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Can Market Failure Cause Political Failure

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Abstract

How can market failure interact with choice of institutional reform made by an electorate? We study this question in the framework of occupational choice where agents are endowed heterogeneously with wealth and talent. In our model, market failure due to unobservability of talent endogenously creates a class structure that affects vote on institutional reform. We find that the preferences of these classes may be highly non monotonic in wealth and are often aligned in ways that creates a tension between institutional reforms that are growth maximising and those that are politically feasible. This is in contrast to the world without market failure where the electorate unanimously vote in favour of surplus maximising institutional reform. We find that inefficiencies of market failure may be further amplified by political choices made by interest groups created in the inefficient market.

JEL Classification: O12, O16, O17

1 Introduction

It is well known that market failures abound in the real world. A key insight in the institutional approach to development economics is that capital market failures prevent individuals and economies from reaching their full potential and can lead to poverty traps (see Banerjee and Newman (1993) and Galor and Zeira (1993)). In this literature institutional frictions are taken as exogenous.

It is also well known that even fully accountable governments can fail to implement growth maximising policies when they lack sufficient instruments for compensating losers. Furthermore, the political economy approach to development has emphasized how concentration of political power in the hands of an elite, may lead to distortion of the market by the elites for maximising their own payoffs.[1] The existing political economy literature argues that the distribution

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[1] This is most obvious when elites lobby for barriers to entry (Djankov et al. (2002)). Acemoglu (2003) makes the argument that concentration of political power may lead to distortion of the market through manipulation of factor prices in ways that benefit the political elites.

of political power may be sufficiently spiked so as to allow the elites to distort the market outcome in their favour, and this typically leads to inefficiencies.

In this paper we highlight the reverse link, namely that market failure may create a political failure even when political power is uniformly distributed. We think of political failure as the failure of the electorate to pick the surplus maximising reform.[2] The motivation for this paper is to uncover the political implications of market failure. In our model, in the first best world with well functioning markets, the electorate unanimously chooses institutions that maximise total surplus. However once a market imperfection in the form of unobservability of entrepreneurial talent is introduced, things change dramatically. The market responds to this imperfection by screening agents based on their wealth. This leads to creation of a class structure in the economy with preferences that are aligned in ways that defeat surplus maximising reforms.

We argue that in addition to the well known impact of market failure articulated in the literature on poverty traps, there may be a political impact of market failure. The latter problem could turn out to be more persistent since unlike the solutions to poverty traps that are easier to characterise[3], the solutions to political failure that are politically feasible may not exist. A more general message emerging from our model is that market and political failures complement each other in terms of generating economic inefficiencies.

1.1 Related literature

A paper that is related to ours is Acemoglu and Verdier (2000) where the choice between market failure or corruption is studied. In that model market failure creates a need for bureaucracy which would not arise in the first best world. However there are agency problems within the government since bureaucrats are hard to monitor. This creates a trade-off between the inefficiency of market failure and tolerating corruption. Our paper on the other hand shows that even a fully accountable government without any agency problems would be guided by the electorate to choose sub-optimal reforms. The point of our model is that market failure may shape the political economy in inefficient ways.

Our paper is related to the growing literature on micro political economy. This literature looks at failure of alternative institutions and asks two questions:

1. Which institutions make an economy more productive?

2. Which institutions are more likely to be chosen given a certain distribution of political power?

There are four papers that ask similar questions. Perotti and Volpin (2004) have a model where agents are endowed with wealth and are either consumers or entrepreneurs. There is a non convexity in the production function and entrepreneurs with wealth lower than a certain threshold are financed by equity. Project returns are subject to the ex post moral hazard problem and investor protection, the institution that they study, can mitigate the problem. Elites that

[2] For a somewhat different notion of political failure see Besley (2006)

[3] Micro-lending has been a big theme in this literature. See for example Ghatak and Guinnane (1999)

have wealth over the threshold required to start an enterprise lobby for lower investor protection so as to face a lower competition in the product market. The political economy process is modelled as a social planner that maxmises the weighted sum of the total surplus and bribes from lobbies. As the weight on the bribes increases, investor protection goes down.

Rajan and Zingales (2006) study a model with 3 groups of exogenous size; the educated, the uneducated, and the oligarchs. They consider educational and pro market reform. Educational reforms allow the uneducated to become educated and increase their wages through an increase in their productivity. Pro market reforms allow educated workers to setup their own firms. An agent's preference for any reform is driven by which group the agent belongs to.

Biais and Mariotti (2003) develop a model to address the question of optimal bankruptcy laws. They have a model of occupational choice where agents can be entrepreneurs or workers. Credit market is imperfect because entrepreneurial effort is unobservable. The mechanism through which bankruptcy law affects total surplus is the following: a tough bankruptcy law implies a strong threat of liquidation ex-ante. This induces high effort which increases surplus. However liquidation is ex-post inefficient since some surplus is lost when a company is harvested for its assets at liquidation. In terms of the political economy; rich want soft laws to have lower wages. Poor want the opposite. The agents with intermediate wealth align with rich if they are entrepreneurs and align with poor otherwise. This paper is similar to ours in the sense that here too a market failure generates the need for institutions. The paper differs from ours in terms of the result they find on the choices an electorate make. In their model soft laws which are often chosen by the electorate are often efficient due to inefficiency of liquidation ex post. In contrast, our results indicates that their exists an inherent tension between politically feasible and surplus maximising reforms.

Another paper that is related to ours is Caselli and Gennaioli (2008). In their model agents differ in two discrete dimensions; talent and license. There is an exogenous mismatch between talent to run an enterprise and the endowment of license that is requied to run an enterprise. They model how this exogenously conferred incumbancy and talent interact to create preferences for deregulation and legal reform. Deregulation lowers the cost of acquiring a new license whereas legal reform makes the trade of licenses between agents easier. In these models, markets can be complete and perfectly competitive if the best possible institutions are chosen. In absence of such institutions, frictions are created that take the economy away from the growth maximising outcome. In Caselli and Gennaioli (2008) for instance, the lack of perfect legal institutions creates a problem of enforceability of contracts between agents who wish to trade licenses and the presence of regulation deters entry. Hence the source of problems in these models is purely the exogenous presence of political allignments that undermine the support for best possible institutions. In our model on the other hand these political allignments are endogenised and the fundamental source of inefficiency will be the adverse selection problem created by the unobservability of entrepreneurial talent. Institutions, depending on their quality, would mitigate or worsen this problem but even the best possible institutions will not be enough to solve the problem entirely since unobservability of talent is an informational handicap. Caselli and Gennaioli (2008) focus on government frictions: in the absence of the exogenously given license requirements, one would get the first best in their model. In our model, even with fully benevolent government and perfectly competitive markets, there are market frictions arising from informational (i.e., adverse selection) and transactional constraints (limited liability). As in the standard neoclassical model, preference and technology differences might have seemingly similar implications: e.g., in the Solow model, low steady state output could result from lower saving propensity or use of less efficient technology. However, the policy implications are dramatically different: preference differences are more intractable than technology differences and this is especially so if we recognize the potential mutual interaction of preferences and technology adoption which, for example, reflects some underlying market failure. Analogously, we argue that with government frictions the policy implications are to be found in the political domain and are relatively easy to characterize which is not to say they are easy to implement: improve political institutions to improve the quality of candidates, improve incentives for incumbents so that inefficient rent-extracting policies are removed. In contrast, with market frictions the policies are far less easy to characterize, and this is especially so if they interact with an otherwise frictionless political system where the distribution of political power is uniform.

2 Model

The basic setup is similar to the model presented in extension section in Ghatak et al. (2007).

2.1 Technology

There are two technologies in the economy: a subsistence technology that yields $\underline{w}$ with certainty for one unit of labour and a more productive technology that yields a return R in case of success and 0 in case of failure and requires n workers and 1 entrepreneur to run it. In addition to the returns from the project, entrepreneurs receive a positive non appropriable benefit M that can be interpreted as positive net utility of being an entrepreneur as opposed to being a worker.

2.2 Endowments

Agents are endowed with one unit of labour, entrepreneurial talent that is private information of the agent, and illiquid wealth. Talent θ of an agent is the probability of success of the more productive technology if she becomes an entrepreneur. θ is distributed with a cdf $F(\theta)$. Agents are endowed with illiquid wealth a with a distribution $G(a)$. We assume that the distribution of wealth and talent is independent and that wealth is observable.

2.3 Occupational Choice

Agents choose their occupation. They can either choose to work in the subsistence sector, become workers, or become entrepreneurs. They are paid a wage w at the end of the period if they choose to work for a wage. If they choose entrepreneurship, their payoff is stochastic. The project succeeds with a probability θ which is the unobservable talent of the agent. To set up a firm an entrepreneur needs to hire n workers and pay them a wage w up front. Where $w \geq \underline{w}$ since working with the subsistence technology is an outside option that all agents have.

Our assumption that the productive technology requires n workers and 1 entrepreneur implies that workers are the entrepreneur are perfect complements in the production function. This assumption greatly simplifies our analysis and allows us to get sharp political economy results though is not central to our analysis.

