Income Inequality, Property Rights and Investment: The Case of the CIS Countries

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Abstract

This thesis investigates the income inequality-private investment channel in the panel of 9 CIS countries for a period 1998 – 2006, hypothesizing the property rights protection as the link between the two. Increased income inequality produces socio-political instability. The latter, by threatening property rights protection, reduces investment. I analyze whether this link holds in the CIS countries. I successfully test the main hypothesis that individuals in the CIS countries, where the institution of private property has been introduced relatively recently and where the society has been previously inexperienced with property rights, are more irresponsive to increased political uncertainty than individuals in the countries where the institution of private property has been long established. Besides, I find that the richer and the poorer countries in my sample have different inequality-investment relationships and that the relationship patterns significantly differ from each other.

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Introduction

This thesis analyses the effect of income inequality on private investment in nine of the twelve CIS¹ countries, by focusing on the concept of property rights protection as the link between the two. Modern theory that bridges income inequality and investment has been developed in three main directions: imperfection of capital markets, voting for fiscal policy, and political instability. Contributors² to the theory of imperfect capital markets³ as the mechanism linking income polarization and investment argue that the imperfection rules out the financing of at least some good projects (projects with high expected rate of return). They claim that poor credit applicants who own these projects have less access to credit sources as compared to their rich counterparts with the same or worse project quality. Therefore, when income inequality rises, the number of good projects excluded from financing rises as well, the consequence of which being the decrease of the economic growth.

The second channel through which income inequality is thought to influence investment is income redistribution. Supporters of this theory state that an increase in income inequality increases the rate of the income tax that the median (decisive) voter prefers, thus decreasing incentives to invest. In the literature describing this link⁴, fiscal policy is designed as an exclusively redistributive apparatus taxing income pro rata but redistributing the tax income lump sum to all agents through transfer payments. Therefore, higher tax adversely affects investment, reducing the post-tax return on it. The tax rate chosen after voting, however, positively depends on the distance between the median and average incomes, that is, on that between the median and average voters. As income is taxed proportionally but the

¹ CIS - Commonwealth of Independent States, includes Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

² See for example Benabou (1996), Deininger and Squire (1998).

³ Imperfect, e.g. due to moral hazard or enforcement problems

⁴ See for example Perotti (1993), Alessina and Rodrik (1994).

transfer is lump-sum, larger distance between the median and the average voters gives the former a stronger incentive to vote for higher taxes. Thus, the poorer the decisive voter, the higher the tax set after voting, and the lower the investment.

The third strand of theory relates income differences to investment through political instability⁵. Increases in income inequality produce social discontent in society, and thus provide incentives for the group at the very bottom of the income distribution to engage in rent seeking, expressed mainly in illegal or violent actions. Social unrest generates political uncertainty and decreases investment incentives by creating more uncertainty in general as well as by directly interrupting market activities.

However, only relatively recently, did scholars pay attention to property rights as another important link between income polarization and investment. The suggested chain is the following: increase in income inequality affects socio-political instability, which in turn increases political uncertainty (e.g., increases the probability that the government will produce inadmissible digression from the current policy line). This, in turn, increases the property rights insecurity through an increase in the probability that the current government will repudiate contracts, change or modify laws in a way not acceptable for investors. Therefore, the final point through which investors perceive and analyze political instability is the degree of property rights protection. According to this theory then, if one controls for the quality or security of property rights in an empirical investigation, income polarization should have a weaker direct effect on investment, if not actually become entirely insignificant. My main hypothesis is that individuals in the CIS countries, where the institution of private property has been introduced relatively recently and where the society has been previously inexperienced with property rights, are more irresponsive to increased political uncertainty

⁵ See for example Alessina and Perotti (1993), Perotti (1994).

than individuals in the countries where the institution of private property has been long established.

The CIS countries represent a particularly interesting case to study. In terms of property rights protection, their development after their having become independent republics may be different from that of countries never having experienced the Soviet regime. When they were Communist republics, they did not have any experience with private property for seventy years; this, in conjunction with absolute dictatorship throughout this long period, might have substantially changed citizens' perception of private property. This thesis contributes to the literature by advancing a new theoretical angle for understanding investment incentives in post-Communist countries, and by testing it empirically. Estimating the panel of nine⁶ out of twelve members of the CIS countries in the period 1998 – 2006, I am specifically interested in three questions: (1) Does income inequality affect private investment in the CIS countries? (2) Does controlling for property rights diminish substantially the effect of income distribution on private investment in the CIS countries? (3) Is this effect different from the effects found for other countries?

