

Investor Protection, Risk Sharing and Inequality*

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Abstract

This paper studies the relationship between investor protection, financial risk sharing and income inequality. In the presence of market frictions, better protection makes investors more willing to take on entrepreneurial risk while lending to firms. This implies lower cost of external finance and better risk sharing between financiers and entrepreneurs. Investor protection, by boosting the market for risk sharing plays the twofold role of encouraging agents to undertake risky enterprises and providing them with insurance. By increasing the number of risky projects, it raises income inequality. By extending insurance to more agents, it reduces it. As a result, income inequality grows with the size of the market for risk sharing until this market is big enough, then it declines. Empirical evidence from a cross-section of sixty-eight countries and a panel of fifty countries over the period 1976-2000, supports the predictions of the model and documents a new stylized fact on the link between stock market development and inequality.

JEL Classification: D31, E44, O16

Keywords: Income inequality, stock market development, financial development, optimal financial contracts, investor protection, instrumental variables, dynamic panel data.

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1 INTRODUCTION

A recent literature on law and finance has shown that investor protection plays a significant role in shaping the financial structure of an economy, by affecting the relative weights of equity and debt in external finance, with ambiguous effects on economic performance.¹ What has not been recognized though, is that investor protection, through its effect on financial structure and the allocation of risk, may influence the risk taking behavior of investors and firms, thereby affecting income inequality. This paper investigates the link between investor protection, risk sharing and income inequality, both theoretically and empirically. It proposes a simple model where investor protection promotes risk sharing between financiers and entrepreneurs, thereby inducing more risk taking in the economy. Better insurance on individual earnings and wider risk taking, in turn, affect income inequality in opposite ways. The relationships predicted by the model are then confronted with the data.

To formalize these ideas, I construct a general equilibrium overlapping generation model where agents are risk averse and heterogeneous in their entrepreneurial ability. When young, agents face a choice between a safe and a risky technology, and entrepreneurial ability affects the probability of success in the risky project. Starting up a firm requires an initial investment, so that entrepreneurs need to borrow capital. Financial contracts are designed to be optimal and incentive compatible, and may make risk sharing between investors and entrepreneurs possible to a certain degree. Financial markets are subject to imperfections arising from the non-observability of output to financiers, but measures of investor protection can be adopted to amend these frictions. In particular, by promoting transparency, investor protection makes it costly for entrepreneurs to misreport their cash flow.² For instance, this cost can be thought of as the extra-compensation an advisory firm charges to certify a falsified book or to design financial operations to hide revenues from outside financiers. Better guarantees generate more confidence among investors, thereby making them more willing to bear risk and insure the entrepreneurs through lending. In turn, investors can spread the individual risk by holding diversified portfolios of risky activities. As a result, financial systems with stronger investor protection provide entrepreneurs with higher degrees of risk sharing. Finally, I rule out wealth heterogeneity, so that all inequality is due to idiosyncratic factors (ability), financial market conditions and income risk. Under these assumptions, better investor protection affects

¹See, among others, Acemoglu and Johnson (2005), La Porta et al. (1997) and (2006) and Beck et al. (2004).

²Investor protection takes the form of a hiding cost also in Aghion et al. (2005), Castro et al. (2004) and Lacker and Weinberg (1989). In this paper, like in the two latter, the cost is proportional to the hidden amount, while in the first, it equals a fraction of the initial investment.

income inequality in three ways. (i) It improves risk sharing, thereby reducing income volatility for a given mass of agents operating the risky technology; (ii) it raises the share of the population choosing the risky option, and therefore being exposed to earning risk; and (iii) it increases the reward to ability. (i) tends to reduce inequality, while (ii) and (iii) raise it.

The main result of the paper is that income inequality is a hump-shaped function of investor protection and of the size of the market for financial instruments that allow risk sharing (briefly, the market for risk sharing). Any improvement upon a low level of investor protection increases risk taking more than risk sharing, thereby driving inequality up. However, when investor protection is sufficiently high - and the market for risk sharing is big enough - any further improvement affects more risk sharing than risk taking, hence reduces income inequality.

This theoretical result is derived in terms of the size of the market for risk sharing, which cannot be measured directly. It can be argued, though, that entrepreneurs bear more risk the more leveraged they are, and thus the market for risk sharing is bigger, the higher the weight of equity relative to debt in the capital structure. Therefore, to evaluate empirically the predictions of the model, I follow Castro et al. (2004) in proxying the size of the market for risk sharing with the ratio of stock market capitalization over total credit to the private sector. In particular, I provide supportive evidence from a cross-section of sixty-eight countries and a panel of fifty countries, spanning from 1976 to 2000. First, the results show that income inequality grows with the ratio of stock market capitalization over total credit to the private sector, until this ratio is a little higher than one, than it declines. This is a new stylized fact in the literature on finance and inequality. Moreover, the data confirm that the relative size of the stock market increases with investor protection.

The contribution of this paper is related to three main strands of literature. Acemoglu and Johnson (2005), as well as La Porta et al. (1997, 1998, 1999, 2006), show that investor protection, and in general institutions aimed at contracting protection affect the financial structure of an economy by promoting the development of stock markets, but have unclear effects on economic performance. None of these studies has considered income inequality.

Many papers (see Levine, 2005 for a survey) have addressed, both theoretically and empirically, the link between financial development and macroeconomic performance in terms of GDP growth, investments, productivity and aggregate volatility.³ It is also shown that whether financial markets are more stock- or debt-based does not seem to matter for

³In particular, Acemoglu and Zilibotti (1997) show that development goes hand in hand with better risk diversification and is closely related to aggregate (GDP growth) volatility. The present paper does not feature aggregate volatility, rather it addresses income variability and dispersion across individuals.

macroeconomic performance, but no attention has been paid to the effects of financial structure on income distribution.

Theoretical contributions by Aghion and Bolton (1997), Banerjee and Newman (1993), Galor and Zeira (1993), Greenwood and Jovanovic (1990), and Piketty (1997), among others, have proposed explanations for the relationship between financial development, inequality and growth. In most of these models, income inequality originates from heterogeneity in the initial wealth distribution, paired with credit market frictions. As the poorest are subject to credit constraints, they are prevented from making efficient investments in the most productive activities.⁴ Over time, capital accumulation determines the dynamics of wealth and income. I depart from this approach in two main respects. First, I shift the focus from financial development, broadly defined as the overall availability of external finance to the private sector, to the development of instruments that allow agents not only to raise external finance but also to share risks at the same time. Second, I consider a different source of ex-ante heterogeneity (entrepreneurial ability), and propose a new mechanism translating differences in ability into income inequality that is independent of wealth accumulation. In the present paper, heterogeneity in productivity, the extent of risk sharing and the size of the risky sector ultimately determine the income distribution. Similarly, in Acemoglu and Zilibotti (1999) income inequality is not generated by ex-ante wealth heterogeneity, but by managerial incentives.

