Wealth Inequality and the Political Economy of Financial and Labor Markets

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May 29, 2017

Abstract

We study a two factor model with credit restrictions, where political groups: labor, SMEs and large firms arise endogenously and have opposing interests with respect to structural variables such as employment protection and creditor protection. We embed these groups in a political model and obtain the prediction that in poor countries an increase in wealth inequality will lead to lower employment protection and worse creditor protection as result of the political platforms of the parties. The negative effect of higher wealth inequality is smaller in wealthy countries. We perform a preliminary empirical test across countries, obtaining good agreement with predictions of the model.

Keywords: Wealth distribution, conflicts of interest,

JEL: O16, G31, G32.

*Ronald Fischer acknowledges the support of Fondecyt # 1150063. Fischer and Huerta acknowledge the support of the Instituto Milenio de Sistemas Complejos and the Instituto Milenio de Imperfecciones de Mercado y Políticas Públicas. The contents of this document, as well as the analysis and conclusions derived from it, are the exclusive responsibility of the authors and does not represent the opinion of the Banco Central de Chile or its Counsellors.

1 Introduction

This paper studies the effects of imperfect creditor protection in an economy with two factors, elastic labor and capital. In the last 20 years the interest in these imperfections and their effect on the economy have been studied empirically by many authors, including Demirgüç-Kunt and Maksimovic (1996), Levine (2005) and Rajan and Zingales (1998). Moreover, there has been much interest on the reasons for the existence of these imperfections.

Our paper tries to answer the following question: why do many countries have underdeveloped financial markets if there is evidence that financial development facilitates economic growth? Some authors have pointed to the legal origin as the source of the deficiencies in the financial markets (La Porta et al. (1997) and La Porta et al. (2008)), while other authors point to the level of social development (Guiso et al., 2004), or the lack of expertise required to create a viable financial sector (Greenwood and Jovanovic (1990) and Bencivenga and Smith (1991)). While there are many competing explanations, the connection between the political process and the distribution of wealth has not been explored theoretically and it provides an alternative explanation for the lack of development of the financial markets in some countries. We embed our model in a political economy framework analogous to the one in Pagano and Volpin (2005) to show that in poor societies, an increase in wealth inequality shifts the platforms of political parties to those preferred by the economically powerful: lower protection of labor and lower creditor protection. Thus, wealth inequality and its interaction with the political process is another explanation for why some less developed countries have deficient financial markets. Preliminary cross country regressions confirm the main predictions of the model.

In our model, a continuum of agents own heterogenous amounts of capital. Risk neutral agents can choose to be entrepreneurs, in which case they combine a non-tangible, unalienable unit of specific capital (e.g. human capital) with investment and homogenous labor in order to carry out a project. If they do not choose to become entrepreneurs, workers can supply homogenous labor in response to wages. Workers are wealth constrained and need access to the capital market to develop their projects. The banking system is competitive and there is an open capital market, so funds can be obtained by banks at a fixed rate.

Potential entrepreneurs face restrictions in their demand for credit due to deficient credit protection. As in Burkart and Ellingsen (2004) we assume that entrepreneurs who are granted a loan can be tempted to abscond with the loan instead to investing in a firm. In that case, the legal system will be able to recover a fraction of the amount absconded, which we use as a measure of the quality of the legal system. This means that only agents with sufficient own capital will receive loans and are able to create firms. Even when they receive credit, the amount may not be enough to achieve the efficient firm size given the interest rate and the wage rate. These intermediate sized firms will be an important element in our political analysis.

Projects can fail, but since agents-entrepreneurs are risk neutral, they only consider the expected value of the projects. In case of failure of a project, a fraction of the assets can be recovered, the fraction being a function of the quality of the bankruptcy system. Workers have higher priority over the assets of failed firm. The extent of the priority for labor will be the second policy variable in the model.

In the model three groups appear endogenously in equilibrium: workers, enterprises which face credit constraints and large efficient firms. In this setting we study how changes in the distribution of wealth interacts with changes in the credit protection and worker protection parameters and their effects on the three groups. There appear three groups with different positions with respect to the credit protection and worker protection variables: workers, small an medium enterprises and larger firms. In turn these positions affect the platforms of competing political parties as in Pagano and Volpin (2005). These groups appear endogenously and arise from structural characteristics of the economy: the distribution of wealth and the characteristics of the production function.

Our main result is that if we consider two poor economies with the same wealth, the one with more inequality will have a political equilibrium with lower credit protection as well as lower protection for workers.

The intuition for out results shares certain similarities to the logic in Shleifer and Wolfenzon (2002) in which they show that in countries which restrict the flow of capital, existing entrepreneurs are opposed to improvements in investor protection, in contrast to economies whose capital markets are open. The difference lies in that the improvement in investor protection in a closed economy raises interest rates, because there is increased demand for funds by more productive firms, which hurts the less productive firms. Another somewhat similar viewpoint is Rajan and Zingales (2003), who propose that incumbent firms oppose financial development because increased competition reduces their rents. Better disclosure rules and enforcement reduce the relative importance of incumbent's collateral and reputation, facilitating entry.

In our case, the capital markets are open so improvements in the financial market has no effect on interest rates and there are no rents from imperfect competition. The effect is indirect and channeled through the labor market: improved creditor protection provides access to loans to previously excluded entrepreneurs (who would have been workers otherwise), as well as increasing the size of loans of firms that are not operating at the efficient level. This raises wages and hurts firms that were already operating efficiently because they were no credit constrained. These larger firms will oppose the improvements in financial legislation. Moreover, the larger financially constrained firms agree with large efficient firms in opposing financial improvement, because the positive effects from becoming more efficient by having improved access to credit are smaller than the negative effect of higher wages due to increased demand for labor.

In addition, when a firm fails, workers are given preference (are protected) from the recovered assets of the firm. Workers prefer a high degree of labor protection in case of firm failure, and the cost of this protection falls disproportionately on financially constrained firms. Thus there is a group of smaller firms which we call SMEs, whose interests diverge from those of larger firms and of workers in favoring more protection for credit and less protection for labor. We show that the size of the effect of improved credit protection on wages is larger in poor countries as inequality increases. Moreover as inequality increases in poor countries, more entrepreneurs have access to capital markets and therefore there are fewer workers, and thus a smaller group favoring labor protection. Thus the party platforms (Pagano and Volpin, 2005) regarding these parameter values in equilibrium have lower credit protection combined with lower protection for workers, perpetuating a very unequal economy. These effects are smaller in wealthy countries.

We provide a preliminary empirical test of the model, using cross country regressions (due to the scarcity of wealth data for non-OECD countries). The results show that an increase in wealth inequality (measured by the wealth Gini) leads to significant and fairly large falls in protection for workers and to a reduction in loan recovery rates in poor countries, but that this effect is smaller in wealthy countries, as predicted by the model.

Section 2 describes the base model. In Section 3 we analyze the differing interests of the various types of entrepreneurs and of workers towards improvements of creditor and worker protection. In Section 4 we embed these groups in a political model and study the impact of an increase of wealth inequality on the equilibrium platform. Section 5 presents preliminary empirical evidence consistent with the main model's prediction and Section 6 concludes.

2 The Model

We examine a static model of an open economy with heterogeneous agents and variable-investment decisions. There is only one good in this economy, with production function $f(K, L)$, satisfying $f_K, f_L > 0$, strictly concave and satisfying the Inada conditions. Agents are assumed to be price takers in all markets: labor, capital and output. Thus the model incorporates the assumption of decreasing returns to scale to capital investment. We normalize the price of the single good.[1]

The single period is divided into five stages (see Figure 3). In the first stage, a continuum of agents indexed by $z \in [0, 1]$ are born, each endowed with one unit of inalienable specific capital (an idea, an ability or a project) that cannot be transferred or sold. Each entrepreneur is also

[1]We make the simplification of assuming that from the point of view of the firm, labor is continuous (i.e., it is behaves like capital). On the other hand, when considering the welfare of workers employed by the different types of firms we use the fact that workers are attached to specific firms.

born with different amounts of observable wealth or mobile capital K_z. The cumulative wealth distribution among the population of agents is given by $\Gamma(\cdot)$, which has a continuous density and full support.

During the second stage, agents have two options: they can either start a firm, or if they are unable to obtain a loan, they work for hire. In that case, they deposit their wealth in a bank, losing the potential contribution of their specific capital. In the third stage, agents who receive a loan either invest in a firm or abscond, committing *ex-ante* fraud. If an agent absconds with a loan, a fraction $1-\phi$ of the loan is recovered by the legal system.[2] Therefore, $1-\phi$ represents the degree of *ex-ante* creditor protection or the *loan recovery rate*. In the fourth stage, if an agent does not abscond, there is a probability $1-p$ of failure of the project. In that case, a fraction η of total investments is recovered. In the last stage, deposits are repaid and payoffs are realized.

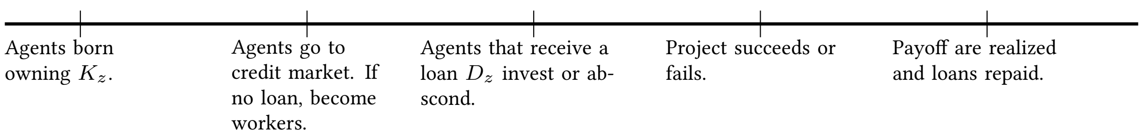

Figure 1: Time line.

In case of failure of the firm, some assets will survive bankruptcy, and can be used to pay part of the debt owed to creditors. The fraction η of total investment $K_z + D_z$ that is recovered in bankruptcy depends on the quality of bankruptcy laws –the time it takes to resolution, for example–, and on the hardness of the sector.[3] All loans are equally likely to fail.

Given that an entrepreneur borrowed D_z, if her firm fails, banks and workers must be repaid out of the recovered assets $\eta(K_z + D_z)$. Workers are assumed to have priority in bankruptcy. When salaries are w, they are always paid $\Theta w L_z,\ \Theta \in [0,1]$ out of the recovered assets. Hence the effective recovery rate on loans is the residual after workers have been paid. This residual $\eta(K_z + D_z) - \Theta w L_z > 0$, is assumed positive. This implies that workers always get the amount corresponding to their seniority and there is always some remainder to compensate banks.[4] For simplicity, we assume the entrepreneur receives nothing in case of bankruptcy.

[2]See Burkart and Ellingsen (2004) and footnote 6 for details.

[3]See Braun (2005), i.e., sectors in which recovery rates are higher because of sector characteristics, as in property versus intangibles.

[4]To simplify the analysis, we assume that workers have no further rights in the remaining assets. Otherwise, in their employment decisions, workers would have to evaluate the fraction of $(1-\Theta)w$ that she would recover from the remaining assets in case of the failure of the project. This fraction depends on equilibrium wages and on the investment of the firm, making it a very difficult problem. The assumption has no qualitative impact on our results.

Agents are risk neutral and try to maximize their total utility from consumption given by:

$$U(C_z) = U(K_z, D_z) = \begin{cases} p[f(K_z + D_z, L_z) - (1 + r_z)D_z - wL_z - \theta] & \text{if the agent forms a firm} \\ (1 + \rho)K_z + pwl_z + (1 - p)\Theta wl_z & \text{if the agent deposits her wealth in a bank and offers } l_z \text{ labor in the market.} \end{cases} \tag{1}$$

Here θ is a sunk startup cost of a firm and $(1 + \rho)K_z$ is the return on K_z deposited in the competitive banking system, with ρ the international rate, because of our assumption of a small open economy. The wage rate w is obtained from the labor market equilibrium, and l_z is the amount of labor provided by an agent z that is not an entrepreneur. The interest rate charged to firm z is r_z, which covers the possibility of bankruptcy and the recovery rate in that state.

The expected profit of a firm is:

$$\pi(K_z + D_z, L_z) = p[f(K_z + D_z, L_z) - (1 + r_z)(K_z + D_z) - wL_z - \theta] \tag{2}$$

Using this definition, the utility function of an entrepreneur can be rewritten as:

$$U_e(K_z, D_z, L_z) = \pi(K_z + D_z, L_z) + p(1 + r_z)K_z \tag{3}$$

Without credit market imperfections, all agents, no matter how small their initial capital stock, would have access to the credit market. All entrepreneurs would be able to borrow as much as they wanted at a personalized interest rate r_z, and therefore, would be able to operate their firms at the profit maximizing capital and labor levels K^*, L^*:

$$\begin{aligned} f_K(K^*, L^*) &= \frac{1 + \rho - (1 - p)\eta}{p} \\ f_L(K^*, L^*) &= w\left(1 - \frac{1 - p}{p}\Theta\right) \end{aligned} \tag{4}$$

i.e., where the marginal productivities of labor and capital equal their expected costs. However, not all entrepreneurs will be able to reach the optimal capital level, because loans are limited by moral hazard. The borrower may decide to abscond in order to finance non-verifiable personal consumption. Thus, investment decisions are non-contractible, and that loans used to finance personal benefits are only repaid to the extent that creditor rights are enforced.

Entrepreneurs who invest their borrowed capital plus their initial wealth in a firm, enjoy returns after repaying their obligations. This requires that output, labor costs and sales revenue are verifiable and can be pledged to investors. Due to moral hazard, some agents will have only partial access to credit market and must operate their business using a smaller than optimal capital stock and consequently an inefficient amount of labor.[5] Poorer agents may not even have access to the credit market and have no option but to become workers. In this model there is credit rationing: a rationed borrower may be willing to pay a higher interest rate to lenders in order to get a loan or a higher loan, but investors do not want to grant such a loan, because they cannot trust the borrower. For credit restricted entrepreneurs, equation (4) becomes a strict inequality.

