Financial Sector Policies, Poverty and Income Inequality

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Abstract

While finance has been shown to influence the distribution of income, little research has been devoted to the potential impact of financial policy on income inequality. This study analyzes the relationship between repressive financial policies and inequality across countries. We show that financial repression tends to increase income inequality. IV regression and modeling average method has been used to confirm the robustness of positive relations between financial repression and income inequality. We also find that this relationship credit controls and entry barriers in banking sector are the two most important financial policies influencing inequality. Moreover, GDP per capita growth and urbanization serve as two important factors that might alleviate income inequality. These results have important policy implications, not the least so for China, where rising inequality poses a significant problem for the government.

JEL Classification: D31; G00; I30; O11; O16

Keywords: Income distribution; Poverty; Financial repression; Capital markets; China

1 Introduction

The levels of inequality and poverty vary significantly across countries and regions. The Human Development Report in 2011 also shows that overall inequality has worsened. Furthermore, the distribution of both income and poverty vary significantly over time. While some countries undergo considerable declines, others experience increases in inequality (e.g. Beck et al., 2007). These patterns indicate that the understanding of what drives inequality is as important as ever.

There is a growing literature on finance and inequality that primarily focuses on the link between financial development and inequality. As Demirguc-Kunt and Levine (2009) point out, a less developed financial system may influence how important individual skills versus parental wealth, social status and political connections are for an individual's economic opportunities. A poorly developed financial system may therefore increase the persistence of the gap between rich and poor. In addition, financial development or the general quality of a financial system may affect capital allocation, which in turn has an effect not only on economic growth in general, but also on the demand for labor across sectors, thus influencing income levels for different parts of society. A number of studies have linked finance to inequality with analyses based on arguments like these.

However, while the link between finance and inequality is now commonly acknowledged, much less research has gone into trying to identify potential relationships between financial policies and inequality. Demirguc-Kunt and Levine (2009) note that there is "startlingly little research on how formal financial sector policies - such as bank regulations or securities markets laws - affect inequality". Using a comprehensive cross-country panel data set, this study attempts to shed light on the potential link between financial policy and inequality. In particular, we focus on how repressive financial policies affect the level of inequality. Given the rapidly increasing level of inequality and the social tensions it may bring about in China, we also devote a separate section to a discussion on financial repression and inequality in a Chinese context. Our empirical analysis supports the hypothesis that repressive financial policies increase inequality. In addition to initial fixed effect regressions, we also take potential endogeneity issues into consideration by performing robustness checks with dynamic panel and instrumental variable regressions. We also find that the relationship between financial repression and inequality is significant for low- and middle-income countries, but not for high-income countries. Finally, we identify several individual policies including interest rate controls, capital account controls, weak banking supervision, and concentration in the banking sector that are especially important for inequality. We believe that these results are of particular importance to policymakers in low- and middle-income countries that are experiencing high and increasing levels of inequality.

The rest of this study is structured as follows. In the next section, we frame the topic of financial repression and inequality with two strands of literature, one that links finance in general to inequality and one that focuses on financial repression. Section 3 introduces the data and then discusses the empirical methodology. Section 4 presents the results from the baseline regression model as well as robustness checks and the effects of individual policies across countries. Section 5 then focuses on the case of China. Finally, Section 6 concludes the study.

2 Literature Review and Theoretical Framework

The importance of finance is not new to the literature on inequality. Finance is often incorporated in theoretical models in the form of exogenous financial market imperfections that lead to income inequality. For example, Mookherjee and Ray (2002) note that credit markets must be assumed missing or imperfect in dynastic models, otherwise finances necessary for offspring to further their education may be borrowed, leading to equalization of wages (net of costs) across professions. Becker and Tomes (1986) employ the often used argument that human capital functions as poor collateral to lenders due to the risk of moral hazard to incorporate imperfect access to capital in their model on transmission of earnings, assets and consumption (and thus inequality) across generations. Galor and Zeira (1993) show that, in the presence of credit market imperfections, countries with different wealth distributions that invest in human capital can follow very different growth paths. Banerjee and Newman (1993) model economic development by focusing on occupation decisions. They demonstrate that poor agents choose to work for a wage over self-employment due to capital market imperfections. In their dynastic model, Mookherjee and Ray (2003) demonstrate how imperfect capital markets result in persistent inequality. Finally, Matsuyama (2004) incorporates credit market imperfections in an overlapping-generations model to analyze financial market globalization and the inequality of nations.

As noted earlier, capital market imperfections can have particularly severe consequences for the underprivileged as such imperfections limit their economic opportunities. A relaxation of credit constraints can thus reduce inequality and allow for a more efficient credit allocation. However, it has also been argued that financial development may actually increase the level of inequality, as improved financial services may favor those who are already using them the most (Greenwood and Jovanovic, 1990). Clarke et al. (2006) show that financial development does reduce inequality and therefore reject the argument that financial development favors the rich. Similarly, Beck et al. (2007) provide evidence that financial development increases income for the poorest more than for wealthier income groups, thereby reducing overall inequality. They also find that financial development brings with it a significant drop in the fraction of the population that lives on less than \$1 day, thus emphasizing the importance of financial development for the poorest.