2.4 Credit Market

Since the wealth of an agent is illiquid, agents need to borrow from the credit market to become entrepreneurs. The credit market is perfectly competitive and uses wealth to screen agents. It offers a contract which is a pair $(r(a), a)$ where a is the collateral and $r(a)$ is the corresponding interest rate. However, in this economy the protection of property rights may not be perfect. In particular all agents face a risk that their wealth a is expropriated by the state with a probability τ where $\tau = 0$ implies perfect protection of property rights. Similarly, the enforcement of contracts in the economy may not be perfect either, in particular, in case of failure of the project the bank can only recover a proportion ϕ of the collateral from defaulters. Hence, given a collateral a the interest rate is determined using the following zero profit condition:

$$r(a)nw\theta + (1-\theta)(1-\tau)\phi a = nw \tag{1}$$

For a loan to be viable the return from the project when it succeeds must be large enough to pay the principal with the interest rate. This implies that the following condition must also hold:

$$R - r(a)nw \geq 0 \tag{2}$$

This condition will define the credit constraint in the economy since there will be a level of wealth below which the condition will not be satisfied. An agent with wealth a and talent θ chooses entrepreneurship if:

$$\theta(R - r(a)nw) + M - (1-\tau)(1-\theta)a > w \tag{3}$$

2.4.1 First Best

If talent was observable, the first best would be achieved and characterized by a threshold θ^* such that those with $\theta \geq \theta^*$ become entrepreneurs and the others become workers and earn $w = \overline{w}$, where

$$\theta^* : \int_{\theta^*}^{1} f(\theta)d\theta = \frac{1}{n+1} \tag{4}$$

and

$$\overline{w} = \frac{\theta^* R + M}{n+1} \tag{5}$$

In the first best world, collateral would not be needed to screen agents. Agents with talent $\theta \geq \theta^*$ would be offered a contract with interest rate $r = \frac{1}{\theta}$. It follows that the value of ϕ will no longer matter. Similarly τ would simply be a redistribution from the agents to the government and would have no efficiency implications unlike the world where talent is unobservable.

Assumption: $\overline{w} > M > \underline{w}$.

$M > \underline{w}$ is necessary for the existence of a credit constraint in this economy. If this were not true, looking at the occupational choice condition we can see that agents would never want to borrow when $R - rnw < 0$ and consequently there would never be a credit constraint.

In the first best, there would be no use for wealth and agents will get credit at the interest rate $r = 1/\theta$. Substituting this interest rate at θ^* and plugging in the value for $\overline{w}$ in equation (2) we find that $\overline{w} > M$ ensures that in the first best the expected expropriable returns from projects that are funded are greater than the size of the loan.

2.4.2 Pooling Contract

Any pooling contract that could be offered and accepted in equilibrium must satisfy the necessary condition of zero profit for competitive banks:

$$r_p(a)nw\theta_p(a) + (1 - \theta_p(a))(1 - \tau)\phi a = nw \tag{6}$$

where $\theta_p(a)$ is the average talent in the pool at wealth level a:

$$\theta_p(a) = \frac{\int_{\hat{\theta}(a)}^{1} \theta f(\theta)d\theta}{1 - F(\hat{\theta}(a))} \tag{7}$$

and $\hat{\theta}(a)$ is the agent with the lowest talent in the pool, who must be indifferent between working for a wage and becoming an entrepreneur with the pooling contract $(r_p(a), a)$. This is determined by:

$$\hat{\theta}(a)(R - r_p(a)nw) - (1 - \tau)(1 - \hat{\theta}(a))a + M = w \tag{8}$$

Plugging (7) in (6), the system of two equations (6) and (8) simultaneously determines the pooling interest rate and the lower bound $\hat{\theta}(a)$ of types that could choose the pooling contract $(r_p(a), a)$ if they have wealth a. However, there exists a lower bound of wealth below which banks are not willing to offer such a contract: R must be greater than or equal to $r(a)nw$ for banks to be willing to lend. The lower bound on the collateral, $\underline{a}_p$, below which banks will not find it profitable to lend, is obtained by solving the zero-profit condition at $R = r(a)nw$:

$$\underline{a}_p = \frac{nw - \theta_p(\underline{a}_p)R}{\phi(1-\tau)(1-\theta_p(\underline{a}_p))} \tag{9}$$

Substituting this into the occupational choice condition (8) of the marginal agent who is indifferent, we find

$$\hat{\theta}(\underline{a}_p) = \frac{w - M + (1-\tau)\underline{a}_p}{(1-\tau)\underline{a}_p} \tag{10}$$

This is the talent of the least talented entrepreneur in the pool at the lowest level of wealth consistent with the pooling contract.

Lemma 1. *The lower bound of talent in a pool at any given wealth class is monotonically increasing in wealth.*

Proof. Equation (8) implicitly defines $\hat{\theta}(a)$. Totally differentiating this equation, and rearranging we find:

$$\frac{d\hat{\theta}(a)}{da}\left(R - r(a)nw + (1-\tau)a - \hat{\theta}(a)\frac{dr(a)}{d\hat{\theta}}\right) = (1-\tau)\left(1 - \frac{\hat{\theta}(a)}{\theta_p(a)}(\theta_p(a) + (1-\theta_p(a))\phi)\right) \tag{11}$$

$$R - r(a)nw \geq 0 \qquad \frac{dr(a)}{d\hat{\theta}} < 0 \qquad \hat{\theta}(a) < \theta_p(a) \tag{12}$$

Hence it must be true that:

$$\frac{d\hat{\theta}(a)}{da} > 0 \tag{13}$$

□

In words, starting from $\underline{a}_p$, an agent of a higher wealth class receives a lower interest rate but has a greater loss in case of failure, and this second effect always dominates for an agent at the bottom of the talent distribution that would be choosing entrepreneurship at lower collateral levels. So the quality of the pool of borrowers is the higher the higher the wealth class.

The maximum wealth level for which a pooling contract can be acceptable is given by

$$\overline{a} = \frac{nw}{(1-\tau)\phi} \tag{14}$$

such that the pooling interest rate drops to 1. This is the level of collateral that will be charged in a pooling contract when the interest rate equals one.

2.4.3 Separating Contract

A separating contract exists if the contract is such that agents have an incentive to reveal their types. Just like in the case of the pooling contract, we can use the zero profit condition, the feasibility condition for the loan, and the agent's occupational choice condition to find the lowest level of talent and collateral that is consistent with a separating contract. These are:

$$\underline{\theta}_s = \frac{nw - \phi(M-w)}{R} \tag{15}$$

$$\underline{a}_s = \frac{(M-w)R}{(1-\tau)(R - nw + \phi(M-w))} \tag{16}$$

The existence of the separating contract depends on the existence of a type dependent collateral schedule that is implementable. In other words, letting $\tilde{\theta}$ be the type that an agent declares in a direct mechanism, if we can find a schedule of collateral $a(\tilde{\theta})$ such that agents find it optimal to declare their true types ($\tilde{\theta} = \theta$), then $(r_s(\tilde{\theta}, a(\tilde{\theta})), a(\tilde{\theta}))$ is a separating contract. Given a certain representation that is possible here, this problem boils down to checking whether the following three conditions hold: the single crossing condition, monotonicity, and the local incentive compatibility constraint (Bolton and Dewatripont (2005)). The representation is the following:

$$v_\theta = \theta q(\theta) - T(\theta) + M \tag{17}$$

where

$$q = R - r_s(a)nw + a(1-\tau) \tag{18}$$

and

$$T = (1-\tau)a \tag{19}$$

Given this representation of the problem it is easy to check that the single crossing property holds. The single crossing property states that the slope of the indifference curve of an agent defined over the quantity she consumes and the transfer she makes to the principal is monotonic in her type. This ensures that the indifference curves of agents with different types intersect only once. Mathematically:

$$\frac{\partial}{\partial \theta}\left(-\frac{\partial v/\partial q}{\partial v/\partial T}\right) > 0 \tag{20}$$

It is trivial to show that this is satisfied.

It is optimal for an agent of type θ with wealth a to declare her type truthfully if:

$$\underset{\tilde{\theta}}{\operatorname{argmax}}\, v_\theta(\tilde{\theta}) = \theta \tag{21}$$

where

$$v_\theta(\tilde{\theta}) = \theta\left(R - r(\tilde{\theta}, a(\tilde{\theta}))nw + (1-\tau)a(\tilde{\theta})\right) - (1-\tau)a(\tilde{\theta}) + M \tag{22}$$

The first order condition for this problem evaluated at $\tilde{\theta} = \theta$ is:

$$\frac{nw}{\tilde{\theta}(1-\tilde{\theta})(1-\tau)(1-\phi)} - \frac{a(\tilde{\theta})\phi}{\tilde{\theta}(1-\tilde{\theta})(1-\phi)} - a'(\tilde{\theta}) = 0 \tag{23}$$

solving this differential equation for $a(\tilde{\theta})$ we find that:

$$a(\tilde{\theta}) = \frac{nw}{\phi(1-\tau)}\left(1 + C\left(\frac{1-\tilde{\theta}}{\tilde{\theta}}\right)^{\frac{\phi}{1-\phi}}\right) \tag{24}$$

where C is the constant of integration. Since lower bound values of $\tilde{\theta} = \underline{\theta}_s$ and $a(\tilde{\theta}) = \underline{a}_s$ we can solve for the particular solution.

$$a(\tilde{\theta}) = \frac{nw}{\phi(1-\tau)}\left(1 - \frac{(R-nw)}{nw}\left(\frac{\underline{\theta}_s}{1-\underline{\theta}_s}\right)^{\frac{1}{1-\phi}}\left(\frac{1-\tilde{\theta}}{\tilde{\theta}}\right)^{\frac{\phi}{1-\phi}}\right) \tag{25}$$

The second order condition for this problem is:

$$-\frac{1}{\theta^2}\left(nw - \phi(1-\tau)a(\theta)\right) - \frac{2\phi(1-\tau)}{\theta}a'(\theta) - a''(\theta)(1-\tau)(1-\theta)(1-\phi) < 0 \tag{26}$$

It is easy to check that this equation always holds, and hence the function is globally concave. Lastly, the condition of monotonicity implies that $q(\theta)$ should be increasing in θ. This is required since high types derive more value from entrepreneurship and hence their payoff in the event of success should be more attractive to them than success when choosing the payoff offered to the low types[4]. It is easy to check that $R - r(a(\theta))nw + (1-\tau)a(\theta)$ is increasing in θ. This is because $a(\tilde{\theta})$ is monotonically increasing in $\tilde{\theta}$. High types post higher collateral since the value that an entrepreneur places on the reduction in the interest rate relative to the increase in collateral is increasing in her type. When the type of the agent is the highest possible, that is, $\theta = 1$, the corresponding collateral is $\overline{a}$ and the interest rate charged is 1 (the same as in the case of the pooling contract). Hence a competitive separating contract exists.