I show that income inequality has a statistically significant effect on investment. I find that income inequality first increases and then decreases investment, remaining significant throughout the whole analysis. This finding provides the implication that poor and rich countries might have different patterns of inequality-investment relationship, for which I split the sample into rich and poor countries and analyze them separately. The results show that the relationship patterns differ statistically significantly. The results of the analysis, when including property rights proxy in the regression, support my hypothesis. Controlling for the property rights protection does not induce the income effect on investment to change

⁶ I do not include Tajikistan, Uzbekistan and Turkmenistan in the analysis due to the unavailability of data for these countries.

considerably or become insignificant. The explanations of this phenomenon is that the variance in the portion of expected return on investment, associated to political instability, will be more for the CIS investors than for the non-CIS investors, because the non-CIS investors can estimate (and forecast) the political uncertainty (including the threat to property rights) more precisely than can their CIS counterparts. The reason for this is that, due to their having been the part of the Soviet Union, the CIS investors do not have information about the past political instabilities and the past investment as well as about other factors influencing investment and instability, while the non-CIS investors have it. Therefore, the CIS investors' response to increased political uncertainty created by increased income inequality will be more mute, or limited, than that of the non-CIS investors. Hence, the effect that controlling for property rights does not much change either the effect or the significance of the inequality component in the regression.

The rest of the thesis is organized as follows: Review of the literature provides short descriptions of the papers relevant to the topic of the thesis, emphasizing various findings by different authors. Data and methodology section introduces the variables and describes their sources, provides the empirical model and introduces the methodology used in the analysis. Estimation results show the panel regression outcomes and provide explanations for the found effects. The Conclusion section restates the major findings and mentions several drawbacks of the analysis, providing implications for further research.

1. Review of the Literature

Early works linking income inequality to economic growth go back to Kuznets (1955) and Kaldor (1956). Kaldor, concerned with the causal relationship between income distribution and growth and employing the Keynesian theory of distribution, states that income distribution affects growth through the savings mechanism. The author assumes that the capitalists' and wage earners' propensities to save differ and that the former exceeds the latter. In the model, the difference between the two propensities is a multiplier in an equation relating income distribution and growth. Therefore, the larger the difference, the more a small change in income distribution affects growth. Kuznets looks at the problem the other way around, explaining the reasons of income distribution through the mechanism of a dynamically growing economy. He provides two possible explanations for the inequalitygrowth link: the rich saving more, and the shift away from agriculture to urbanization. In the first case, he argues that other things being equal, the aggregate effect of savings inequality would be expressed in rising proportion of income-bearing assets under the ownership of higher-income groups, the ground for larger income shares of the current owners and their descendants. In the second case Kuznets claims that, *ceteris paribus*, urban population's average per capita income being greater than that of their rural counterparts and the productivity of an urban dweller increasing faster than that of a rural one, increased urbanization should produce a larger gap in income inequality.

Analyzing the effect of income distribution (and of subsequent redistribution) on investment in human capital, Perotti (1993) relies on the assumption that income distribution is not fixed, but can change in an economy where the tax system provides redistribution of income. Assuming the absence of perfect capital markets and investment in education as a mechanism for growth, the author argues that individuals with post-tax income below the level of education cost will be unable to invest and will earn the same income in the second period (no growth). However, those with post-tax income above the education cost will invest and will subsequently raise their own income (growth). Building non-overlapping twogeneration and infinite-horizon models, Perotti shows that the distribution of income most conducive to growth in a poor economy is that very unequal, whereas in the case of a relatively rich economy the situation is exactly the opposite. Such divergence of the paths in the two types of economics is explained by the logic that if income is relatively evenly distributed in a poor economy, everyone's after-tax income is below the cost of education. Therefore, unless a certain level of inequality is present, no one will be able to invest and, therefore, no growth will happen. In a relatively richer country, however, the situation changes so that if middle class has already invested but the income difference between it and the lower class is high enough, the decisive voter might not have an incentive to choose a tax rate that would enable the lower class to also invest in education. Thus, further inequality lowers growth.

Concerned about the different rates of growth in different periods of countries, Persson and Tabellini (1994) construct a theoretical model where the individuals' incentives to accumulate capital, human capital and knowledge usable in production hinge on the degree to which they can appropriation the fruit of their efforts. This, in turn, crucially depends on tax and regulatory policies adopted by the government. Supporting theoretical results with empirical evidence, they determine the adverse role of income inequality in growth and argue that countries where distributional conflict is more severe adopt policies that allow less private appropriation, less investment and, therefore, less growth.

Sonin (1998), modeling the effect of property rights protection on growth in an unequal economy, shows that when unlawful expropriation is possible, economic agents resort to privately-financed protection of the fruit of their efforts. Privately-financed protection includes not only the hiring of a security company to protect property, but also the

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undertaking of relational investments (e.g., building corrupt relationship with authorities), hiring an advocate, etc. When private protection of property rights is prevalent (due to the weakness of its public counterpart), Shleifer (1997) argues that agents are encouraged to expropriate the resources of the others. Initial income inequality encourages rich agents for shaping institutions so as to best comply with their private needs, thus even more increasing the inequality effect.