While the studies above are important for the understanding of the relationship between finance and inequality, they do not focus on financial policy. Demirgue-Kunt and Levine (2009) argue that economists tend to underestimate the potentially important impact of financial sector policies on inequality. This paper is, to the best of our knowledge, the first study that focuses on how repressive financial policies may affect inequality. McKinnon (1973) was arguably the first to use the term financial repression. He defined it as financial policies set by the government for the purpose of regulating interest rates, setting reserve requirements on bank deposits, and allocating resources in the economy. Such repressive policies are commonly believed to be hindering financial deepening, lowering the efficiency in the financial system and, as a result, holding back economic growth (McKinnon, 1973; Shaw, 1973). Roubini and Sala-i-Martin (1992) develop a theoretical model that incorporates the negative effect of financial repression on growth and then show empirically that this indeed seems to be the case for a large panel of countries. In a related paper, King and Levine (1993) present a model in which financial sector distortions have a negative impact on the rate of innovation, which in turn leads to lower overall economic growth.

We argue that repressive financial policies have the potential to greatly increase the level of inequality. Linking the literature on financial development and inequality with that on financial repression, previous research shows that financial repression may hinder financial development. For example, King and Levine (1993) find that financial repression can have a negative effect on financial development. In a related paper, Ang and McKibbin (2007) show that repressive financial policies have a significant negative effect on financial deepening. When implementing repressive and distortive financial policies, the government is in effect allocating financial resources to certain sectors in the economy. In line with this reasoning, Johansson and Wang (2011) develop a model in which financial repression distorts the economic structure in favor of the industry sector. In a related study, Johansson and Wang (2012) find that severe repressive financial policies lead to external imbalances, most likely a result of a distorted economic structure due to the emphasis on allocation of capital into the domestic manufacturing sector. The allocation of capital into selected economic activities may in turn reduce the efficiency in the financial sector and limit economic opportunity. Based on the previous discussions on lower efficiency and limited economic opportunity due to credit constraints for the poor, repressive financial policies can thus be expected to increase the level of inequality.

To conclude, we hypothesize that there is a positive relationship between financial repression and inequality and that the poor are more adversely affected by repressive financial policies.

3 Data and Econometric Framework

3.1 Cross-Country Data

In this paper, our main focus is on the potential impact that financial repression has on income inequality. We define financial repression as policies that impede financial liberalization and thus hinder financial development. Typical repressive financial policies include regulated interest rates, credit rationing, entry barriers into the banking sector, capital controls, and so on. For inequality, we follow the literature and concentrate on income distribution as a proxy for the inequality of opportunity (Demirgüç-Kunt and Levine, 2009).

The measure we use for financial repression is from Abiad et al. (2008) and consists of an index based on seven different repressive financial policies: credit controls; interest rate controls; barriers to entry in the financial sector; state ownership in the banking sector; supervision of the banking sector; capital account restrictions; and repression of security markets. Abiad et al. (2008) score each country along each of these seven dimensions. The score is graded from 0 to 3, with 0 corresponding to the highest degree of repression and 3 indicating full liberalization. Before including the different measures in our analysis, we normalize each variable into the interval of 0 to 1 by dividing each of them by 3 and then subtracting the score from 1. Thus, the higher the score, the higher the degree of financial repression in terms of the financial policy in question.

To assess the impact of financial repression on income inequality across countries, we examine (i) the impact on poverty, (ii) the impact on the Gini coefficient, and (iii) the impact of each individual repressive policy. Poverty refers to the poverty headcount ratio provided by the World Bank in the World Development Indicator database. The poverty line was recalibrated from \$1 to \$1.25 a day in 2008. For completeness, we also look at the alternative poverty line of \$2 day provided by the same source. Population below \$1.25 (\$2) a day is defined as the percentage of the population living on less than \$1.25 (\$2) a day at 2005 international prices. The poverty headcount ratio shows that countries marked by abundant poverty are mainly concentrated to Africa and a few Asian countries. Typical examples of extreme cases are Mozambique with a poverty level \$1.25 (\$2) of 74.7% (90%) in 2003 while the poverty level in Nepal was 55.1% (77.6%) in 2004. Most countries have experienced significant declines in poverty. For example, China has come a long way to reduce overall poverty since the beginning of its economic reforms in 1978, with its poverty headcount ratio dropping dramatically from 84% (97.8%) for the poverty level \$1.25 (97.8% for the poverty level \$2) in 1985 down to 15.9% (36.3%) in 2005.

Following the literature on inequality, we use the Gini coefficient as a proxy for income inequality. The Gini coefficient is derived from the Lorenz curve, which measures the income distribution among different income groups. In this paper, we use Gini coefficients from the Standardized World Income Inequality Database (SWIID)¹.

We collect data for 66 countries for the period 1981 to 2005. Table 1 reports the summary statistics. The definition of the variables and their respective data sources are listed in an appendix. As mentioned earlier, the level of poverty varies significantly across time and countries, ranging from 0 to 84% in the sample when using the \$1 headcount ratio and from 0 to 98% when using the \$2 headcount ratio. The proxy for income distribution, the SWIID Gini coefficient, ranges from a low 0.20 to a extremely high level of 0.69. The financial repression index varies from 0 to 1 with a mean of 0.44. Similarly, the control variables openness, FDI, schooling, government size and growth in GDP exhibit great variation across the sample.