[4]For simplicity we call agents with talent $\theta < \theta^*$ low types and agents with talent $\theta \geq \theta^*$ high types.

3 Equilibrium

3.1 Equilibrium in the Credit Market

We have shown that both pooling and separating contracts are viable. Given that banks can introduce any contract $(r(a), a)$ we will now characterise the equilibrium in the model. We will use the Rothschild Stiglitz equilibrium concept where an equilibrium is characterised by *i)* all the contracts in the equilibrium set make non negative profits and *ii)* non existence of a contract that can be introduced that will make a strictly positive profit. We will assume that $\underline{a}_p > 0$. It is easy to check that $\underline{a}_p < \underline{a}_s < \overline{a}$. Hence there is no contract that can be offered to (and accepted by) an agent with wealth $a < \underline{a}_p$ that will make non negative profits.

Lemma 2. *There exists a level of wealth $\hat{a}_p$ defined by $\underline{\theta}_s = \hat{\theta}(\hat{a}_p)$ where $\overline{a} > \hat{a}_p > \underline{a}_s$ such that the only contract in the equilibrium set for $a < \hat{a}_p$ can be a pooling contract.*

Proof. Recall that $\hat{\theta}(a)$ is the level of talent such that an agent with this talent is indifferent between becoming an entrepreneur with the pooling contract $(r_p(a), a)$ and working for a wage. Since the distribution of wealth is continuous, there exists a level of wealth $\hat{a}_p$ such that an agent with talent $\underline{\theta}_s = \hat{\theta}(\hat{a}_p)$ is indifferent between both these alternatives and the separating contract $(r(a(\underline{\theta}_s)), a(\underline{\theta}_s))$. At $\underline{a}_s$ the agent with type $\underline{\theta}_s$ prefers the pooling to the separating contract since she receives a cross subsidy. At $\hat{a}_p$ the attractiveness of the cross subsidy disappears since the collateral requirement becomes too high. Hence even though a separating contract is feasible at $\underline{a}_s$ it is not incentive compatible for an agent with type $\underline{\theta}_s$ to accept it. It becomes incentive compatible only when the agent has wealth $a \geq \hat{a}_p$ at which point he prefers $(r_s(a(\underline{\theta}_s)), a(\underline{\theta}_s)$ to $(r_p(\hat{a}_p), \hat{a}_p))$ □

Lemma 3. *In the region of wealth $a \in (\hat{a}_p, \overline{a})$ there exists a level of talent $\hat{\theta}_s(a)$ such that agents with talent $\theta > \hat{\theta}_s(a)$ prefer the pooling contract and agents with talent $\theta \leq \hat{\theta}_s(a)$ prefer the separating contract.*

Proof. Note that for $a \in (\hat{a}_p, \overline{a})$ a fully separating contract schedule is not available since the collateral required for full separation of types is $\overline{a}$. $\frac{\partial \hat{\theta}(a)}{\partial a}$ implies that the attractiveness of the pooling contract is increasing in type. This is obvious since it simply captures the fact that more wealth is better for screening than less. This implies the existence of a cutoff talent $\hat{\theta}_s(a)$ for level of wealth $a \geq \hat{a}_p$ such that it becomes possible to offer agents with talent $\theta \leq \hat{\theta}_s(a)$ a separating contract that they prefer to the pooling contract. Note that $\hat{\theta}_s(\hat{a}_p) = \hat{\theta}(\hat{a}_p) = \underline{\theta}_s$ and $\hat{\theta}_s(\overline{a}) = 1$ □

Proposition 1 (Existence and Uniqueness). *A unique credit market equilibrium exists such that agents with wealth a:*

- *$a \geq \overline{a}$: are offered separating contracts*

- *$\overline{a} > a > \hat{a}_p$: are offered both pooling and separating contract*

- *$\hat{a}_p > a > \underline{a}_p$: are offered pooling contracts*

- *$\underline{a}_p > a$: are credit constrained*

Proof. $a < \underline{a}_p$ are credit constrained since no contract that makes non negative profits can be offered to these agents. Lemma 2 shows that only a pooling contract can exist in the region of wealth $a < \hat{a}_p$. Lemma 3 shows that in the region of wealth $\overline{a} > a > \hat{a}_p$ agents with talent $\theta \leq \hat{\theta}_s(a)$ a separating contract and $\theta > \hat{\theta}_s(a)$ accept a pooling contract. For the region of wealth $a \geq \overline{a}$ a fully separating schedule of contract exists that is offered and accepted by agents. This is a unique equilibrium since the zero profit pooling and separating contract schedules are unique. □

Proposition 2 (Occupational Choice)**.** *Agents with wealth:*

- *$\underline{a}_p > a$ become workers*

- *$\hat{a}_p > a \geq \underline{a}_p$ and talent $\theta \geq \hat{\theta}(a)$ accept the pooling contract and become entrepreneurs and the rest become workers*

- *$\overline{a} > a > \hat{a}_p$ and talent $1 \geq \theta > \hat{\theta}_s(a)$ accept the pooling contract and become entrepreneurs; and talent $\hat{\theta}_s(a)) \geq \theta \geq \underline{\theta}_s$ accept the separating contract and become entrepreneurs, and the rest become workers*

- *$a \geq \overline{a}$ and talent $\theta \geq \underline{\theta}_s$ accept the separating contract and become entrepreneurs and the rest become workers*

Proof. Follows from Lemma 1 and Proposition 1 □

3.2 Equilibrium in the Labour Market

The labour market is perfectly competitive. An equilibrium is characterised by the demand equalling supply. It is much easier to characterise the equilibrium by thinking of the labour demand of a firm instead of the labour demand by an entrepreneur. A firm demands 1 unit of entrepreneurial and n units of non entrepreneurial labour. Supply is 0 for wage $w < \underline{w}$, and 1 at $w = \underline{w}$. Labour demand is given by:

$$L_d = (n+1)\left(\int_{\underline{a}_p}^{\hat{a}_p}\left(1 - F(\hat{\theta}(a))\right) g(a)da + (1 - F(\underline{\theta}_s))(1 - G(\hat{a}_p))\right) \tag{27}$$

Proposition 3. *The equilibrium wage is* $\underline{w}$ *when* $L_d(\underline{w}) \leq 1$ $w > \underline{w}$ *when* $L_d(\underline{w}) > 1$

Proof. Note that Labour demand is monotonically decreasing in the wage:

$$\frac{\partial L_d}{\partial w} = (n+1)\left(-g(\underline{a}_p)\frac{\partial \underline{a}_p}{\partial w}(1 - F(\underline{\theta}_p)) - f(\underline{\theta}_s)\frac{\partial \underline{\theta}_s}{\partial w}(1 - G(\hat{a}_p)) - \int_{\underline{a}_p}^{\hat{a}_p} f(\hat{\theta}(a))\frac{\partial \hat{\theta}(a)}{\partial w} g(a)da\right) < 0 \tag{28}$$

since

$$\frac{\partial \underline{a}_p}{\partial w} > 0 \qquad \frac{\partial \underline{\theta}_s}{\partial w} > 0 \qquad \frac{\partial \hat{\theta}(a)}{\partial w} > 0 \tag{29}$$

If Labour demand is less than 1, there is excess supply of labour in the economy and the wage must equal $\underline{w}$ which is the outside option to working for a wage. If the labour demanded at $w = \underline{w}$ is more that 1, then the economy is tight in the sense that no one is engaged in the subsistence sector, and the wage must increase to equilibriate demand and supply.

□

Note that in this economy $M > w$ is necessary and sufficient for there to be a credit constraint. If the equilibrium wage rises above this then the bank's zero profit condition is satisfied even at 0 wealth. We will assume that the equilibrium wage is lower than M since the problem without credit constraint is not interesting to analyse.[5]

4 Institutions

The argument that we make in this paper is that when an imperfect market creates interest groups, then the political choices made by the electorate are affected. In the first best where talent is observable, the best institutions are chosen. As we move away from the first best world, there is not only a market inefficiency created by the non observability of talent, but also a political inefficiency created by the electorate voting in favour of inefficient institutions.

The parameter τ captures how poor the enforcement of property rights is. A high τ implies that law enforcement is poor and assets are likely to be stolen by thieves or taken over by the local strongman. Hence a straightforward way to think about τ is how tough government is on property related crime and how well it enforces the claims of someone dispossessed of their property. Less

[5] It should be noted that in contrast to Ghatak et al. (2007) there are no multiple equilibria since firm level labour demand is constant at n.

violently, τ can also be thought of as how well the titling system works. To the extent it is easy to bribe the local bureaucrat to get the names on the land titles changed, τ would be high and vice versa.

The treatment of ϕ is somewhat different since it is the proportion of collateralized wealth that can be liquidated in real terms. Hence $(1-\phi)$ is pure inefficiency and consequently there is a strong case for thinking that $\phi = 1$ will be the surplus maximising policy. We find that under certain conditions, this effect may be dominated through the inefficiencies caused in the occupational choices due to a high ϕ since a high ϕ can end up making entrepreneurship too attractive.

In our model $(1-\tau)$ and ϕ are two parameters that capture the strength of property rights and contractual institutions respectively. The most plausible way to think about these are that these are parameters that capture institutional frictions that reduce the efficiency of market transactions involving wealth.

This can be illustrated with the following example. To fix ideas let us think of wealth as land. Consider a scenario where there's an agent who wishes to rent out his land. This landlord would consider two things when entering into a rental contract with a potential tenant. Firstly he would consider how secure his property rights are. When τ is high, the landlord realises that his property rights over the land he is renting out are not very secure. This dampens the incentives for renting the land since the landlord worries about a potential capture by the tenant.

Independently, a low ϕ implies that enforcement of contracts is costly. The landlord anticipates that in the event a tenant refuses to vacate the land as per the terms of the rental contract, the landlord would need to approach the courts for enforcement of his contractual rights. Even if property rights are fully secure, if ϕ is low, the court costs would be substantial. Therefore a low ϕ would also dampen the incentives to put land to its productive use.