There are, to my knowledge, only two empirical assessments of the relationship between financial development and income inequality (Clarke et al., 2006 and Beck et al., 2007). As the theoretical works above, these papers are interested in the effects of overall external finance availability on income inequality, and both find evidence of a negative relationship. My contribution focuses explicitly on the impact of a particular form of finance, i.e. risk sharing instruments, on income inequality. Therefore, instead of taking a general measure of financial depth as a regressor for income inequality, I use the size of the stock market relative to total private credit, that seems well suited to account for the degree of risk sharing allowed by a financial system. The empirical results, supporting the theoretical predictions in this paper, document a new stylized: an increase in stock market size tends to raise income inequality, while a rise in credit availability reduces it. Not only is this consistent with the previous evidence on the negative effect of financial depth on income inequality, but it also provides a novel contribution by emphasizing the opposite role of equity-like finance in raising inequality.

The remainder of the paper is organized as follows. Section 2 presents the model and its

⁴The credit constraint can derive from the non-observability of physical output as in Banerjee and Newman (1992) and Galor and Zeira (1993), or effort as in Aghion and Bolton (1997) and Piketty (1997).

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A PROOFS

Lemma 1

The assumptions that $A > B$ and $\varphi A < B$ together with continuity of V_i in π_i imply the existence of a unique point $\pi^* \in (0, 1)$ where $V^* = B\chi - r$. From this, it follows that for $\pi_i = 1$, $(1 - \theta_i^h) A\chi = (A\chi - r) > B\chi - r$, hence $V_i = v[(1 - \theta_i^h) A\chi, r] > v(B\chi - r, r)$, and for $\pi_i = 0$, $(1 - \theta_i^l) \varphi A\chi = \varphi A\chi - r < B\chi - r$, thus $V_i = v[(1 - \theta_i^l) \varphi A\chi, r] < v(B\chi - r, r)$. To prove that π^* is a threshold, I just need to show that V_i is increasing in π_i . The derivative of V_i w. r. t. π_i under the optimal equity contract is

$$\frac{dV_i}{d\pi_i} = v\left[(1 - \theta_i^h) A\chi, r\right] - v\left[(1 - \theta_i^l) \varphi A\chi, r\right] + [\pi_i v'_h + (1 - \pi_i) v'_l] p A\chi > 0.$$

Therefore, $\forall \pi_i \geq \pi^*$, $\pi_i v[(1 - \theta_i^h) A\chi, r] + (1 - \pi_i) v[(1 - \theta_i^l) \varphi A\chi, r] \geq v(B\chi - r, r)$.

Lemma 2

To prove that the threshold ability is decreasing in investor protection, I obtain the derivative of π^* with respect to p ,

$$\frac{d\pi^*}{dp} = -\frac{dV}{dp} \left(\frac{dV}{d\pi}\right)^{-1},$$

and show that it is negative. I have derived $\frac{dV}{d\pi^*} > 0$ in the proof of Lemma 1. I just need to derive

$$\frac{dV}{dp} = \pi_i (1 - \pi_i) (1 - \varphi) A (v'_l - v'_h).$$

Notice that $\frac{dV}{dp} > 0$ for any π , since utility is concave. It follows that $\frac{d\pi^*}{dp} < 0$.

To prove that the threshold is convex in investor protection, I need to prove that $\frac{d^2\pi^*}{(dp)^2} > 0$.

$$\begin{aligned} \frac{d^2\pi^*}{(dp)^2} &= \frac{\frac{d^2V}{d\pi dp} \frac{dV}{dp} - \frac{d^2V}{(dp)^2} \frac{dV}{d\pi}}{\left(\frac{dV}{d\pi}\right)^2} \\ &= -\left(\frac{dV}{d\pi}\right)^{-1} \left\{ \pi^* (1 - \pi^*) A\chi (v'_l - v'_h) + A\chi [\pi^* v'_h + (1 - \pi^*) v'_l] \right. \\ &\quad \left. - p (A\chi)^2 \pi^* (1 - \pi^*) (1 - \varphi) (v''_l - v''_h) \right\} \frac{d\pi^*}{dp} \\ &\quad - \left(\frac{dV}{d\pi}\right)^{-1} \left\{ (A\chi)^2 (1 - \varphi)^2 \pi^* (1 - \pi^*) [\pi^* v''_h + (1 - \pi^*) v''_l] \right\}. \end{aligned}$$

All terms divided by $\frac{dV}{d\pi}$ are positive, since the CRRA specification of the utility function implies that $v'_l > v'_h$ and $v''_l < v''_h$, and $\frac{d\pi^*}{dp} \leq 0$. Therefore, $\frac{d^2\pi^*}{(dp)^2} = -(> 0)^{-1} \{(\geq 0) +$

$(> 0) - (\leq 0) \} (\leq 0) - (> 0)^{-1} \{ < 0 \} > 0$.

Proposition 1

To prove the increasing monotonicity of the size of the risk-sharing market, and its concavity at high levels of investor protection, I derive

$$\begin{aligned} \frac{dM}{dp} &= -g(\pi^*) \frac{d\pi^*}{dp} \\ \frac{d^2M}{(dp)^2} &= -g'(\pi^*) \left(\frac{d\pi^*}{dp} \right)^2 - g(\pi^*) \frac{d^2\pi^*}{(dp)^2}. \end{aligned}$$

From Lemma 1, $\frac{d\pi^*}{dp} \leq 0$, that implies $\frac{dM}{dp} \geq 0$; hence, the size of the market for risk sharing is increasing in investor protection. From Lemma 2, $\frac{d^2\pi^*}{(dp)^2} > 0$. Moreover, $\lim_{p \rightarrow 1} \frac{d\pi^*}{dp} = \lim_{p \rightarrow 1} \left(\frac{dV}{dp} / \frac{dV}{d\pi} \right) = \lim_{p \rightarrow 1} \frac{\pi(1-\pi)(1-\varphi)[v'(w^l, r) - v'(w^h, r)]}{v(w^h, r) - v(w^l, r) + [\pi v'(w^h, r) + (1-\pi)v'(w^l, r)]pA} = 0$. It follows that M is concave in p in a neighborhood of $p = 1$, since $\lim_{p \rightarrow 1} \frac{d^2M}{(dp)^2} < 0$.

Corollary 1

By optimality of factor employment in the final good sector, $K_Y = Y \times \left[\frac{\alpha}{r(1-\alpha)} \right]^{1-\alpha}$, which can be re-written, after substituting Y with Y^D , as $K_Y = \Gamma \frac{2+r+\beta}{1+\beta} \left\{ G(\pi^*) B\chi + \int_{\pi^*}^1 \{ [\pi + (1-\pi)\varphi] Ag(\pi) d\pi - r \} \right.$, with $\Gamma = \left[\frac{\alpha}{r(1-\alpha)} \right]^{1-\alpha}$. The first derivative of $\frac{M}{F}$ w.r.t. p is

$$\begin{aligned} \frac{d\frac{M}{F}}{dp} &= -\frac{d\pi^*}{dp} \frac{g(\pi^*)}{(1+\Gamma Y)^2} \left\{ 1 + \Gamma \frac{2+r+\beta}{1+\beta} \left\{ A\chi \int_{\pi^*}^1 [\pi + (1-\pi)\varphi] d\pi \right. \right. \\ &\quad \left. \left. - [1 - G(\pi^*)] A\chi [\pi^* + (1-\pi^*)\varphi] + B\chi - r \right\} \right\}, \end{aligned}$$