[TABLE 1 HERE]

3.2 Econometric Framework

Our main focus is on the relationship between repressive financial policies and income inequality. To analyze this relationship, we use several alternative model specifications. In the benchmark model, we run a fixed effect regression with inequality as the dependent variable and financial repression as the key independent variable:

$$INEQUALITY_{it} = \beta_0 + \beta_1 FREP_{it} + \beta_2 X_{it} + \alpha_i + \lambda_t + \xi_{it}.$$
 (1)

¹ SWIID standardizes United Nations University's World Income Inequality Database (WIID) and income data from other sources. Data from the Luxembourg Income Study is used as standard. The standardization of the Gini coefficient better allows for broad cross-country research on income and inequality.

Here, *INEQUALITY*_{it} is the measurement of the inequality of income distribution of country *i* at year *t* proxied by the Gini coefficient. *FREP*_{it} represents the level of financial repression of country *i* in year *t*. *X*_{it} is a vector of control variables that affect the income distribution, including: initial value of income inequality and schooling; *real GDP per capita growth*; trade openness, measured as the sum of exports and imports as share of to capture the degree of international openness; the growth rate of the GDP deflator (Inflation) over the sample period to control for the macroeconomic fluctuation. Further, we include urbanization, measured by urban population as share of the total population. We include two fixed effects: α_i is the country-specific effect, λ_t is the year effect. Finally, ξ_{it} is an unobserved error term that changes over time and across countries.

Our key regressor is financial repression. We define financial repression as repressive policies that impede financial liberalization. Typical financial repression policies include regulated interest rates, credit rationing, entry barriers into the banking sector, capital account controls and restrictions in security markets. The measure we use for financial repression is from IMF Financial Reform Database by Abiad et al. (2008), which consist of an index based on seven different repressive financial policies: credit controls; interest rate controls; entry barriers into the banking sector; state ownership in the banking sector; lack of prudential regulation and supervision of the banking sector; capital account controls; and restrictions in security markets. Abiad et al. (2008) score each country along each of these seven dimensions. The score of each variable is graded from 0 to 3, with 0 corresponding to the highest degree of repression and 3 indicating full liberalization. We normalize each variable into the interval of 0 to 1 by dividing each of them by 3 and then subtracting the score from 1. Thus, the larger the score is, the higher financial repression is in terms of the financial policy in question.

To control for the effects initial status and at the same time increase the degree of freedom, we make five year average make over the sample period from 1981-2005. The initial variable is taken by the value of the first year in every five-year interval. To deal with uncertainty of model specification and estimation, we employ newly developed modeling average technique, called weighted-average least square (WALS), as well as the standard Bayesian model averaging (BMA), to provide robustness evidence of our baseline estimates.

There is also a risk that the relationship between repressive financial policies and income inequality might be driven by reverse causation. For instance, an improvement in income distribution and a lower income inequality might lead to political pressures to create a more efficient financial system that allows for reasonable competition and funding of projects based on market criteria, not political intervention and allocation. Moreover, a reduction in poverty might stimulate the demand for easy access to financial funding. Both of these examples indicate that a reduction in income inequality might require the alleviation of repressive financial policies to facilitate a more efficient allocation of financial assets in the economy. To deal with this potential problem, we employ two stage least square (2SLS), using Legal Origins as instrumental variable for financial repression.

4 Empirical Analysis – Cross-Country Data Set

4.1 Financial Repression and Poverty

As noted earlier, research on financial development and inequality shows that improvements in financial intermediation, markets and contracts result in better economic opportunities, reduced inequality and a more equal income distribution. By implementing repressive and distorted financial policies, the government can allocate financial resources directly to certain preferred sectors or groups, which in turn will reduce the efficiency of the financial sector, limit economic opportunities and therefore raise inequality and worsen the income distribution. As noted in Section 2, we hypothesize that the poor face inferior access to financial support for their businesses in financially repressed economies, something that in turn will increase the poverty headcount ratio among the population.

Before our analysis of the relationship between financial repression and inequality, we therefore start with an examination of the impact of repressive financial policies on poverty. We run both ordinary least square and fixed effect regressions with the poverty headcount ratio as the dependent variable. The results are presented in Table 2, where the first three columns present the impact of financial repression on the fraction of population living on less than \$1.25 a day. We first introduce the financial repression index into the fixed effect regression model as a single independent variable in column 1. We then control for initial schooling, interaction of initial Gini and GDP per capita growth and GDP per capita growth. The estimation results show that financial repression is positively associated with the headcount ratio at \$1.25 per day. Also,

GDP per capita growth and its interaction with initial Gini enter significantly but with different signs, indicating that the effect of income growth on poverty reduction might vary with initial income inequality. FDI and government size are both positively associated with the poverty ratio, but neither are significant.