2.1 Bank Behavior

Because of competition in the banking market, banks have losses if they lend to agents who commit fraud. In order to assure that fraudulent behavior never occurs in the equilibrium, borrowers must satisfy the following incentive compatibility constraint to receive a loan D_z:[6]

$$\max_{L_z} p[f(K_z + D_z, L_z) - (1 + r_z)D_z - wL_z - \theta] \geq \phi D_z \tag{5}$$

Note that condition (5) uses assures that the utility received by an agent who receives a loan D_z is higher if she does not abscond. Additionally, the following breakeven constraint or participation constraint must be satisfied:

$$\pi(K_z, D_z, L_z) \geq 0 \tag{6}$$

Condition (6) ensures that the profit of the firm is nonnegative. This condition is equivalent to requiring that the utility of the entrepreneur from operating a firm is at least what she obtains from loaning all her capital.

We have noted that the interest rate is differentiated, and depends on the wealth of the agent. The reason is that in case of failure, the return to the bank depends on the assets that can be recovered. Besides the parameters that determine the quality of the financial system (ϕ and η) the return in case of failure depends on the original capital invested in the project that can be recovered in bankruptcy (η), and on the fraction of wages which have priority over bank debt (Θ). This recovery rate depends on the priority of workers in case of bankruptcy. In some countries wages owed to workers are considered normal debt, with no special seniority. In other countries, wages have priority, so workers are paid first from the assets that survive bankruptcy. The profits

[5]Given that there are no imperfections in the labor market, the amount of labor hired will be efficient for that amount of investment.

[6]More generally, we would have $\phi \cdot (D_z + \alpha K_z)$ on the RHS, where $\alpha \in [0, 1]$ measures the fraction of own capital that can be absconded. Note that if the asset of the entrepreneur consists of real estate, $\alpha = 0$, and we obtain the case we examine here. Our formulation simplifies the expressions, but has no qualitative effects.

of a representative bank are:

$$U_b = p(1+r_z)D_z + \max\{(1-p)(\eta(K_z+D_z) - \Theta w L_z), 0\} - (1+\rho)D_z$$

where ρ is the cost of funds of the bank. The fraction of investment that is recovered in bankruptcy affects agents differently depending on their wealth. The zero profit condition on banks determines the interest rate charged to each entrepreneur z:

$$(1+r_z) = \frac{1+\rho}{p} - \frac{1}{pD_z}(1-p)(\eta(K_z+D_z) - \Theta w L_z$$

which we replace in (1) to obtain the utility of an entrepreneur:

$$U_e(z) \equiv p[f(K_z+D_z, L_z) - \theta - wL_z] + (1-p)[\eta(K_z+D_z) - \Theta w L_z] - (1+\rho)D_z$$

This means that the incentive compatibility constraint (5) of entrepreneurs depends on the level of protection for workers (Θ) and on the quality of the of the bankruptcy legislation indirectly, by influencing the interest rate charged by banks to different borrowers.

2.2 Critical Capital Levels

Potential entrepreneurs fall into different regimes that are differentiated by the capital levels of entrepreneurs. There are critical capital levels such that agents that belong to the intervals between these capital levels are treated similarly by banks. The first critical capital level K_d is the lowest amount of capital needed to receive a loan. Agents with $K_z < K_d$ are excluded from the capital markets, do not form firms and become workers, as we show below. To proceed, we define the following auxiliary function:

$$\psi(K_z, D_z, L_z) \equiv p[f(K_z+D_z, L_z) - \theta - wL_z] + (1-p)[\eta(K_z+D_z) - \Theta w L_z] - (1+\rho+\phi)D_z, \quad (7)$$

a concave function in $K_z + D_z$ and L_z. Note that $\psi(K_z, D_z, L_z) = 0$ defines the debt D_z such that a entrepreneur with wealth K_z is indifferent between operating a firm and absconding with the loan and committing *ex ante* fraud.

Given $K_z \geq K_d$ and the associated loan $L_z \geq 0$, there is an associated level of L_z that maximizes expected profits. The critical capital level K_d is such that the optimal values of labor L_d and debt D_z satisfy $\psi(K_d, D_d, L_d) = 0$. Thus the conditions that determine the triplet (K_d, L_d, L_d)

describing the smallest firm are:

$$\begin{aligned} \Psi(K_d, D_d, L_d) &= 0 \\ \Psi_D(K_d, D_d, L_d) &= 0 \\ \partial U_e(K_d, D_d, L_d)/\partial L_d &= 0 \end{aligned} \tag{8}$$

The first equation is the non-absconding condition, and the other two determine the profit maximizing levels of debt and of labor. An entrepreneur with access to the credit market (i.e., with $K_z > K_d$) solves:

$$\begin{aligned} &\max_{D_z, L_z} U_e(K_z, D_z, L_z) \\ &\text{s.t.} \quad \Psi(K_z, D_z, L_z) \geq 0 \\ &\qquad\; U_e(K_z, L_z, D_z) \geq U_w(K_z, l_z) \end{aligned} \tag{9}$$

where U_w is the agent's utility when working for hire, i.e., the condition requires that the entrepreneur prefers to start a firm rather than work for hire. We describe U_w in the next subsection.

Recall that K^* is the optimal scale for production. We define the second critical value K_r as the lowest level of capital such that the agent can obtain a loan D_r such that $K_r + D_r = K^*$, i.e., it is the minimum level of own capital which allows an entrepreneur to be capital unconstrained and borrow up to the efficient capital stock K^*.[7] All agents with higher capital also operate efficiently. Only entrepreneurs in the range $K_z \in [K_d, K_r]$ face credit constraints that do not allow them to operate at the efficient scale. The various intervals and associated behaviors are shown in figure 2.

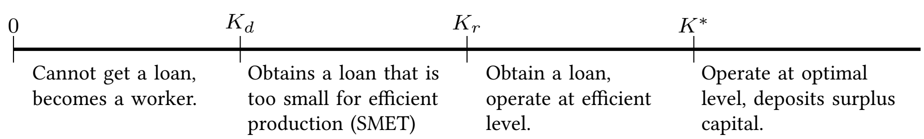

Figure 2: Entrepreneurial choices as a function of initial wealth.

We characterize the scale of operations and the maximum debt in that range in the following lemma:

[7] More formally, K_r is defined by

$$\psi(K_r, D_r, L^*) \equiv p[f(K_r + D_r, L^*) - \theta - wL^*z] + (1-p)[\eta(K_r + D_r) - \Theta wL^*] - (1 + \rho + \phi)D_r = 0,$$

with $K_r + D_r = K^*$, and is unique by concavity of ψ.

Lemma 1 *The maximum debt D_z satisfies the following conditions:*

1. $\frac{\partial D_z}{\partial K_z} > 1$ *if* $K_d \leq K_z < K_r$.
2. $D_z > 0$ *and* $D_z > K_z$ *if* $K_d \leq K_z < K_r$.

Proof: See appendix ■

The lemma shows that credit constrained firms have more debt than own capital, and leverage increases with the amount of capital. Though these firms are credit constrained, they hire labor efficiently. For the range $[K_d, K_r]$, labor demand of a firm increases with the capital stock of the entrepreneur (see Lemma 2 in the Appendix). The reason is that in the credit constrained range, total investment $K_z + D_z$ increases with K_z, thus raising the marginal productivity of labor and leading to more hiring. However, with non-optimal investment the firm employs fewer workers than when it is credit unconstrained. On the other hand, all credit unconstrained have the same plant size K^* and hire the same amount of labor. The aggregate labor demand is then:

$$\mathcal{D}(w) \equiv \int_{K_d}^{K_r} L_z(w)\partial\Gamma(K_z) + L^*(w)(1 - \Gamma(K_r)) \tag{10}$$

2.2.1 The definition of an SME

The segment of credit constrained entrepreneurs form a group that naturally suggests the concept of small and medium enterprises (SMEs). From the policy point of view, an SME is relevant because they usually operate at an inefficient scale and have limited access to credit, as described in Claessens and Perotti (2007). The definition of an SME is usually made in terms of the size or employment of firms, but such a definition would be inappropriate for industries where the efficient firm size is small. While those firms may face some of the problems associated to SMEs, they are not credit constrained and operate efficiently.[8] In this paper we have a single good, so we do not face the problem, of different efficient firm sizes. For our purposes, we define the credit restricted firms as SMETs, where T stands for technical.

The reason we define credit restricted firms in general as SMETs rather than SMEs is that when considering policy issues, a fraction of larger SMETs shares the political platform of efficient firms, as we show in section 3. We restrict the definition of SMEs to the subgroup of smaller SMETs that have a common orientation with regard to policy issues.

Note that our characterization of SMETs shows several properties that are observed in real world SMEs. Brock and Evans (1989) cite as one of the characteristics of small firms the fact that

[8]They could face other problems, such those caused by labor laws designed for large scale firms in other industries which do not account for integer constraints due to small size.

employment is more variable than in large firms when facing general and idiosyncratic shocks.[9] In our model credit restricted firms have a larger change in their employment in response to a shock to K_z (or to productivity), as a result of lemmas 1 and 2. The intuition is that the amount of credit a firm can obtain increases at a decreasing rate with own capital when credit restricted, and that loans are larger than capital stock in that range. Hence the amount of capital hired will be sensitive to K_z, and more so as the capital stock approaches the minimum value required for a loan. As a second consequence we obtain the observation of the Global Finance Development Report 2014, chapter 3, that the return to capital in real world SMEs is higher than in larger firms (see also Beck and Demirgüç-Kunt (2008)).

2.3 Labor Supply

We use a simple model of individual labor supply to generate a supply function of labor. We assume if an agent z chooses to be a worker, the cost of providing an amount l_z of labor is $\varsigma(l_z)$, where $\varsigma' > 0, \varsigma'' > 0, \varsigma''' \geq 0$ with $\varsigma(0) = 0, \varsigma(+\infty) = \infty$.[10] To simplify, we assume that agents are expected utility maximizers and can either work or become entrepreneurs.

The utility of a worker that provides l_z units of labor to a firm (and deposits his capital K_z) is: $U_w = (1+\rho)K_z + pwl_z + (1-p)\Theta wl_z - \varsigma(l_z)$. The workers problem is concave, and individual labor supply depends on wages w, but not on the capital stock K_z owned by the agent. Given the wage rate w, all workers offer the same amount of labor $l(w)$. We can define the generalized cost of labor $w_g \equiv pw + (1-p)w\Theta$ as the expected cost of labor.

For an agent to become an entrepreneur, $U_e(K_z, D_z, L_z) \geq U_w(K_z, l_z)$. There are two possible cases. In the first case, the inequality is strict, so society is divided among those that have sufficient wealth to obtain a loan and start their firm, and those that have to work, because they cannot develop their project. Having enough wealth for a loan implies a discrete increase in well-being relative to an agent who has to sell his labor. In the second case, some workers with wealth above K_d have access to loans but prefer to work, i.e., there is no jump in utility when an agent obtains a loan. While we work with the strict inequality case, our results continue to hold in the case where some agents are better off as workers than as owners of SMEs.

We define labor supply as:

$$\mathcal{S}(w) \equiv l(w) \cdot \Gamma(K_d)$$

[9] In the initial paper of the Journal.

[10] Imposing nonnegativity conditions on the third derivative is common in these types of models, see for instance Laffont and Tirole (1993, Sec. 2.3).

Then there is a labor market equilibrium when there is a wage w such that:

$$\int_{K_d}^{K_r} L_z(w)\partial\Gamma(K_z) + L^*(w)(1-\Gamma(K_r)) = l(w)\cdot\Gamma(K_d) \tag{11}$$

Lemma 2 (Equilibrium in the labor market) *There is a unique equilibrium wage in the labor market.*

Proof: See appendix ■

Before studying the political economy conflicts among groups of firms, we need to determine the effects of changes in the parameters of the model on the wages and minimum capital levels, which provides the backbone for our results:

Proposition 1 *The equilibrium wage w rises and the minimum capital level K_d decreases after:*

1. *An improvement in* ex-ante *creditor protection* $1-\phi$.
2. *An decrease in worker protection* Θ.

Proof: See appendix. ■

The reason for these effects is that these parameter shifts allow credit restricted agents to improve their access to the credit market. Previously excluded agents are able to access the credit market (a marginal effect) and become entrepreneurs, and credit restricted agents are able to increase borrowing. There is increased investment by these agents. Since it is a small country and there are no capital restrictions, the interest rate remains constant. The increased demand for labor of restricted entrepreneurs is reflected in higher wages.

On the other hand, suppose that workers' priority in bankruptcy increases ($\Theta\uparrow$). By the lemma, access to credit of smaller firms falls. First, because raising the payment $\Theta w l_z$ to workers in case of bankruptcy shifts K_d to the right. Some potential employers cannot obtain credit to start a firm and must become workers, thus increasing the supply of labor. A second effect occurs because restricted entrepreneurs ($K_z \in [K_d, K_r)$) obtain smaller loans and therefore hire fewer workers, again lowering wages. Hence total hours demanded also fall and wages decline, partially compensating for the increased cost of workers.

