

Economic Growth & Income Inequality: A revised cross-sectional econometric analysis of the global impact of income inequality on economic growth around the world

Abstract: After decades of investigation there is an abundance of research dedicated to the relationship between income inequality and economic growth. The research emphasizes the relationship primarily for developed countries with a renewed focus on the developing world. This paper examines the effects of inequality on GDP per capita growth from 2007 to 2012 for all countries with available data and compares that relationship to other impactful factors on economic growth. These other factors include savings rate, fertility rate, and the unemployment rate. Through empirical analysis we found income inequality represented by the Gini coefficient to be very significant throughout all the models tested, and the savings rate and fertility rate proved significant at the 5% level. Also, the unemployment rate proved completely insignificant to economic growth. These results proved that the relationship between economic growth and income inequality is overall positive and highly correlated.

Georgia Institute of Technology

ECON 3161 - Dr. Shatakshee Dhongde

Group Members: Anna Hunter, Wendy Martinez, & Ulcka Patel

14 April 2016

I. Introduction

Explicating the relationship between income inequality and economic growth is one of the greatest challenges of the twenty-first century. Currently in the United States, income inequality has become a key issue in the 2016 presidential campaign with candidates purporting a range of different economic policies for implementation in order to reduce the impact on those at the bottom of the inequality scale; this issue remains a primary concern for most developed nations as their economic growth becomes constant instead of exponential. For the developing world, economic growth has always been a prominent topic among political figures and the citizens as developing countries are associated with the extreme ends of the income inequality scale.

Since the 2008 Financial Crisis economic growth has been regarded as a sign of recovery, and economic policies have been geared with the goal of stimulating and maintaining high levels of economic growth. However, with economic growth the topic of income inequality has also become a widely discussed issue in recent years. Economic growth reduces poverty and unemployment, increases the standard of living, and permits life-sustaining needs such as food, health, shelter, and protection to become more available to people around the world, thus it is a global issue worthy of attention and scholastic research. For many income inequality is not just viewed as an economic issue, but it has evolved into a very highly criticized social issue. Economic growth and income inequality are topics widely discussed by the many, yet understood by the few. Thus, these issues warrant investigation and the development of substantially supported policy recommendations. This analysis will include the examination of developed and developing economies in order to discover the relationship between income inequality and economic growth in a world of globalization and expected further economic interconnectedness. This paper predicted and concluded, following the data analysis, that income inequality and economic growth share a positive relationship. As a country experiences an increase in income inequality, then that country will also experience some increase in economic growth. This assumption proved an accurate guess because as an economy grows certain incomes remain unchanged or change over longer periods of time and some social classes reap all the benefits from the growth/changes in income while others remain predominantly unaffected. This relationship proved true following both single and multiple linear regression tests.

This paper is organized as follows. Section II will provide information and literary support to justify the research and hypothesis tests conducted. Section III introduces the data and techniques used to conduct our study. Section IV illuminates the results from the data and analysis methods employed, and Section V concludes the findings of this research.

The goal of this research was to provide a well-explained and foundational correlation between economic growth and inequality. This paper accounts for an assimilation of factors combined uniquely in order to further expound upon the relationship of economic growth and inequality. This research encapsulated the classification system used by the World Bank to provide non-prejudicial analysis across the globe, thus providing insight into the different relationships shared by the developed and developing worlds. This research contributes to the arduous and continuing discussion by adding a new layer and a simple groundwork to what is already and will be available. This will bolster further research for economists interested in the topic for future endeavours.

II. Literature Review

Our hypothesis was intended for a medium-run examination of the relationship between economic growth and income inequality as our single linear regression and multi-linear regression models measured GDP per capita growth over a course of five years from 2007 to 2012. Research severely lacks examination of the long-run relationship between these two variables, therefore there is little guidance beyond the short and medium-run effects. Also, there are numerous theories about the relationship between economic development and inequality as this relationship has been tested since the 1950s starting with Simon Kuznets and Nicholas Kaldor. The insurmountable research available seems to argue towards a positive and/or negative relationship between economic development and income inequality, and our experiment provided yet another thought provoking contribution.