We then control for inflation and trade openness in Column 3. As shown, the estimation results confirm that an increase in financial repression is significantly associated with an increase in the poverty headcount ratio. Furthermore, Trade openness is significantly negatively associated with the poverty headcount ratio, indicating that trade might facilitate a reduction in poverty.²

The dependent variable in columns 4 to 6 is the fraction of the population living on less than \$2 a day. When using the same methodology as in the first three columns, our regression results show that the relationship between financial repression and poverty is robust when using the \$2 a day poverty headcount ratio as an alternative measure of poverty. Again, financial repression is again positively related to the poverty ratio, GDP per capita growth enters

² While a more detailed analysis of the relationship between trade and inequality is beyond the scope of this paper, it suffices to say that this relationship is still being debated in the literature. Early studies link trade to lower inequality through the Hecksher-Ohlin model and the Stolper-Samuelson theorem. In this framework, inequality should decrease with increased trade in developing countries and but increase in developed countries. Later studies show that trade is actually associated with an increase in inequality in some developing countries (e.g. Goldberg and Pavcnik, 2007). For a more detailed discussion on this topic, see Harrison et al. (2010).

significantly and its effect on poverty might vary with initial Gini. The other explanatory variables are all insignificant.

[TABLE 2 HERE]

4.2 Financial Repression and Income Distribution

We have argued that financial repression disproportionately affects economic opportunities. In a financially repressed economy, wealthy individuals have better access to financial support while the poor face more limited economic opportunities due to constraints in the financial system, something that results in higher income inequality. In this subsection, we examine the impact of financial repression on income distribution. Table 3 presents the main results from the baseline regression. The dependent variable is the SWIID Gini coefficient.

We start from two initial conditions (Column 1). Since impact of GDP growth might vary with initial income inequality, we control for the interaction between initial income equality and GDP per capita growth. In line with the growth literature, we also control for initial schooling as an indicator of the initial human capital stock in the economy. We then control for GDP per capita growth and inflation indicating the macroeconomic environment (column 2). As shown, this does not alter the result on financial repression and inflation does not enter the inequality regression significantly. Next, we expand the control variables to include two different ways to measure economic openness (trade liberalization dummy and trade openness). The measures of openness do not enter significantly. Moreover, we confirm that our main hypothesis of a positive relation between financial repression and income inequality and the size of estimated coefficient on financial repression does not change. In column 5, following Cai et al (2010), we control for urbanization. As shown, urbanization is negatively associated with income inequality.

More importantly, the coefficient on financial repression is positive and significant at the 5% or 1% level in all the regressions and the magnitude is relatively stable, suggesting that financial liberalization is significantly associated with income inequality reduction. GDP per capita growth and urbanization are negatively related to income inequality, suggesting that income growth and urbanization might serve as important factors reducing income inequality.

[TABLE 3 HERE]

4.3 Effects of Individual Policies

The empirical results so far suggest that financial repression increases the poverty ratio and the level of income inequality. This effect is likely due to a more inefficient asset allocation and a worsening of the distribution of economic opportunity among the population as a result of repressive financial policies. That repressive policies might result in higher income inequality is quite intuitive. So why do governments choose to adopt these policies? It has been argued that central planners devise and adopt repressive financial policies, such as interest rate restrictions, credit allocation regulations, capital account controls, and barriers to entry in the banking sector in order to achieve faster economic growth (Hellmann et al., 1998, 2000). In the presence of incomplete information, such policies can be Pareto improving by providing a direct allocation of limited financial resources, thereby at least partly solving the problems of market failure and financial instability. An examination of individual policy variables and their relationship to inequality may shed light on the impact of specific policies and thus have significant policy implications. Given the potential issue of multicollinearity among the individual policy variables (Abiad et al., 2008), we will not include all seven variables in a single regression. We instead run separate regressions with inequality as the dependent variable and each of the seven policies as the key explanatory variable.

Table 4 presents the results of the regressions with the individual repressive policies as explanatory variables. The dependent variable is again the SWIID Gini coefficient. The estimation coefficients on credit controls and barriers of entry into the banking sector are positive and significant at the 5% level. The coefficients on the ineffectiveness of banking regulation and state ownership in banking system are positive but only at the 10% level. The coefficients on interest-rate controls, capital-account controls and the restrictions in security market are positive but insignificant. One conclusion of these estimations is that by improving the efficiency in financial supervision, strengthen the competition in banking sector, liberalizing the credit controls and releasing the entry barriers of the banking industry governments will be able to alleviate at least some of the existing poverty, expand economic opportunity and reduce overall income inequality.

[Table 4 Here]

5 Robustness Checks

5.1 Selecting Robust Determinants by Modeling Average

In this section, we employ newly developed modeling average technique, called weighted-average least square (WALS), as well as the standard Bayesian model averaging (BMA), to provide robustness evidence of our baseline estimates. As proved by Magnus et al (2010), WALS obtains a better risk profile and avoid unbounded risk by treating the unknown prior in a different manner. And the space over which we perform model selection increases linearly rather than exponentially in size. Therefore, WALS is theoretically and practically superior to BMA methodology.