We can also show that if a larger fraction of the investment can be recovered after the failure of the project and used to pay creditors and workers (higher η), then access to credit is easier. Similarly we can also show that if the international interest rate ρ falls, access to credit is easier and more entrepreneurs are able to form firms.

It is easy to show that an increase in worker protection in bankruptcy leads to a reduction in the optimal size of a firm. As the generalized cost of labor rises, the firm uses less labor and invests less.

Lemma 3 *If Θ increases, D_z and L_z decrease for all $z \in [K_d, K_r]$.*

Proof: See Appendix. ■.

2.4 Wealth Distribution Effects

The next step is to analyze the effect of changes in the distribution of wealth, because this will help us determine analyze the effects of wealth inequality on the political equilibrium. There will be an effect on wages, on the mass of workers unable to obtain credit and on the mass of efficient entrepreneurs. In order to interpret these conditions we define a *poor economy* as one in which access to credit requires more than the average amount of capital in the economy, i.e., where $K_d > \mathbb{E}(K_z)$. It is important to note that this criterion depends not only on the distribution of wealth, but also on the quality of financial legislation and on the level of worker protection, as these policy parameters determine the value of K_d. Similarly, a rich economy is one in which an agent with less than the average wealth has unconstrained access to credit: $K_r < \mathbb{E}(K_z)$.

We study changes in the wealth distribution by mean preserving spreads (MPS), which increase inequality without changing the total wealth of society. Our main result regarding inequality follows:

Proposition 2 *Consider two economies 1 and 2, such that economy 1's wealth distribution is an MPS of that of economy 2. In a poor economy the equilibrium wage w is higher in economy 1. Moreover, if $f_{LL,K} < 0$ and $f_{KL,K} < 0$, then:*[11]

1. *Workers in economy 1 are better off.*

2. *Firms' profits of all firms are lower in economy 1.*

If $K_r < \mathbb{E}(K_z)$, all these effects are reversed.

This result shows the counterintuitive result that in very poor economies, a small regressive wealth redistribution raises wages and welfare of workers, while firms are worse off. The reason is that the redistribution increases the mass of firms with access to capital, increasing labor demand and raising wages. Existing firms are made worse off by the higher expected payments to workers. In the more unequal economy, as capital is more concentrated, access to credit increases, aggregate investment rises and output is larger.[12]

While on average workers are better off, when one considers workers as associated to firms (see section 3), those employed by smaller firms are worse off, while workers employed by larger

[11] The Cobb-Douglas and the CES production functions satisfy this property.

[12] See also Balmaceda and Fischer (2010). The empiric paper of Brueckner and Lederman (2015) find this result, but associates it to the reasoning of Galor and Zeira (1993).

firms are better off. For firms the effects is less marked: all firms are worse off in the more concentrated economy, but the negative effects are milder for large firms.

We can also show that there exists another cutoff $K_\lambda^w \in (K_d, K_r)$ such that the representative worker of a firm in the range $(K_d, K_\lambda^w]$ receives smaller generalized wages from the firm after the MPS. This should not be interpreted as that these workers are doing worse than other workers. However, the firm shrinks and reduces its demand for labor. Since there is no frictional unemployment in our model, these workers can hire their excess hours in order to obtain the same wage as the average worker.[13] Conversely the representative worker of a firm with $K_z > K_\lambda^w$ receives a higher generalized wage from his firm.

All of these results are reversed for wealthy economies. For economies of intermediate wealth, $\mathbb{E}(K_z) < K_d < K_r$, the results are ambiguous, except for countries that are close to being wealthy or close to being poor, for whom the results continue to hold by continuity.

3 Political Economy Conflicts

In this section we examine the differing interests of the various types of entrepreneurs and of workers towards measures that increase worker protection in bankruptcy and that improve the legal rights of creditors. We use the previous results to describe the effects of changes in parameter values on the different types of agents and explain the derived political economy effects. First we show that improvements in worker protection create a wedge between classes of entrepreneurs, because the adverse effect on smaller firms is relatively larger than the effect on bigger firms.

Proposition 3 (Worker protection and small-large firm conflicts) *If worker protection Θ increases then:*

1. *All firms experience a decrease in their profits, but there exists a threshold $K_\Theta \in (K_d, K_r)$ such that the negative impact of the change on firms with $K_z \in (K_d, K_\Theta]$ is relatively larger than on firms with $K_z \geq K_r$.*

2. *On average, workers are better off.*

Proof: See Appendix.

An increase in protection for workers in case of the failure of a firm reduces the welfare of those entrepreneurs who now cannot obtain a loan and are unable to form firms, and go back to being workers. Secondly, firms that are financially constrained will receive smaller loans, reducing their productive efficiency and their labor demand. Firms that are well capitalized and

[13] Clearly, if we had frictions in the model, these workers would not be able to use all their surplus labor and would be worse off.

that continue to use the efficient level of capital after the increase in Θ are less affected, because they do not suffer the effects of the stricter lending constraint and still produce efficiently.[14]

There is a further conflict associated to the rise in worker protection. While the average worker is better off, a worker in a small firm will receive a smaller fraction of his income from the firm. As mentioned before, since we have no frictional unemployment, these workers can sell their extra hours and obtain the average generalized wage. In a more realistic model where workers cannot sell easily this extra time, these workers would be made worse by improved worker protection.[15] Since the representative worker in a smaller firms receives less income from wages from working in those firms, she is made worse off with the increase in protection in bankruptcy. Those in larger firms are unambiguously better off. Thus the model predicts that there will be a conflict of interests regarding Θ between workers in small and those in larger firms. We prove this result in the appendix.

Improvements in financial markets create a wedge between types of entrepreneurs. Credit constrained entrepreneurs are better off, some because they now have access to credit that was denied before, and others who were credit-constrained, because they have access to more credit, leading to more efficient firms. On the other hand, non-constrained entrepreneurs are worse off, because they were unconstrained and operating efficiently before, but now have to pay higher wages to workers due to increased demand for labor by constrained firms. Even the larger credit constrained entrepreneurs are worse off, because even though they benefit from the looser credit, they lose from the higher salaries, and the total effect is negative for them. Thus they should join the efficient large firms in their opposition to improvements in credit markets. In this paper we use this difference in attitude towards financial reform to be the hallmark of a Small and Medium Enterprise: an SME is a credit constrained firm that is in favor of improvements in credit markets.

Proposition 4 (Improvements in credit markets harm large firms) *If ex-ante creditor protection $1 - \phi$ improves then:*

1. *There exists a threshold $K_\phi \in (K_d, K_r)$ such that all firms with $K_z \in (K_d, K_\phi)$ are better off, while firms with $K_z \geq K_\phi$ are worse off.*

2. *On average, workers are better off.*

Proof: See appendix.

The opposition to improvements in finance due to the effect on factor prices has been observed. These effects have been described by Rajan and Ramcharan (2011, p. 1897) in their study

[14] Thus they will tend to be less opposed to proposals to raise Θ, creating a wedge with the interests of smaller firms.

[15] This explains the exemption from worker protection rules of smaller firms, see for instance Boeri and Jimeno (2005).

of US farming in early twentieth century. Similarly Rajan and Zingales (2003) in a study of financial development in the twentieth century, propose a factor price explanation for the opposition of incumbents to financial development, see also La Porta et al. (2000). In those models, incumbent –large– firms oppose financial development because it creates competition and increases finance costs in closed economies. In our open economy case, the factor channel for the conflict among entrepreneurs is through labor.[16]

4 Political Economy with Endogenous Interest Groups

Consider a model with three periods. At period $t = 0$, a continuous mass of potential entrepreneurs are born, each one endowed with an observable amount of wealth $K_z \sim \Gamma(\cdot)$. In period $t = 1$, elections are held, and each agent z must vote according to his economic interests. Two parties, A and B, compete for votes by proposing an institutional platform $(1-\phi, \Theta) \in [0,1] \times [0,1]$, where $1-\phi$ is a measure of creditor protection and Θ defines the quality of workers protection after bankruptcy. At period $t = 2$, the basic-model scheme takes place under the elected policy platform; some agents become workers and others become entrepreneurs. Figure 3 illustrates the time line.

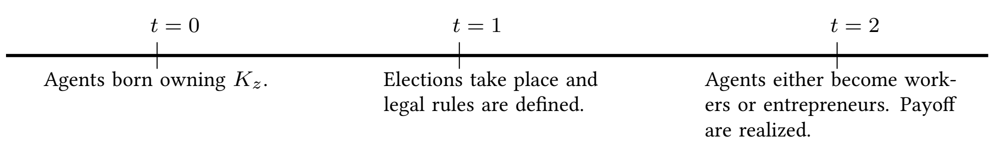

Figure 3: Time line.

As we have shown above, the model gives rise to three groups with different preferences: large firms, small and medium sized firms and workers. We have defined SMEs as firms which favor improvements in creditor rights $1-\phi$. These are always firms that do not achieve the efficient level of capital investment. On the other hand, firms owned by entrepreneurs with K_z above K_ϕ oppose financial improvements and we denote them as large firms. Table 1 summarizes the preferences of each group.

We can use the approach of Pagano and Volpin (2005) (and originally from Persson and Tabellini (1999)), to analyze the political implications of these results, with the necessary adaptations to a model where the groups are i) endogenous, ii) their demographic weights are also endogenous and iii) there is heterogeneity within these groups. Political parties should take into account these features when committing to a political platform.

[16] As mentioned before, Shleifer and Wolfenzon (2002) show that factor price-based opposition to financial market improvements is smaller in open economies.

Table 1: Political preferences

Type of agent	Effect of $1-\phi$ on utilities	Effect of Θ on utilities
Workers; $K_z \in [0, K_d)$	+	+
SMEs; $K_z \in [K_d, K_\phi)$	+	-
Large entrepreneurs; $K_z \geq K_\phi$	-	-

4.1 Political Equilibrium

Two parties A and B compete for the three groups of voters: large firms(L), SMEs(S) and workers (W). They compete for their votes by proposing policies platforms q_a and q_b respectively. They act simultaneously and do not cooperate. Both parties are rent-seeking. Party A is close to rich entrepreneurs' preferences, i.e. it is taken as right-wing, while party B is close to workers, i.e. it is a left-wing party. The remaining group on average has no political preference.

Probabilistic voting is assumed so as to ensure an equilibrium. In order to avoid cycling problems we assume that there is uncertainty about preferences of each voter. In particular, there is a continuum of agents z^ν with capital K_z, but with different preferences. We assume that a voter ν with capital K_z belonging to group $j \in \{L, S, W\}$ votes for party A if:

$$\Pi_j^z(q_a) > \Pi_j^z(q_b) + \tilde{\delta} + \sigma_{\nu j}^z \tag{12}$$

where $\tilde{\delta}$ reflects the general popularity of party B which is assumed to be uniformly distributed on $[-1/2\varphi, 1/2\varphi]$. The term $\sigma_{\nu j}^z = \bar{\sigma}_j + \tilde{\epsilon}_{\nu j}^z$ represents the ideological preference for party B of a voter ν with capital K_z; where $\bar{\sigma}_j$ is the group specific preference for party B and $\tilde{\epsilon}_{\nu j}^z$ is the idiosyncratic preference of the voter ν with capital K_z, which is assumed to be uniformly distributed in $[-1/2\chi, 1/2\chi]$.[17]

Note that, in contrast with Persson and Tabellini (1999), there is another source of heterogeneity within each group because agent's have different wealth. Therefore, in each subgroup $j \in \{L, S, W\}$ and for each value of capital K_z in that subgroup, we can find the voter ν (with capital K_z) who is indifferent between the two parties:

$$\tilde{\epsilon}_{\nu j}^z = \Pi_j^z(q_b) - \Pi_j^z(q_a) - \tilde{\delta} - \bar{\sigma}_j \tag{13}$$

All voters who own K_z and with an ideological preference $\epsilon \leq \tilde{\epsilon}_{\nu j}^z$ vote for party A, while the rest vote for party B. Thus, the fraction of agents in group j who have capital K_z and vote for

[17]The parameter χ is understood as an index of ideological cohesion. In order to simplify calculations, we assume that it does not vary across groups.

party A is:

$$\tilde{p}^z_{Aj} = Prob\left[\epsilon \leq \tilde{\epsilon}^z_{\nu j}\right] = \chi[\Pi^z_j(q_b) - \Pi^z_j(q_a) - \tilde{\delta} - \bar{\sigma}_j] + \frac{1}{2} \tag{14}$$

Now consider a proportional voting system, in which it is equally important to win votes in all groups. Note also that for all agents with $K_z < K_d$ –workers– the effects of legislation are the same: they are all paid the same salary and receive the same benefits from an increase in Θ. However, they receive different amounts $(1+\rho)K_z$ from depositing their wealth in the banking system, so Π^z_W and p^z_{AW} depend on each worker z. Similarly, all agents with $K_z > K_r$ operate efficient firms and are affected in the same way by variations in policy, so in this case p_{AL} does not depend on z. However, for inefficient firms, with $K_z \in [K_d, K_r)$, utilities depend on the value of K_z. Thus the probability that party A wins the election is:

$$p_A = \text{Prob}\left[\int_0^{K_d} \tilde{p}^z_{AW}\partial\Gamma(K_z) + \int_{K_d}^{K_\phi} \tilde{p}^z_{AS}\partial\Gamma(K_z) + \int_{K_\phi}^{K_r} \tilde{p}^z_{AL}\partial\Gamma(K_z) + \tilde{p}_{AL}[1-\Gamma(K_r)] \geq \frac{1}{2}\right] \tag{15}$$

where the probability is taken with respect to $\tilde{\delta}$. Integrating with respect to the measure $\bar{\delta}$ leads to:

$$p_A = \varphi\Bigg(\int_0^{K_d}[\Pi^z_W(q_a) - \Pi^z_W(q_b) - \bar{\sigma}_W]\partial\Gamma(K_z) + \int_{K_d}^{K_\phi}[\Pi^z_E(q_a) - \Pi^z_E(q_b) - \bar{\sigma}_S]\partial\Gamma(K_z) + \tag{16}$$

$$\int_{K_\phi}^{K_r}[\Pi^z_E(q_a) - \Pi^z_E(q_b) - \bar{\sigma}_L]\partial\Gamma(K_z) + [\Pi^*_E(q_a) - \Pi^*_E(q_b) - \bar{\sigma}_L][1-\Gamma(K_r)]\Bigg) + \frac{1}{2} \tag{17}$$

where Π^z_E, with $E = \{S, L\}$, stands for the utility function of agents that become entrepreneurs; recall that the functional form of Π^z_E in this range is the same.[18] The only difference between agents with $j = S$ and $j = L$ is that the latter ones benefit from a decrease of creditor protection.