Concerned about the causal relationship between income inequality and investment and trying to find the exact interrelation between them, Alessina and Perotti (1993) employ simultaneous equations methods to test this causal chain on a cross section of seventy countries. Hypothesizing the socio-political instability as the channel through which inequality affects investment, they find that inequality increases sociopolitical instability through increased probabilities of mass violence and direct disruption of production, and instability decreases investment by increasing uncertainty about the future economic policy and threatening property rights.

Barro (2000) undertakes the analysis of a broad panel of countries to estimate the effects of income inequality on investment and growth. While using different variables including the democracy index, inflation, and the share of the government consumption in GDP, he finds that overall there is a little relation between the measure of inequality and a country's rate of growth and investment. He also reports that inclusion of other inequality measures (e.g., the richest quintile-share, or the share of the three middle quintiles) instead of the initially-used Gini coefficients does not change much the basic results. However, an increase in inequality tends to inhibit growth in poor countries, but when the per capita GDP increases to a certain level, income inequality is found to be rather conducive to growth.

Forbes (2000) calls for the reassessment of the relationship between income inequality and growth. Providing evidence from a panel of countries in different five-year periods, she

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shows that inequality is positively and significantly related to growth in short-run and medium-run. However, the effect substantially decreases and eventually becomes insignificant, but the positive sign is still persistent. The opposite results are attributed to the improved quality of the inequality data and to the usage of Arellano-Bond fixed effects⁷ estimation instead of using the usual fixed effects by the author.

Perotti (1994) explicitly tests the role of the capital market imperfections, the voting for fiscal policy and the socio-political instability as the links between income inequality and investment. He finds that, keeping the capital market imperfection constant, the more equally distributed income is associated with an increase in investment. However, the degree of the capital market imperfection is inversely related to the effect and the significance of inequality and the more the imperfection decreases, the less effect inequality has on investment. Government transfers (through distortionary taxation due to the difference between the median and the average voters) also seem to inversely affect investment. Finally, the author reports that investment is an inverse function of socio-political instability, which in turn is positively affected by the increase in inequality.

Hypothesizing property rights protection as an important link between inequality and growth, Keefer and Knack (2000) explore the chain by using various measures of social polarization. According to the evidence provided by the authors, income inequality, land inequality and ethnic division are all negatively and significantly associated with property rights⁸, and the property rights index has a significant positive effect on growth. One key result of the paper shows that inequality affects the property rights index not only indirectly (by increasing socio-political instability), but also directly, as inclusion of the instability

⁷ The author claims that the Arellano-Bond fixed effect is a better method in this case, because, instead of analyzing differences in inequality and growth across countries, it focuses on the changes in these variables within each country across time.

⁸ Keefer and Knack (2000) use a composite index of property rights provided by the ICRG (International Country Risk Guide).

measures like the number of revolutions, the number of coups (successful and unsuccessful), etc. in the regression of the ICRG index on various polarization variables makes the inequality effect change very little and remain significant. Another important result of the analysis is that inclusion of the ICRG index together with the polarization measures in the growth regression makes the inequality variables drop very significantly and become insignificant in case of income inequality (that of income inequality drops by about a half and the land inequality drops by about third).

Svensson (1998) investigates another potential consequence of polarization – a government's incentive to underinvest in legal infrastructure. He argues that weakly-enforced property rights cause the marginal product of capital and the privately appropriable rate of return to differ, referring to the government's role of protecting the property and the contract rights. However, according to the author's theoretical model, competing parties, with one holding office at a particular time, might have an incentive to underinvest in legal infrastructure. A weak legal infrastructure, in turn, decreases investment due to weakly enforced property rights. The author provides cross-sectional evidence that supports the link from inequality to investment⁹. Obtaining result very similar to that of Keefer and Knack (2000), Svensson finds no significant effect of any measure of polarization on investment after controlling for the quality of property rights protection.

Questioning the negative relationship between socio-political instability and investment, Campos and Nugent (2003) employ the Granger causality¹⁰ framework to reinvestigate the mentioned association. The main finding, robust to various alternative specifications, is that despite the contemporaneous negative relationship between instability

⁹ Svensson (1998) uses private investment as well as total investment as dependent variables and finds that the results just slightly differ with no major change in any of the coefficients or in their statistical significance.

¹⁰ Granger Causality – according to Granger causality, if one variable Granger-causes the other, the past values of the former must contain unique information that helps predict the latter beyond the level predicted by the past values of only the latter alone.

and investment, there is a positive causal relationship going from the former to the latter. The authors provide three possible explanations for this finding: investors may postpone investments due to uncertainty and invest in subsequent periods; instability may destroy capital, causing a large change in replacement investment; and instability might entail changes in current government and its policies that are favorable in the long run.