Although economic theory may provide general qualitative variables, we still suffer from uncertainty of model specification and estimation. Modeling average is a proper treatment of model uncertainty. The objective of modeling average is to find the best possible estimates. The framework is a linear regression model

$$\mathbf{y} = \mathbf{X}_1 \boldsymbol{\beta}_1 + \mathbf{X}_2 \boldsymbol{\beta}_2 + \boldsymbol{\varepsilon}$$

Where $y(n \times 1)$ is the vector of regressant, $X_1(n \times k_1)$ and $X_2(n \times k_2)$ are matrice of deterministic regressor, ε is the unknown disturbances. X_1 contains the control variables of interest on theoretical or other grounds, while X_2 contains additional explanatory variables of which we are less certain. As named in Magnus et al (2010), X_1 is called as focus regressor, and X_2 auxiliary regressors. We analyze two set-ups. Based on traditional literature and our framework regressions, we take real GDP per capita growth, and its interaction term with initial Gini as the focus regressors and the rest five explanatory variables as auxiliary regressors. In set-up 2, we take all variables except constant term as the auxiliary variables. In both set-ups, the dependent variable is income inequality measured by GINI coefficient.

The estimation results for set-up 1 are given in table 5, containing four focus regressors and five auxiliary regressors. Column 1 and 3 reports the estimation coefficients by WALS and BMA respectively. All the regressors have the same signs across our estimation methods and model set-ups. Real income growth is negatively correlated with income inequality, financial repression is positively and urbanization is negatively correlated with income inequality, which is also basically consistent with our baseline estimates. The economic impact of all focus regressors does not vary much between WALS and BMA. Generally, the estimated coefficients are somewhat larger for WALS than for BMA, especially for the auxiliary regressors. The regressor openness diminishes statistically and economically, from 0.016 to 0.024 by WALS or 0.003 by BMA, compared with baseline estimates.

[Table 5 Here]

To shed some lights on the relative importance of each regressor, we report the t ratio for each of the WALS estimates in Column 2 and t ratio and posterior inclusion probability (pip) in Column4 and 5. As a rough guideline for robustness of a regressor, a value pip above 0.5 is recommended (Raftery, 1995). We see from table 5 that each focus regressor is of pip=1, because these regressors are included in the model with probability one. Therefore, pip values for the three focus regressors are unformative. Among the auxiliary regressor, urbanization is the most robust regressor with a WALS absolute t-ratio of 2.34 and pip of 0.81. Financial repression is the second most robust regressor, with a WALS absolute t-ratio of 2.23 and pip of 0.68. While the pip values for the rest four auxiliary regressors are all below 0.5, suggesting statistical insignificance in the model estimation.

To relate and compare our results directly to previous estimates, only the constant term is treated as the focus regressor, while model selection takes place over all other variables. This is the procedure most commonly used in modeling average. As shown in table 6, the estimates do not vary much from table 4. From pip perspective, initial status of inequality, real GDP growth, urbanization and financial repression are the four most robust regressors with pip above 0.5. The rest three auxiliary regressors, trade openness, initial schooling, and inflation are not statistically robust.

The estimates by modeling average provide further support for the robustness of our baseline estimates. Financial repression is statistically and economically in all model estimations and model set-ups with posterior inclusion probability of above 0.5.

[Table 6 Here]

5.2 Using Legal Origins as Instrument Variables

We already show that financial repression is positively associated with inequality measured by GINI coefficient. An endogeniety risk comes up when the relationship between repressive financial policies and the inequality is driven by reverse causation. We should recognize that an improvement in income distribution and a lower income inequality might lead to political pressures to create a more efficient financial system that allows for reasonable competition and funds projects basing on market criteria, not political intervention and allocation. And a reduction in poverty might stimulate the demand for easy access to financial funding. In addition, one might also worry about potential missing variables or measurement errors. In econometric theory, a common solution is to find instrument variables for financial repression and perform two-stage least square regression (2SLS).

In this section, we exploit the legal origins as instrumental variables for financial repression. A growing body of work suggests that cross country differences in legal origins help explain differences in financial development (LLSV, 1998, 1999; Levine, 1998; La Porta et al, 2008). We argue that legal origins serve as more relevant instrumental variables for repressive financial policies than financial development. Intuitively, countries with common law system tend to emphasize the role of the market, whereas countries with civil law system tend to emphasize the role of regulation and the government. In line with this, financial systems in countries applying common law tend to be much liberalized than those applying civil law. Therefore, legal origin is probably associated with income inequality through the effect on financial repression.

However, the validity of the instrument requires a strong first stage (IV relevance) and the exclusion restriction to hold. LLSV (1998, 1999) identified the legal origin of each country's Company/Commercial Law. Furthermore, the Legal Origin Statistics from NationMaster defined a new legal origin of Socialist for former Soviet Union member countries. Accordingly,

we have five legal origin dummy variables: English, French, German, Nordic (Scandinavian) and Socialist legal origins. We then define the English Legal Origin dummy variable equals 1 if the country adopted its Company/Commercial Law from British Common Law and 0 otherwise. The similar rule applies to the other legal origin dummies. Our sample comprises counties with English Common Law, counties with French Civil Law, counties with German Civil Law, counties with Nordic Civil Law, counties with Socialist Civil Law.

We first perform the first-stage regression for the IV strategy as follows:

FrinancialRepression_i =
$$\pi_0 + \pi_1$$
LegalOrigin_i + $\gamma X_i + \varepsilon_i$

where X_i are the same control variables as in the benchmark model specification.