Note that for each value of z in the first integral which considers the smallest SMEs, the average voter prefers high creditor protection. The agents under the second integral correspond to larger SMEs, and are those that for each value of z, on average prefer weak creditor protection.

Following the methodology developed in Pagano and Volpin (2005), party A will maximize p_A choosing the policy platform q_A and taking as given q_b. On the other hand, party B will choose the optimal platform q_B in order to maximize the probability of wining $p_B \equiv 1 - p_A$. Therefore, the optimum outcome is a symmetrical Nash equilibrium. Note that the maximization problem

[18]We denote $\Pi_E(K^*)$ by Π^*_E to simplify notation.

of party A is equivalent to maximizing the politically weighted social surplus:

$$\bar{\Pi}(q_a) = \int_0^{K_d} \Pi_W^z(q_a)\Gamma(K_d) + \int_{K_d}^{K_\phi} \Pi_E^z(q_a)\partial\Gamma(K_z) + \int_{K_\phi}^{K_r} \Pi_E^z(q_a)\partial\Gamma(K_z) + \Pi_E(q_a)[1-\Gamma(K_r)] \tag{18}$$

thus, the problem that party A solves is:

$$\max_{q_A=(\phi,\Theta)} \bar{\Pi}(q_a)$$
$$s.t \quad \phi,\Theta \in [0,1]$$

which leads to the FOCs:

$$\underbrace{\frac{\partial \Pi_W}{\partial \phi}}_{<0}\Gamma(K_d) + \gamma(K_d)\underbrace{\frac{\partial K_d}{\partial \phi}}_{>0}\underbrace{[\Pi_W(K_d) - \Pi_E(K_d)]}_{<0} + \int_{K_d}^{K_\phi}\underbrace{\frac{\partial \Pi_E^z}{\partial \phi}}_{<0}\partial\Gamma + \int_{K_\phi}^{K_r}\underbrace{\frac{\partial \Pi_E^z}{\partial \phi}}_{>0}\partial\Gamma + \underbrace{\frac{\partial \Pi_E^*}{\partial \phi}}_{>0}(1-\Gamma(K_r)) = 0 \tag{19}$$

$$\underbrace{\frac{\partial \Pi_W}{\partial \Theta}}_{>0}\Gamma(K_d) + \gamma(K_d)\underbrace{\frac{\partial K_d}{\partial \Theta}}_{>0}\underbrace{[\Pi_W(K_d) - \Pi_E(K_d)]}_{<0} + \int_{K_d}^{K_r}\underbrace{\frac{\partial \Pi_E^z}{\partial \Theta}}_{<0}\partial\Gamma + \underbrace{\frac{\partial \Pi_E^*}{\partial \Theta}}_{<0}(1-\Gamma(K_r)) = 0 \tag{20}$$

From expression 19, note that if the mass of agents to the left of K_ϕ increases, the equilibrium creditor protection $1-\bar{\phi}$ also increases. Similarly, if the mass of agents to the left of K_d increases, the equilibrium employment protection $\bar{\Theta}$ increases. These results are reversed if we consider increases in the mass of agents to the right of K_ϕ or K_d respectively. These effects allow us to state our main result (recall that a country where $K_d > \mathbb{E}(K_z)$ is a poor country or/and one with low creditor protection).

Result 1 *Consider two countries 1 and 2, such that economy 1's wealth distribution is an MPS of that of economy 2. Provided that $K_\phi < K_2$, if $K_d > \mathbb{E}(K_z)$, then the equilibrium platform $(1-\bar{\phi},\bar{\Theta})$ is lower in economy 1. In contrast, if $K_d < \mathbb{E}(K_z)$ or $K_r < \mathbb{E}(K_z)$ this effect is smaller.*

We prove these results only for ϕ, since the procedure to show the effect of an MPS on Θ is analogous. In our analysis we omit the indirect effects that come from general equilibrium effects through changes in wages. As we show in proposition 10, these are second order effects that cannot compensate the direct impact of an MPS. We consider MPSs that cross only twice. Figure 4 illustrates the double crossing condition.

Proof: Using the same procedure described in 10 and differentiating equation (19)-which we call $FOC(\phi)$-with respect to λ leads to:

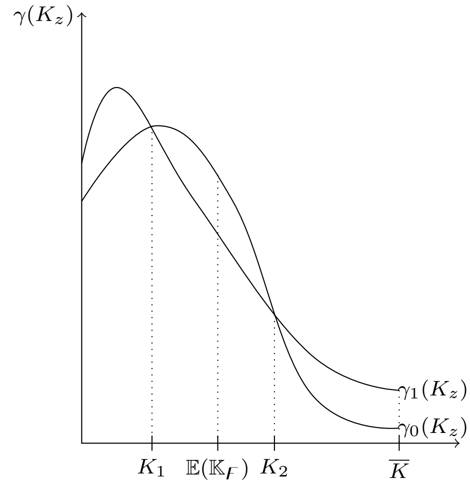

Figure 4: Densities associated to two MPS Distributions that satisfy the double crossing condition.

$$\frac{\partial FOC(\phi)}{\partial \lambda} = \frac{\partial \Pi_W}{\partial \phi}(\Gamma_1(K_d) - \Gamma_0(K_d)) + (\gamma_1(K_d) - \gamma_0(K_d))\frac{\partial K_d}{\partial \phi}[\Pi_W(K_d) - \Pi_E(K_d)] + \int_{K_d}^{K_r} \frac{\partial \Pi_E}{\partial \phi}(\partial\Gamma_1 - \partial\Gamma_0) - \frac{\partial \Pi^*}{\partial \phi}(\Gamma_1(K_r) - \Gamma_0(K_r) \tag{21}$$

Case 1: $K_d > \mathbb{E}(K_z), K_r \in (\mathbb{E}(K_z), K_2)$

In this case we find a lower bound for expression (21):

$$\frac{\partial FOC(\phi)}{\partial \lambda} > \frac{\partial \Pi_W}{\partial \phi}(\Gamma_1(K_d) - \Gamma_0(K_d)) + (\gamma_1(K_d) - \gamma_0(K_d))\frac{\partial K_d}{\partial \phi}[\Pi_W(K_d) - \Pi_E(K_d)] + \int_{K_d}^{K_r} \frac{\partial \Pi_E^*}{\partial \phi}\underbrace{(\partial\Gamma_1 - \partial\Gamma_0)}_{<0} - \frac{\partial \Pi^*}{\partial \phi}(\Gamma_1(K_r) - \Gamma_0(K_r))$$

$$= \underbrace{\left[\frac{\partial \Pi_W}{\partial \phi} - \frac{\partial \Pi_E^*}{\partial \phi}\right]}_{<0}\underbrace{(\Gamma_1(K_d) - \Gamma_0(K_d))}_{<0} + \underbrace{(\gamma_1(K_d) - \gamma_0(K_d))}_{<0}\underbrace{\frac{\partial K_d}{\partial \phi}}_{>0}\underbrace{[\Pi_W(K_d) - \Pi_E(K_d)]}_{<0} > 0$$

where we have used the fact $\frac{\partial \Pi_E}{\partial \phi}$ is increasing in K_z and that it becomes positive to the right of K_ϕ. Therefore, an MPS in this case is expected to reduce ϕ, since it gives higher weight to the positive terms of the FOC and lower weights to the negative ones.

Case 2: $K_d > \mathbb{E}(K_z), K_2 \in (K_\phi, K_r)$

In this case we have that:

$$\frac{\partial FOC(\phi)}{\partial \lambda} > \frac{\partial \Pi_W}{\partial \phi}(\Gamma_1(K_d) - \Gamma_0(K_d)) + (\gamma_1(K_d) - \gamma_0(K_d))\frac{\partial K_d}{\partial \phi}[\Pi_W(K_d) - \Pi_E(K_d)]$$

$$+ \int_{K_d}^{K_2} \frac{\partial \Pi_E(K_2)}{\partial \phi} \underbrace{(\partial \Gamma_1 - \partial \Gamma_0)}_{<0} + \int_{K_2}^{K_r} \frac{\partial \Pi_E(K_2)}{\partial \phi} \underbrace{(\partial \Gamma_1 - \partial \Gamma_0)}_{>0} - \frac{\partial \Pi_E^*}{\partial \phi}(\Gamma_1(K_r) - \Gamma_0(K_r))$$

$$= \underbrace{\left[\frac{\partial \Pi_W}{\partial \phi} - \frac{\partial \Pi_E(K_2)}{\partial \phi}\right]}_{<0} \underbrace{(\Gamma_1(K_d) - \Gamma_0(K_d))}_{<0} + \underbrace{(\gamma_1(K_d) - \gamma_0(K_d))}_{<0} \underbrace{\frac{\partial K_d}{\partial \phi}}_{>0} \underbrace{[\Pi_W(K_d) - \Pi_E(K_d)]}_{<0}$$

$$+ \underbrace{\left[\frac{\partial \Pi_E(K_2)}{\partial \phi} - \frac{\partial \Pi_E^*}{\partial \phi}\right]}_{<0} \underbrace{(\Gamma_1(K_d) - \Gamma_0(K_d))}_{<0} > 0$$

where we have used again the properties of $\frac{\partial \Pi_E}{\partial \phi}$. Note that as $\mathbb{E}(K_z)$ becomes higher, such that $K_d, K_r < \mathbb{E}(K_z)$, the positive effect of an MPS on ϕ is attenuated and might even be reversed. For instance, suppose a marginal variation of case 1, such that $K_d \in (K_1, \mathbb{E}(K_z))$ and $K_\phi, K_r \in (\mathbb{E}(K_z), K_2)$. This particular case satisfies that $\Gamma_1(K_d) - \Gamma_0(K_d) > 0$ and therefore, the positive effect of the rest of the terms identified in case 1 are partially reversed. ■

While this result only refers to poor countries, it has the advantage that it can be tested empirically, as we do in the next section, which presents preliminary results.

5 Empirical Evidence

In this section we provide preliminary evidence for the predictions described in the last section. We test the main political implications of the model summarized in Result 1. Consistent with the fact that both institutional measures are jointly determined in our model, we run a cross-sectional system of seemingly unrelated regressions. Although it would be desirable to conduct the analysis using panel data, we use cross-sectional data due to the lack of data to create a panel of using international measures of wealth inequality which covers more than the OECD countries (and we need variation in average wealth for our results to show up). Based on our sample –which includes 57 advanced and developing countries– we can conclude that higher wealth inequality leads to lower creditor protection and employment protection in low wealth countries. Evidence shows that this negative effect is reduced for high wealth countries.

We measure the strength of creditor rights $1 - \phi$ with the loan recovery rate from Doing Business (average by country for the period 2004-2016) and with the Legal Rights Index from the World Bank (average from 2004 to 2014). The quality of employment laws Θ is measured by the OECD Employment Protection Legislation (EPL) index for both regular and short-term contracts, which is available from 2008 to 2015 for both developed and developing countries. Wealth inequality is measured with the wealth Gini index computed for the 2000s for several countries by Davies et al. (2011). We use two different measures of the wealth of a country: wealth per capita from Davies et al. (2011) and capital stock taken from the database constructed by Berlemann and Wesselhöft (2016), converted into per capita terms using total population data from World Development Indicators. Legal origins data comes from La Porta et al. (1999).

Table 1 confirms the main prediction of the model: higher wealth inequality in low wealth countries leads to lower creditor protection and employment protection. We test the robustness of the results by removing the 10% lowest and highest countries by Wealth per capita and Capital Stock per capita. The results continue to have the same signs and significance levels in the case of creditor protection, but lose significance in two of the cases of the tests of employment protection. Considering that only 46 observations remain in the case of measuring wealth with capital stocks, these are good results.

We obtain similar and even stronger results when the dependent variable is the Legal Rights Index of the World Bank. It is noteworthy that in this case the dummies for legal origin are significant at the 1% level.