Risk-sharing finance as a ratio of total external finance is increasing in investor protection, $\frac{d\frac{M}{F}}{dp} \geq 0$ for any $p \in [0, 1]$, since $\frac{d\pi^*}{dp} \leq 0$ and the term in brackets is always positive. To prove concavity of $\frac{M}{F}$ in a neighborhood of $p = 1$, I derive

$$\begin{aligned} \frac{d^2\frac{M}{F}}{(dp)^2} &= -\frac{d^2\pi^*}{(dp)^2} \frac{g(\pi^*)}{(1+\Gamma Y)^2} \left(1 + \Gamma \frac{2+r+\beta}{1+\beta} \Psi \right) \\ &\quad - \left(\frac{d\pi^*}{dp} \right)^2 \frac{g'(\pi^*)}{(1+\Gamma Y)^2} \left(1 + \Gamma \frac{2+r+\beta}{1+\beta} \Psi \right) \\ &\quad + \left(\frac{d\pi^*}{dp} \right)^2 \frac{g(\pi^*)}{(1+\Gamma Y)^2} \Gamma \frac{2+r+\beta}{1+\beta} \Psi [1 - G(\pi^*)] A\chi (1-\varphi) \\ &\quad - 2 \left(\frac{d\pi^*}{dp} \right)^2 \frac{g(\pi^*)^2}{(1+\Gamma Y)^3} \left(1 + \Gamma \frac{2+r+\beta}{1+\beta} \Psi \right) \Gamma \frac{2+r+\beta}{1+\beta} \\ &\quad \times A\chi [\pi^* + (1-\pi^*)\varphi] - B\chi, \\ \Psi &\equiv A\chi \int_{\pi^*}^1 [\pi + (1-\pi)\varphi] d\pi - A\chi [1 - G(\pi^*)] [\pi^* + (1-\pi^*)\varphi] + B\chi - r. \end{aligned}$$

As $\lim_{p \rightarrow 1} \frac{d\pi^*}{dp} = 0$, while $\frac{d^2\pi^*}{(dp)^2} > 0$ at any p , $\lim_{p \rightarrow 1} \frac{d^2 M}{(dp)^2} < 0$.

Lemma 3

To prove non monotonicity, I differentiate $Var(w)$ with respect to p :

$$\begin{aligned}
\frac{dVar(w)}{dp} &= \frac{d\pi^*}{dp} \left\{ g(\pi^*) [B\chi - r - E(w)]^2 - 2G(\pi^*) [B\chi - r - E(w)] \frac{dE(w)}{d\pi^*} \right\} \\
&\quad - \frac{d\pi^*}{dp} g(\pi^*) \left\{ \pi^* [w^h(\pi^*) - E(w)]^2 + (1 - \pi^*) [w^l(\pi^*) - E(w)]^2 \right\} \\
&\quad + \frac{d\pi^*}{dp} \frac{dE(w)}{d\pi^*} 2 \int_{\pi^*}^1 \left\{ \pi [w^h - E(w)] + (1 - \pi) [w^l - E(w)] \right\} g(\pi) d\pi \\
&\quad + 2 \int_{\pi^*}^1 \left\{ \pi \frac{dw^h}{dp} [w^h - E(w)] + (1 - \pi) \frac{dw^l}{dp} [w^l - E(w)] \right\} g(\pi) d\pi \\
&= \frac{d\pi^*}{dp} g(\pi^*) \left\{ [B\chi - r - E(w)]^2 - \pi^* [w^h(\pi^*) - E(w)]^2 \right. \\
&\quad \left. - (1 - \pi^*) [w^l(\pi^*) - E(w)]^2 \right\} \\
&\quad - 2(1 - \varphi) A\chi \int_{\pi^*}^1 \pi(1 - \pi) (w^h - w^l) g(\pi) d\pi.
\end{aligned}$$

Notice that the term in the first two lines represents the market size effect and is positive for all p , while the last line accounts for the risk sharing effect and is negative for all p .

For $p \rightarrow 0$, $\pi^* \rightarrow 1$, $E(w) \rightarrow B\chi - r$, $w^h \rightarrow A\chi - r$, $w^l \rightarrow \varphi A\chi - r$. Therefore,

$$\lim_{p \rightarrow 0} \frac{dVar(w)}{dp} = -\frac{d\pi^*}{dp} g(1) (A - B)^2 \chi^2 > 0.$$

For $p \rightarrow 1$, $\pi^* \rightarrow \pi_{p=1}^* = \frac{B - \varphi A}{(1 - \varphi)A}$, $w^h(\pi^*) - w^l(\pi^*) \rightarrow 0$, $w^h(\pi_{p=1}^*) \rightarrow w^l(\pi_{p=1}^*) = [\pi_{p=1}^* + (1 - \pi_{p=1}^*) \varphi] A\chi - r = B\chi - r$, $\frac{d\pi^*}{dp} \rightarrow 0$. I study how $\frac{dVar(w)}{dp}$ approaches zero in a left neighborhood of $p = 1$ by means of Taylor's first-order approximation. Notice that

$$\begin{aligned}
\frac{d^2 Var(w)}{(dp)^2} &= \left[\frac{d^2 \pi^*}{(dp)^2} g(\pi^*) + \left(\frac{d\pi^*}{dp} \right)^2 g'(\pi^*) \right] \left\{ [B\chi - r - E(w)]^2 \right. \\
&\quad \left. - \pi^* [w^h(\pi^*) - E(w)]^2 - (1 - \pi^*) [w^l(\pi^*) - E(w)]^2 \right\} \\
&\quad + \frac{d\pi^*}{dp} g(\pi^*) \left\{ 2 \frac{d\pi^*}{dp} \frac{dE(w)}{d\pi^*} \{ [\pi^* + (1 - \pi^*) \varphi] A\chi - B\chi \} \right. \\
&\quad \left. + 2\pi^* (1 - \pi^*) (1 - \varphi)^2 (A\chi)^2 - \frac{d\pi^*}{dp} \left\{ [w^h(\pi^*) - E(w)]^2 \right. \right. \\
&\quad \left. \left. - [w^l(\pi^*) - E(w)]^2 \right\} + 2(1 - \varphi)^2 (A\chi)^2 \int_{\pi_{p=1}^*}^1 \pi (1 - \pi) g(\pi) d\pi. \right.
\end{aligned}$$

It follows that, in a neighborhood to the left of $p = 1$,

$$\frac{dVar(w)}{dp} = 2(p - 1)(1 - \varphi)^2 (A\chi)^2 \int_{\pi_{p=1}^*}^1 \pi (1 - \pi) g(\pi) d\pi < 0.$$

Proposition 2

Recall from Proposition 1 that M is increasing in p . I characterize the relationship between the size of the risk-sharing market and the variance of earnings by studying

$$\begin{aligned}
\frac{dVar(w)}{dM} &= \frac{dVar(w)}{dp} \left(\frac{dM}{dp} \right)^{-1} \\
&= -[B\chi - r - E(w)]^2 + (1 - \pi^*) [w^l(\pi^*) - E(w)]^2 \\
&\quad + \pi^* [w^h(\pi^*) - E(w)]^2 + \left[\frac{d\pi^*}{dp} g(\pi^*) \right]^{-1} \times \\
&\quad 2(1 - \varphi)^2 (A\chi)^2 (1 - p) \int_{\pi^*}^1 \pi (1 - \pi) g(\pi) d\pi
\end{aligned}$$