The distinction between the two institutions is heuristic.[6] In most applications one can think of, ϕ and τ would interact together creating aggregate transaction costs that would dampen the incentives for market transactions involving wealth. For example in the model presented here, both enter multiplicatively when agents post their wealth as collateral to become entrepreneurs. The credit market takes into account both the insecurity of the property right over the collateral and the costs of enforcing the credit contract in case of default.

In the first best when talent in observable, the preferences of the electorate are unanimously aligned with surplus maximisation. Hence a $\tau = 0$ is chosen because better property rights increase the expected payoff of all agents. Similarly the optimal ϕ would be chosen to the extent there are any contrac-

[6]In Besley (1995) three channels through which property rights affects investment incentives are laid out. These are the security of tenure, the use of property as collateral, and the benefits of gains from trade. Of these we feel that the first and the third are channels through which τ would affect investment incentives whereas the second channel relating to the use of land as collateral is affected by an interaction of τ and ϕ as is the case in the model. Of course wealth in our model is exogenous and therefore the issue of investment incentives does not arise.

tual transactions involving wealth.[7] As soon as there's a departure from the first best, the inefficiency of the market gets further amplified by the choices of the electorate that are governed by the class structure created in the inefficient market.

The best institutions are the ones that maximise the total surplus in the economy which in this model happens when the most talented agents become entrepreneurs regardless of their wealth. This is equivalent to the quality of the pool of entrepreneurs being maximised. Under the first best the total surplus in the economy is:

$$W_{fb} = (R+M)\int_{\theta^*}^{1} \theta f(\theta) d\theta + \int_{0}^{\infty} (1-\tau) a g(a) d(a) \tag{30}$$

By inspecting this expression it is clear that the total surplus is decreasing in τ. Since all agents lose a part of their wealth as τ increases, agents unanimously vote for τ equal to zero. Since collateral is not posted in this economy, there is no loss of efficiency due to ϕ.

In the second best world with unobservable talent, the total surplus is:

$$W_{sb} = (R+M)\left(\int_{\underline{a}_p}^{\hat{a}_p}\int_{\hat{\theta}(a)}^{1} \theta f(\theta) g(a) d\theta da + \int_{\hat{a}_p}^{\infty}\int_{\underline{\theta}_s}^{1} \theta f(\theta) g(a) d\theta da\right) \tag{31}$$

$$+\underline{w}\left(1-(n+1)\int_{\underline{a}_p}^{\hat{a}_p}(1-F(\hat{\theta}(a)))g(a)da + (1-F(\underline{\theta}_s))(1-G(\hat{a}_p))\right)$$

$$\int_{0}^{\infty}(1-\tau)ag(a)d(a)+\phi\left(\int_{\underline{a}_p}^{\hat{a}_p}\int_{\hat{\theta}(a)}^{1} a(1-\theta)f(\theta)g(a)d\theta da + \int_{\hat{a}_p}^{\infty}\int_{\underline{\theta}_s}^{1} a(1-\theta)f(\theta)g(a)d\theta da\right)$$

In this economy there are two productive activities: the subsistence sector where a worker produces $\underline{w}$ and the hi tech sector where n workers and 1 entrepreneur produce $R+M$. The wage paid to the worker in the hi tech sector is simply a transfer from the entrepreneur to the worker which doesn't enter the total surplus. In the world with full information, the first best is guaranteed, where all agents are engaged in the hi tech sector either as a worker or entrepreneurs. This is what equation (30) captures. In the second best world this is no longer true. The mass of agents engaged in the hi tech sector is $n+1$ times the mass of entrepreneurs. The rest of the agents engage in the subsistence sector where they produce $\underline{w}$. This is captured in the second part of equation (31) which takes a positive value when $w = \underline{w}$ and 0 otherwise.

[7] Note that in the first best in our model there are no contractual transactions involving wealth since talent is observable and wealth has no use as a screen. Hence all values of ϕ are optimal in the first best world.

The third part of the expression captures the loss of wealth when τ is greater than 0. Similarly when ϕ is less than one there is some loss of collateral in case of default.

The first best could be achieved if $\underline{a}_p = 0$ and $\hat{\theta}(a) = \underline{\theta}_s = \theta^*$. In such a case none of the agents in the economy are engaged in the subsistence sector and hence the second term in the expression drops out.

It is easy to see why the first best is never possible when talent is unobservable. Even when there is no credit constraint, at low enough levels of wealth, separation is not possible. At the bottom of the wealth distribution where $a = 0$, the credit market can only offer a pooling contract. With a pooling contract at $a = 0$, the talent of the least talented agent that chooses entrepreneurship is always lower than θ^* since θ^* is the talent of the least talented agent that accepts her actuarially fair contract in the full information case. Since the least talented agent receives a cross subsidy with the pooling contract but not a separating contract, the talent of the marginal agent with 0 wealth is lower when talent is unobservable. But since the mass of entrepreneurs is bounded at $\frac{1}{n+1}$, and at the lower end of the wealth distribution agents with talent less than θ^* are entrepreneurs, then at wealth $a \geq \hat{a}_p$, $\underline{\theta}_s$ must be greater than θ^*. That is, agents that would become entrepreneurs in the first best world, choose to work for a wage. This drives the inefficiency in the model. If credit constraint exists then there is the added inefficiency of agents with high talent but low wealth that are excluded from entrepreneurship. The first best can only be replicated in the world with incomplete information if all agents have sufficient wealth and can be offered a separating contract. Therefore if the average wealth in this economy is greater than the threshold level of wealth required for separation, a policy of redistribution can restore full efficiency in this economy. If the total level of wealth is insufficient or if the instruments for conducting such a redistribution are unavailable then there will always be some inefficiency since there would at the same time be agents with talent less than θ^* who choose entrepreneurship and talent greater than θ^* that choose working for a wage.

Given this discussion, it is possible to envisage distributions of wealth and talent such that there exists a non zero "natural level of credit constraint". That is, the total surplus may not always be maximised when the credit constraint is pushed down. Though reducing the credit constraint allows agents with low wealth to become entrepreneurs, this has an effect through the labour market of increasing the wage. Increasing the wage may in turn reduce the number of high type entrepreneurs with high wealth.

To discuss whether endogenous institutions can bring the economy in the direction of higher welfare or not, suppose that all agents can vote in a binary election between a status quo institution (status quo ϕ or τ) and an alternative. When faced with a binary choice, each agent votes sincerely.

One obvious remark we will make, without making distributional assumptions, is that an alternative policy that is aimed at maximising total surplus may not win when put to majority vote. This result in itself is not particularly surprising. Since redistributive instruments are lacking it is to be expected that agents inefficiently use institutions to redistribute rather than to maximise surplus. Indeed such a choice of institutions is not inefficient in the paretian sense. What is interesting here however is that the alignment of interest groups is itself created by the existence of market failure and this alignment takes the economy away even from the second best world with market failures. In other words, the inefficiency of market failure is further amplified by the political alignments it creates.

The cornerstone to understanding why agents choose non surplus maximising institutions is the following: in this economy there are always at least $\frac{n}{n+1}$ workers. Since $n \geq 1$, a policy that increases wage has support of at least half the population. However policies that increase wage may not increase the quality of the pool of entrepreneurs. This is the insight that we will use to generate the results in the rest of this section. Thus efficient institutions are those that increase the quality of the pool of entrepreneurs whereas institutions that increase wage are politically feasible.

4.1 Support for improvement in judicial enforcement

The parameter ϕ in the model denotes the amount of collateral that banks can liquidate in case of default and is the parameter that denotes the quality of the judiciary. Instead of a cost that is proportional to the collateral in dispute, the quality of the judiciary could be modelled as a fixed cost that need to be paid for approaching the judiciary. In such a model ϕ would be a fixed cost and interest rate would instead be determined by the following zero profit condition:

$$r(a)nw\theta + ((1-\tau)a - \phi)(1-\theta) = nw \tag{32}$$

The idea we wish to capture with ϕ is the efficiency of the judiciary in expropriating assets of a defaultor and handing them over to the creditor at the least possible cost. This idea is captured in both these formulations. Given the discussion on efficiency and political feasibility, we have:

Proposition 4. *A policy aimed at increasing ϕ is guaranteed majority support but may not always be surplus maximising.*

Proof. There are two parts to this proposition. The first part is that a policy of increasing ϕ is guaranteed majority support. This is proven in the appendix. The second part is that such a policy is not guaranteed to be surplus maximising. This is proven by construction of an example in the final extension where increasing ϕ reduces total surplus. □

The intuition for the result is the following. It is easy to show that the equilibrium wage is non decreasing in ϕ, and hence the proposal for increasing ϕ is supported by the majority. However, total surplus may not be increasing in ϕ since the effect of an increase in ϕ on the quality of the pool of entrepreneurs is ambiguous.

This result is quite striking when contrasted against the standard intuition about contracting institutions. Here improving the quality of contracting institutions (increasing ϕ) is not always good since that makes entrepreneurship more attractive and this induces low types to become entrepreneurs. This result arises because there are inherent externalities when agents borrow money: the low type entrepreneurs by their very existence impose an externality on the high types. Our result can be easily understood when seen in the light of the theory of second best.

4.2 Support for improvement in property rights

The agents face a risk of expropriation. With a probability τ their wealth is expropriated. This has an effect on occupational choice since the risk of expropriation reduces the value of wealth as collateral. This in turn makes entrepreneurship more attractive since agents do not place as much weight on default and consequent loss of collateral.