As this brief literature review suggested, the exact relationship and links between income inequality and investment are still unclear. While some authors have found negative interrelation between inequality and growth, others have reported positive association between the two, and yet others have advocated for a nonlinear relationship between them. The reasons for having obtained different results can, however, be various. Application of data from different countries might have influenced the outcome (e.g., some authors use only developed countries, while others use both developed and developing ones). Different effects may have originated from different time spans as well. For example, the cross-sectional estimation might produce results different from those of panel analysis, or the relation between two variables may not be the same in different time periods. Different variables may also have played a role in generating different outcomes (for example, some authors use the income shares of different quintiles as measures of inequality (actually this is the measure of equality) and the others use Gini coefficients (a measure of inequality) for the same purpose). Methodology is another source of difference. For example, Forbes (2000) reports positive effect of inequality on growth after using the Arellano-Bond fixed effects estimation, while Barro (1999), employing the three-stage least square estimation, finds that inequality inhibits growth in poor countries and supports it in rich countries. Lastly, any combination of the mentioned reasons might also have served as an origin of divergence.

The CIS countries have similar history for at least the last century (to cut it short, before becoming the part of the Soviet Union, all these countries were the serfdoms of low-

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developed empires – either the Russian or the Ottoman). Besides, the average income patterns in these countries are also similar in addition to the fact that all countries surveyed are lower income countries. The legacies of the past seventy year are quite common as well. As long as the source of heterogeneity in the inequality-investment relation is still unclear in the theory, relative homogeneity of the CIS data can contribute to filling the gap towards better understanding of this theoretical interrelation. Besides, the results can help complete the broad picture of the inequality-investment interrelation, which has not included the CIS countries so far. Motivated by this logic, I empirically investigate the inequality-investment channel in the CIS region, controlling for other factors thought to influence the relation and test existing theory to try to shed more light on it.

2. Data and Methodology

2.1. Data

I carry out a panel regression using a sample of nine out of twelve CIS member countries for the period of nine years from 1998 to 2006. Data were not available for a longer period, and were entirely missing for three countries (Tajikistan, Uzbekistan and Turkmenistan). The definitions and the sources of variables used in this analysis are provided below.

Income inequality, SHARE. The source of the income distribution data is the Interstate Statistical Committee of the CIS Countries. The variable for income inequality is constructed in the following way: the sum of the shares of the total income belonging to the first two poorest quintiles is divided by the share of the total income belonging to the richest fifth quintile. Therefore, I assume that greater value of this variable means more equally distributed income.

Private domestic investment, PINV. The dependent variable in my analysis is private domestic investment as a percentage of GDP. Private domestic investment includes non-residential investment (expenditures by firms for machines, tools and so on), residential investment (expenditures by households and firms on apartments, buildings, new factories, etc) and change in inventories (the change of firm inventories in a given period). The data comes from the EBRD country reports¹¹.

Protection of property rights, ROL. The next variable is ROL - Rule of law – a measure of the rule-obedience level in a certain society. There has been a general consensus

¹¹ The reports are based on variety of sources, including national authorities, other international organizations and EBRD staff estimates.

among scholars that no measure of property rights, whether a single variable or a complex index constructed using different econometric techniques, is exact due to their subjective nature and, therefore, due to inherent measurement errors in them. Some authors have proxied the quality of property rights with single variables, others have constructed indexes by adding up several measures, and yet others have employed principal components and other analyses to derive the measures of the property rights quality. For example, Keefer and Knack (2000) use the ICRG index, which contains variables such as contract enforceability, quality of bureaucracy, risk of expropriation, etc. However, these measures for the CIS countries have been unavailable to me, which has left me with an option of a single variable for measuring property rights protection - the rule of law. The data about this variable comes from the World Bank Worldwide Governance Indicators. ROL is constructed using the unobserved components methodology¹². It is measured in units in the range from -2.5 to 2.5, with higher values corresponding to the increased obedience to the rule of law. The variable, while being probably a rougher proxy for property rights protection than more sophisticated indexes, is still a valid measure of the security of private property. First, the higher is the level of a society's rule-obedience, the more likely is the presence of low levels of corruption, expropriation of private property and contract unenforcement in that society. Therefore, the rule of law can be considered measuring (at least to some extent) the mentioned variables. Second, increase in the level of the rule of law will decrease the uncertainty for the investors, as, *ceteris paribus*, they will know with higher probability what rules will be applied to them in different states of world. Therefore, they will be able to better form their expectations, better order their business conduct and feel more security in case of investing.