For $p \rightarrow 0$, $\pi^* \rightarrow 1$, $E(w) \rightarrow B\chi - r$, $w^h \rightarrow A\chi - r$, $w^l \rightarrow \varphi A\chi - r$, hence

$$\lim_{p \rightarrow 0} \frac{dVar(w)}{dM} = (A - B)^2 \chi^2 > 0.$$

For $p \rightarrow 1$, $\pi^* \rightarrow \pi_{p=1}^* = \frac{B - \varphi A}{(1 - \varphi)A}$, $w^h(\pi^*) - w^l(\pi^*) \rightarrow 0$, $w^h(\pi_{p=1}^*) \rightarrow w^l(\pi_{p=1}^*) =$

$[\pi_{p=1}^* + (1 - \pi_{p=1}^*)] A\chi - r = B\chi - r$, and $\frac{d\pi^*}{dp} \rightarrow 0$. It thus follows that

$$\begin{aligned} \lim_{p \rightarrow 1} \frac{dVar(w)}{dM(p)} &= \lim_{p \rightarrow 1} \frac{\frac{d}{dp} \left[2(1 - \varphi)^2 (A\chi)^2 (1 - p) \int_{\pi^*}^1 \pi(1 - \pi) g(\pi) d\pi \right]}{\frac{d}{dp} \left[\frac{d\pi^*}{dp} g(\pi^*) \right]} \\ &= 2 \int_{\pi_{p=1}^*}^1 \pi(1 - \pi) g(\pi) d\pi \frac{v(B\chi - r) + A\chi v'(B\chi - r)}{\pi_{p=1}^* (1 - \pi_{p=1}^*) g(\pi_{p=1}^*) v''(B\chi - r)} < 0, \end{aligned}$$

since $v'' < 0$ for any CRRA utility function.

B CLOSED ECONOMY

In this section, I show how the economy can be closed without affecting the main results discussed in sections 2 and 3. Assume that capital and intermediate goods can no longer be imported or exported. It follows that their prices will be pinned down by domestic demand and supply: $r_t = \alpha \frac{Y_t}{K_{Yt}}$, and $\chi_t = (1 - \alpha) \frac{Y_t}{X_t}$. Further, capital will follow the law of motion:

$$K_{t+1} = \frac{1}{1 + \beta} \left\{ G(\pi_t^*) B\chi_t + A\chi_t \int_{\pi_t^*}^1 [\pi + (1 - \pi)\varphi] g(\pi) d\pi - r_t \right\}, \quad (8)$$

where the RHS is aggregate savings. Aggregate capital is allocated between the final and the intermediate good sectors:

$$K_{t+1} \equiv K_{Yt+1} + 1.$$

The aggregate supply of intermediate goods, X_t , equals total production of safe and risky projects:

$$X_t = G(\pi_t^*) B + A \int_{\pi_t^*}^1 [\pi + (1 - \pi)\varphi] g(\pi) d\pi.$$

Notice that the production of intermediate goods X_t is decreasing in the threshold ability π_t^* . Optimal technology adoption maintains the threshold property of Lemma 1, since agents take prices as given and the risky payoffs are still increasing in ability. In any period, the threshold ability π_t^* satisfies:

$$\pi_t^* v(w_t^h(\pi_t^*), r_{t+1}) + (1 - \pi_t^*) v(w_t^l(\pi_t^*), r_{t+1}) = v(B\chi_t - r_t, r_{t+1}). \quad (9)$$

Equations (9) and (8) characterize the dynamic equilibrium. In the next sections, I report numerical solutions for the steady state and the transition dynamics. In particular, I show that Lemmas 2-3 and Propositions 1-2 continue to hold in the steady state. Moreover, along the transition between steady states with different investor protection, the size of

the risk-sharing market converges monotonically. Income inequality may instead converge along an oscillatory path, as a consequence of the dynamics of prices and capital.

B.1 THE DYNAMICS

The dynamics of the closed economy satisfies equations (??) and (9):

$$\pi_t^* v \left(w_t^h(\pi_t^*), r_{t+1} \right) + (1 - \pi_t^*) v \left(w_t^l(\pi_t^*), r_{t+1} \right) = v(B\chi_t - r_t, r_{t+1})$$

$$K_{t+1} = \frac{1}{1 + \beta} \left\{ G(\pi_t^*) B\chi_t + A\chi_t \int_{\pi_t^*}^1 [\pi + (1 - \pi)\varphi] g(\pi) d\pi - r_t \right\}$$

Differently from the small open economy, equilibrium earnings $w_t(\pi_i)$ now depend also on factor prices, that are functions of the threshold ability (π_t^*), and of the capital employed in the final sector ($K_{Yt} = K_t - 1$). Given K_t (which is predetermined), an increase in the hiding cost p raises the left-hand side of equation (9), which would determine a drop in the threshold ability π^* . A lower threshold would in turn imply an increase in the production of intermediate goods (X_t) and in the demand of capital in the final good sector (K_{Yt}), and therefore a drop in the price of intermediate goods (χ_t) and a rise in the interest rate (r_t). These changes in factor prices would feed back into equation (9), reducing both the left and the right-hand sides. In general equilibrium, the overall effect on the threshold depends on which side drops more. Notice however, that under perfect investor protection the threshold ability does not depend on relative factor prices, since $\pi_{p=1}^* = \frac{A-B}{(1-\varphi)A}$.

Since the analytical characterization of the dynamic equilibrium becomes awkward, I proceed by means of numerical solutions. The main results are displayed in Figures 4-6. In all simulations, I adopt the following parametrization: $A = 150$, $B = 100$, $\alpha = 0.33$, $\beta = 0.17$ (equivalent to a six per cent annual discount for thirty years, i.e. a generation), and G uniform in $[0, 1]$.

Notice that, in the absence of investor protection, a minimum initial capital is required in order for production of the intermediate good, and hence of the final good too, to be feasible: $K_0 > \frac{1}{1-\alpha}$ (which makes sure that $B\chi(\pi^* = 1) > r(\pi^* = 1)$). Also, even in under perfect investor protection ($p = 1$), no young agent chooses the risky technology if capital is so scarce that the repayment due by an entrepreneur with ability 1 exceeds her cash flow: $K < \frac{\alpha}{1-\alpha} \frac{B}{A}$ (which makes sure that $A\chi(\pi^* = 1) > r(\pi^* = 1)$). Given that $\alpha = 0.33$, at $p = 1$ there is a non-zero market for risk sharing, whenever capital satisfies $K > \frac{1}{1-\alpha}$.

Figure 4 describes the dynamics of an economy that starts with a very low capital endowment, $K_0 = 0.5 + \frac{1}{1-\alpha}$, and an intermediate degree of investor protection, $p = 0.5$. When K_0 is very low, the interest rate is so high relative to the price of the intermediate

good that no young agent chooses the risky technology. Hence, the market for risk sharing is inactive and inequality is zero. As capital is accumulated, the interest rate falls and the price of intermediates rises. When the ratio r/χ becomes low enough, some young agents prefer the risky project and raise capital through the risk-sharing market. This implies that some income inequality arises due to the “market size” effect, as in the model of sections 2-3. The adjustment of capital and prices continues until the steady state is reached. Decreasing marginal productivity of capital guarantees the existence of the steady state.