The political support for a change in τ is ambiguous since the effect on wage is ambiguous. We can see this from the following:

$$\frac{\partial L_d}{\partial \tau} : (n+1) \left(-g(\underline{a}_p) \frac{\partial \underline{a}_p}{\partial \tau} (1 - F(\underline{\theta}_p)) - f(\underline{\theta}_s) \frac{\partial \underline{\theta}_s}{\partial \tau} (1 - G(\hat{a}_p)) - \int_{\underline{a}_p}^{\hat{a}_p} f(\hat{\theta}(a)) \frac{\partial \hat{\theta}(a)}{\partial \tau} g(a) da \right) \tag{33}$$

The sign of this expression is ambiguous. This is because:

$$\frac{\partial \underline{a}_p}{\partial \tau} > 0 \qquad \frac{\partial \underline{\theta}_s}{\partial \tau} = 0 \qquad \frac{\partial \hat{\theta}(a)}{\partial \tau} < 0 \tag{34}$$

$$\frac{\partial \underline{a}_p}{\partial \tau} = \frac{\left(\frac{nw - \theta_p(\underline{a}_p) R}{\phi(1-\tau)^2 (1-\theta_p(\underline{a}_p))} \right) - \frac{\partial \theta_p(\underline{a}_p)}{\partial \tau}|_{\underline{a}_p} \left(\frac{R - nw}{\phi(1-\tau)(1-\theta_p(\underline{a}_p))^2} \right)}{1 + \frac{\partial \theta_p(\underline{a}_p)}{\partial \underline{a}_p} \left(\frac{R - nw}{\phi(1-\tau)(1-\theta_p(\underline{a}_p))^2} \right)} > 0 \tag{35}$$

since

$$\frac{\partial \underline{\theta}_p}{\partial \tau}|_{\underline{a}_p} = -\frac{M - w}{(1-\tau)^2 \underline{a}_p} < 0 \tag{36}$$

The credit constraint is increasing in τ. When τ increases, the effective wealth of an agent decreases, and the interest rate at all levels of wealth increases. This is intuitive since an increase in τ decreases the value of wealth as a screen. Since agents are likely to have their wealth expropriated anyway, posting a high collateral is less effective in revealing an agent's type. Take the limiting case where τ goes close to 1, in this case, the credit market correctly anticipates that all agents are equally eager to post any collateral since they know that their wealth will be expropriated and hence don't attach any value on recovery of collateral in the event of success and consequent repayment of the loan.

There are two opposing effects on wage of an decrease in τ. Firstly decreasing τ reduces the level of credit constraint. This increases the number of entrepreneurs. Decreasing τ also decreases the attractiveness of entrepreneurship for marginal agents ($\hat{\theta}(a)$), who were previously accepting the pooling contract to become entrepreneurs due to the cross subsidy from higher types within their wealth level. Since there are two opposite effects on wage, the precise effect on total surplus of a change in τ would depend on the assumptions on the distribution of wealth and talent. However in case these two effects exactly cancel each other out, it is possible then to characterise the effect on total surplus.

Proposition 5. *If the wage remains unchanged as a result of a change in τ, then decreasing (increasing) τ increases (decreases) total surplus*

Proof. If wage remains unchanged as a result of a decrease in τ then the new equilibrium pareto dominates the previous equilibrium. All agents who remain workers are unaffected, all entrepreneurs are made better off due to a reduction in the interest rate. Additionally there are agents who were previously credit constrained who can now become entrepreneurs for whom the policy is a strict improvement over status quo. Since it is a pareto improvement, it must also increase total surplus. Similarly if an increase in τ keeps the wage unchanged, it must reduce the total surplus since workers are unaffected, entrepreneurs are made worse off due to the increase in the interest rate, and there are at least some agents who are denied credit as a result of the increase in the credit constraint who are made strictly worse off. □

By continuity we can extend this proposition to mean that if the change in wage as a result of an improvement in property rights is small enough, then total surplus must have increased. It is possible to push this result further.

Proposition 6. *If the change in wage as a result of improvement (deterioration) in property right is negative (positive) then total surplus must increase (decrease).*

Proof. Note first that the average quality of the pool of entrepreneurs is a sufficient statistic for gauging changes in total surplus. If the wage decreases as a result of an decrease in τ, it must be the case that the effect on labour demand through $\hat{\theta}(a)$ dominates the reduction in the credit constraint. Now note that the average talent at the lowest level of wealth where a pooling contract is offered ($\underline{a}_p$) is lower than the average talent of the pool. This is true because the distribution of wealth and talent are independent and the talent of the least talented agent within a wealth level is increasing in wealth.

Now note that is always possible to construct a distribution of wealth such that the pre reform average talent is the same but post reform the credit constraint is relaxed more to the extent that the two opposing effects on wage cancel each other out and wage remains unchanged. In this case, the average talent post reform would be lower than the case where the wage went down. However, given the previous result, the total surplus would still increase. Since the initial average quality of the pool of entrepreneurs is the same by construction, this implies that the ex post level of talent must have increased in the case where the wage decreases. □

This result brings into sharp relief the trade-off between political feasibility and efficiency of institutional reform. Only reforms that increase wages are politically feasible but these may not correspond to reforms that are surplus maximising. In case of property rights institutions, when reforming them (decreasing τ) has an unambiguous impact on the total surplus, they are politically unfeasible because they end up reducing the wage.

5 Extension: Discrete Types

We now assume that the distribution of talent is discrete. This makes the characterisation of efficient policy more straightforward. In particular with such a distribution, it is always surplus maximising to relax the credit constraint since, unlike in the continuous case, there is a clearly defined 'high type', that always chooses entrepreneurship when given access to credit. In the case with the continuous distribution, there is an inefficiency from increased wage on the occupational choice of a rich agent with high talent who would have been an entrepreneur in the first best world with complete information but who chooses working for a wage due to the requirement of posting collateral. In the world with a discrete distribution of talent, this effect is absent.

Proportion q of the agents are high types who succeed with probability 1. The rest $(1-q)$ are low types who succeed with probability $\theta < 1$. We make the following assumptions:

$$\theta(R - n\underline{w}) + M > \underline{w} > \theta R - n\underline{w} + M \tag{37}$$

This assumption guarantees that even when wage is at it's subsistence level, low types prefer not to become entrepreneurs if they have to finance their investment themselves but prefer to be entrepreneurs when they are financed by banks and have only limited liability to pay back the loan. In this model since there are only two possible realisations of output $\{0, R\}$, limited liability translates to the loan being repaid only when the project succeeds (outcome R). This greatly simplifies the characterisation of the total surplus. Since types are discreet, the quality of the pool of entrepreneurs is maximised when all entrepreneurs are high types. Since high types always value entrepreneurship more than low types, lowering the credit constraint increases surplus. This is because increasing the number of entrepreneurs leads to an increase in wage. This induces low types with high wealth to become workers. Since the size of the pool is constant, lowering the credit constraint implies the increase in the proportion of high types. The following assumption ensures that the proportion of high types in the population is large enough such that it the credit constraint is completely relaxed, the economy would reach the surplus maximising outcome.

$$q \geq \frac{1}{1+n} \tag{38}$$

In other words with these assumptions, the credit constraint becomes a sufficient statistic for gauging the efficiency in this economy.

5.1 Supply of Credit

$$R - rnw \geq 0 \tag{39}$$

This equation always holds as it ensures that the returns from the project are large enough to payback loan with interest. Banks would never offer a credit contract where this condition did not hold. Hence this equation, when satisfied by an equality defines a credit constraint in the sense that if there exists an agent to whom banks cannot offer a low enough interest rate that satisfies this equation, then no credit will be offered to such an agent. If the equilibrium is pooling, the zero profit condition in the credit market is:

$$r_p(a) \{q + (1-q)\theta\} nw + (1-q)(1-\theta)\phi a = nw \tag{40}$$

It can be seen that:

$$\frac{dr_p(a)}{da} < 0 \tag{41}$$

By substituting the equation for $r(a)$ from (41) into (40) it follows that:

$$\underline{a} = \max\left\{\frac{nw - R[q + (1-q)\theta]}{\phi(1-q)(1-\theta)}, 0\right\} \tag{42}$$

where $\underline{a}$ is the lowest level of wealth that can sustain a pooling equilibrium while maintaining zero profits for the bank. This implies that in a pooling equilibrium, banks will not lend to agents with wealth $a < \underline{a}$.

5.2 Demand for Credit

$$v_H(a, r, w) = R - rnw + M \tag{43}$$
$$v_L(a, r, w) = \theta(R - rnw) + M - (1-\theta)a \tag{44}$$

High types always derive greater value from entrepreneurship than low types implying that $v_H(a, r, w) \geq v_L(a, r, w)$ always holds when high and low types are offered the same credit contract and so this is also true in the special case when the pooling interest rate is offered. We can therefore focus on low types. It is easy to check that in the pooling equilibrium:

$$\frac{\partial v_L^P(a, r_p(a), w)}{\partial a} < 0 \tag{45}$$

The intuition for this is straighforward. Poorer low types are more inclined to be entrepreneurs than richer low types since they have less to lose in terms of collateral they post when borrowing. This is because poor low type borrowers are cross subsidised more heavily by poor high type borrowers than rich low type borrowers are by rich high type borrowers. It is interesting to note that cross subsidisation in this model is always across type but within the same level of wealth since the level of wealth is observable. More generally, the classic negative externality created by adverse selection operates within the same wealth level in this model. This feature of the model turns out to be important in creating different constituencies across wealth and ability that have differing interests in mitigating or worsening the problem of unobservability of types.

Since it is never optimal for low types to self finance their projects, there exists a level of wealth $\hat{a}$ such that the cross subsidisation for low types with greater wealth is not enough to induce them to choose entrepreneurship. Low types with wealth $a \geq \hat{a}$ prefer being workers rather than borrowing at the pooling interest rate and posting the corresponding collateral. Hence $\hat{a}$ is the level of wealth such that the following condition holds:

$$w = v_L^P(\hat{a}, r_p(\hat{a}), w) \tag{46}$$

and solving this out we find:

$$\hat{a} = \left[\frac{\theta\left\{(q+(1-q)\theta)\,R - nw\right\}}{(q+(1-q)\theta)} + M - w\right]\frac{1}{(1-\theta)\left\{q+(1-\phi)(1-q)\theta\right\}} \tag{47}$$

Note that the equilibrium in the credit market for wealth $a \geq \hat{a}$ cannot be fully seperating for wealth levels close enough to $\hat{a}$. This is true because given we have assumed 0 profits for banks, a fully seperating equilibrium must entail an interest rate of 1 since a pool of high types repays loans with probability 1. However a discontinuity in the rate of interest charged, from $r(\hat{a}) >> 1$ for $a = \hat{a}$ to $r(a) = 1$ for $a > \hat{a}$ cannot be an equilibrium since this would attract low types into back into entrepreneurship for wealth $a = \hat{a}$ due to the continuity of v_L. And hence it will not be an equilibrium for banks to charge interest rate $r = 1$ at wealth $a = \hat{a}$.