¹² The estimate derived by using this methodology is conditional expectation of the rule of law in each country, conditioning on the observed data from each country.

Other Variables. DOMCRED, domestic credit as a percentage of GDP measures the total amount of credit provided to firms and households in a specific year relative to GDP. Its source has been the EBRD Country Reports. The variable DEPRATE is the average rate of deposit in a specific country in a specific year and also comes from the EBRD official estimates. Inflation, the source of which has been the IMF¹³, measures the average rate of annual inflation in a country. Variables PRIM and GRAD are the numbers of pupils enrolled in the primary schools and the secondary schools as percentages to total population. Their origin has been the Interstate Statistical Committee of the CIS Countries. The last variable, the logarithm of GDP per capita, comes from the IMF.

2.2. Model and Methodology

The topic of my interest is the income inequality - investment channel in the CIS countries and the property rights protection as the mechanism connecting these two ends. More income inequality is likely to produce more mass violence, as a large group of poor citizens, facing a much smaller group of their very rich counterparts, is likely to become discontent with own socio-economic condition and demand drastic changes, so that social unrest and unlawful seizure of power are more likely in such society. Widespread social unrest increases the likelihood of extreme deviation of a government from the current policy line and the likelihood of the overthrow of the current government, thus threatening the property rights protection by making the future economic policy more uncertain. Besides, laws have shorter expected lives when political instability increases. Therefore, investors, being uncertain about the protection of their property rights, might postpone projects, undertake investment abroad, or might generally prefer other activities to investment (actual

¹³ IMF – international Monetary Fund

violence can also cause cessation of productive activities). The main issue that I want to explore is whether this theoretical link holds in the CIS countries. My hypothesis is that individuals in the CIS countries, where the institution of private property has been introduced relatively recently and where the society has been previously inexperienced with property rights, are more irresponsive to increased political uncertainty (which itself is the result of increased income inequality) than individuals in the countries where the institution of private property has been long established. Under property right mentioned above I mean the rights to use (and to profit from) the property, to control (to exclude the others from using it) and to transfer (either some part or the whole) it. Therefore, protection of property rights implies the protection of these rights. Besides, under having inexperienced property rights I mean the absence of personal experience of using, controlling and transferring the property due to the past non-existence of these rights in the CIS countries.

One potential problem, which I would like to pay attention to, is that inequality and investment might evolve together. Several authors have suggested such a relationship¹⁴. To account for this possible feature of the relationship between them, I include SHARE lagged by one period, rather than SHARE itself. Besides, I use the method of first differencing rather than fixed effects estimation to account for strong positive serial correlation present in my model (the Durbin-Watson statistic is 0.9 in case of fixed effects estimation). However, differencing itself does not solve the problem of serial correlation. Therefore, having included SHARE lagged by one period instead of SHARE itself does not solve the issue of reverse causality either, because the change in lagged SHARE may remain correlated with SHARE and with SHARE led by one period. However, if this logic is true, part of the effect of the change in lagged SHARE may in fact be the "effect" of the change in the SHARE lead (reverse causality). Therefore, I also include the change in SHARE lead in the regression.

¹⁴ For example, see Alessina and Perotti (1993), Keefer and Knack (2000)

Besides, I include other variables in the equation to account for other channels through which inequality is supposed to affect private investment and for other potential forces that might not necessarily be in the inequality-investment channel but might still influence it. In this way, I attempt to disentangle the effect of inequality and protection of property rights on investment from other effects. I capture the relationship between the variables in the following base specification of a cross-sectional time series equation:

$$d(PINV_{it}) = \beta_0 + \beta_1 \cdot d(ROL_{it}) + \beta_2 \cdot d(SHARE_{it-1}) + \beta_3 \cdot d(SHARE_{it+1}) + u_{it}$$

where $d(\cdot)$ denotes differencing effect from a certain year to the previous one.

As discussed above, I expect coefficient β_1 to have a positive sign in the equation, so that an increase in the rule of law level is associated with better protection of property rights and, therefore, to increase in investment. SHARE is a proxy for income inequality, so that an increase in this variable is associated with lower inequality, and, therefore, with increase of investment. Thus, the sign of β_2 is supposed to be also positive. Because investment in period *t* is likely to affect the distribution of income in period t+1 positively, the coefficient on the lead of SHARE should be also positive.

