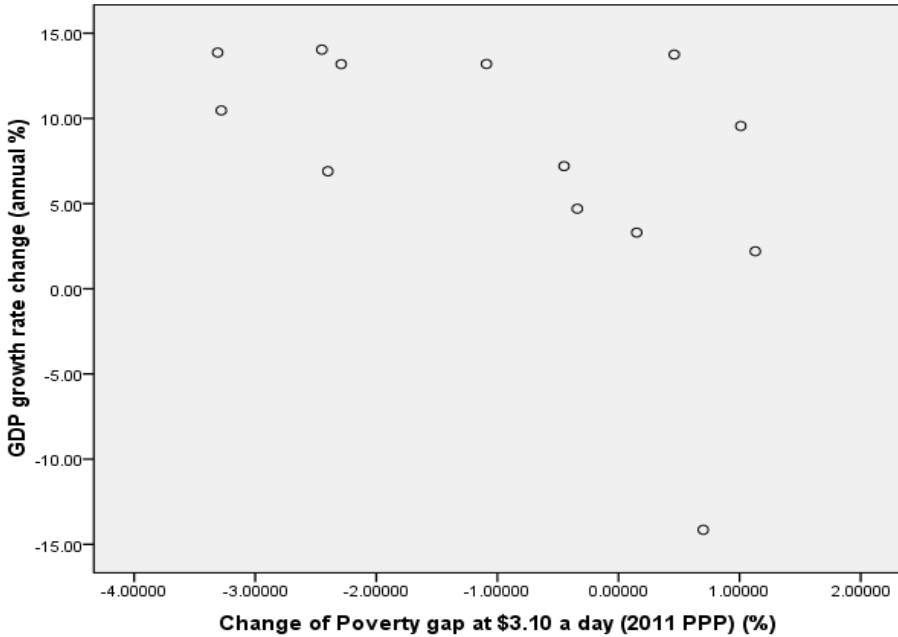
APPENDICES

Appendix 1

Before doing Pearson correlation, I have checked heteroscedasticity requirement with the help of the scatter plot. For doing a Pearson correlation the scatter plot should be akin to the one pictured below.



The plots, however, are not evenly distributed in case of our scatter plot (pictured below); hence I decided to do a Spearman correlation.



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ԱԼԲԵՐՏ ՀԱՅՐԱՊԵՏՅԱՆ*ՀՊՏՀ մակրոէկոնոմիկայի ամբիոնի ասպիրանտ****Աղքատության, տնտեսական աճի և անհավասարության փոխկապվածությունը Հայաստանում.–***

Աղքատությունը տնտեսագիտական ակադեմիական գրականության մեջ ամենաուսումնասիրված հիմնահարցերից մեկն է: Ուշագրավ է, որ հենց այս հիմնախնդրի հետազոտման համար Ամարտյա Սենը դարձավ տնտեսագիտության բնագավառում Նոբելյան մրցանակի դափնեկիր: Այնուամենայնիվ, հիմնահարցը շարունակում է մնալ արդիական և չլուծված (կամ մասնակիորեն լուծված), և այնպիսի երկրներում, ինչպիսին Հայաստանն է, աղքատությունը, վերջին տարիների ընթացքում, արձանագրել է աճի միտում: Սակայն պետք է նշել, որ յուրաքանչյուր երկիր պահանջում է առանձնահատուկ մոտեցում: Ուստի տնտեսագիտության մեջ ամենաշատը քննարկված հիմնահարցերից մեկը՝ աղքատության, ՀՆԱ աճի և եկամուտների անհավասարության կապը, նպատակահարմար է դիտարկել ըստ որոշակի երկրների՝ չընդհանրացնելով եզրահանգումներն այլ երկրների պարագայում:

Սույն հոդվածում լուսաբանվում են աղքատության, ՀՆԱ աճի և եկամուտների անհավասարության հիմնախնդիրները ՀՀ-ում: Մասնավորապես՝ իրականացվել է կոռելյացիոն-ռեգրեսիոն վերլուծություն աղքատության մակարդակի փոփոխության և մնացյալ անկախ փոփոխականների միջև կապը և փոխկախվածությունը բացահայտելու նպատակով:

Հիմնաբառեր. *աղքատություն, անհավասարություն, ՀՆԱ աճ, ՋիՆիի գործակից:*

JEL: O4, O15, I3

АЛЬБЕРТ АЙРАПЕТЯН*Аспирант кафедры Макроэкономики АГЭУ****Взаимосвязь экономического роста, нищеты и неравенства в Армении.–***

Тема борьбы с бедностью является одной из наиболее исследуемых проблем в научной литературе. Примечательно, что исследование данной темы позволило Амартия Сену стать лауреатом Нобелевской премии в области экономики. Однако, несмотря на большое количество исследований, бедность была и продолжает оставаться серьезной проблемой во многих странах, как и в Армении, продолжая демонстрировать тенденцию к росту.

Наряду с этим, необходимо отметить, что случай каждой страны индивидуален. В данном контексте понимания связи между ростом ВВП, бедностью и неравенством необходимо достигать путем изучения опыта каждой отдельной страны, а не основывать свою политику на уже имеющихся

в научной литературе восприятиях. Проще говоря, опыт ни одной страны не является обобщающим.

В нашем исследовании мы попробуем дать ответ на следующий исследовательский вопрос: “Какова связь между экономическим ростом и распределением дохода/богатства в Армении?”

Ключевые слова: бедность, неравенство, экономический рост, коэффициент Джини.

JEL: O4, O15, I3