The second-stage regression for the 2SLS strategy is

INEQUALITY_i =
$$\pi'_0 + \pi'_1$$
FrinancialRepression_i + $\gamma'X_i + \varepsilon'_i$

Where $INEQUALITY_i$ the GINI coefficient of country i and $FrinancialRepression_i$ is the estimation result from the first-stage regression.

Table 7-8 report estimation results using the legal origin as instrumental variable for the average GINI coefficient between 1981 and 2005. The estimates provide strong evidence that a more repressed financial system has statistically significant and quantitatively important positive effect on income inequality.

The instruments satisfy the diagnostic tests for exogeneity and relevance comfortably. The instruments are not weak as the reported values of Shea's partial R²; the value for Shea's Partial

R² reacheas 0.318 and 0.214 when the legal origin instruments and control variables are considered in Column 1 and 2 of Table 8. The P-value (0.179 in Column 1 and 0.214 in Column 4) of the Hansen's J statistic shows that the null of exogeneity for the set of instruments cannot be rejected at any reasonable significance level.

[Table 7 & 8 Here]

6 Financial Repression and Income Inequality – The Case of China

The Chinese experience during the reform period offers an interesting case study for the relationship between financial repression and inequality. During the last 30 years, China has managed to achieve a continuously high GDP growth, with an annual average of approximately 10%. However, despite substantial and wide ranging economic reforms, the Chinese economy still possesses typical repressive financial policies, including heavily regulated interest rates, state-controlled credit allocation, high and frequently adjusted reserve requirements, as well as a tightly controlled capital account. As Huang and Wang (2011) point out, most of these repressive policies were introduced before the beginning of the economic reforms during a time at which the Chinese financial system was underdeveloped and financial resources were scarce. As mentioned earlier, the Chinese case seems to indicate that financial repression have had positive effects on growth during the initial stages of economic reforms and opening up. Instead, it has been argued by several observers that the negative effects of financial repression have increased over time in China. Li (2001) states that repressive financial policies have resulted in increasing inefficiencies and that they may have resulted in a low-efficiency trap which in itself prevents

further financial liberalization. Huang and Wang (2011) take this argument to the data and show that there was a structural break in the relationship between financial repression and economic growth around 2000.

The direct effect of repressive financial policies on inequality found earlier in this study points indicate that financial repression is likely an important factor behind increasing income disparities in China. As has noted in numerous official statements by the Chinese leadership, income inequality is becoming an increasingly important issue for the Chinese government with economic opportunities for large parts of the population being limited while certain parts of Chinese society are experiencing a fast and significant improvement in the quality of life. This is also seen in the current 12th year plan in which efforts to remedy increasing inequality levels constitutes an important part (Johansson, 2012).

Much of this increasing income disparity is connected to increasing disparities between rural and urban areas. Figure 1 shows how rural income is lagging behind urban income and how this phenomenon has accelerated during the second half of the reform period. Figure 2 shows how closely the urban-rural income ratio has moved to the national inequality level. As Johansson (2012) points out, these increasing disparities may be due to repressed repressive financial policies that holds down regional financial development and limits access to finance. Thus, besides effects such as lower efficiency and, over time, hinder to economic growth, the empirical results in this study support the argument that financial repression has been one of the drivers behind the dramatic increase in income inequality in China during the last decades.

[FIGURE 1 HERE]

[FIGURE 2 HERE]

7 Concluding Remarks

Previous research has shown that there is a significant relationship between finance and inequality. However, to the best of our knowledge, there is as of yet no study that focuses on the potential impact of repressive financial policies on inequality. If financial policies turn out to have significant effects on overall inequality and poverty, that would have direct and important policy implications. To shed light on this issue, this study uses data for a large set of countries from 1981 to 2005 to analyze the relationship between financial repression and inequality. The empirical results support the argument that repressive financial policies increase inequality and worsen poverty. The effect of repressive financial policies is related to the national level of income, with less developed countries exhibiting much a much stronger association between financial repression and inequality. When focusing on individual repressive policies, we find that interest rate controls, capital account controls, weak banking supervision, and concentration in the banking sector all have a significant and positive relationship with inequality. These results have direct practical implications for policy makers, especially in less developed countries that are experiencing fast increases in inequality.

We also discuss the case of China, which constitutes a particularly interesting case due to its reliance on heavy repressive financial policies in its economic model. As rising inequality has become a key concern for Chinese policy makers the empirical results in this study provide further support for the need of continued reforms of China's financial sector. While the results in this study highlight an important link between financial repression and inequality and poverty, further research is needed for us to better understand that link. Having used cross-country and provincial macro-level data as a first step to assess the effects of financial repression, a natural next step is to complement this initial study with micro-level data to hopefully better understand how certain repressive financial policies affect firms and individuals across regions.