Table 3 describes the size of the effects. the effects can be sizeable: a 1% increase in the wealth Gini for the poorest 5% of countries (measured by capital stock) leads to a decrease of -2.405% in the loan recovery rate. Conversely, in a rich country, a decrease by 1% in wealth inequality will increase the loan recovery by 0.77%. If measured by the wealth per capita, the effect is smaller, but still larger than 1%. The effect on the employer protection index is more difficult to interpret, because the scale is ordinal. However, a 1% increase in the wealth Gini increases protection by 0.0208 in a scale of 1-4, that is, about 0.5%.

6 Conclusions

This paper has examined a two factor one good open economy model with credit constrained entrepreneurs, differentiated by their initial level of wealth. Agents with little initial wealth cannot obtain loans to develop their projects, while those with more wealth can get loans to create productive firms. Given the distribution of initial wealth, some agents are not subject to credit and become workers, others are credit constrained and develop firms that do not have the efficient size (SMETs), and there is a third group of entrepreneurs that are credit unconstrained and create efficient firms.

We examine the effect of increased efficiency of financial markets –understood as improvements in the loan recovery rate– on access to productive loans and on the efficiency of credit constrained firms as well as on wages and the labor supply. We also examine the effects of increased inequality and show that in an economy with low amounts of wealth, increased inequality leads to higher wages and lower profits. We then show how the different groups in the economy are affected by changes in worker protection and by improvements in the financial market institutions (reflected in better loan recovery rates). Three groups endogenously appear that are impacted differently by the changes in these parameters: workers, the smaller of the credit constrained firms, which we define as SMEs, and large firms, which include the larger SMETs.

We then embed the results in a political economy model similar to Pagano and Volpin (2005) to examine the effects on the political platforms of two parties. We show that the political equilibrium is such that in a poor country, the one with more inequality has worse credit protection and lower labor protection. In a rich country, these effects of increased inequality are smaller.

We perform a preliminary test of these results using cross-country data (given the lack of data on wealth distribution, which does not allow the construction of panels with sufficient variation in incomes). Using 57 countries for which we have data we test whether the theoretical results are as predicted. We find that in a poor country, a 1% increase in the wealth Gini lowers the loan recovery rate by more than 2.4% and lowers protection by around 0.5%. While these results are tentative, they confirm the predictions of the model.

Table 1: Wealth Inequality Effects on Creditor Protection and Employment Protection Laws

	Recovery Rate				*Legal Rights Index (World Bank)*				*Employment Protection Law (OECD)*			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Wealth Gini	-2.766***	-2.405***	-3.109***	-2.637***	-9.945**	-0.502	-11.94**	-2.883	-3.613***	-4.511***	-3.534***	-4.153***
	(0.353)	(0.339)	(0.409)	(0.392)	(4.762)	(3.925)	(5.131)	(4.214)	(1.210)	(1.252)	(1.249)	(1.234)
Wealth Gini x Log(Cap. Stock per capita)	0.209***	0.148***			1.193***	0.676**			0.0918	0.205**		
	(0.0258)	(0.0264)			(0.348)	(0.305)			(0.0885)	(0.0973)		
Wealth Gini x Log(Wealth per capita)			0.231***	0.159***			1.112***	0.740**			0.0386	0.151
			(0.0332)	(0.0330)			(0.417)	(0.354)			(0.101)	(0.104)
English Legal Origin		0.194***		0.129***		4.275***		3.700***		-0.643***		-0.594***
		(0.0527)		(0.0499)		(0.609)		(0.537)		(0.194)		(0.157)
Socialist Legal Origin		-0.0583		-0.0414		2.318***		2.591***		0.0873		0.0842
		(0.0524)		(0.0543)		(0.605)		(0.583)		(0.193)		(0.171)
German Legal Origin		0.121*		0.158**		2.129**		2.203***		-0.364		-0.248
		(0.0724)		(0.0784)		(0.837)		(0.843)		(0.267)		(0.247)
Scandinavian Legal Origin		0.229***		0.298***		2.441***		2.715***		-0.244		-0.0903
		(0.0729)		(0.0763)		(0.843)		(0.820)		(0.269)		(0.240)
R-squared	0.613	0.729	0.505	0.630	0.177	0.577	0.108	0.511	0.136	0.300	0.131	0.311
Observations	57	57	67	67	57	57	67	67	57	57	67	67

Table 2: Marginal Effect of Wealth Gini on Recovery Rate and EPL

Marginal Effect of Wealth Gini	*Recovery Rate (%)*	*EPL (OECD, 1-4)*
Perct. 5% Log(Cap. Stock per capita)	-1.2850	-0.0288
Perct. 95% Log(Cap. Stock per capita)	0.6515	0.0208
Perct. 5% Log(Wealth per capita)	-1.2730	-0.0282
Perct. 95% Log(Wealth per capita)	0.7660	0.0238

*For the percentile 5% (95%) we show the effects of increasing (decreasing) 1% the wealth Gini.

Table 3: Robustness Test

	(1)	(2)	(3)	(4)
Dependent variable: Recovery Rate				
Wealth Gini	-3.453***	-2.990***	-3.746***	-2.857***
	(0.390)	(0.385)	(0.529)	(0.510)
Wealth Gini x Log(Cap. Stock per capita)	0.289***	0.220***		
	(0.0315)	(0.0327)		
Wealth Gini x Log(Wealth per capita)			0.300***	0.189***
			(0.0476)	(0.0507)
English Legal Origin		0.187***		0.133**
		(0.0525)		(0.0557)
Socialist Legal Origin		-0.0311		-0.0136
		(0.0492)		(0.0608)
German Legal Origin		0.133*		0.218**
		(0.0795)		(0.0972)
Scandinavian Legal Origin		0.161*		0.297***
		(0.0934)		(0.0796)
R-squared	0.705	0.782	0.504	0.634
Depedent variable: Employment Protection Law (OECD)				
Wealth Gini	-4.302***	-6.010***	-4.303***	-5.009***
	(1.552)	(1.446)	(1.646)	(1.599)
Wealth Gini x Log(Cap. Stock per capita)	0.115	0.385***		
	(0.125)	(0.123)		
Wealth Gini x Log(Wealth per capita)			0.151	0.354**
			(0.148)	(0.159)
English Legal Origin		-0.912***		-0.571***
		(0.197)		(0.175)
Socialist Legal Origin		0.0985		0.257
		(0.185)		(0.191)
German Legal Origin		-0.374		-0.0712
		(0.299)		(0.305)
Scandinavian Legal Origin		-0.473		-0.145
		(0.351)		(0.249)
R-squared	0.147	0.440	0.125	0.343
Observations	46	46	54	54

*Estimations were obtained removing the lowest 10% and the highest 10% of Log(Wealth per capita) and Log(Cap. Stock per capita).

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A Appendix: Proofs

A.1 Basic Properties

Lemma 1 *The maximum debt D_z satisfies the following conditions:*

1. $\frac{\partial D_z}{\partial K_z} > 1$ *if* $K_d \leq K_z < K_r$.

2. $D_z > 0$ *and* $D_z > K_z$ *if* $K_d \leq K_z < K_d$.

Proof:

Recall the condition which defines $D(K_z)$ in the range $K_d \leq K_z < K_r$:

$$\Psi(K_z, D_z, L_z) = 0 \tag{22}$$

Differentiation of this condition leads to:

$$\frac{\partial \Psi(K_z, D_z, L_z)}{\partial K_z} + \frac{\partial \Psi(K_z, D_z, L_z)}{\partial D_z}\frac{\partial D_z}{\partial K_z} + \frac{\partial \Psi(K_z, D_z, L_z)}{\partial L_z}\frac{\partial L_z}{\partial K_z} = 0 \tag{23}$$

$$\Rightarrow \frac{\partial D_z}{\partial K_z} = -\frac{\Psi_L \frac{\partial L_z}{\partial K_z} + \Psi_K}{\Psi_D} \tag{24}$$

where:

$$\Psi_K = pf_K + (1-p)\eta > 0 \tag{25}$$

$$\Psi_L = p(f_L - w) - (1-p)\Theta w = 0 \tag{26}$$

$$\Psi_D = pf_K - (1 + \rho + \phi - (1-p)\eta) \leq 0 \tag{27}$$

Therefore, if $K_d \leq K_z < K_r$, we conclude that:

$$\frac{\partial D_z}{\partial K_z} = -\frac{f_K + \frac{1-p}{p}\eta}{f_K - \left(\frac{1+\rho+\phi-(1-p)\eta}{p}\right)} > 0 \tag{28}$$

Moreover,because $f_K(K_z+D_z, L_z) \in \left[\frac{1+\rho+\phi-(1-p)\eta}{p}, \frac{1+\rho-(1-p)\eta}{p}\right]$, we have that $\frac{\partial D_z}{\partial K_z} > 1$ if K_z lies in the constrained range $[K_d, K_r]$. For the second part of the lemma, note first that the conditions that define K_d are not satisfied at $D_d = 0$. Using the compatibility constraint and the participation constraint jointly:

$$\Psi(K_z, D_z, L_z) = U_e(K_z, D_z, L_z) - \phi D_z = 0$$
$$U_e(K_z, D_z, L_z) \geq U_w(K_z, l_z)$$
$$\Rightarrow \phi D_z \geq U_w(K_z, l_z) = (1+\rho)K_z + wl_z[p + (1-p)\Theta] - \varsigma(l)$$
$$\Rightarrow D_z \geq \frac{(1+\rho)}{\phi}K_z > K_z$$

where for the definition of individual labor supply l, see below.

Lemma 2 *The level of labour L_z a firm contracts increases with K_z.*

Proof: The optimal labour demand L_z is defined by:

$$f_L(K_z, L_z) = w\left(1 + \Theta\frac{1-p}{p}\right) \tag{29}$$

Differentiating this condition with respect K_z we obtain that:

$$f_{KL}\frac{\partial D_z}{\partial K_z} + f_{LL}\frac{\partial L_z}{\partial K_z} = 0 \tag{30}$$

$$\Rightarrow \frac{\partial L_z}{\partial K_z} = -\frac{f_{KL}\frac{\partial D_z}{\partial K_z}}{f_{LL}} > 0 \tag{31}$$

Lemma 2 (Equilibrium in the labor market) *There is a unique equilibrium wage in the labor market.*

Proof: First note that the optimal amount of labour supplied by each worker $l(w)$ is defined by:

$$w[p + (1-p)\Theta] = \varsigma'(l(w))$$

Differentiating with respect to w leads to:

$$\frac{\partial l(w)}{\partial w} = \frac{p + (1-p)\Theta}{\varsigma''(l)} > 0 \tag{32}$$

Given the labor market wage, firm z demand for labor satisfies: $pf_L(K_z + D_z, L_z) = pw + (1 - p)\Theta w$. From the FOC of labour in the firm:

$$\frac{\partial L_z}{\partial w} = \frac{1 + \frac{(1-p)}{p}\Theta - f_{LK}\frac{\partial D_z}{\partial w}}{f_{LL}} < 0 \tag{33}$$

where we have used the fact that $\frac{\partial D_z}{\partial w} = \frac{L_z(p+(1-p)\Theta)}{pf(K_z+D_z,L_z)-(1+\rho+\phi-(1-p)\eta)} < 0$.

$$\frac{\partial\Psi}{\partial D_d}\frac{\partial D_d}{\partial w}+\frac{\partial\Psi}{\partial L_d}\frac{\partial L_d}{\partial w}+\frac{\partial\Psi}{\partial K_d}\frac{\partial K_d}{\partial w}+\frac{\partial\Psi}{\partial w}=0$$

Replacing terms from previous conditions we obtain that:

$$\underbrace{\left(f_K-\left[\frac{1+\rho+\phi-(1-p)\eta}{p}\right]\right)}_{=0}\frac{\partial D_d}{\partial w}+\underbrace{\left(f_L-w-\frac{1-p}{p}\Theta w\right)}_{=0}\frac{\partial L_d}{\partial w}+\frac{\partial K_d}{\partial w}\left(f_K+\frac{(1-p)}{p}\eta\right)=\frac{L_d}{p}+\frac{1-p}{p}L_d\Theta$$

$$\Rightarrow\frac{\partial K_d}{\partial w}=\frac{L_d(1+(1-p)\Theta)}{pf_K+(1-p)\eta}>0$$

$$\frac{\partial\mathcal{S}_L}{\partial w}=\frac{\partial l}{\partial w}\Gamma(K_d)+l\cdot\frac{\partial K_d}{\partial w}\gamma(K_d)>0 \tag{34}$$

For the demand of labour we have:

$$\frac{\partial\mathcal{D}_L}{\partial w}=\int_{K_d(w)}^{+\infty}\frac{\partial L_z}{\partial w}\partial\Gamma(K_z)-\frac{\partial K_d}{\partial w}L_d\gamma(K_d)<0 \tag{35}$$

Since $\varsigma''>0, \lim_{l\to\infty} w\to\infty$, and thus there is an equilibrium. ■

Lemma 3 *The cost function $\varsigma(l_z), l_z>0$, satisfies:*

1.

$$\varsigma'(l_z)\frac{l_z}{\varsigma(l_z)}\geq 1$$

2.

$$\varsigma(l_z)''l_z^2\geq\varsigma'(l_z)l_z-\varsigma(l_z)$$

Proof: Define the auxiliary function:

$$\Upsilon_{l_z}(\bar{l})\equiv\frac{\varsigma(l_z)-\varsigma(\bar{l})}{l_z-\bar{l}};\bar{l}<l_z \tag{36}$$