To ensure an equilibrium, we assume that when indifferent, low types randomise between entrepreneurship and working for a wage. This implies a region of wealth within which a semi-separating equilibrium operates. With probability $\lambda(a)$ a low type agent with wealth a chooses entrepreneurship. To determine $\lambda(a)$ first note that the semi separating interest rate $r_s(a)$ is defined by:

$$v_L(a, r_s(a), w) = w \tag{48}$$

which yields the following expression for $r_s(a)$:

$$r_s(a) = \frac{\theta R + M - w - (1-\theta)a}{nw\theta} \tag{49}$$

which is decreasing in wealth. Therefore moving upward on the distribution of wealth, there exists a wealth level $\overline{a} > \hat{a}$ such that low types with wealth $a \geq \overline{a}$ do not borrow even when the interest rate is 1. The semi-separating equilibrium with the interest rate $r_s(a)$ operates between wealth $\hat{a}$ and $\overline{a}$ such that a contract $(a, (r_s(a))$ maintains the indifference of the low types between entrepreneurship and working for a wage. Since the indifference of the low types is maintained with $(a, r_s(a))$ and working for a wage is strictly preferred to the pooling contract $(a, r_p(a))$, this implies that $r_p(a) > r_s(a)$ for $a > \hat{a}$ and $r_p(\hat{a}) = r_s(\hat{a})$. Such an interest rate in equilibrium when low types choose entrepreneurship with probability λ needs to satisfy the following zero profit condition:

$$\left\{\frac{q + (1-q)\theta\lambda(a)}{q + (1-q)\lambda(a)}\right\} r_s(a)nw + \left\{\frac{(1-q)(1-\theta)\lambda(a)}{q + (1-q)\lambda(a)}\right\} \phi a = nw \tag{50}$$

and this equation uniquely determines λ.

To sum up, at a givel level of wealth a such that $\hat{a}_L \leq a \leq \overline{a}$ banks choose an interest rate $r_s(a)$ that makes the low types indifferent between working for a wage and entrepreneurship. This interest rate is unique since $v_L(r, a, w)$ is monotonically decreasing in r (and the Leontief technology rules out any intensive margin effect on wages). When subjected to the zero profit condition, this interest rate uniquely determines a probability λ that when used by low types to randomise between entrepreneurship and working for a wage, the zero profit condition of the bank holds. Hence the strategy $r_s(a)$ for banks and $\lambda(a)$ for low type with wealth a is the unique nash equilibrium. At $\overline{a}$, $\lambda = 0$ and the interest rate banks charge equals 1 since the pool of borrowers is composed only of high types at $a \geq \overline{a}$.

$$\overline{a} = \frac{\theta(R - nw) + M - w}{(1-\theta)} \tag{51}$$

Similarly at $\hat{a}$, $\lambda = 1$ since this is the highest level of wealth consistent with a pooling contract. Substituting for $r_s(a)$ using (12) into (13) we can see that:

$$\frac{d\lambda(a)}{da} < 0 \tag{52}$$

This implies that as the level of wealth increases, for the semi-separating contract to be consistent with the zero profit condition, λ must decrease in wealth.

5.3 Equilibrium in Credit Market

Proposition 7. *Agents with wealth $a \geq \overline{a}$ are always offered the separating contract $(\overline{a}, 1)$.*

Proof. Assume a contract $(\overline{a}, r')$ exists that dominates $(\overline{a}, 1)$.For this to be true $r' < 1$ must be true since at a given wealth level the contract with the lowest interest rate dominates. The bank that offers this contract makes losses since the opportunity cost of capital is 1, and hence, this contract will not be offered. But this is a contradiction. □

Lemma 4. *If $\hat{a} < \underline{a} < \overline{a}$ then there exists an $\underline{\hat{a}}$ such that $R - r_s(\underline{\hat{a}})nw = 0$ and $\hat{a} < \underline{\hat{a}} < \underline{a}$*

Proof. By definition of $\underline{\hat{a}}$ and $\underline{a}$: $R = r_s(\underline{\hat{a}})nw = r_p(\underline{a})nw$.Since $r_s(a) < r_p(a)$,and both interest rates are decreasing in $a, \underline{\hat{a}} < \underline{a}$.

To show $\hat{a} < \underline{\hat{a}}$ note that both $r_p(a)$ and $r_s(a)$ are decreasing in wealth. Also note $r_s(\hat{a}_L) = r_p(\hat{a}_L) > r_p(\underline{a})$. But since $\hat{r}(\underline{\hat{a}}) = r(\underline{a}) = \frac{R}{nw}$ by definition, this implies $\underline{\hat{a}} > \hat{a}_L$. To see that $\underline{\hat{a}} < \underline{a}$ note that $\hat{r}(a) < r(a)$ for $a > \hat{a}_L$.This implies that if $r_s(\underline{\hat{a}}) = r_p(\underline{a})$ then $\underline{\hat{a}} < \underline{a}$. Hence $\hat{a}_L < \underline{\hat{a}} < \underline{a}$. Explicitly $\underline{\hat{a}} = \max\left\{0, \dfrac{M-w}{(1-\theta)}\right\}$ □

Proposition 8. *A credit market equilibrium exists such that:*

i) If $\underline{a} < \hat{a} < \overline{a}$ then agents with wealth a where $\hat{a} \leq a < \overline{a}$ are offered the semi-seperating contract $(a, r_s(a))$, agents with wealth a where $\underline{a} < a < \hat{a}$ receive a pooling contract $(a, r_p(a))$, and agents with wealth $a < \underline{a}$ get no credit.

ii) If $\hat{a} < \underline{a} < \overline{a}$ then agents with wealth a where $\underline{\hat{a}} \leq a < \overline{a}$ and are offered the semi-seperating contract $(a, r_s(a))$, and agents with wealth $a < \underline{\hat{a}}$ get no credit.

Proof. i)

Consider the semi-seperating case where $\hat{a} \leq a < \overline{a}$. By the same argument that was used to prove proposition 1, it is clear that for a contract (a, r') to dominate $(a, r_s(a))$, $r' < r_s(a)$. By definition $r_s(a)$ is the interest rate that ensures $v_L(r_s(a), w) = w$. Hence (a, r') is accepted by all the high and low types with wealth a. By revealed preference low types strictly prefer (a, r') to $(a, r_s(a))$ which is the zero profit semi-seperating contract that they are indifferent to. Since for a given wealth level and pool of borrowers the profit function of the bank is monotonically increasing in the interest rate it follows that (a, r') makes losses. But since it makes losses (a, r') will never be offered.

Consider the pooling case where $\underline{a} < a < \hat{a}$. Note that high types strictly prefer any reduction in the interest rate for an increase in collateral, hence at a given wealth level a, collateral equals a.Therefore a contract (a, r') where $r' > r_p(a)$ has no takers. If $r' < r_p(a)$, it is accepted by everyone but makes losses since it undercuts $(a, r_p(a))$, the zero profit contract . Hence it will not be offered.

Consider the case where $a < \underline{a}$, since at this level of wealth seperation is not possible and the pooling contract makes losses, no contract can be introduced that makes positive profits.

ii)

If $\hat{a}_L < \underline{a}$ then by Lemma 2 there must exist an $\underline{\hat{a}}$ such that $R = r_s(\underline{\hat{a}})nw$. Hence a contract offered to agents with wealth $a < \underline{\hat{a}}$ makes losses. By the same argument used in i), for the wealth level a such that $\underline{\hat{a}} \leq a < \overline{a}$ the only interest rate compatible with equilibrium is $r_s(a)$. □

Hence under parameter values $0 < \underline{a} < \hat{a}_L < a^*$, which is the richest case, the poorest ($a < \underline{a}$) are credit constrained, the lower middle classes($\underline{a} < a < \hat{a}_L$) get pooling contracts where interest rates are high but decreasing in wealth due to presence of low types in the pool of entrepreneurs. In the pooling contracts, low types choose to become entrepreneurs with probability 1. At a higher point in the wealth distribution ($\hat{a}_L < a < a^*$) the proportion of low types that borrow becomes lower. In particular low types borrow with probability λ which is decreasing in wealth and at some point at high enough wealth ($a \geq a^*$) this probability drops to zero. The rich therefore get fully seperating contract with interest rate 1 since their wealth in form of collateral immunises them from any ill effect of adverse selection.

Lemma 5. *$\underline{a} \geq \overline{a}$ is never true. Hence, if there are credit constraints, then there must be regions of wealth where the credit contract that is offerred is semi-separating.*

Proof. $\underline{a} \geq \overline{a}$ implies that $R - nw \leq 0$. But by assumption 1 this is never true for wage $w \leq \overline{w}$ □

5.4 Equilibrium in the Labour Market

The Labour Markets are assumed to be perfectly competitive. Labour Supply is 0 for wage lower than $\underline{w}$ and 1 for any wage $w \geq \underline{w}$. Labour demand is given by:

$$(1+n)\left[q(1-G(\underline{a})) + (1-q)\left\{(G(\hat{a}_L) - G(\underline{a})) + \int_{\hat{a}_L}^{a^*} \lambda(a)g(a)da\right\}\right] \tag{53}$$

if $\underline{a} < \hat{a}_L < a^*$ and

$$(1+n)\left[q\{1-G(\underline{\hat{a}})\} + (1-q)\int_{\underline{\hat{a}}}^{a^*} \lambda(a)g(a)da\right] \tag{54}$$

if $\hat{a}_L < \underline{a} < a^*$

Note that whenever $w > \underline{w}$, this implies that the economy is tight in the sense that there is no subsistence sector. The number of entrepreneurs (workers) in such an economy is $\frac{1}{n+1}\left(\frac{n}{n+1}\right)$. After this point since the number of entrepreneurs cannot rise, the increase in wage can only come from the increase in the quality of the pool of entrepreneurs when low types are substituted for high types. Conversely, any policy that reduces the number of entrepreneurs and hence leads to the creation of the subsistence sector.