Notice that the price of intermediate goods (χ) affects inequality also by changing the earnings differentials between safe and risky entrepreneurs. The higher χ , the wider the earnings differentials, the higher inequality (“price” effect). This implies that, with endogenous prices, inequality may vary even if stock market size does not.

Figure 5 shows the adjustment after a policy change that increases investor protection from $p = 0$ to $p = 0.05$, starting from the steady state. Due to the convexity of π_t^* in p , the risky intermediate sector expands remarkably in response to the policy change. The marginal productivity of capital in the final sector rises sharply because the production of intermediates increases. This causes an overshooting of the interest rate, that gradually declines with capital accumulation to its new (higher) steady state level. Inequality immediately jumps up and oscillates around its new (higher) steady state level until capital and prices are stable.

If the policy change occurs at high levels of investor protection, as shown in figure 6 for p from 0.85 to 0.9, the effect on productivity of factors (hence prices) is weaker. An increase in p induces a small increase in the size of the risky intermediate sector, and has virtually no effect on the interest rate. Inequality falls, since the “risk sharing” effect outweighs the “market size” effect at high levels of investor protection.

B.2 THE STEADY STATE

In the steady state, $K_{t+1} = K_t = K$ and $\pi_{t+1}^* = \pi_t^* = \pi^*$. The equilibrium is the solution to the system:

$$\begin{aligned} VV &\equiv \pi^* v(w^h(\pi^*), r) + (1 - \pi^*) v(w^l(\pi^*), r) - v(B\chi - r, r) = 0 \\ KK &\equiv (1 + \beta) K - G(\pi^*)(B\chi - r) - \int_{\pi^*}^1 [\pi w^h(\pi) + (1 - \pi) w^l(\pi)] g(\pi) d\pi = 0. \end{aligned}$$

In the presence of perfect investor protection, the threshold ability does not depend on factor prices and is equal to $\frac{B-\varphi A}{(1-\varphi)A}$ as in the small open economy. Figure 7 plots the comparative statics for all levels of investor protection $p \in [0, 1]$ in the steady state, which

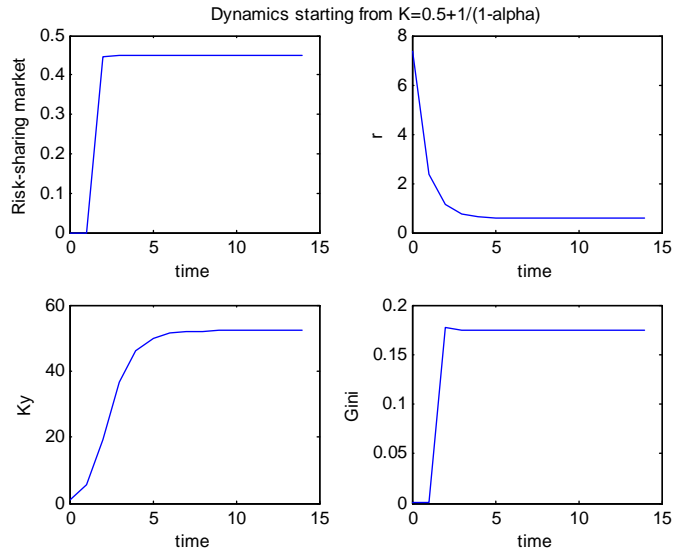


Figure 4: Dynamics from a low initial capital endowment ($K=0.5+\frac{1}{1-\alpha}$) to the steady state, given $p=0.5$.

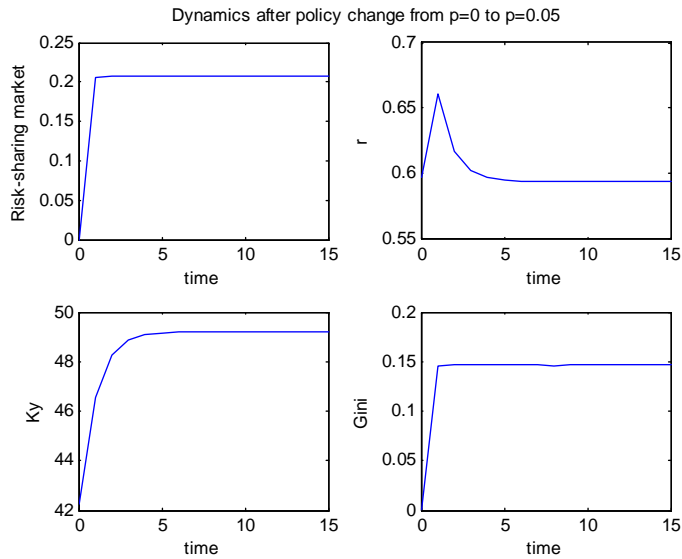


Figure 5: Dynamic adjustment after a policy change from $p=0$ to $p=0.05$.

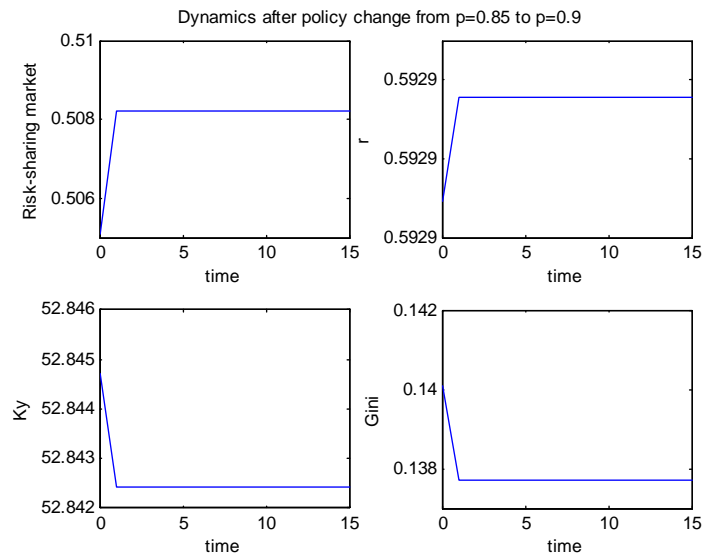


Figure 6: Dynamic adjustment after a policy change from $p=0.85$ to $p=0.9$.

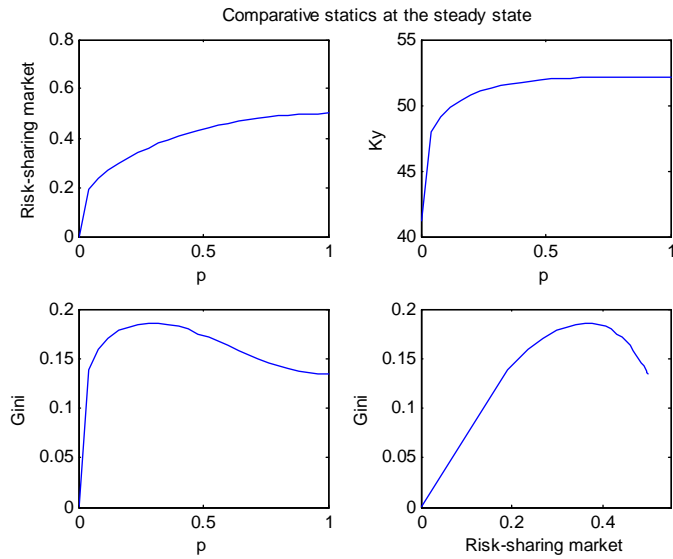


Figure 7: Comparative statics for varying investor protection across steady states.

shows that Lemmas 1-3 and Propositions 1-2 continue to hold in the closed economy. In fact, the “price” effect, that affects inequality along the dynamics, is irrelevant in the steady state. Therefore, the comparative statics on investor protection is driven by the “market size” and “insurance” effects only, as in the small open economy.