Differentiation with respect $\bar{l}$ leads to:

$$\Upsilon'_{l_z}(\bar{l})(l_z-\bar{l})=\frac{\varsigma(l_z)-\varsigma(\bar{l})}{l_z-\bar{l}}-\varsigma'(\bar{l}) \tag{37}$$

Note that $\Upsilon'_{l_z}(z) \geq 0$. In fact the convexity of $\varsigma(\cdot)$ implies that:

$$\varsigma(\lambda l_z + (1-\lambda)\bar{l}) \geq \lambda\varsigma(l_z) + (1-\lambda)\varsigma(\bar{l}), \forall\lambda \in [0,1]$$
$$\Rightarrow \frac{\varsigma(\bar{l} + \lambda(l_z - \bar{l})) - \varsigma(\bar{l})}{\lambda} \leq \varsigma(l_z) - \varsigma(\bar{l})$$

Taking the limit $\lim_{\lambda\to 0^+}$ we obtain:

$$\varsigma'(\bar{l})(l_z - \bar{l}) \leq \varsigma(l_z) - \varsigma(\bar{l})$$
$$\Rightarrow \Upsilon'_{l_z}(\bar{l})(l_z - \bar{l}) \geq 0 \Rightarrow \Upsilon'_{l_z}(\bar{l}) \geq 0$$

where we have used the fact $l_z > \bar{l}$. This last condition implies that $\Upsilon_{l_z}(\bar{l}_1) \leq \Upsilon_{l_z}(\bar{l}_2), \forall \bar{l}_1 \in [0, \bar{l}_2]$. In particular, it is satisfied for $\bar{l}_1 = 0$ and any $\bar{l}_2 \to l_z$ with $l_z \geq 0$. This is,

$$\Upsilon_{l_z}(0) < \lim_{\bar{l}_2 \to l_z \geq 0} \Upsilon_{l_z}(\bar{l}_2)$$
$$\Leftrightarrow \frac{\varsigma(l_z)}{l_z} \leq \varsigma'(l_z)$$

which proves the first part of the result. For the last item define the function:

$$\Omega(l_z) \equiv \varsigma(l_z) - \varsigma'(l_z)l_z - \varsigma''(l_z)l_z^2;\ l_z \geq 0 \tag{38}$$

Note that $\Omega(0) = 0$ and that $\Omega'(l_z) = l_z \cdot (\varsigma'''(l_z)l_z + \varsigma''(l_z)) > 0, \forall l_z > 0$ (because $\varsigma'' > 0$ and $\varsigma''' > 0$). Thus $\Omega(l_z) \geq 0, \forall l_z \geq 0 \Leftrightarrow \varsigma(l_z)''l_z^2 \geq \varsigma'(l_z)l_z - \varsigma(l_z)$.

A.2 Basic Statics

Proposition 5 *The equilibrium wage w rises and the minimum capital level K_d decreases after:*

1. *An improvement in* ex-ante *creditor protection $1-\phi$.*

2. *An increase in* ex-post *protection η.*

3. *A decrease in worker protection Θ.*

4. *A decrease in international interest rate ρ.*

5. *A decrease in fixed costs θ.*

Proof: We do the case of w first. In order to simplify calculations we define $x = \phi, \eta, \Theta, \rho, \theta$. From the equilibrium labour market condition we have[19,20]

$$\left(\frac{\partial l}{\partial w}\frac{\partial w}{\partial x}+\frac{\partial l}{\partial x}\right)\Gamma(K_d)+l\cdot\gamma(K_d)\left(\frac{\partial K_d}{\partial x}+\frac{\partial K_d}{\partial w}\frac{\partial w}{\partial x}\right)-\left[\int_{K_d(w)}^{+\infty}\left(\frac{\partial L_z}{\partial w}\frac{\partial w}{\partial x}+\frac{\partial L_z}{\partial x}\right)\partial\Gamma(K_z)\right.$$
$$\left.-L_d\gamma(K_d)\left(\frac{\partial K_d}{\partial x}+\frac{\partial K_d}{\partial w}\frac{\partial w}{\partial x}\right)\right]=0 \quad (39)$$

For $x = \phi$, $x = \Theta$,$x = \rho$ or $x = \theta$ the direct effect on K_d is: $\frac{\partial K_d}{\partial x} > 0$. If $\frac{\partial w}{\partial x} > 0$ then all terms would be positive and the labour market equilibrium condition would be violated. On the other hand, if $\frac{\partial w}{\partial x} < 0$, we will have terms with opposite signs and the market condition will be satisfied. Therefore, the equilibrium wage decreases after an increase in ϕ, Θ,ρ or θ. If $x = \eta$ then we have that: $\frac{\partial K_d}{\partial x} < 0$. Using the same argument we conclude that $\frac{\partial w}{\partial x} > 0$.

Again, for the case of K_d, we define $x = \phi, \eta, \Theta, \theta$. Differentiating condition (22) at (K_d, D_d, L_d) we obtain:

$$\frac{\partial\Psi(K_d,D_d,L_d)}{\partial K_d}\frac{\partial K_d}{\partial x}+\frac{\partial\Psi(K_d,D_d,L_d)}{\partial D_d}\frac{\partial D_d}{\partial x}+\frac{\partial\Psi(K_d,D_d,L_d)}{\partial L_d}\frac{\partial L_d}{\partial x}+\frac{\partial\Psi(K_d,D_d,L_d)}{\partial x}=0$$
$$\Rightarrow\left(f_K+\frac{(1-p)}{p}\eta\right)\frac{\partial K_d}{\partial x}+\underbrace{\left(f_K-\left[\frac{1+\rho+\phi-(1-p)\eta}{p}\right]\right)}_{=0}\frac{\partial D_d}{\partial x}+\underbrace{\left(f_L-w-\frac{1-p}{p}\Theta\right)}_{=0}\frac{\partial L_d}{\partial x}=-\frac{\partial\Psi(K_d,D_d,L_d)}{\partial x}$$
$$\Rightarrow\frac{\partial K_d}{\partial x}=-\frac{\frac{\partial\Psi(K_d,D_d,L_d)}{\partial x}}{pf_K+(1-p)\eta}$$

Differentiating and replacing terms we obtain that:

[19] Note that L_d is the amount of labour demanded by a firm which owns K_d.

[20] Notice that total differentiation of $K_d(w)$ with respect any measure x incorporates a direct effect and a indirect effect (given by the change in w): $\frac{\partial K_d(w)}{\partial x} = \left(\frac{\partial K_d}{\partial x} + \frac{\partial K_d}{\partial w}\frac{\partial w}{\partial x}\right)$

$$\frac{\partial K_d}{\partial \phi} = \frac{D_d + \frac{\partial w}{\partial \phi} L_d(p + (1-p)\Theta)}{p f_k + (1-p)\eta} \tag{40}$$

$$\frac{\partial K_d}{\partial \eta} = \frac{-(1-p)(K_d + D_d) + \frac{\partial w}{\partial \eta} L_d(p + (1-p)\Theta)}{p f_k + (1-p)\eta} \tag{41}$$

$$\frac{\partial K_d}{\partial \rho} = \frac{D_d + \frac{\partial w}{\partial \rho} L_d(p + (1-p)\Theta)}{p f_k + (1-p)\eta} \tag{42}$$

$$\frac{\partial K_d}{\partial \Theta} = \frac{L_d \left(\frac{\partial w}{\partial \Theta}((1-p)\Theta + p) + w(1-p)\right)}{p f_k + (1-p)\eta} \tag{43}$$

$$\frac{\partial K_d}{\partial \theta} = \frac{p + \frac{\partial w}{\partial \theta} L_d(p + \Theta(1-p))}{p f_k + (1-p)\eta} \tag{44}$$

Note that condition (39) implies that $|\frac{\partial w}{\partial \phi}| < \frac{D_d}{L_d(p+(1-p)\Theta)}$, $|\frac{\partial w}{\partial \Theta}| < \frac{(1-p)w}{p+(1-p)\Theta}$, $|\frac{\partial w}{\partial \rho}| < \frac{D_d}{L_d(p+(1-p)\Theta)}$, $|\frac{\partial w}{\partial \eta}| < \frac{(1-p)(K_d+D_d)}{L_d(p+(1-p)\Theta)}$ and $|\frac{\partial w}{\partial \theta}| < \frac{1}{L_d(1+\Theta(1-p))}$, otherwise the equilibrium condition will be violated. Therefore we conclude that: $\frac{\partial K_d}{\partial \phi} > 0$, $\frac{\partial K_d}{\partial \Theta} > 0$, $\frac{\partial K_d}{\partial \eta} < 0$, $\frac{\partial K_d}{\partial \rho} > 0$, and $\frac{\partial K_d}{\partial \theta} > 0$. ■

Lemma 3 *If Θ increases, D_z and L_z decrease for all $z \in [K_d, K_r]$.*

Proof:

Differentiating condition (22) we obtain:

$$\frac{\partial \Psi(K_z, D_z, L_z)}{\partial D_z}\frac{\partial D_d}{\partial x} + \frac{\partial \Psi(K_z, D_z, L_z)}{\partial L_z}\frac{\partial L_z}{\partial x} + \frac{\partial \Psi(K_z, D_z, L_z)}{\partial x} = 0$$

$$\Rightarrow \underbrace{\left(f_K - \left[\frac{1+\rho+\phi-(1-p)\eta}{p}\right]\right)}_{<0}\frac{\partial D_z}{\partial x} + \underbrace{\left(f_L - w - \frac{1-p}{p}\Theta\right)}_{=0}\frac{\partial L_z}{\partial x} = -\frac{\partial \Psi(K_z, D_z, L_z)}{\partial x}$$

$$\Rightarrow \frac{\partial D_z}{\partial x} = -\frac{\frac{\partial \Psi(K_z, D_z, L_z)}{\partial x}}{\left(f_K - \left[\frac{1+\rho+\phi-(1-p)\eta}{p}\right]\right)}$$

If $x = \Theta$ then we obtain that:

$$\frac{\partial D_z}{\partial \Theta} = \frac{\frac{L_z}{p}\left(\frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + (1-p)w\right)}{\left(f_K - \left[\frac{1+\rho+\phi-(1-p)\eta}{p}\right]\right)} < 0 \tag{45}$$

From the FOC of labour we obtain:

$$f_{KL}\frac{\partial D_z}{\partial \Theta} + f_{LL}\frac{\partial L_z}{\partial \Theta} = \frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + (1-p)w) \tag{46}$$

$$\Rightarrow \frac{\partial L_z}{\partial \Theta} = \frac{\frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + (1-p)w - f_{KL}\frac{\partial D_z}{\partial \Theta}}{f_{LL}} < 0 \tag{47}$$

where we have used the fact that $\frac{\partial D_z}{\partial \Theta} < 0$ and $\frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + (1-p)w > 0$.

A.3 Results Related to Different Workers and Entrepreneurial Groups

In order to compare the effects of Θ and ϕ among the different entrepreneurial groups we define the profits of a firm of size $K_z + D_z$ as follows:

$$\Pi(K_z+D_z, L_z) = p[f(K_z+D_z, L_z) - \theta - wL_z] + (1-p)[\eta(K_z+D_z) - \Theta w L_z] - (1+\rho)(D_z+K_z) \tag{48}$$

Recall that workers' utilities are given by:

$$U_w = (1+\rho)K_z + pwl + (1-p)\Theta wl - \varsigma(l) \tag{49}$$

Proposition 6 *If worker protection Θ increases then:*

1. *All firms experience a decrease in their profits, and there exists a threshold $K_\Theta \in (K_d, K_r)$ such that firms with $K_z \in (K_d, K_\Theta]$ are worse off than firms with $K_z \geq K_r$.*
2. *On average, workers are better off.*

Proof: For firms with $K_z \in [K_d, K_r)$ differentiation of condition (48) with respect Θ leads to:

$$\frac{\partial \Pi(K_z+D_z, L_z)}{\partial \Theta} = \frac{\partial \Pi}{\partial D_z}\frac{\partial D_z}{\partial \Theta} + \underbrace{\frac{\partial \Pi}{\partial L_z}}_{=0}\frac{\partial L_z}{\partial \Theta} + \frac{\partial \Pi}{\partial \Theta} \tag{50}$$

$$\Rightarrow \frac{\partial \Pi(K_z+D_z, L_z)}{\partial \Theta} = \underbrace{\left(f_K - \left(\frac{1+\rho-(1-p)\eta}{p}\right)\right)}_{>0}\underbrace{\frac{\partial D_z}{\partial \Theta}}_{<0} - L_z\underbrace{\left(\frac{\partial w}{\partial \Theta}(p+(1-p)\Theta) + (1-p)w\right)}_{>0} < 0 \tag{51}$$

For firms which produce optimally ($K_z \geq K_r$) we have that:

$$\frac{\partial \Pi(K^*, L^*)}{\partial \Theta} = \frac{\partial \Pi}{\partial K^*}\frac{\partial K^*}{\partial \Theta} + \underbrace{\frac{\partial \Pi}{\partial L^*}}_{=0} + \frac{\partial \Pi}{\partial \Theta}$$

$$\Rightarrow \frac{\partial \Pi(K^*, L^*)}{\partial \Theta} = p\underbrace{\left(f(K^*, L^*) - \frac{(1+\rho)-(1-p)\eta}{p}\right)}_{=0}\frac{\partial K^*}{\partial \Theta} - L^*\left(\frac{\partial w}{\partial \Theta}(p+(1-p)\Theta) + (1-p)w\right) < 0$$