In the corner case where $w = \overline{w}$, high types are indifferent between working for a wage and becoming entrepreneurs. It will typically not be an equilibrium for all of them to choose entrepreneurship or woking for a wage. In this case the equilibrium will be in mixed strategies.

Lemma 6. *If $w = \overline{w}$ then high types must choose entrepreneurship (working for a wage) with probability p $(1-p)$ where $p = \dfrac{1}{q(n+1)}$ for equilibrium to exist.*

Proof. Note that $w = \overline{w}$ implies that $q \geq \frac{1}{n+1}$. To see this note 2 things:

1. Define $v_H(1, w)$ as the value from entrepreneurship that a high type agent gets when the interest rate the bank charges him is 1. It is easy to see that this is independent of his wealth. By definition: $\overline{w} = v_H(1, \overline{w})$. Since $v_H(1, w) > v_L(1, w)$, $\overline{w} > v_L(1, \overline{w})$. This implies that in an economy where the wage is $\overline{w}$ there are no low type entrepreneurs.

2. Note that when $w > \underline{w}$ none of the agents are engaged in the subsistence sector and hence $\frac{1}{n+1}$ are entrepreneurs This is true because in this economy the capacity for entrepreneurship is limited by the size of the population due to the perfect complements production function. When none of the agents are engaged in the subsistence sector ($w > \underline{w}$), only $\frac{1}{n+1}$ will be entrepreneurs and $\frac{n}{n+1}$ will be workers (the population is normalised to 1).

1 and 2 imply that $q \geq \frac{1}{n+1}$. If high types randomise and become entrepreneurs with probability p, since the number of agent in the economy is infinite, by law of large numbers, there will be pq entrepreneurs and $(1-p)q+(1-q)$ workers in the economy. It is easy to see that this yeilds $\frac{1}{n+1}$ entrepreneurs and $\frac{n}{n+1}$ workers. □

5.5 Support for improvement in judicial enforcement

Proposition 4 shows that wage is non decreasing in ϕ and this implies that a policy of increasing ϕ is always supported by the majority. We will now illustrate that it is not always optimal to 'improve' contractual institutions (increase ϕ). Consider an increase in ϕ from ϕ to ϕ', changes $\hat{a}$ to $\hat{a}'$, $\underline{a}$ to $\underline{a}'$, $\overline{a}$ to $\overline{a}'$ and w to w'

Proposition 9. *A policy of increasing ϕ is inefficient if* $\dfrac{\Delta w}{\Delta \phi}\dfrac{\phi'}{w'} > 1 - \dfrac{R[q + (1-q)\theta]}{n\underline{w}}$

Proof. Assume that as a result of the policy ϕ increases to ϕ'. Since the number of firms in this model are constant at $\frac{1}{n+1}$ for $w > \underline{w}$ the policy is efficient if the number of high type entrepreneurs increases as a result of the policy. Since all unconstrained high type agents choose entrepreneurship, if the credit constraint worsens ($\underline{a}' > \underline{a}$) as a result of an increase in ϕ then the number of high type entrepreneurs decreases. This is always true when the condition stated in the proposition holds. □

Interestingly in this model the constituencies that arise that are aligned for and against reforms of contractual institutions are non monotonic in wealth. We now show this formally.

Lemma 7. *There exists a level of wealth $\widetilde{a}$ where $\hat{a} > \widetilde{a} > \underline{a}$ if*

$$\frac{\Delta w}{\Delta \phi}\frac{\phi'}{w'} > 1 - \frac{R[q + (1-q)\theta]}{n\underline{w}} \tag{55}$$

such that agents with wealth $\hat{a} > a > \widetilde{a}$ support the policy and all agents with wealth $\widetilde{a} > a > \underline{a}$ oppose the policy.

Proof. All agents with wealth $a = \hat{a}$ support the policy. Low types with $\hat{a}$ support the policy since their payoff rises from w to w' and $w > w'$. Similarly high types with wealth $\hat{a}$ also support the policy, since the equation establishing the support of the low types for the policy:

$$v_L(\hat{a}, r_p'(\hat{a}), w') = w' > w = v_L(\hat{a}, r_p(\hat{a}), w) \tag{56}$$

Simplifies to

$$-r_p'(\hat{a})nw' > -r_p(\hat{a})nw \tag{57}$$

which is also a sufficient condition for high types with wealth $\hat{a}$ to support the policy. Note that this condition captures the fact that there are two effects of ϕ on an entrepreneurs payoff that work in opposite directions. Increase in ϕ increases the wage bill of the entrepreneur but decreases the interest rate. The effect of the change in interest rate on the payoff of an entrepreneur is increasing in wealth:

$$\frac{\partial v_L^P}{\partial r_p(a)} \frac{\partial r_p(a)}{\partial \phi} = -\frac{a(1-q)(1-\theta)\theta}{\{q + (1-q)\theta\}} \tag{58}$$

It can be seen that ϕ and a are complements in the interest rate; an increase in ϕ reduces the interest more for an agent with higher wealth. On the other hand:

$$\frac{\partial v_L^P}{\partial w} = -\frac{\theta n}{q + (1-q)\theta} \tag{59}$$

Hence for a level of wealth However when the level of wealth is low enough, there exists a level of wealth $\widetilde{a}$ such that the two effects exactly cancel each other out. This happens when condition Equation 56 holds with equality.

Note that this yields an $\widetilde{a}$ that is the same regardless of the type of the agent.

Assuming Equation 56 holds ensures that $\widetilde{a} > \underline{a}'$ □

Lemma 8. *There exists a level of wealth a^* such that high (low) type agents with wealth $a > a^*$ oppose (support) the policy and all agents with wealth $a^* > a > \widetilde{a}$ support the policy where $\overline{a} > a^* > \overline{a}'$*

Proof. Firstly note that all agents with wealth $\overline{a}' > a > \hat{a}$ support the policy. This is easy to see since all low type agents with wealth in this interval are indifferent between entrepreneurship and working work a wage, before and after the implementation of the policy. Hence

$$v_L(a, r', w') = w' > w = v_L(a, r, w) \tag{60}$$

which establishes the support of the low types. Infact for the same reason, high types in this region support the policy too since this condition simplifies to:

$$-r_s'(a)nw' > -r_s(a)nw \tag{61}$$

which is sufficient to show the support of the high types.

At wealth level $a > \overline{a}'$ all low types become workers and prefer the policy since it increases wage. High types however face a tradeoff between the reduction in interest rate and increase in wage. At $\overline{a}$ high types strictly oppose the policy since the interest rate cannot go lower than 1 so the only effect of the policy on their payoff is the negative effect through the increase in their wage bill. Therefore there must exist an a^* such that $\overline{a} > a^* > \overline{a}'$ at which wealth level high types are indifferent to the policy. □

We can now analyse how different wealth and ability configurations would create different constituencies for reform.

Proposition 10. *Consider an increase in ϕ from ϕ to ϕ', the following are the configurations of support and opposition if* $\frac{\Delta w}{\Delta \phi}\frac{\phi'}{w'} > 1 - \frac{R[q+(1-q)\theta]}{n\underline{w}}$*:*

- $a > a^*$*: High types opposed, Low types in favour*

- $a^* > a > \widetilde{a}$*: Both High and Low types in favour*

- $\widetilde{a} > a > \underline{a}$*: Both High and Low types opposed*

- $\underline{a} > a$*: Both High and Low types in favour*

Proof. The first and second part of the proposition follow directly from Lemma 8. The third part of the proposition follow from Lemma 7. Finally agents with wealth $a < \underline{a}$ are credit constrained and hence work for a wage. Hence they support the policy since it raises their wage. Rich high and low types with wealth $a > a^*$ are only affected through the effect on wage change in ϕ through the change in wage. Since wage increases and high types are entreprenerus they oppose the reform whereas low types are workers and hence support the policy. □

The assumption on elasticity:

$$\epsilon = \frac{\phi}{w}\frac{\Delta w}{\Delta \phi} > 1 - \frac{\{q+(1-q)\theta\}\, R}{nw} \tag{62}$$

indicates that the elasticity of wage with respect to ϕ should be high enough for the feedback effect of ϕ to be strong enough to worsen the credit constraint.

5.6 Improvement in property rights

We now consider an increase in the probability of expropriation τ

Proposition 11. *The effect of an increase in τ on wage is ambiguous.*

Proof.

$$\frac{dL_D}{d\tau} = \left[-g(\underline{a})\frac{\partial \underline{a}}{\partial \tau} + (1-q)d \int_{\hat{a}}^{\overline{a}} \frac{\partial \lambda(a)}{\partial \tau} g(a) da \right] \tag{63}$$

τ affects the equilibrium wage through labour demand. The sign of this effect is indeterminate since $\frac{\partial \underline{a}}{\partial \tau} > 0$ and $\frac{\partial \lambda(a)}{\partial \tau} > 0$ □

Proposition 12. *It is always inefficient to increase τ*

Proof. $\underline{a}$ is the only threshold that is increasing in τ and hence increasing τ unambiguously worsens the credit constraint. This is equivalent with inefficiency as the number of high type entrepreneurs decreases. □

These two results show that though it is always efficient to reduce τ, since the effect of a change in τ on wages is ambiguous, such a policy does not necessarily have majority support. Examples can be constructed where the distribution of wealth is such that agents would vote for an increase in τ.