However, as mentioned above, there exist other channels through which income inequality may affect investment. Therefore, I include several other variables in the full specification. Domestic credit is included in the regression to capture the effect of the increase in investment through increased access to credit resources. The variable for domestic credit is supposed to proxy the degree of capital market imperfections, so that if capital markets become les imperfect, projects that were not possible to invest in before should be financed, thus increasing investment. Therefore, it should positively affect investment. The opportunity cost of investment is proxied by the deposit rate in the equation. I expect that the sign of its coefficient is negative. The logarithm of annual GDP per capita is included in the analysis as a proxy for the average per capita wealth of a society. The argument for including this measure is that "good things go together", that is, richer countries invest more .I expect the sign of the coefficient of this variable to be positive. As proxy for productivity (or human capital), I include GRAD, the number of pupils enrolled in the secondary school as the percentage to total population. Theoretically, an increase in productivity should increase investment. Thus, I expect that the variable will positively affect the investment. Throughout all estimations, I report cluster standard errors to account for serial correlation and heteroskedasticity.

3. Estimation Results

3.1. Investment, inequality and property rights

This section presents the results of the empirical analysis in basic and full model specifications. Table 1 below reports the estimates of different specifications. I included several other regressions in the table to show how the relation between income inequality

Equation	1	2	3	4	5
С	1.030*** (0.240)	0.740* (0.316)	1.018*** (0.287)	0.001 (0.228)	0.292 (0.238)
D(SHARE(-1))	-14.528** (2.998)	-25.994*** (6.032)	-12.564** (2.535)	-16.527*** (2.467)	-15.415*** (2.454)
D(SHARE(-1))^2		86.237*** (9.883)	44.964** (13.808)	46.887** (16.323)	45.653** (13.925)
D(SHARE(1))			16.374* (7.125)	17.467* (7.962)	17.427* (6.962)
D(ROL)					5.098* (2.056)
D(DOMCRED)				0.102 (0.180)	0.081 (0.187)
D(DEPRATE)				0.016 (0.054)	-0.005 (0.056)
D(GRAD)				4.426 (4.942)	3.806 (4.578)
D(LOG(GDPPC))				4.525 (1.969)	2.602 (1.957)
R-squared	0.04	0.18	0.32	0.35	0.38
No.obs.	63	63	54	54	54
Durbin-Watson	1.36	1.84	2.15	2.22	2.13

Table 1. Income inequality and private investment

Dependent variable = The change in private investment (D(PINV)), 1998 - 2006. Standard errors are calculated using cluster standard errors and covariance method (White period standard errors and covariance method). A *, ** or *** indicates significance at .05, .01 or .001 level respectively against two-tailed tests. Standard errors are reported in parentheses.

and investment changes in different settings. The first equation is a regression of the change in private investment on just the change in the first lag of SHARE. The coefficient on the explanatory variable is highly significant but negative. This finding should suggest that increase in income equality decreases investment. Such effect can, however, be linked to the short run. After adding the squared change of the lagged SHARE, the estimate on the new component is also significant at .001 level but positive. This suggests that the effect of income inequality on investment is not monotonic, as it first decreases and then increases. The turning point is approximately 0.15, that is (ceteris paribus) until the sum of the shares of the bottom two quintiles roughly equals 15 % of that of the fifth, the richest, quintile, increase in income equality decreases investment. This effect is quite interesting and suggests that rich and poor countries can have different patterns of inequality-investment relation. Although my sample is relatively restricted, I split it to see whether countries differ in these patterns. This analysis is provided in Section 3.2.

Furthermore, I add the change in the led SHARE to the basic equation. The argument behind this is, as stated above, to control for the reverse causality that the change in investment might cause to the change in lagged SHARE through the led SHARE. One key result is that, indeed, inclusion of the variable in the equation makes the coefficients on the change of lagged SHARE and on that of squared lagged SHARE both drop by approximately half, while the effect of the change in led SHARE is significant at 5 %. The turning point is approximately 0.14. It also proves my hypothesis of the existence of reverse causality in the model.

The fourth equation adds other explanatory variables to the previous regression. All the variables but the change in DEPRATE have right sign but none of them, including DEPRATE, is significantly associated to investment. The inclusion of these variables changes the model little. The change in the lagged SHARE increases in absolute terms by about 4 percentage points, while the squared change of lagged SHARE increase by about 2 percentage points. The turning point is approximately 0.177. The constant drops and becomes insignificant. I do not include inflation in the regression, because its correlation with some

other explanatory variables is quite high (for example, correlation between change in inflation and that of log GPD per capita is 0.38). In the extended specification I add inflation to the regression, the results of which I report in the appendix. The results of estimating the model in extended specification are almost identical to that of the working model.

The fifth regression adds the property rights proxy to the regression. The variable is highly significant (almost at 0.01 level) and has a positive effect on private investment. One standard deviation increase in the change of ROL is associated with an increase in the change of private investment by about 10.8 percentage points. Inclusion of the property rights variable makes the coefficients on the changes of lagged SHARE and squared lagged SHARE decrease slightly by 1 percentage point each. The turning point also decreases slightly and becomes approximately 0.166.