C SIMULATION DETAILS

This section describes step by step the procedure I followed for simulating the small open economy of section 2 and 3 (and the closed economy in the previous section of the Appendix).

1. Give values for the main parameters $(A, B, \varphi, \beta, \alpha)$ and the interest rate, and compute the threshold ability with perfect investor protection $(\pi_{p=1}^*)$.
2. Compute values for the parameters of the Lognormal distribution of abilities, (μ, σ) , from Barro and Lee’s (2000) data. The database provides observations for the percentages of the population aged 15 and above with no, primary, secondary and tertiary education (lu, lp, ls, lh) , along with the average year of each education level (pyr, syr, hyr) . I compute the average years of schooling for people with primary, secondary and tertiary education (q_1, q_2, q_3) , respectively):

$$q_1 = \frac{pyr}{lp + ls + lh}; q_2 = q_1 + \frac{syr}{ls + lh}; q_3 = q_1 + q_2 + \frac{hyr}{lh}.$$

The average years of schooling and their variance are then

$$E(Q) = \sum_{i=1}^3 l_i q_i$$

$$V(Q) = \sum_{i=0}^3 l_i (q_i - E(Q))^2,$$

with $l_0 = lu$, $l_1 = lp$, $l_2 = ls$ and $l_3 = lh$. Group the countries in low-income, middle-income and high-income following the WDI criterion and take the average values of $E(Q)$ and $V(Q)$. Finally, μ and σ can be derived from the expressions for mean and variance of the Lognormal distribution:

$$E(Q) = e^{\mu + \frac{\sigma^2}{2}}$$

$$V(Q) = e^{2\mu + 2\sigma^2} - e^{\mu + \sigma^2}.$$

3. Define a grid of 101 degrees of investor protection $p \in [0, 1]$, and a grid of initial

guesses for the threshold ability $\pi^* \in [\pi_{p=1}^*, 1]$, equally spaced by 0.0001 (the finer the grid, the better the approximation).

4. Draw $\Pi = 10001$ ability levels from a Lognormal (μ, σ) and sort them in ascending order. Identify the ability level $\pi_{.9995}$: $G(\pi_{.9995}) = 0.9995$ and divide every $\pi \leq \pi_{.9995}$ by this figure. Replace all $\pi > \pi_{.9995}$ by 1, so that the distribution is normalized to values included in $[0, 1]$, and truncated in a way that makes the top 0.05 per cent of the population successful with certainty. Compute the Cdf of ability,

$$G(\pi_i) = \frac{\# \text{ of realizations } \pi \leq \pi_i}{\Pi}.$$

5. For every degree of investor protection p

- (a) compute $\pi^*(p)$ as the solution to the technology choice problem. In particular, recursively find the point in the grid of π^* satisfying:

$$\begin{aligned} \log(B - r) &= \pi^* \log(w^h) + (1 - \pi^*) \log(w^l) & (10) \\ w^h &= A [\pi^* p (1 - \varphi) + \varphi + (1 - p)(1 - \varphi)] - r \\ w^l &= A [\pi^* p (1 - \varphi) + \varphi] - r > 0. \end{aligned}$$

- (b) For every ability π

- i. draw the earning realization:

$$\begin{aligned} w &= \begin{cases} B - r & \pi < \pi^* \\ A [\pi^* p (1 - \varphi) + \varphi + (1 - p)(1 - \varphi)] - r & \pi \geq \pi^* \end{cases} \\ \epsilon &\sim Bi(N, \pi), \text{ with } N = \# \text{ of } \pi \geq \pi^*. \end{aligned}$$

- ii. sort w and derive its cumulative density function as $F(w_i) = \frac{\# \text{ of realizations } w \leq w_i}{\Pi}$

- iii. compute the Lorenz Curve as $L(w_m) = \frac{\text{mean of } w \leq w_m}{\text{mean of } w} \frac{m}{\Pi}$ for $m = 1, 2, \dots, \Pi$

- iv. compute the Gini coefficient as $Gini = 1 - 2 \sum_{m=1}^{\Pi} \frac{L(w_m)}{\Pi}$

- (c) save the threshold and the Gini in $(1 \times p)$ vectors, $\pi^*(p)$ and $Gini(p)$, the earnings realizations, their distribution and the Lorenz curve in $(p \times \Pi)$ matrices, $\mathbf{w}(p, \pi)$, $\mathbf{F}(p, w(p, \pi))$ and $\mathbf{L}(p, w(p, \pi))$

When simulating the closed economy, step 1 does not specify r .

Step 5.(a) finds the threshold ability $\pi_t^*(p)$ which solves (10) for a given initial capital K_t , taking into account that $\chi_t = (1 - \alpha)(K_t - 1)^\alpha \times \left\{ A \sum_{i=\pi_t^*}^1 [\pi_i + (1 - \pi_i) \varphi] g(\pi_i) + G(\pi^*) B \right\}^{-\alpha}$ and $r_t = \alpha (K_t - 1)^{\alpha-1} \times \left\{ A \sum_{i=\pi_t^*}^1 [\pi_i + (1 - \pi_i) \varphi] g(\pi_i) + G(\pi^*) B \right\}^{1-\alpha}$.

After step 5.(c), capital in the next period is computed as $K_{t+1} = \sum_{i=0}^1 w_i - r$ and plugged into step 5.a. as new initial capital K_t . This recursion goes on until the steady state is reached and $K_t = K_{t+1}$.

Table A
Countries and Samples

Country	CL	CS	PL	PS	Country	CL	CS	PL	PS
Australia	y	y	y	y	Kenya	y	y		
Austria	y				Korea	y	y	y	y
Bangladesh	y		y	y	Malaysia	y	y	y	y
Barbados	y				Mauritius	y		y	
Belgium	y	y	y		Mexico	y	y	y	y
Bolivia	y				Nepal	y			
Botswana	y				Netherlands	y	y	y	y
Bulgaria			y		New Zealand	y	y	y	y
Brazil	y	y	y	y	Norway	y	y	y	y
Canada	y	y	y	y	Pakistan	y	y	y	y
Chile	y	y	y		Panama	y			
China	y		y		Paraguay	y			
Colombia	y	y	y		Peru	y	y	y	y
Costa Rica	y		y	y	Philippines	y	y	y	
Denmark	y	y	y	y	Poland	y		y	y
Ecuador	y	y	y		Portugal	y	y	y	
Egypt	y	y	y		Romania	y			
El Salvador	y				Russia			y	y
Finland	y	y	y	y	Singapore	y	y	y	y
France	y	y	y	y	Slovak Republic			y	
Germany	y	y	y	y	South Africa	y	y		
Ghana	y		y	y	Spain	y	y	y	y
Greece	y		y		Sri Lanka	y	y	y	y
Guatemala	y				Sweden	y	y	y	y
Honduras	y				Switzerland	y			
Hong Kong	y	y	y	y	Taiwan	y	y	y	y
Hungary	y		y		Thailand	y	y	y	y
India	y	y	y	y	Trinidad and Tobago	y		y	y
Indonesia	y	y	y	y	Tunisia	y		y	
Iran	y				Turkey	y	y	y	
Ireland	y				United Kingdom	y	y	y	y
Israel	y	y			United States	y	y	y	y
Italy	y	y	y	y	Uruguay	y	y		
Jamaica	y		y		Venezuela	y	y	y	y
Japan	y	y	y	y	Zambia	y			
Jordan	y	y	y	y	Zimbabwe	y	y		

Note: C and P stand for cross-sectional and panel datasets, respectively.
L and S for large and small samples.