6 Extention: An example where increasing ϕ reduces total surplus

We now construct an example where increasing ϕ reduces the total surplus. In our model contractual institution is characterized by the parameter ϕ, where $1-\phi$ is the proportion of collateral that is lost during the recovery of pledged assets by the bank in the event of default. One can think of ϕ as the degree of judicial efficiency. There are two ways through which ϕ affects the total surplus. There is a direct inefficiency of loss of part of collateral in case of default when ϕ is low. There is also an indirect effect through the effect of ϕ on the composition of the pool of borrowers. This second effect can potentially go in the opposite direction and can overwhelm the first. This effect works through the labour market. It has been shown in proposition (4) that the equilibrium wage is monotonically increasing in ϕ. In the following example the quality of pool effect dominates and hence the surplus maximising ϕ in the economy is less than one. Assume that the distribution of wealth is discrete. There are three classes in the population: the rich, the middle, and the poor of size p_r, p_m, p_p with wealth a_r, a_m, a_p respectively. Assume:

Assumption 1. $q(p_r + p_m) < \frac{1}{n+1}$

Where q is the proportion of high type entrepreneurs.

It turns out that if there is a subsistence sector in the economy then it is always surplus enhancing to locally increase ϕ. Hence to make the problem interesting assume that there is no subsistence sector in the economy. The two feasible values for ϕ will be $\{\underline{\phi}, 1\}$. In this economy, for some parameter values, the credit constraint will be higher with $\phi = 1$. Assume that this is the case. The change in total surplus as a result of increasing $\underline{\phi}$ to 1 is:

$$\Delta TS = TS(\underline{\phi}) - TS(1) = qp_m(1-\theta)R - (1-\theta)(1-q)(1-\underline{\phi})\big(p_m a_m \lambda_m(\underline{\phi}) + p_r a_r \lambda_r(\underline{\phi})\big) \tag{64}$$

The first term in the expression represents the increase in the total surplus due to replacement of some low type entrepreneurs by high types as a result of access to credit due to reduction in the credit constraint. The second term represents the reduction in the surplus due to destruction of a proportion of assets in case of default due to imperfect judiciary. In the second term $\lambda_(\underline{\phi})$ is the proportion of low type entrepreneurs with wealth i that choose entrepreneurship in equilibrium.

Lemma 9. *If credit constraint worsens as a result of an increase in ϕ from $\underline{\phi}$ to 1, then $\lambda_m(\underline{\phi}) = 1$*

Proof. Assume this is not true. Then there are two possibilities: either $\lambda_m(\underline{\phi}) = 0$ or $0 < \lambda_m(\underline{\phi}) < 1$. Consider $\lambda_m(\underline{\phi}) = 0$. This implies that $\lambda_r(\underline{\phi}) = 0$ since $\frac{\partial \lambda}{\partial a} < 0$. This implies that all entrepreneurs are high types. This contradicts Assumption 1. If $0 < \lambda_m(\underline{\phi}) < 1$ then the interest rate for agents with wealth a_m is:

$$r_s(a_m, (\underline{\phi}) = \frac{\theta R + M - w(\underline{\phi}) - (1-\theta)a_m}{nw(\underline{\phi})\theta}$$

Substituting this into the equation that determines the credit constraint:

$$R - r_s(a_m, \underline{\phi})nw(\underline{\phi}) \geq 0$$

it is easy to check that the credit constrain is decreasing in equilibrium wage. Since the equilibrium wage is monotonically increasing in ϕ and hence the credit constraint with $\phi = 1$ must be lower than the credit constraint with $\underline{\phi}$ but this is a contradiction. □

Hence the change in total surplus simplifies to:

$$\Delta TS = qp_m(1-\theta)R - (1-\theta)(1-q)(1-\underline{\phi})\big(p_m a_m + p_r a_r \lambda_r(\underline{\phi})\big) \tag{65}$$

Now we can back out $\lambda_r(\underline{\phi})$ since we know that the proportion of entrepreneurs in the economy is $\frac{1}{n+1}$.

$$\lambda_r(\underline{\phi}) = \left(\frac{1}{(n+1)p_r} - \frac{p_m}{p_r} - q\right)\frac{1}{1-q}$$

Substituting this into the expression for the change in total surplus, we find that $\Delta TS > 0$ if:

$$R > \frac{1-\underline{\phi}}{q}\left((1-q)a_m + \left(\frac{1}{(n+1)p_m} - 1 - q\frac{p_r}{p_m}\right)a_r\right) \tag{66}$$

This equation ensures that if the credit constraint worsens as a result of an increase in ϕ, the loss of efficiency through reduction in the quality of the pool of entrepreneurs dominates the loss of collateral during recovery with a lower ϕ. The credit constraint worsens if:

$$R - nw(\underline{\phi})r_p(a_m, \underline{\phi}) > 0 > R - nw(1)r_p(a_m, 1)$$

Solving the model to derive the equilibrium wage rate, and interest rate at wealth level a_m for both values of ϕ we find:

$$n\frac{\theta(\theta R + M) + (n+1)p_r q(1-\theta)(\theta R + M - a_r)}{(n+1)(\theta + (1-\theta)p_r q)} - (1-\theta)(1-q)a_m >$$

$$(q + (1-q)\theta)R >$$

$$n\frac{\theta\big(\theta R + M - (1-\underline{\phi})a_r\big)(1 - p_m(n+1)) + p_r q(n+1)\big((1-\theta)(\theta R + M) - (1-\theta(1-\underline{\phi}))a_r\big)}{(n+1)\big(\theta(1-p_m(n+1)) + (1-\theta)qp_r\big)}$$

$$-(1-\theta)(1-q)\underline{\phi}a_m \tag{67}$$

Proposition 13. *For any constellation of parameter values for which* (67) *and* (66) *are satisfied,* $\phi = 1$ *is suboptimal.*

Proof. (67) implies that the credit constraint worsens as a result of an increase in ϕ from $\underline{\phi}$ to 1. This implies that there are fewer high type entrepreneurs with $\phi = 1$. (66) ensures that assuming the credit constraint worsens, the change in total surplus is negative for an increase in ϕ from $\underline{\phi}$ to 1. Taken together they imply that the credit constraint worsens, and enough high type entrepreneurs are credit constrained such that total surplus is diminished. □

In this example increasing ϕ to 1 has a perverse impact on the quality of the pool of entrepreneurs since it worsens the credit constraint by making entrepreneurship too attractive for low types who were previously choosing entrepreneurship.

7 Conclusion

To summarise our result on institutional efficiency and feasibility, in the case where the distribution of wealth and talent is left unspecified (except for the assumption of independence), we find that improving contractual institutions is always feasible but may not always be efficient since contracting is not always efficient as credit contracts enabling low type entrepreneurs reduce total surplus. We find that if reforms in property rights institutions are politically feasible then they reduce the total surplus. Conversely if they are politically infeasible then they are always surplus maximising.

In the case with a discrete distribution of talent we find that improving enforcement of property rights has an unambiguously positive impact on total whereas the effect of improvement in legal enforcement of contracts is less clear. This result dovetails with the empirical findings of Acemoglu and Johnson (2005) who find that property rights institutions have a positive and significant impact on the level of GDP whereas the effect of contracting institutions seems ambiguous. Our political economy result indicates that there is always support for reform of contracting institutions where as this is not the case with regard to reforming property rights institutions. Our results bring into focus another role that markets play. In addition to achieving outcomes on the pareto frontiers there is a political role that markets play, of creating constituencies that have preferences over policies that affect final allocations. We have shown that given this is the case, inefficiencies of market failure may be amplified by the policy choices that constituencies created in a flawed market make. In this sense our paper provides an additional reason to worry about market failure; market failure may lead to a political failure, that is a failure of a political system to pick the surplus maximising policy.

Appendix

Proof of Proposition 4. For proving political support it is sufficient to show that wage is non decreasing in ϕ.

$$\frac{\partial L_d}{\partial \phi} : (n+1)\left(-g(\underline{a}_p)\frac{\partial \underline{a}_p}{\partial \phi}(1-F(\underline{\theta}_p)) - f(\underline{\theta}_s)\frac{\partial \underline{\theta}_s}{\partial \phi}(1-G(\hat{a}_p)) - \int_{\underline{a}_p}^{\hat{a}_p} f(\hat{\theta}(a))\frac{\partial \hat{\theta}(a)}{\partial \phi} g(a)da\right) \geq 0 \tag{68}$$

This is because:

$$\frac{\partial \underline{a}_p}{\partial \phi} = -\left(\frac{\frac{nw-\theta_p(\underline{a}_p)R}{\phi^2(1-\theta_p(\underline{a}_p))}}{(1-\tau)+\frac{\partial \theta_p(\underline{a}_p)}{\partial \underline{a}_p}\frac{R-nw}{\phi(1-\theta_p(\underline{a}_p))^2}}\right) < 0 \tag{69}$$

since

$$\frac{\partial \underline{a}_p}{\partial \phi} < 0 \qquad \frac{\partial \underline{\theta}_s}{\partial \phi} < 0 \qquad \frac{\partial \hat{\theta}(a)}{\partial \phi} < 0 \tag{70}$$

$$\frac{\partial \theta_p(\underline{a}_p)}{\partial \underline{a}_p} = \frac{\partial \underline{\theta}_p}{\partial \underline{a}_p}\frac{1}{(1-F(\underline{\theta}_p))^2}\int_{\underline{\theta}_p}^{1}(\theta-\underline{\theta}_p)f(\theta)d\theta \tag{71}$$

and

$$\frac{\partial \underline{\theta}_p}{\partial \underline{a}_p} = \frac{M-w}{(1-\tau)\underline{a}_p^2} > 0 \tag{72}$$

$$\frac{\partial \underline{\theta}_s}{\partial \phi} = -\frac{M - w}{R} < 0 \tag{73}$$

$$\frac{\partial \hat{\theta}(a)}{\partial \phi} < 0 \tag{74}$$

by inspection.

This implies that the equilibrium wage is non decreasing in ϕ. This ensures that the policy enjoys majority support. The inequalities are strict when $w > \underline{w}$. If there is a subsistence sector, then there is no effect of ϕ on the labour demand. The effect of increasing ϕ on total surplus is ambiguous. This is illustrated example in the appendix.

□

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