However, in contrast to findings of Keefer and Knack (2000) and Svensson (1998), the key observation is that controlling for property rights neither alleviates nor considerably diminishes the effects of the income distribution on private investment. The explanation of this phenomenon can be the following: The variance in the portion of the expected return to investment, associated to political instability will be more for the CIS investors than for the non-CIS investors, because the non-CIS investors can estimate (and forecast) the political uncertainty (including the threat to property rights) more precisely than can do their CIS counterparts. The source of the relative impreciseness of the CIS investors is the absence of the past information about instability and investment as well as about other factors influencing investment and political uncertainty. Therefore, the CIS investors' response to increased political uncertainty created by increased income inequality will be more mute, or limited, than that of the non-CIS investors. Hence, the effect that controlling for property rights does not change much either the effect or the significance of the inequality component in the regression. The absence of past information about investment and political uncertainty is directly related to the 70-year interval of the history of the CIS countries – the Soviet Union, a state where entrepreneurship was illegal and the institution of private property did not exist. This fact automatically excludes any previous data about, or experience in, investment or instability. In addition to the logics employed, with equal risk aversion, the CIS investment will be lower and if the CIS investors are more risk-averse than non-CIS investors, the CIS investment will be even less (because risk aversion and political instability work in the same direction).

3.2. Different Patterns Analysis

I split the sample into two parts, one containing the five poorest¹⁵ countries in the sample and the other containing the other richest four¹⁶, and run regressions separately to see whether the richer and the poorer countries have different relationship between investment and income inequality. Table 2 below provides the estimation results.

In poor countries, both the change in lagged SHARE and the squared change in lagged SHARE have statistically significant effect on the change in private investment at 0.001 and 0.05 levels respectively. Initial income inequality increases investment. However, there is a turning point (0.161) after which further inequality is detrimental to investment. One possible explanation of this effect can be the following: Income inequality is not a measure of a single phenomenon but stands for two factors – as the resource for investment and as the generator of political instability. In the case of poor countries, the resource factor initially dominates the political instability factor. Society initially cares more for investment resources to earn more and, therefore, up to the turning point, individuals who can invest, do so (the political instability factor is not large enough yet to dominate the resource effect).

¹⁵ Armenia, Azerbaijan, Georgia, Moldova, Kyrgyzstan

¹⁶ Belarus, Kazakhstan, Russia, Ukraine

Equation	Poor Countries	Rich Countries	
с	1.641 (0.740)	1.113* (0.544)	
D(SHARE(-1))	-14.528*** (5.358)	13.601** (5.204)	
D(SHARE(-1))^2	45.536* (21.910)	-366.764 (301.154)	
D(SHARE(1))	16.476* (7.290)	14.423 (13.679)	
D(ROL)	6.923* (2.789)	3.426* (1.400)	
D(DOMCRED)	-0.194 (0.099)	0.060 (0.279)	
D(DEPRATE)	0.201 (0.143)	-0.104 (0.099)	
D(GRAD)	-	-3.242 (7.185)	
D(PRIM)	-0.749 (1.150)	-	
R-squared	0.54	0.09	
No.obs.	30	24	
Durbin-Watson	2.16	1.83	

Table 2. Income inequality and private investment, poor and rich countries

Dependent variable = The change in private investment (D(PINV)), 1998 - 2006. Standard errors are calculated using cluster standard errors and covariance method (White period standard errors and covariance method). A *, ** or *** indicates significance at .05, .01 or .001 level respectively against two-tailed tests. Standard errors are reported in parentheses.

However, such investment increases inequality and those who cannot invest become more and more discontent with their conditions. The turning point is the moment when the part of the society that undertook investment and became richer starts caring about the increased discontent of its poorer counterpart (because, in case of socio-political unrest it has more to loose). After the turning point, however, political uncertainty factor dominates the investment resource factor and the society adopts redistribution policies that produce more income equality, decreasing thus the political uncertainty and, therefore, threat to their wealth.

In the richer countries of my sample, however, the inequality-investment pattern changes. The change in lagged SHARE is statistically significant and positive. An increase

by 0.1 points in it increases the change in investment by approximately 1.36 percentage points. The squared change in lagged SHARE has become statistically zero. This effect is in line with findings for poor countries. In richer countries, all parts of societies can invest. Therefore, the problem of investment resources does not arise any more. Individuals care only about political instability as the threat to investment environment (including property rights), as now all of them have more to loose. Therefore, further equality, and not inequality, is conducive to growth. In the regression for poor countries I include the change in PRIM as a measure of productivity, rather than the change in GRAD, because when I divide the sample, the change in GRAD becomes highly correlated with the squared change in lagged SHARE (the correlation coefficient is -0.45). I also test whether the two patterns are statistically significantly different from each other. The F test value is 6.89 against 2.58; therefore, I reject the null that the patterns do not differ significantly.