Table 1. Risk-sharing market and income inequality
OLS - cross-section - 1980-2000

	1	2	3	4	5	6
<i>Smpr</i>	.038 (.029)	.142** (.032)		.035 (.029)	.142** (.032)	.141** (.033)
<i>Smpr</i> ²		-.033** (.008)			-.034** (.008)	-.034** (.008)
<i>Smcap</i>			.252** (.085)			
<i>Smcap</i> ²			-.069* (.036)			
<i>Privo</i>			-.089* (.049)			
<i>Sec25</i>	-.185** (.056)	-.197** (.052)	-.214** (.063)			-.133 (.085)
<i>Gh_15</i>				.114* (.058)	.149** (.061)	.070 (.086)
<i>GDP</i>	-.099 (.122)	-.157 (.109)	-.173* (.106)	-.061 (.127)	-.088 (.114)	-.123 (.119)
<i>GDP</i> ²	.115 (.126)	.162 (.113)	.169 (.106)	.008 (.122)	.034 (.106)	.116 (.121)
R ²	.499	.579	.562	.472	.555	.573
Obs.	68	68	68	67	67	67

The dependent variable is the average Gini coefficient between 1980 and 2000. Real per capita GDP and education (*sec25* and *gh_15*) are in initial values, financial variables (*smpr*, *smcap* and *privo*) are in sample averages. All regressions include a dummy for Latin American countries. Coefficients are estimated with Ordinary Least Squares. Robust standard errors are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively.

Table 2. Risk-sharing market, investor protection and income inequality
OLS - cross-section - 1980-2000

	1	2	3
<i>Investor_pr</i>	.008* (.005)	-.001 (.005)	-.009* (.005)
<i>Smpr</i>		.101** (.025)	
<i>Smpr*investor_pr</i>			.014** (.002)
<i>Sec25</i>	-.175** (.067)	-.166** (.067)	-.158** (.067)
<i>GDP</i>	-.167 (.223)	-.308 (.183)	-.338* (.183)
<i>GDP</i> ²	.131 (.238)	.286 (.202)	.306 (.197)
R ²	.496	.641	.646
Obs.	43	42	42

The dependent variable is the average Gini coefficient between 1980 and 2000. Real per capita GDP and education (*sec25* and *gh_15*) are in initial values, *smpr* is in sample averages. All regressions include a dummy for Latin American countries. Coefficients are estimated with Ordinary Least Squares. Robust standard errors are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively.

Table 3. Investor protection, risk-sharing market and income inequality
IV - cross-section - 1980-2000

Panel A. First Step – Dependent variable: <i>smpr</i>			
	1	2	3
	Whole sample	Smpr<1.5	Whole sample
<i>Sec25</i>	.031 (.598)	.246 (.313)	-.293 (.471)
<i>GDP</i>	.212 (1.016)	.579 (.545)	1.299 (.941)
<i>GDP</i> ²	-.298 (1.093)	-.539 (.585)	-1.597 (1.039)
<i>Investor_pr</i>			.097** (.024)
<i>Eff_jud</i>			.047 (.040)
<i>UK legal origin</i>	.588** (.242)	.419** (.128)	
<i>FR legal origin</i>	.135 (.269)	.126 (.141)	
<i>GE legal origin</i>	.017 (.339)	-.053 (.177)	
R ²	.183	.302	.386
Obs.	68	65	42
Panel B. Second Step – Dependent variable: <i>Gini</i>			
	1	2	3
	Whole sample	Smpr<1.5	Whole sample
<i>smpr</i>	.109** (.042)	.136** (.047)	.077** (.038)
<i>Sec25</i>	-.176** (.077)	-.201** (.060)	-.163** (.067)
<i>GDP</i>	-.082 (.143)	-.224* (.114)	-.275* (.152)
<i>GDP</i> ²	.102 (.155)	.233* (.123)	.246 (.173)
Sargan (p-value)	.345	.149	.369
F-test	3.98	7.08	9.44
(p-value)	.012	.000	.000

Panel A. The dependent variable is average *smpr* between 1980 and 2000. Real per capita GDP and education (*sec25* and *gh_15*) are in initial values, investor protection and efficiency of the judiciary are averages.

Panel B. The dependent variable is the average Gini coefficient between 1980 and 2000. Real per capita GDP and education (*sec25* and *gh_15*) are in initial values, *smpr* is in sample averages. Both p-values and statistics are reported for the F-test of the excluded instruments. Only p-values are reported for the Sargan test of overidentifying restrictions.

All regressions include a dummy for Latin American countries. Coefficients are estimated with Two-Stage Least Squares. Robust standard errors are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively.

Table 4. Risk-sharing market and income inequality
Sensitivity analysis - cross-section - 1980-2000

	OLS Latest <i>Gini</i> Average <i>smp</i>		IV – legal origins Latest <i>Gini</i> Average <i>smp</i>		OLS Average <i>Gini</i> <i>smp</i> (1985)	
	1 Whole sample	2 Whole sample	3 Whole sample	4 <i>smp</i> <1.5	5 Whole sample	6 Whole sample
<i>Smp</i>	.032 (.031)	.136** (.035)	.109** (.046)	.131** (.051)	.087** (.032)	.040 (.063)
<i>Smp</i> ²		-.034** (.009)				.0003 (.0004)
R ²	.469	.543	.265	.541	.633	.639
F-Test (p-value)			3.900 (.013)	7.600 (.000)		
Sargan (p-value)			1.786 (.409)	3.202 (.202)		
Obs.	65	65	65	62	40	40

In columns 1-4 the dependent variable is the latest available observation of Gini coefficient after 1985, *smp* is 1980-2000 average. Initial (1980) values of real per capita GDP and *sec25* plus a dummy for Latin America are included. In columns 5-6 the dependent variable is the 1985-2000 average of Gini, *smp* is observed in 1985. Initial (1985) values of real per capita GDP and *sec25* plus a dummy for Latin America are included. Coefficients in columns 1-2 and 5-6 are estimated with Ordinary Least Squares. Coefficients in columns 3-4 are second step estimates from 2SLS regressions, with legal origins as instruments for *smp*; first step estimates are not reported but available from the author. Robust standard errors are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively.