Appendix 1

Variable	Source	Variable Description			
Cross-Country Data					
Poverty Headcount	WIDI	The percentage of the population living on less than \$1.25 (\$2) a day at 2005 international			
Ratio \$1.25(\$2)	WDI	prices			
Gini	SWIID	Standardized World Income Inequality Database			
Financial Repression	IMF; Abiad et al. (2008)	Financial Repression Index			
GDP per	Dava Windd Tabla	Count of and our casity CDD			
capitaGrowth	Penn world Table	Growth of real per capita GDP			
Trade Liberalization	Wacziarg and	Link:			
Dummy	Welch(2008).	http://www.anderson.ucla.edu/faculty_pages/romain.wacziarg/papersum.html.			
FDI	WDI	FDI inflow to GDP ratio			
Schooling	WDI	Secondary school enrollment rate			
Inflation	WDI	Growth of GDP Deflator			

Note: Abbreviations for data sources are: International Monetary Fund (IMF), the World Bank's World Development Indicators (WDI).

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Figure 1 Urban Household Disposable Income and Rural Household Pure Income in China 1978-2008 (Thousand RMB)



Note: Data are from China Compendium of Statistics, published by NBS.





Note: Data are from NBS, SWIID, and authors' calculations. The urban-rural income differential is on the left-hand axis and the Gini coefficient on the right-hand axis.

Table 1 Summary Statistics

Variable	OBS	Mean	Std.Dev	Min	Max
Cross-Country Data					
Headcount ratio \$1.25	402	0.177	0.217	0.000	0.885
Headcount ratio \$2	402	0.309	0.290	0.000	0.978
GINI(SWIID)	2082	0.368	0.099	0.186	0.689
Financial Repression	2081	0.435	0.286	0.000	1.000
Openness	1963	0.674	0.506	0.038	4.306
Inflation	2119	0.736	6.170	-0.270	154.000
GGDP	2120	0.017	0.048	-0.453	0.251
Schooling	1766	0.727	0.322	0.026	1.620
Urbanization	2225	0.566	0.225	0.064	1.000

Note: See Appendix 1 for detailed information on the variables.

Dependent Variable	Н	eadcount ratio) \$1.25/day	I	Headcount rati	io \$2/day
Poverty ratio	1	2	3	4	5	6
Financial Repression	0.141**	0.165***	0.129**	0.135***	0.150***	0.130**
	(0.031)	(0.054)	(0.063)	(0.030)	(0.055)	(0.063)
Initial GINI*GGDP		-12.187***	-10.142***		-12.900***	-10.805***
		(3.376)	(3.602)		(3.476)	(3.602)
Initial Schooling		-0.059	-0.043		-0.117	-0.096
		(0.099)	(0.106)		(0.102)	(0.105)
GDP Growth		5.464***	4.628		5.683***	4.802***
		(1.416)	(1.513)		(1.458)	(1.503)
Inflation			-0.051			-0.040
			(0.045)			(0.045)
Trade Openness			-0.146**			-0.106
			(0.074)			(0.074)
Estimation Method	FE	FE	FE	OLS	OLS	FE
Country-Specific Effect	YES	YES	YES	YES	YES	YES
Year	81-05	81-05	81-05	81-05	81-05	81-05
Countries	63	59	55	63	59	55
Observations	207	149	133	207	149	135
Pseudo R ²	0.165	0.208	0.144	0.198	0.294	0.243

Table 2 Financial Repression and the Poor

Note:

Dependent Variable	Income Inequality (GINI Coefficient)				
	(1)	(2)	(3)	(4)	(5)
Financial Repression	0.054***	0.052**	0.053**	0.061***	0.063***
	(0.021)	(0.021)	(0.022)	(0.022)	(0.022)
Initial GINI*GGDP	-0.039	3.372***	3.455**	3.674***	4.110***
	(0.253)	(0.839)	(0.864)	(0.874)	(0.868)
Initial Schooling	-0.006	-0.005	-0.006	-0.010	-0.008
	(0.025)	(0.007)	(0.024)	(0.026)	(0.026)
GDP per capita Growth		-1.419 ^{***}	-1.481***	-1.579 ^{***}	-1.747***
		(0.334)	(0.344)	(0.349)	(0.346)
Inflation		-0.009	-0.006	-0.011	-0.006
		(0.016)	(0.017)	(0.017)	(0.016)
Trade Liberalization Dummy			0.0002		
			(0.008)		
Trade Openness				0.022	0.021
				(0.016)	(0.016)
Urbanization					-0.245***
					(0.084)
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Pseudo R [∠]	0.144	0.383	0.389	0.335	0.258
Year	81-05	81-05	81-03	88-05	88-05
Country #	86	86	83	79	79
Ν	292	292	281	258	258

Table 3 Financial Repression and Income Inequality

Note: Standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at 10 percent, 5 percent and 1 percent levels, respectively. Note that five year average data is used and the initial Gini and schooling are the values of the first year in every five year interval.