The Kuznets model evoked the interest in examining the relationship between income inequality and economic growth, however this model is starkly contrasted as the data shifts regions: for example, the East Asian economies had little inequality and rapid economic development post-World War II, yet South America had high level of inequality and a much lower development rate. Thusly, the surge of investigation began.

In the atmosphere of globalization and further economic interdependence, the interest in the relationship between economic growth and income inequality grows only more popular and in-demand. One major concern by most economists in this field is the discovery of a new variable to accurately measure income inequality. Deininger and Squire (1996) introduced the GINI coefficient within their research, which has been at the center of controversy since its inception. As Tuomas Malinen (2013) pointed out, the GINI coefficient is inaccurate in its measures as some developed countries like France and Norway appear to have higher inequality than developing countries like India. However, in his calculus, the GINI coefficient and the EHII2008 measure, a replacement for the GINI, produced the same results: economic growth and income inequality share a negative relationship with slightly different parameter estimates. Regardless, Malinen's analysis along with others justifies the usage of the GINI

Index for empirical research regarding the examination of economic development and income inequality. Lastly, Malinen incorporated the savings rate in his calculation, thus determining that inequality in developing countries “may enhance growth indirectly indirectly through increased aggregate savings and investment.” Investment, both foreign and domestic, creates jobs and rises in income, therefore it appears logical that developing countries need higher income individuals to invest in their own infrastructure/projects in order to create opportunity for others. While this was not the author’s main argument, it provided needed insight and justified the usage of the savings rate in our multi-linear regression model.

Contrast to Malinen, Forbes (2000) determined that there is a positive relationship between economic growth and income inequality for the short and medium-run. Through the inclusion of country effects such as income, inequality, male education, female education, and purchasing power parity, the relationship between economic growth and income inequality is positive and significant although this does not determine how the variables are interconnected. The exclusion of country effects in the model provides that the relationship between growth and inequality is altogether insignificant. The evidentiary support within the study was robust and derived from data from various countries. The panel estimation utilized within this study reduced measurement errors and according to Malinen (2013) provided more statistical power and therefore support for their findings. Notably, this study acknowledges that the relationship may not hold for very poor countries, which proved troublesome for this examination as data for very poor countries was mostly unavailable.

Along a similar theme, Fawaz, Rahnama, & Valcarcel (2014) discovered that high-income developing countries (HIDCs), as classified by the World Bank, and low-income developing countries (LIDCs) exhibit contrasting relationships. In their study, which focused on the relationship in the context of credit constraints, the HIDCs held a positive relationship between economic growth and inequality. The LIDCs possessed a relationship opposite that of the HIDCs. As economic growth increased, then income inequality decreased. In order to prevent bias and provide further evidence of these contrasting narratives, Fawaz, Rahnama, & Valcarcel (2014) employed different techniques of analysis over the period of 1960 to 2010. Their research also emphasized the relationship seen only in the short and medium-run. Our research contradicted this analysis as both developed and developing countries proved to share a positive relationship between economic growth and inequality according to our regressions.

Most of the research included in this analysis spanned throughout the spectrum. Researchers using different types of analysis have found positive, negative, and non-linear patterns between economic growth and inequality. However, within the robust research most expose similar bias despite their findings. Malinen (2013) argued that credit market imperfections, institutions, and social unrest created negative bias towards the results contributing to the negative relationship between economic growth and

inequality. Forbes (2000) agreed with Malinen, that bias possibly altering the results of their models derive from different factors characteristic of each differing state such as levels of corruption and higher government spending on health and/or education. These factors along with others such as economic diversity and social structures greatly impacted the data included. The developing countries pose the largest data collecting problem as their definitions for certain variables are not uniform to those of the developed, and developing economies tend to have larger informal employment sectors that creates differences between the data collected on paper and the reality on the ground.