Note that $\lim_{K_z \to K_d^+} \frac{\partial \Pi}{\partial \Theta} = -\infty$. Else if $K_z \geq K_r$ then $\frac{\partial \Pi}{\partial \Theta} = -[\frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + (1-p)w]L^* > -\infty$. Since $\frac{\partial \Pi}{\partial \Theta}$ is continuous in $(K_d, +\infty]$, there exists an interval $K_z \in (K_d, K_\Theta]$ such that $\frac{\partial \Pi}{\partial \Theta}$ is always more negative than when $K_z \geq K_r$. For an average worker we have that:

$$\frac{\partial U_w}{\partial \Theta} = \frac{\partial w}{\partial \Theta} l(p + (1-p)\Theta)) + w \frac{\partial l}{\partial w}\frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + wl(1-p)\Theta - \varsigma'(l)\frac{\partial l}{\partial w}\frac{\partial w}{\partial \Theta} \tag{52}$$

$$\Rightarrow \frac{\partial l}{\partial w}\frac{\partial w}{\partial \Theta}\underbrace{(p + (1-p)\Theta)w - \varsigma'(l)}_{=0} + l\left(\frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + w(1-p)\right) > 0 \quad \blacksquare$$

The following result show that there is a range of SMETs such that workers are worse off with improvements in worker protection, in the sense that the fraction of the wages they receive from their firms decreases (in our model there are no frictions and no unemployment, but we show here that if workers could not reallocate their labor costlessly, workers in these firms would be worse off. To prove this result let the generalized wage be ω ($\equiv pw + (1-p)\Theta w$) and the number (mass) of workers in firm z as $n_z(\omega) \equiv \frac{L_z(\omega)}{l(\omega)}$, i.e., as the demand for labor of a firm divided by the amount of labor provided by a worker at the prevailing generalized wage rate. Recall that the total utility that workers laboring in firm z receive from the firm is:

$$\tilde{U}_w(L_z) \equiv n_z \cdot (pwl + (1-p)\Theta wl - \varsigma(l)) = pwL_z + (1-p)\Theta wL_z - n_z\varsigma(l) \tag{53}$$

The increase in Θ, which supposedly protects workers in case of the failure of a firm, has ambiguous effects on their welfare, which depend on the type of firm in which they work. While "on average" workers are better off (since total compensation rises), workers in smaller firms are worse off. In some cases the firms close down because the entrepreneur does not obtain financing under the new conditions. SME's that survive have to shrink, because they obtain smaller loans and hire less labor, so workers in those firms can also be made worse off. Note that $\tilde{K}_\Theta$ is the threshold level of capital such that such that the representative worker in SMEs with less capital is worse off with the increase in Θ. The result also shows that the representative worker in larger firms is always better off.

Proposition 7 (Worker protection harms workers in small firms) *Assume $f_{LL,K} < 0$ and $f_{KL,K} < 0$. If worker protection measured by Θ increases, there exists a threshold $\tilde{K}_\Theta \in (K_d, K_r)$ such that:*

1. *The representative worker in a firm with $K_z \in (K_d, \tilde{K}_\Theta)$ is worse off.*
2. *The representative worker in a firm with $K_z > \tilde{K}_\Theta$ is better off.*

Proposition 8 *Assume $f_{LL,K} < 0$ and $f_{KL,K} < 0$. If worker protection Θ increases then there exists a cutoff $\tilde{K}_\Theta \in (K_d, K_r)$ such that:*

1. *The representative worker of a firm with $K_z \in (K_d, \tilde{K}_\Theta)$ is worse off.*

2. *The representative worker of a firm with $K_z > \tilde{K}_\Theta$ is better off.*

Proof: We define the auxiliary function $g(\Theta) \equiv \frac{\partial w}{\partial \Theta}(p + (1-p)\Theta) + (1-p)w$. Differentiating condition (53) with respect Θ:

$$\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta} = g(\Theta)L_z + \frac{\partial L_z}{\partial \Theta}\left(\underbrace{pw + (1-p)\Theta w}_{=\varsigma'(l)} - \frac{\varsigma(l)}{l}\right) - \frac{L_z}{l}\frac{\partial l}{\partial \Theta}\left(\varsigma'(l) - \frac{\varsigma(l)}{l}\right)$$

$$\Rightarrow \frac{\partial \tilde{U}_w(L_z)}{\partial \Theta} = g(\Theta) \cdot L_z \underbrace{\left[1 - \frac{1}{\varsigma''(l) \cdot l}\left(\varsigma'(l) - \frac{\varsigma(l)}{l}\right)\right]}_{>0} + \underbrace{\frac{\partial L_z}{\partial \Theta}}_{<0}\underbrace{\left(\varsigma'(l) - \frac{\varsigma(l)}{l}\right)}_{>0} \tag{54}$$

where we have used the fact that $\frac{\partial l}{\partial \Theta} = \frac{g(\Theta)}{\varsigma''(l)} > 0$ and lemma 3. Note that the sign of $\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta}$ is ambiguous and will depend on K_z. For a firm which is operating close enough to K_d we obtain that $\lim_{K_z \to K_d^+} \frac{\partial \tilde{U}_w(L_z)}{\partial \Theta} = -\infty$ (because $\lim_{K_z \to K_d^+} \frac{\partial D_z}{\partial \Theta} = -\infty$ and so, $\lim_{K_z \to K_d^+} \frac{\partial L_z}{\partial \Theta} = -\infty$), so at least in a neighborhood of K_d the representative worker is worse off. In addition, note that the labour market must satisfy the welfare equilibrium condition:

$$[pwl + (1-p)\Theta wl - \varsigma(l)]\,\Gamma(K_d) = \int_{K_d}^{K_r} \tilde{U}_w(L_z)\partial\Gamma(K_z) + \tilde{U}_w(K^*)(1 - \Gamma(K_r)) \tag{55}$$

$$\Rightarrow \underbrace{\frac{\partial U_w}{\partial \Theta}\Gamma(K_d) + U_w\gamma(K_d)\frac{\partial K_d}{\partial \Theta}}_{>0} = \int_{K_d}^{K_r} \frac{\partial \tilde{U}_w(L_z)}{\partial \Theta}\partial\Gamma(K_z) - \tilde{U}_w(L_d)\gamma(K_d)\frac{\partial K_d}{\partial \Theta} + \frac{\partial \tilde{U}_w(K^*)}{\partial \Theta}(1 - \Gamma(K_r))$$

we know that $\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta} < 0$ in some neighborhood of K_d and that the second term of the right-hand side is also negative, so $\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta}$ must be positive in some range (otherwise condition (55) is violated). If $\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta}$ is strictly increasing in K_z then we can conclude that there exist some $\tilde{K}_\Theta \in (K_d, K_r)$ such that $\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta} < 0$ if $K_z \in [K_d, \tilde{K}_\Theta)$ and $\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta} > 0$ if $K_z > \tilde{K}_\Theta$. Now, all we need to show is that $\frac{\partial\left(\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta}\right)}{\partial K_z} > 0$. Differentiation of $\tilde{U}_w$ with respect to K_z leads to:

$$\frac{\partial\left(\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta}\right)}{\partial K_z} = g(\Theta) \cdot \underbrace{\frac{\partial L_z}{\partial K_z}}_{>0}\underbrace{\left[1 - \frac{1}{\varsigma''(l) \cdot l}\left(\varsigma'(l) - \frac{\varsigma(l)}{l}\right)\right]}_{>0} + \frac{\partial\left(\frac{\partial L_z}{\partial \Theta}\right)}{\partial K_z}\underbrace{\left(\varsigma'(l) - \frac{\varsigma(l)}{l}\right)}_{>0}$$

where we have used the result of lemmas 2 and 3. In addition, we have that:

$$\frac{\partial L_z}{\partial \Theta} = g(\Theta)\left(\frac{1}{f_{LL}} - \frac{f_{KL}}{f_{LL}h(K_z, L_z)}\right) \tag{56}$$

where we have defined $h(K_z, L_z) \equiv f_K - \frac{1+\rho+\phi-(1-p)\eta}{p}$. Differentiating this condition with respect K_z :

$$\frac{\partial\left(\frac{\partial L_z}{\partial \Theta}\right)}{\partial K_z} = g(\Theta)\left(\underbrace{-\frac{f_{LL,K}}{(f_{LL})^2}}_{>0} - \underbrace{\left[\frac{\overbrace{f_{KL,K}f_{LL}h(K_z,L_z)}^{<0} - f_{KL}\overbrace{(f_{LL,K}h(K_z,L_z) + f_{LL}f_{KK})}^{>0}}{(f_{LL}h(K_z,L_z))^2}\right]}_{<0}\right) > 0$$

where we have used the fact that $f_{LL,K} < 0$ and $f_{KL,K} < 0$. Therefore, we conclude that $\frac{\partial\left(\frac{\partial \tilde{U}_w(L_z)}{\partial \Theta}\right)}{\partial K_z} > 0$, which leads to the result of the proposition.

Proposition 9 *If ex-ante creditor protection $1-\phi$ improves then:*

1. *There exists a threshold $K_\phi \in (K_d, K_r)$ such that all firms with $K_z \in (K_d, K_\phi)$ are better off, while firms with $K_z \geq K_\phi$ are worse off.*
2. *On average, workers are better off.*

Proof: Differentiating (48) with respect ϕ we have:

$$\frac{\partial \Pi(K_z + D_z)}{\partial \phi} = (pf_K - (1+\rho-(1-p)\eta))\frac{\partial D_z}{\partial \phi} - L_z\frac{\partial w}{\partial \phi}(p+(1-p)\Theta)) \tag{57}$$

where:

$$\frac{\partial D_z}{\partial \phi} = \frac{D_z + L_z\frac{\partial w}{\partial \phi}(p+(1-p)\Theta))}{pf_K - (1+\rho+\phi-(1-p)\eta)} \tag{58}$$

Replacing this last expression in (57) we obtain that:

$$\frac{\partial \Pi(K_z + D_z)}{\partial \phi} = \underbrace{\frac{D_z\,(pf_k - (1+\rho) - (1-p)\eta)}{pf_k - (1+\rho+\phi) - (1-p)\eta}}_{<0} + \underbrace{\frac{\frac{\phi}{p}L_z\frac{\partial w}{\partial \phi}(p+(1-p)\Theta))}{pf_k - (1+\rho+\phi) - (1-p)\eta}}_{>0} \tag{59}$$

For firms which produce optimally we obtain that:

$$\frac{\partial \Pi(K^*)}{\partial \phi} = p\underbrace{\left(f(K^*) - \frac{(1+\rho)-(1-p)\eta}{p}\right)}_{=0}\frac{\partial K^*}{\partial \phi} - \frac{\partial w}{\partial \phi}L^*(p+(1-p)\Theta) > 0 \tag{60}$$

Notice that the sign of expression (59) is ambiguous. However, note that $\lim_{K_z \to K_d^+} \frac{\partial \Pi}{\partial \phi} = -\infty$. Since $\frac{\partial \Pi}{\partial \phi}$ is continuous in $(K_d, +\infty)$, the Intermediate Value Theorem implies that there exists at least some cutoff $K_\phi \in [K_d, K_r]$ such that $\frac{\partial \Pi}{\partial \phi} = 0$. In order to proof that this cutoff is unique we differentiate expression 57 with respect to K_z:

$$\frac{\partial}{\partial K_z}\left(\frac{\partial \Pi(K_z + D_z)}{\partial \phi}\right) = p\frac{\partial f_K}{\partial K_z}\underbrace{\frac{\partial D_z}{\partial \phi}}_{<0} + \underbrace{[pf_K - (1+\rho-(1-p)\eta)]}_{>0}\frac{\partial}{\partial K_z}\left(\frac{\partial D_z}{\partial \phi}\right) \underbrace{-\frac{\partial L_z}{\partial K_z}\frac{\partial w}{\partial \phi}(p+(1-p)\Theta))}_{>0}$$

Note first that $\frac{\partial f_K}{\partial K_z} <= 0$, since as K_z increases firms become more efficient and marginal productivity converges to $1+\rho-(1-p)\eta$ (at K^*).

For an average worker we obtain:

$$\frac{\partial U_w}{\partial \phi} = l \cdot \frac{\partial w}{\partial \phi}(p+(1-p)\Theta) < 0 \tag{61}$$

A.4 Results Related to Changes in Wealth Distribution

Proposition 10 (General equilibrium effects of an MPS) *Consider two economies 1 and 2, such that economy 1's wealth distribution is an MPS of that of economy 2. If $K_d > \mathbb{E}(K_z)$, then the equilibrium wage w is higher in economy 1. Otherwise, if $K_r < \mathbb{E}(K_z)$, the equilibrium wage is higher in economy 2.*

Proof: Recall that the wealth distribution $\Gamma(K_z)$ can be written as a convex combination of two MPS distributions Γ_0, Γ_1: $\Gamma \equiv \lambda\Gamma_1 + (1-\lambda)\Gamma_0$, such that Γ_1 is a MPS of Γ_0.