Table 5. Risk-sharing market and income inequality
Robustness analysis - cross-section - 1980-2000

	OLS		IV – legal origins	
	1 Whole sample	2 Whole sample	3 Whole sample	4 <i>smpr</i> <1.5
<i>Smpr</i>	.039 (.032)	.158** (.037)	.122** (.049)	.165** (.058)
<i>Smpr</i> ²		-.037** (.009)		
<i>Gov</i>	-.0006 (.0008)	-.001 (.0008)	-.002 (.002)	-.0015 (.0011)
<i>Trade</i>	.00001 (.0001)	-.0002 (.0002)	-.0002 (.0003)	-.0003 (.0003)
<i>Sec25</i>	-.186** (.057)	-.207** (.054)	-.185** (.082)	-.220** (.063)
<i>GDP</i>	-.111 (.136)	-.140 (.120)	-.069 (.162)	-.182 (.125)
<i>GDP</i> ²	.122 (.138)	.139 (.124)	.081 (.172)	.184 (.133)
R ²	.502	.592	.264	.571
F-Test (p-value)			3.18 (.030)	5.45 (.002)
Sargan (p-value)			2.231 (.328)	3.942 (.139)
Obs.	68	68	68	65

The dependent variable is the average Gini coefficient between 1980 and 2000. Real per capita GDP and *sec25* are in initial values, *smpr*, government expenditure (*gov*) and *trade* over GDP are in sample averages. All regressions include a dummy for Latin American countries. Coefficients in columns 1-2 are estimated with Ordinary Least Squares. Coefficients in columns 3-4 are second step estimates from 2SLS regressions, with legal origins as instruments for *smpr*; first step estimates are not reported but available from the author. Robust standard errors are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively.

Table 6. Risk-sharing market and income inequality
Static Panel – 1976-2000

	Large sample			DPD sample		
	1 RE	2 FE	3 RE	4 RE	5 RE	6 RE
<i>Smpr</i>	2.615** (.551)	2.88* (1.62)		3.368** (1.059)	7.430** (2.389)	
<i>Smpr</i> ²		-.023 (.259)			-1.983* (1.036)	
<i>Smcap</i>			17.449** (3.886)			6.579** (1.760)
<i>Privo</i>			-5.358** (1.899)			-3.097 (2.472)
<i>Sec25</i>	-.177** (.049)	-.149** (.068)	-.206** (.049)	-.180** (.050)	-.198** (.050)	-.161** (.048)
<i>GDP</i>	-12.923* (7.151)	-7.803 (11.89)	-14.892** (7.196)	-9.053 (7.181)	-9.107 (7.011)	-10.417 (7.439)
<i>GDP</i> ²	10.839** (4.838)	8.795 (6.443)	9.369** (4.774)	9.054* (4.686)	8.875* (4.651)	8.368* (4.652)
Hausman test	.425	.026	.951	.461	.248	.369
Countries	50	50	50	34	34	34
Obs.	144	144	144	112	112	112

The dependent variables is the Gini coefficient. Real per capita GDP, and education (*sec25*) are in initial values, financial variables (*smpr*, *smcap* and *privo*) are in sample averages over non-overlapping 5-year periods. All equations were estimated with random (RE) and fixed effects (FE). The coefficients are reported from the specification chosen based on the Hausman tests, whose p-values are reported in the table. Robust standard errors are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively.

Table 7. Risk-sharing market and income inequality
Dynamic Panel Data – System GMM – 1976-2000

	1	2	3	4	5	6
$\log(Smpr)$	.045** (.021)	.041** (.021)	.204** (.071)	.128* (.068)		
$\log(Smpr^2)$			-.119** (.054)	-.061 (.054)		
$\log(Smcap)$					.106** (.029)	.095** (.034)
$\log(Privo)$					-.106** (.041)	-.131** (.037)
$\log(Gini_5)$	.369** (.151)	.387** (.144)	.361** (.139)	.441** (.132)	.379** (.181)	.445** (.164)
$\log(Sec25)$	-.081 (.104)	-.095 (.083)	-.105 (.079)	-.069 (.069)	-.117 (.095)	-.134 (.103)
$\log(GDP)$	.188 (.174)	.249 (.170)	.166 (.168)	.274 (.167)	.161 (.158)	.320* (.176)
$\log(GDP^2)$	-.211 (.206)	-.280 (.204)	-.198 (.189)	-.322 (.196)	-.146 (.177)	-.287 (.187)
Sargan (p-value)	.387	.506	.793	.776	.508	.647
m_2 (p-value)	.527	.870	.383	.822	.346	.481
Time FE	No	Yes	No	Yes	No	Yes
(F-Test)		(.153)		(.293)		(.123)
Countries	32	32	32	32	32	32
Obs.	84	84	84	84	84	84

The dependent variables in the system are the log and the log-difference of the Gini coefficient. All regressors are in log and log-differences. Real per capita GDP, and education (*sec25*) are in initial values, financial variables (*smpr*, *smcap* and *privo*) are in sample averages over non-overlapping 5-year periods. Coefficients are first step estimates from 2-step system GMM regressions *à la* Arellano and Bover, performed with PcGive. All regressors are treated as endogenous (Gini) or predetermined, hence instrumented. Lagged levels are used as instruments for differences, and lagged differences as instruments for levels. Robust (first step) standard errors are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively. P-values for the Sargan and m_2 tests are reported from the second step.

Table 8. Risk-sharing market and income inequality
Robustness analysis – Panel – 1976-2000

	Static Panel – RE		Dynamic Panel – System GMM			
	1	2	3	4	5	6
<i>Smpr</i>	2.858** (1.139)	6.683** (2.411)	.047** (.020)	.168** (.068)	.057** (.022)	.189** (.069)
<i>Smpr</i> ²		-1.865* (1.031)		-.093* (.051)		-.099* (.053)
<i>Gov</i>	.066 (.089)	.059 (.087)	-.009 (.087)	-.004 (.077)		
<i>Trade</i>	.024 (.017)	.022 (.016)			-.028 (.024)	-.034* (.019)
<i>Gini</i> ₅			.347** (.149)	.367** (.133)	.390** (.143)	.400** (.140)
<i>Sec25</i>	-.174** (.050)	-.189** (.050)	-.088 (.072)	-.092 (.071)	-.139** (.064)	-.163** (.067)
<i>GDP</i>	-10.074 (7.363)	-10.070 (7.214)	.189 (.171)	.196 (.166)	.219 (.168)	.169 (.143)
<i>GDP</i> ²	9.576** (4.667)	9.353** (4.636)	-.211 (.196)	-.232 (.183)	-.214 (.194)	-.169 (.171)
Hausman	.325	.118				
Sargan (p-value)			.584	.896	.808	.967
m ₂ (p-value)			.504	.393	.414	.386
Countries	34	34	32	32	32	32
Obs.	112	112	84	84	84	84

The dependent variable is the 5-year average Gini coefficient. Real per capita GDP and *sec25* are in initial values, *smpr*, government expenditure (*gov*) and *trade* over GDP are in 5-year averages. All regressions include a dummy for Latin American countries. All variables are in levels in columns 1-2, in logs and log-differences in columns 3-6. Coefficients in columns 1-2 are estimated with random effects (preferred to fixed effects on the basis of the Hausman test). Coefficients in columns 3-4 are first step estimates from 2-step system GMM regressions *à la* Arellano and Bover, performed with PcGive. All regressors are treated as endogenous (Gini) or predetermined, hence instrumented. Lagged levels are used as instruments for differences and lagged differences as instruments for levels. Robust standard errors (from the first step, in columns 3-6) are reported in parenthesis, 5 and 10 per cent significant coefficients are marked with ** and *, respectively. P-values for the Sargan and m₂ tests are reported from the second step.