III. Data

Our research paper attempts to evaluate the effect of income inequality on economic growth rates in 74 countries worldwide as shown Appendix A1. Although we gathered data for 215 countries, the missing data limited the sample size to 74 countries but remained representative of developed and developing economies; the very poor countries or low-income economies, as classified by the World Bank, were the least represented due to unavailable data, however some were included. The data used in our paper was obtained from the World Bank. To measure economic growth, we used a log-level model. This model will show the effect of a percent change of GDP when the Gini coefficient is increased by 1 point. We used the percent change of GDP as our dependent variable (y) and decided on a range of five years, 2007-2012, in order to capture the short and medium economic growth rate. The five-year range allows for a more accurate representation of a country's short-term growth. This range is wide enough to cover any economic fluctuations that might occur that one year may not capture and allows for a larger sample size that may otherwise be reduced; the majority of contributing research also measured growth over five year periods. An observation to note is that this time period starts before the recent economic recession and ends in the recovery period.

Our independent variable (x) is the Gini coefficient, used to measure inequality, for the year 2007. A Gini coefficient of zero represents perfect equality, while 100 represents perfect inequality. In order to gain a better understanding of our results and the relative contributions of the predictors to the total variance, we added other independent variables in our multiple regression models. The variables picked were chosen because they were what we decided had the most economic significance to measure the effect of inequality on growth rate. The other included variables include the 2007 gross savings rate, 2007 unemployment rate, and the 2007 fertility rate. We decided to use the gross savings and unemployment rates because both are economic indicators that show the growth of a country. The fertility rate was chosen to be incorporated in the analysis because research proved that lower fertility rates are a sign of economic growth (Upreti). It was a better measure than death rate which we had previously tried to utilize. A dummy variable was used to see the effect that inequality has on growth rate for high income

countries versus countries with lower incomes. These two categories were created using the World Bank classification system: High-Income economies classified as developed countries while developing countries were compiled from those that were classified as Upper-Middle Income economies, Lower-Middle Income economies, and Low-Income economies. Within the dataset, a value of one is placed for the developed countries which have an income of \$12,736 or more, while a zero is placed for countries lower than \$12,736.

For the sake of accuracy and effectiveness, the data and models were required to fit the Gauss-Markov assumptions to ensure that the Ordinary Least Squares (OLS estimates) were accurate, linear, and unbiased estimators. The first assumption states that a model should be linear in parameter and our model holds up to that assumption as shown in our results section for Model 1. The second assumption states that random sampling should be used for the model, which is the case for our research. We collected data from all the countries in the world regardless of their income classifications through the World Bank and obtained our sample from any countries with available data points for the years necessary. The third assumption dictates that the variables cannot be perfectly correlated, and the expected value of the independent variables should equal zero. Our data was tested for collinearity and deemed to be not perfectly collinear. Also, none of our variables had an expected value of zero as shown in our summary statistics in Table 1. The fourth assumption refers to the zero conditional mean and states that the error u has an expected value of zero given any values of the independent variables. The fifth assumption states that the variance of the error u is constant given any values of the independent variables. To ensure that our research models were the best linear unbiased estimators (B.L.U.E.), we conducted several multiple regression models to test the significance of our independent variables and came to our final multiple regression model shown by Model 5.

Table 1-Overall Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
gdpchange	74	31.42	37.96	-35.24	167.99
gini2007	74	37.19	8.45	24.37	59.37
gsavs2007	74	24.72	23.46	-8.75	206.82
unemp2007	74	7.33	5.31	0.6	29.7
fer2007	74	2.35	1.27	1.25	7.69

Table 2-Descriptive Statistics for Developed Countries

Variable	Obs	Mean	Std. Dev	Min	Max
gdpchange	34	25.48	33.65	-35.24	115.81
gini2007	34	38.65	10.00	26	59.37
gsavs2007	34	21.48	8.56	-5.53	37.43
unemp2007	34	7.70	6.27	0.6	29.7
fer2007	34	2.20	1.00	1.25	5.58

Table 3-Descriptive Statistics for Developing Countries

Variable	Obs	Mean	Std. Dev	Min	Max
gdpchange	40	36.47	41.01	-20.12	167.99
gini2007	40	35.95	6.75	24.37	54.33
gsavs2007	40	27.47	30.85	-8.75	206.82
unemp2007	40	7.01	4.40	1.2	21.6
fer2007	40	2.48	1.47	1.27	7.69