These findings are in line with Gerschenkron's theory (1962), which states that relative backwardness motivates the government to introduce institutions conducive to growth. The more backward an economy is in the beginning of the development, the more interventions will the government undertake in the market to direct capital and entrepreneurial skills to emerging industries and the more consumption will be squeezed in favor of investment, thus increasing inequality. Similar effect is found in the paper of Perotti (1993), where the source of growth is investment in education. Individuals, whose post-tax income does not exceed the cost of investment in human capital, will not be able to invest and will thus get the same income in the next period. These citizens cannot produce growth. Therefore, the more the number of such citizens in a country, the less is its growth. He also finds that the configuration that is most conducive to growth in relatively richer countries is exactly opposite (i.e., more income equality is associated to more growth).

Conclusion

In this thesis, I have analyzed the effect of income inequality on private investment in nine out of twelve CIS countries. Motivated by the existing theory which posits the property rights protection as a connecting factor between income inequality and investment, or as the channel through which inequality can affect investment, I have empirically tested whether this link holds for the CIS countries. The main testable hypothesis has been that individuals (investors) in the CIS countries, where the institution of private property has been established relatively recently and where the society has been previously inexperienced with property rights, are less responsive to increased political uncertainty than individuals in countries where the institution of private property has been long established. The results of the empirical part of the thesis support my hypothesis.

Furthermore, I have analyzed patterns of the inequality-investment relation in poorer and richer countries in my sample and have found that the patterns differ significantly. In case of the poorer countries, I have found that initial inequality is associated with more investment, but after a certain point, further increases in inequality are detrimental to investment. In the richer countries, however, there is no turning point and increases in income equality are constantly associated with more investment. These findings are in line with Gerschenkron's theory (1962), which states that the poorer the country is in the beginning of development, the more interventions will the government undertake in the market to direct capital and entrepreneurial skills to emerging industries and the more consumption will be squeezed in favor of investment, thus increasing inequality. These results are similar to those of Perotti (1993), who finds that initial inequality is conducive to growth.

Although the analysis may provide useful information about the inequality-investment relationship in the CIS countries, I would like to mention several drawbacks present in here.

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The first shortcoming of the analysis is the small size of the sample, which limits the inference of stronger results from the estimation. For example, a longer time period may improve the results because some variables' (e.g., education) have long time effects on investment. Alternatively, the addition of the other three countries of the CIS might have increased the turning point of the inequality effect, because all the three countries qualify as poorer countries, compared to my poor countries sample, and are authoritarian¹⁷.

Another shortcoming is the absence of other variables (for example, tax rates and family structures) that can also affect investment through other channels. For example, some part of the effect of a factor unavailable to me, e.g., the tax rates, may be picked up by the other factors, e.g., GDP per capita, which, in the absence of the tax variable, distorts the effect of the per capita GPD on investment.

The muted response to the increased inequality in the CIS can be the result of individuals' protecting their property in ways other than legal (for example, through the relational investment). If this is true, an increase in political instability (through increasing inequality) would also produce rather muted changes in property rights protection. Although I do not find such evidence (obviously because I do not control for any measures of investors' reliance on forces other than the law), this hypothesis is not without merit. Relational investment has been prevalent in the period of Communism, and as social norms and culture change very slowly, it might be inherited by modern relations.

The analysis also provides implications for further research. It would be a step forward to analyze how limited is the response to political uncertainty of the CIS investors compared to that of the non-CIS investors, or to what extent does the absence of past information limit the responsiveness of CIS investors, and what are more exact consequences of this limitation. Alternatively, one would control for additional factors thought to shape the

¹⁷ US Department of State Country Reports on Human Rights 2005

inequality-investment channel and identify (or reject) other threads going from the former to the latter. However, such analysis would require much more comprehensive and detailed data sample with more countries, more years and more factors.

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Appendix

Equation	1
С	
D(SHARE(-1))	-15.119*** (2.822)
D(SHARE(-1))^2	44.477* (17.018)
D(SHARE(1))	17.619* (7.558)
D(ROL)	5.147* (2.100)
D(DOMCRED)	0.068 (0.195)
D(DEPRATE)	0.001 (0.070)
D(GRAD)	3.753 (4.491)
D(LOG(GDPPC))	(2.169) 2.867083
D(INFLAT)	0.004 (0.015)
R-squared	0.38
No.obs.	54
Durbin-Watson	2.13

Table 3. Income inequality and private investment, extended specification

Dependent variable = The change in private investment (D(PINV)), 1998 - 2006. Standard errors are calculated using cluster standard errors and covariance method (White period standard errors and covariance method). A *, ** or *** indicates significance at .05, .01 or .001 level respectively against two-tailed tests. Standard errors are reported in parentheses.