Dependent Variable			Bilateral Rea	I Exchange R	ate Against \$	SUS	
	1	2	3	4	5	6	7
CREDITCONTROL	0.027**						
	(0.004)						
INTCONTROLS	. ,	0.015					
		(0.011)					
ENTRYBERRIES		()	0.025**				
-			(0.012)				
DISREGULATION			(01011)	0.027*			
DISINE GOL/ ITOIN				(0.015)			
STATEOW/NERSHID				(0.013)	0.019*		
STATLOWINLKSHIP					0.019		
CARCONTROL					(0.011)	0.007	
CAPCONTROL						0.007	
						(0.012)	
SECURITYMKT							0.014
	***	***					(0.015)
Initial GINI*GGDP	4.249	3.984	3.962***	3.939***	4.122***	4.2009***	3.938***
	(0.879)	(0.883)	(0.878)	(0.880)	(0.884)	(0.888)	(0.888)
Initial Schooling	-0.006	-0.009	-0.008	-0.008	-0.009	-0.009	-0.010
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
GDP Growth	-1.817	-1.746	-1.765***	-1.737***	-1.759***	-1.767***	-1.713***
	(0.349)	(0.353)	(0.351)	(0.351)	(0.351)	(0.354)	(0.357)
Urbanization	-0.253***	-0.226****	-0.221***	-0.267***	-0.240***	-0.243***	-0.229***
	(0.085)	(0.086)	(0.085)	(0.087)	(0.085)	(0.087)	(0.086)
Trade Openness	0.019	0.018	0.016	0.011	0.014	0.013	0.014
	(0.024)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Inflation	-0.004	0.004	0.006	0.004	0.001	0.005	0.007
	(0.017)	(0.016)	(0.016)	(0.016)	(0.017)	(0.017)	(0.016)
Country FE	Ŷ	Ŷ	Ŷ	Ŷ	Ŷ	Ŷ	Ŷ
Year FE	Y	Y	Y	Y	Y	Y	Y
Pseudo R [∠]	0.135	0.140	0.152	0.144	0.283	0.139	0.153
Country	79	79	79	79	79	79	79
Year	25	25	25	25	25	25	25
Ν	258	258	258	258	258	258	258

Table 4 Individual Repressive financial Policies and Income Inequality

Note: Unbalanced panel regressions with standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent and 1 percent level, respectively.

Regressor	WALS		BMA		
	Coef.	t-ratio	Coef.	pip	t-ratio
Focus regressors					
Constant	0.584	14.04	0.597	1	11.86
Initial GINI*GGDP	3.990	4.61	3.984	1	4.49
Growth of GDP per capita	-1.712	-4.97	-1.707	1	-4.82
Auxiliary regressors					
Financial Repression	0.045	2.27	0.037	0.67	1.19
Trade Openness	0.016	1.22	0.002	0.11	0.27
Inflation	-0.003	-0.20	-0.002	0.06	-0.04
Initial Schooling	-0.002	-0.11	-0.001	0.06	-0.08
Urbanization	-0.189	-2.37	-0.196	0.80	-1.58

Table 5 Modeling Average Results: WALS and BMA, Set-up 1

Note: Estimates and standard errors reported for WALS and BMA are not conditional on inclusion. As Magnus et al (2010) stated, since conditional moments will overestimate the impact of regressor on the regressant, unconditional moments should be reported.

Table 6 Modeling Average Results: WALS and BMA, Set-up 2

Regressor	WALS		BMA		
	Coef.	t-ratio	Coef.	pip	t-ratio
Focus regressor					
Constant	0.584	14.33	0.598	1	11.93
Auxiliary regressors					
Financial Repression	0.044	2.23	0.038	0.68	1.21
Initial GINI*GGDP	3.565	4.11	3.954	1.00	4.28
Growth of GDP per capita	-1.493	-4.32	-1.694	1.00	-4.58
Trade Openness	0.015	1.11	0.002	0.11	0.27
Inflation	-0.005	-0.32	-0.0002	0.06	-0.04
Initial Schooling	-0.001	-0.07	-0.001	0.06	-0.08
Urbanization	-0.188	-2.43	-0.197	0.81	-1.61

Note: Estimates and standard errors reported for WALS and BMA are not conditional on inclusion. As Magnus

et al (2010) stated, since conditional moments will overestimate the impact of regressor on the regressant,

unconditional moments should be reported.

Dependent Variable	Financial Repression Index	(Regression Results fromFirst Stage)
French	0.038	0.034
	(0.037)	(0.037)
German	0.123**	0.108**
	(0.057)	(0.052)
Nordic	0.070	0.069
	(0.075)	(0.074)
Socialist	0.428***	0.313***
	(0.089)	(0.087)
Controls	Y	Y
Country	61	56
Observations	61	56

Table 7 First Stage Results: Instrument Variable Regression

Note: According to the findings from modeling average methods, we control initial GINI, initial schooling, GDP growth per capita and urbanization in column 1. In column 2, we add the trade openness into the control variables.

Table 8 Second Stage Results: Instrument Variable Regression

Dependent Variable	GINI (Regression Results from Second Stage)			
Financial Repression	-0.129**	-0.020**		
-	(0.057)	(0.920)		
Controls	Y	Y		
Shea's Partial R-SQR	0.294	0.234		
Anderson-Rubin Wald Statistic(P-Value) (Weak Instrument Robust Inference)	0.000	0.000		
Kleibergen-Paap rk LM Statistic(P-Value) (Under identification Test)	0.011	0.014		
Hansen's J test(P-Value) (Over Identification Test)	0.124	0.214		
Country	69	56		
Observations	69	56		

Note: According to

the findings from modeling average methods, we control initial GINI, initial schooling, GDP growth per capita and urbanization in column 1. In column 2, we add the trade openness into the control variables.