Table 4-Variables, description, unit of variables and predicted signs

Variable Name	Description	Unit	Predicted Effect
gdpchange	GDP per capita growth, (current US\$), Percent change between 2007 and 2012	%	Dependent variable
gini2007	Gini coefficient	(World Bank estimate)	+
gsavs2007	Gross Savings	(% of GDP)	+
unemp2007	Unemployment, total	(% of total labor force)	-
fer2007	Fertility rate, total	(births per woman)	-

IV. Results

The following simple regression model, Model 1, was constructed to test the effects of inequality using the 2007 Gini Coefficient on the GDP per capita percent change between the years 2007 to 2012.

$$\text{Model 1: } \text{gdpchange} = \beta_0 + \beta_1 \text{gini2007} + u$$

The results of the estimation equation are shown in the following table, Table 5.

Table 5- Results of Estimation Equation for Model 1

OLS: Using Observations (n=74)

Dependent Variable: gdpchange

Variable	Coefficient	Std. Error	t-value	p-value	Sig variable
Constant	-43.46	18.05	-2.41	0.02	**
Gini2007	2.01	0.47	4.28	0.00	***

*, **, *** denotes significance of coefficients at 10%, 5%, and 1% respectively.

The level of inequality had a positive relationship with the percent change in GDP per capita, consistent with our hypothesis as stated earlier. It shows that a one-point increase in the Gini coefficient will increase GDP per capita by 201%. The p-value of gini2007 was 0.00 indicating a very high statistical significance.

In addition, we constructed a multiple regression model to account for other factors that may have an effect on economic growth. Table 6 shows estimation equation for each model and their significance levels- *, **, *** at 10%, 5%, and 1% respectively. The additional variables tested were gross savings rate, unemployment, and fertility rate as stated in the Section III. The first multiple regression model included the Gini coefficient and the gross savings rate, labelled Model 2.

$$\text{Model 2: } \text{gdpchange} = \beta_0 + \beta_1 \text{gini2007} + \beta_2 \text{gsavs2007} + u$$

The estimation equation results are shown in Table 6 Model 2. In Model 2, both independent variables were positive and significant. The R^2 value was 0.28, which increased from the R^2 value of 0.20 for Model 1 in the simple regression model.

Moreover, for Model 3 we decided to add unemployment to the independent variables and predicted a negative value.

Model 3: $gdpchange = \beta_0 + \beta_1 gini2007 + \beta_2 gsavs2007 + \beta_3 unemp2007 + u$

The results showed that unemployment was positive contrary to our prediction. With a p-value of 0.49, unemployment was statistically insignificant for our regression model. The Gini coefficient and the gross savings rate retained significance for Model 3.

In Model 4 we added fertility rate which proved significant alongside the Gini coefficient. Gross savings rate was significant at the 5% level, and unemployment was not significant. All variables were positive, and the R² value for this model increased from Model 2 to 0.35.

Model 4: $gdpchange = \beta_0 + \beta_1 gini2007 + \beta_2 gsavs2007 + \beta_3 unemp2007 + \beta_4 fer2007 + u$

Model 5 represents our restricted model which accounts for only the significant, independent variables (Gini coefficient, gross savings rate, and fertility) and omitted the unemployment rate. We concluded this model after testing for the correlation of the variables keeping in mind that a value of positive or negative one would be perfect correlation while a value of zero is no correlation. The results are shown in the Appendix A3. The results for the correlation coefficients proved that the variables are not highly correlated with each other. In fact, there were no values with a magnitude greater than 0.3, thus proving that the variables had very little correlation between each other. Because the variables are not highly correlated, we did not see significance in conducting an F-test. We decided to exclude the unemployment rate because it was statistically insignificant according to our regression, therefore constructing our restricted model to only include the significant variables.