The labour market condition is:

$$l \cdot \Gamma(K_d) = \int_{K_d}^{K_r} L_z \partial\Gamma + L^*(1-\Gamma(K_r))$$

Differentiation of the left-hand side with respect to λ leads to:

$$\frac{\partial l}{\partial \lambda}\Gamma(K_d) + l \cdot [\Gamma_1(K_d) - \Gamma_0(K_d)] + l \cdot \gamma(K_d)\frac{\partial K_d}{\partial \lambda}$$

for the right-hand side we get:

$$\int_{K_d}^{K_r} \frac{\partial L_z}{\partial \lambda}\partial\Gamma + \int_{K_d}^{K_r} L_z(\partial\Gamma_1 - \partial\Gamma_0) - L_d\gamma(K_d)\frac{\partial K_d}{\partial \lambda} + \frac{\partial L^*}{\partial \lambda}(1-\Gamma(K_r)) - L^*[\Gamma_1(K_r) - \Gamma_0(K_r)]$$

Using the fact that $\frac{\partial l}{\partial \lambda} = \frac{\partial l}{\partial w}\frac{\partial w}{\partial \lambda}$, $\frac{\partial K_d}{\partial \lambda} = \frac{\partial K_d}{\partial w}\frac{\partial w}{\partial \lambda}$ and $\frac{\partial L_z}{\partial \lambda} = \frac{\partial L_z}{\partial w}\frac{\partial w}{\partial \lambda}$, and rearranging terms we obtain that:

$$\frac{\partial w}{\partial \lambda}\underbrace{\left[\frac{\partial l}{\partial w}\Gamma(K_d) + l\gamma(K_d)\frac{\partial K_d}{\partial w} - \int_{K_d}^{K_r}\frac{\partial L_z}{\partial w}\partial\Gamma + L_d\gamma(K_d)\frac{\partial K_d}{\partial w} - \frac{\partial L^*}{\partial w}(1-\Gamma(K_r))\right]}_{>0} =$$

$$\int_{K_d}^{K_r} L_z(\partial\Gamma_1 - \partial\Gamma_0) - L^*[\Gamma_1(K_r) - \Gamma_0(K_r)] - l[\Gamma_1(K_d) - \Gamma_0(K_d)]$$

Thus, the sign of $\frac{\partial w}{\partial \lambda}$ depends only on the sign of the right-hand side term $RHS \equiv \int_{K_d}^{K_r} L_z(\partial\Gamma_1 - \partial\Gamma_0) - L^*[\Gamma_1(K_r) - \Gamma_0(K_r)] - l[\Gamma_1(K_d) - \Gamma_0(K_d)]$.

Case 1: $K_r < K_1$

In this case, we can find an upper bound for RHS:

$$\begin{aligned} RHS &< \int_{K_d}^{K_r} L_r \overbrace{(\partial\Gamma_1 - \partial\Gamma_0)}^{>0} - L^*[\Gamma_1(K_r) - \Gamma_0(K_r)] - l[\Gamma_1(K_d) - \Gamma_0(K_d)] \\ &= \underbrace{(L_r - L^*)}_{<0}\underbrace{[\Gamma_1(K_r) - \Gamma_0(K_r)]}_{>0} - (L_r + l)\underbrace{\Gamma_1(K_d) - \Gamma_0(K_d)]}_{<0} < 0 \end{aligned}$$

Case 2: $K_1 \in (K_d, K_r), K_r < E(K_z)$

As in the previous case, we can find a negative upper bound for RHS:

$$\begin{aligned} RHS &< \int_{K_d}^{K_1} L_1 \overbrace{(\partial\Gamma_1 - \partial\Gamma_0)}^{>0} + \int_{K_1}^{K_r} L_1 \overbrace{(\partial\Gamma_1 - \partial\Gamma_0)}^{<0} - L^*[\Gamma_1(K_r) - \Gamma_0(K_r)] - l[\Gamma_1(K_d) - \Gamma_0(K_d)] \\ &= \underbrace{(L_1 - L^*)}_{<0}\underbrace{[\Gamma_1(K_r) - \Gamma_0(K_r)]}_{>0} - (L_1 + l)\underbrace{\Gamma_1(K_d) - \Gamma_0(K_d)]}_{>0} \end{aligned}$$

Case 3: $K_d, K_r \in (K_1, E(K_z))$

In this case is straightforward to see that:

$$RHS = \int_{K_d}^{K_r} L_z \underbrace{(\partial\Gamma_1 - \partial\Gamma_0)}_{<0} - L^* \underbrace{[\Gamma_1(K_r) - \Gamma_0(K_r)]}_{<0} - l \underbrace{[\Gamma_1(K_d) - \Gamma_0(K_d)]}_{<0} < 0$$

Therefore, we conclude that $\frac{\partial w}{\partial \lambda} < 0$ if $K_r > E(K_z)$.

Case 4: $K_d, K_r \in (\mathbb{E}(K_z), K_2)$

In this case we have:

$$RHS > \int_{K_d}^{K_r} L_r \overbrace{(\partial\Gamma_1 - \partial\Gamma_0)}^{<0} - L^*[\Gamma_1(K_r) - \Gamma_0(K_r)] - l[\Gamma_1(K_d) - \Gamma_0(K_d)]$$
$$= \underbrace{(L_r - L^*)}_{<0} \underbrace{[\Gamma_1(K_r) - \Gamma_0(K_r)]}_{<0} - (L_d + l) \underbrace{[\Gamma_1(K_d) - \Gamma_0(K_d)]}_{<0} > 0$$

Case 5: $K_2 \in (K_d, K_r), K_d > \mathbb{E}(K_z)$

For this case we have:

$$RHS > \int_{K_d}^{K_2} L_2 \overbrace{(\partial\Gamma_1 - \partial\Gamma_0)}^{<0} + \int_{K_2}^{K_r} L_2 \overbrace{(\partial\Gamma_1 - \partial\Gamma_0)}^{>0} - L^*[\Gamma_1(K_r) - \Gamma_0(K_r)] - l[\Gamma_1(K_d) - \Gamma_0(K_d)]$$
$$= \underbrace{(L_2 - L^*)}_{<0} \underbrace{[\Gamma_1(K_r) - \Gamma_0(K_r)]}_{<0} - (L_2 + l) \underbrace{[\Gamma_1(K_d) - \Gamma_0(K_d)]}_{<0} > 0$$

Case 6: $K_d > K_2$. In this case is straightforward to see that:

$$RHS = \int_{K_d}^{K_r} L_z \underbrace{(\partial\Gamma_1 - \partial\Gamma_0)}_{>0} - L^* \underbrace{[\Gamma_1(K_r) - \Gamma_0(K_r)]}_{<0} - l \underbrace{[\Gamma_1(K_d) - \Gamma_0(K_d)]}_{<0} > 0$$

Thus, we conclude that $\frac{\partial w}{\partial \lambda} > 0$ if $K_d > \mathbb{E}(K_z)$

Corollary 1 (Effects on credit penetration) *Consider two economies 1 and 2, such that economy 1's wealth distribution is an MPS of that of economy 2. If $K_d > \mathbb{E}(K_z)$, then $1 - \Gamma(K_d)$ is higher in economy 1. Otherwise, if $K_r < \mathbb{E}(K_z)$, then $1 - \Gamma(K_d)$ is higher in economy 2.*

Proof:

Note first that differentiation of $\Gamma(K_d)$ with respect to λ leads to:

$$\frac{\partial \Gamma(K_d)}{\partial \lambda} = \Gamma_1(K_d) - \Gamma_0(K_d) + \gamma(K_d)\frac{\partial K_d}{\partial \lambda}$$

Using the equilibrium labour market condition to obtain that:

$$l \cdot \left[\Gamma_1(K_d) - \Gamma_0(K_d) + \gamma(K_d)\frac{\partial K_d}{\partial w}\frac{\partial w}{\partial \lambda}\right] = \left[\frac{\partial \mathcal{D}_L}{\partial w} - \frac{\partial l}{\partial w}\Gamma(K_d)\right]\frac{\partial w}{\partial \lambda}$$
$$\Rightarrow \frac{\partial \Gamma(K_d)}{\partial \lambda} = \frac{1}{l}\underbrace{\left[\frac{\partial \mathcal{D}_L}{\partial w} - \frac{\partial l}{\partial w}\Gamma(K_d)\right]}_{<0}\frac{\partial w}{\partial \lambda}$$

where we have used the fact that the demand for labour ($\mathcal{D}_L$) is decreasing in w and $\frac{\partial l}{\partial w} > 0$. Using the result of Proposition 10 we conclude that $\frac{\partial \Gamma(K_d)}{\partial \lambda} < 0$ when $K_d > \mathbb{E}(K_z)$ and $\frac{\partial \Gamma(K_d)}{\partial \lambda} > 0$ if $K_r < \mathbb{E}(K_z)$.

Corollary 2 (Effects on different groups) *Consider two economies 1 and 2, such that economy 1's wealth distribution is an MPS of that of economy 2. If $K_d > \mathbb{E}(K_z)$, then:*

1. *On average, workers in economy 1 are better off.*

2. *All firms are worse off in economy 1.*

Otherwise, if $K_r < \mathbb{E}(K_z)$, these effects are reversed.

Proof: For an average worker we have:

$$\frac{\partial U_w}{\partial \lambda} = \left[\frac{\partial l}{\partial w} \underbrace{(pw + (1-p)\Theta w - \varsigma'(l))}_{=0} + l(p + (1-p)\Theta) \right] \frac{\partial w}{\partial \lambda}$$

From Proposition 10 we conclude that $\frac{\partial U_w}{\partial \lambda} > 0$ if $K_d > \mathbb{E}(K_z)$ and $\frac{\partial U_w}{\partial \lambda} < 0$ if $K_r < \mathbb{E}(K_z)$. For an inefficient firm we have:

$$\frac{\Pi(K_z + D_z)}{\partial \lambda} = \left[\underbrace{pf_K - (1 + \rho - (1-p)\eta)]}_{>0} \underbrace{\frac{\partial D_z}{\partial w}}_{<0} - L_z(p + (1-p)\Theta) \right] \frac{\partial w}{\partial \lambda}$$

For an efficient firm we obtain:

$$\frac{\partial \Pi(K^*)}{\partial \lambda} = -L^*(p + (1-p)\Theta \frac{\partial w}{\partial \lambda}$$

Therefore, based on Proposition 10, if $K_d > \mathbb{E}(K_z)$ all firms are worse after an MPS, while if $K_r < \mathbb{E}(K_z)$. all firms are better off after an MPS.

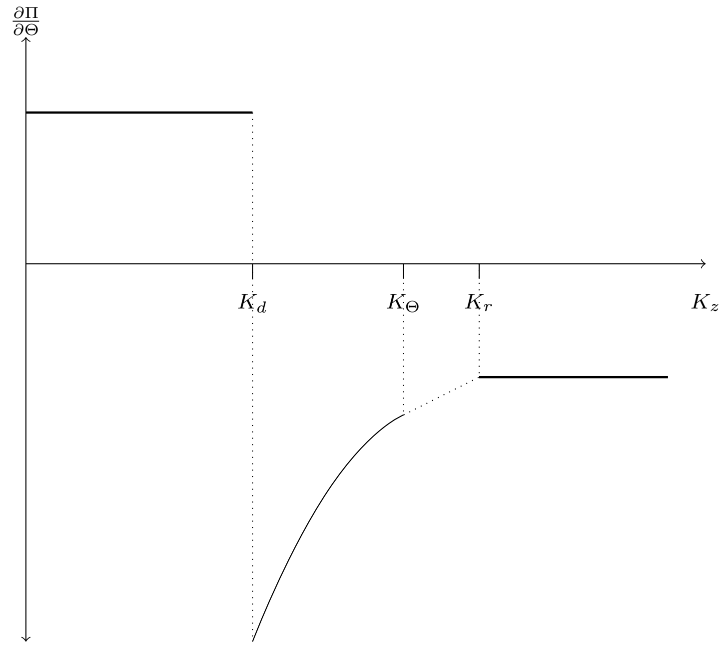

Figure 5: Welfare effects of workers protection reform.

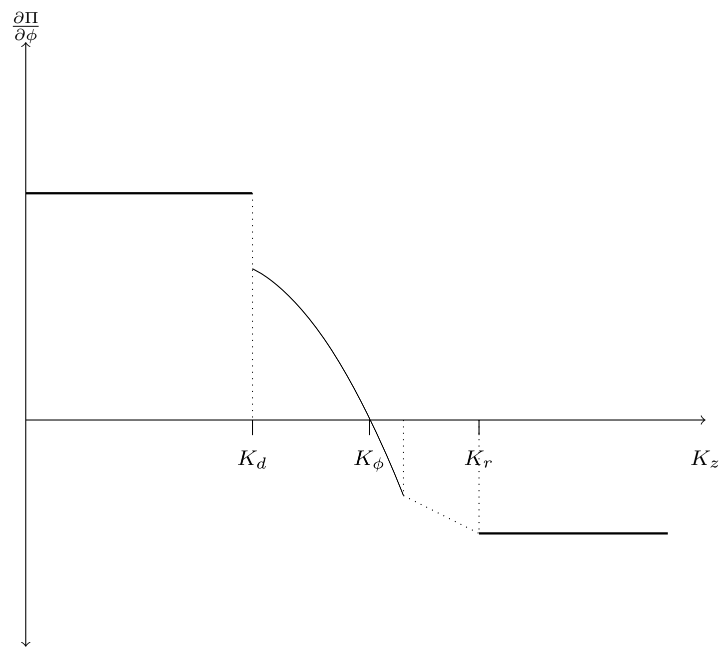

Figure 6: Welfare effects of creditors protection reform.