Model 5: $gdpchange = \beta_0 + \beta_1 gini2007 + \beta_2 gsavs2007 + \beta_3 fer2007 + u$

After constructing our restricted model, we decided to add a dummy variable to show the difference between developed and developing countries. Model 6 shows the regressions for the restricted model including the dummy variable, “dev,” showing that the developed countries had an intercept of -72.55 compared to that of the developing countries at -60.55. This model also had the highest R² value of 0.37.

Model 6: $gdpchange = \beta_0 + \beta_1 gini2007 + \beta_2 gsavs2007 + \beta_3 fer2007 + \beta_4 dev + u$

Table 6- Results of Estimation Equation for Models 1-6

Dependent Variable: $gdpchange$						
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gini2007	2.01*** (4.28)	2.10*** (4.67)	2.12*** (4.61)	1.81*** (4.02)	1.79*** (3.98)	1.92*** (4.27)

Gsavs2007		0.46*** (2.88)	0.46*** (2.88)	0.37** (2.31)	0.37** (2.31)	0.35** (2.19)
Unemp2007			0.26 (0.36)	0.49 (0.70)		
Fer2007				8.32*** (2.70)	8.07*** (2.65)	7.41** (2.44)
Dev						-12.05 (-1.62)
Intercept	-43.46** (-2.41)	-58.12*** (-3.22)	-60.77*** (-3.11)	-68.14*** (-3.61)	-63.15*** (-3.93)	-60.50*** (3.50)
No. of obs.	74	74	74	74	74	74
R-square	0.20	0.28	0.28	0.35	0.35	0.37
Significance level: * = 10%, ** = 5%, *** = 1%						

By comparing the regression models we were able to see factors that have a positive impact on economic growth. The models showed that the Gini coefficient, the gross savings rate, unemployment, and fertility rates all had positive coefficients, and all the variables were significant except for the unemployment rate. The coefficients of the independent variables did not change significantly when independent variables were added to construct Models 2-6. When calculating the percent change in GDP between 2007 and 2012 for all the countries, on average the developing countries had a higher growth rate than the developed countries as shown in Table 3 in the Section III. This could account for the theory of convergence, which is another topic in itself and one we did not initially intend to statistically verify through our analysis. Another explanation regarding the higher growth rate for developing countries is that developing countries tend to be more unequal. This unequal distribution provides more opportunity for income mobility, which would contribute to the larger growth rates seen. This could be a useful topic for further research. Our hypothesis was proven correct through the simple regression model and the multiple regression models indicating that inequality coincides with economic growth. Our prediction about gross savings was verified through the positive coefficient seen in the regression models. We were surprised to see a positive coefficient for unemployment, although it was not statistically significant. We think this may be due to a large informal employment sector in developing countries which may not be accounted for in the World Bank dataset. Finally, we expected fertility to have a negative coefficient due to the fact that most developed countries have lower fertility rates compared to developing countries. However, on average the developing countries had a higher economic growth regardless of the initial

GDP per capita as shown by our data, therefore fertility had a positive coefficient because our analysis only accounts for a short term change in GDP per capita.

V. Conclusions

Overall, the OLS regression models showed that inequality and economic growth share a positive relationship. We understand that inequality in regards to economic growth is a sensitive topic with arguments for both sides, therefore the purpose for this analysis was to offer an estimation of correlation between inequality and growth. By obtaining data from the World Bank we were able to construct a sample size of 74 countries and the utilization of independent variables such as the Gini coefficient, gross savings rate, unemployment, and fertility to measure economic growth (change in GDP per capita for the period 2007-2012). In addition to the Gini coefficient, our analysis showed that gross savings rate, unemployment, and fertility all possessed positive impacts on economic growth for the time period of 2007 to 2012.

In conclusion, we chose Model 5 to best represent our results for this analysis. Furthermore, this study found a contradictory relationship between unemployment and economic growth, which warrants further research. Also, the positive relationship between fertility and economic growth provided a new puzzle to be examined in future projects. Better data and accountability, especially in regards to the Gini coefficient, would also help for further research and analysis.

References

- Deininger, Klaus and Lyn Squire, "A New Data Set Measuring Income Inequality." *The World Bank Economic Review*, 10.3 (1996): 565-91. World Bank. Web. 4 April 2016.
- Fawaz, Fadi, Rahnama, Masha, & Valcarcel, Victor J. "A refinement of the relationship between economic growth and income inequality." *Applied Economics* 46.27 (2014): 3351-3361. Taylor & Francis. Web. 4 April 2016.
- Forbes, Kristin J. "A Reassessment of the Relationship between Inequality and Growth." *American Economic Review* 90.4 (2000): 869-887. Web. 4 April 2016.
- Malinen, Thomas. "Inequality and growth: Another look with a new measure and method." *Journal of International Development* 25.1 (2013): 122–138. Wiley. Web. 4 April 2016.
- Robinson, James A, and Daron Acemoglu. "The Political Economy of the Kuznets Curve." *Review of Development Economics* 6.2 (2002): 183-203. Harvard University. Web. 4 April 2016.
- Thomas, Carolyn. "Income Inequality and Economic Development in Latin America: A test for the Kuznets inverted-u curve." *Indian Journal of Economics & Business* 14.1 (2015): 143. EBSCO. Web. 4 April 2016.
- Upreti, Parash. "Factors Affecting Economic Growth in Developing Countries."
<<http://business.uni.edu/economics/themes/Upreti.pdf>>.
- World Bank, 2007. *Total Fertility Rate* (births per woman) (The World Bank).
- World Bank, 2007. *GDP per capita* (current US \$) (The World Bank).
- World Bank, 2012. *GDP per capita* (current US \$) (The World Bank).
- World Bank, 2007. *GINI Index* (World Bank estimate) (The World Bank).
- World Bank, 2007. *Gross Savings* (% of GDP) (The World Bank).

World Bank, 2010. *Total Unemployment* (% of total labor force) (The World Bank).

Wright, Charles L. "Income Inequality and Economic Growth: Examining the Evidence." *The Journal of Developing Areas* 13.1 (1978): 49–66. JSTOR. Web. 4 April 2016.

Appendices

Appendix 1: List of Countries

Argentina	Georgia	Pakistan
Armenia	Germany	Panama
Austria	Greece	Paraguay
Belarus	Guinea	Peru
Belgium	Honduras	Poland
Bhutan	Hungary	Portugal
Bolivia	Iceland	Romania
Bosnia and Herzegovina	Ireland	Russian Federation
Brazil	Israel	Serbia
Bulgaria	Italy	Slovak Republic
Cabo Verde	Kazakhstan	Slovenia
Cambodia	Kyrgyz Republic	Spain
Cameroon	Lao PDR	Sweden
Canada	Latvia	Switzerland
Colombia	Liberia	Tajikistan
Costa Rica	Lithuania	Tanzania
Cyprus	Luxembourg	Thailand
Czech Republic	Malaysia	Timor-Leste
Denmark	Moldova	Turkey
Dominican Republic	Mongolia	Ukraine
Ecuador	Montenegro	United Kingdom
El Salvador	Morocco	United States
Estonia	Netherlands	Uruguay
Finland	Niger	West Bank and Gaza
France	Norway	

Appendix 2: STATA Regression Outputs

Model 1:

```
. regress gdpchange gini2007
```

Source	SS	df	MS	Number of obs	=	74
Model	21115.5477	1	21115.5477	F(1, 72)	=	18.08
Residual	84077.7074	72	1167.74594	Prob > F	=	0.0001
				R-squared	=	0.2007
				Adj R-squared	=	0.1896
Total	105193.255	73	1441.00349	Root MSE	=	34.172

gdpchange	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
gini2007	2.013506	.4735065	4.25	0.000	1.069588 2.957424
_cons	-43.45608	18.05108	-2.41	0.019	-79.44026 -7.471911

Model 2:

```
. regress gdpchange gini2007 gsavs2007
```

Source	SS	df	MS	Number of obs	=	74
Model	29457.427	2	14728.7135	F(2, 71)	=	13.81
Residual	75735.8281	71	1066.7018	Prob > F	=	0.0000
				R-squared	=	0.2800
				Adj R-squared	=	0.2598
Total	105193.255	73	1441.00349	Root MSE	=	32.66

gdpchange	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
gini2007	2.104225	.4537182	4.64	0.000	1.199537 3.008914
gsavs2007	.4567764	.1633403	2.80	0.007	.1310852 .7824677
_cons	-58.12059	18.03179	-3.22	0.002	-94.07497 -22.16622

Model 3:

```
. regress gdpchange gini2007 gsavs2007 unemp2007
```

Source	SS	df	MS	Number of obs	=	74
Model	29604.1176	3	9868.03921	F(3, 70)	=	9.14
Residual	75589.1375	70	1079.84482	Prob > F	=	0.0000
Total	105193.255	73	1441.00349	R-squared	=	0.2814
				Adj R-squared	=	0.2506
				Root MSE	=	32.861

gdpchange	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
gini2007	2.119555	.4583957	4.62	0.000	1.205314 3.033797
gsavs2007	.4611962	.1647804	2.80	0.007	.1325521 .7898403
unemp2007	.2684896	.728462	0.37	0.714	-1.184382 1.721361
_cons	-60.76716	19.51187	-3.11	0.003	-99.68236 -21.85196

Model 4:

```
. regress gdpchange gini2007 gsavs2007 unemp2007 fer2007
```

Source	SS	df	MS	Number of obs	=	74
Model	36853.0767	4	9213.26918	F(4, 69)	=	9.30
Residual	68340.1784	69	990.437368	Prob > F	=	0.0000
Total	105193.255	73	1441.00349	R-squared	=	0.3503
				Adj R-squared	=	0.3127
				Root MSE	=	31.471

gdpchange	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
gini2007	1.807064	.4539506	3.98	0.000	.901457 2.71267
gsavs2007	.3734471	.1611102	2.32	0.023	.0520411 .694853
unemp2007	.4896462	.7024265	0.70	0.488	-.9116564 1.890949
fer2007	8.319764	3.075294	2.71	0.009	2.18472 14.45481
_cons	-68.13635	18.88415	-3.61	0.001	-105.8092 -30.4635

Model 5:

```
. regress gdpchange gini2007 gsavs2007 fer2007
```

Source	SS	df	MS	Number of obs	=	74
Model	36371.8054	3	12123.9351	F(3, 70)	=	12.33
Residual	68821.4497	70	983.163567	Prob > F	=	0.0000
				R-squared	=	0.3458
				Adj R-squared	=	0.3177
Total	105193.255	73	1441.00349	Root MSE	=	31.355

gdpchange	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
gini2007	1.788855	.4515312	3.96	0.000	.8883048 2.689406
gsavs2007	.3681272	.1603373	2.30	0.025	.0483446 .6879098
fer2007	8.07028	3.043161	2.65	0.010	2.000887 14.13967
_cons	-63.15418	17.41507	-3.63	0.001	-97.88744 -28.42092

Model 6:

```
regress gdpchange gini2007 gsavs2007 fer2007 dev
```

Source	SS	df	MS	Number of obs	=	74
Model	38888.9452	4	9722.2363	F(4, 69)	=	10.12
Residual	66304.3099	69	960.932027	Prob > F	=	0.0000
				R-squared	=	0.3697
				Adj R-squared	=	0.3332
Total	105193.255	73	1441.00349	Root MSE	=	30.999

gdpchange	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
gini2007	1.923468	.4540791	4.24	0.000	1.017605 2.829331
gsavs2007	.3451504	.1591486	2.17	0.034	.0276576 .6626431
fer2007	7.40869	3.036201	2.44	0.017	1.351635 13.46574
dev	-12.05043	7.445525	-1.62	0.110	-26.90385 2.802983
_cons	-60.50173	17.29487	-3.50	0.001	-95.00405 -25.99941

Correlation Output:

```
. correlate gini2007 gsavs2007 unemp2007 fer2007  
(obs=74)
```

	gini2007	gsa~2007	une~2007	fer2007
gini2007	1.0000			
gsavs2007	-0.0715	1.0000		
unemp2007	-0.0856	-0.0662	1.0000	
fer2007	0.2450	0.1841	-0.1453	1.0000

.