POLITICAL ECONOMY OF SCALE AND ENDOGENOUS RULE OF LAW

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Abstract

Credible guarantees of property and contract rights of outside investors are commonly viewed as fundamental prerequisites for economic development and growth. This paper argues that when the rule of law is not a matter of undisputable legal and political tradition, but rather is a policy variable for the government, then the causality between investment activities and investment climate also applies in reverse – namely, that protection of investors' rights is endogenous to a robust economy. The paper shows that "political economy of scale", when an increase in economic activities improves the quality of economic policies, takes place when an economy consists of two sectors – one modern, which requires external investments, and another one traditional, which can function without venture capital.

The paper explores the equilibrium structure which arises in the presence of political economy of scale, and shows that the likelihood of "bad" equilibria with low level of investments and high investment risks, is positively related to the relative productivity of the traditional sector. Thus an external shock which reduces such productivity might unlock an "institutional trap" and lead to higher investments and better enforced rule of law. The paper also shows that under certain assumptions a revenue-maximizing Leviathan-type government might offer outside investors better protection of their rights than a benevolent government which is concerned about economic well-being of its constituency at large.

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1. Introduction

The notion of trap is a staple of the modern development economics. Poor countries, despite of their considerable catch-up potentials, continue to stagnate, being trapped in low-level equilibria. At the core of their predicaments are failures to establish an institutional setup necessary for economic growth, including reliable and functional protection of property and contract rights.

Modern views of factors of economic development and growth put institutions ahead of conventional production inputs. Institutions determine attractiveness of a nation or, if economic policy making is decentralized, of a subnational unit, for outside investors. An investor-friendly institutional regime ensures access to the potentially unlimited pool of global venture capital, which augments and complements locally held factors of production. Good institutions thus entail a healthy and robust economy.

The centerpieces of a modern institutional setup are protection of property rights and contract enforcement. These components are of particular importance for outside investors, who enter into transactions extended over periods of time, and have limited means to enforce on their own contracts underlying such transactions. Unlike spot market exchanges, investments are potentially insecure, being exposed to violations of contacts and property rights. These risks often make investors reluctant to participate in what otherwise could have been a lucrative enterprise. Lacking a credible commitment to honor terms of contracts, investors stay away from "institutionally unsafe" areas, condemning the latter to economic stagnation and poverty.

As a rule, responsibility for institutional failures and ensuing economic woes is borne by the government. In part, it could be government's inaction when investors' rights are violated, and/or inability to ensure impartial and effective third-party contract enforcement. The government thus fails to protect investors against attempts on their assets and rights by other private parties, which renders the economy institutionally insecure. Worse yet, the government itself is often the main culprit which abuses its power and arbitrarily confiscates investors' wealth.

Government predation or inaction is preventable by the rule of law. Traditionally the rule of law is viewed as an exogenously given (or absent) component of the background for economic transactions. According to this view, the rule of law is a matter of political and legal tradition and culture which have evolved over long periods of time. However, developing and transition societies often do not have such an entrenched rule of law, which makes contract enforcement and protection of property rights policy variables for the government, rather than exogenous policy constraints.

Conventional rule of law could be substituted, even if imperfectly, by informal institutions such as trust developed within close-knit networks of transacting agents, traditional means of dispute resolution and arbitration procedures, etc. However, outside investors cannot rely on these surrogates, which are available exclusively to members of narrow communities. Informal substitutes for the rule of law leave outsiders with no

recourse in case of violation of their property and contract rights (Greif, 1994). Therefore for outsiders conventional rule of law, applied by judiciary and upheld by the executive branch of the government, has no alternatives. The question is, whether the government has an incentive to establish the rule of law.

Under an autocratic regime with a ruler motivated by self-enrichment, the government is unlikely to subject itself to the constraints of the rule of law. However, even a self-enriching autocracy could be compelled to provide some public production inputs, including a degree of protection of property and contract rights, in order to maintain its economic domain (Olson, 2000). One might notice that such protection offered by a "rational thief" would be available to insiders and outsiders alike.

Somewhat unexpectedly, outside investors might be less secure under a benevolent democratic government concerned about the wealth of citizenry. On the one hand, such a government has a much stronger incentive, than an autocracy, to provide public production inputs (McGuire, Olson, 1996), and in particular to establish necessary legal foundations for value-adding economic transactions which would have been otherwise suppressed. However, this argument applies only to contracts between *resident* economic agents, when gains from contracting are internalized within the jurisdiction represented by the government. When contracts involve *outsiders*, their inviolability is not any more unconditionally desirable for the jurisdiction in question, because the rights of an outside party could be violated to benefit residents. For example, the government could expropriate the returns to invested capital, which accrue to outside investors, and re-distribute those returns to residents.

Of course, such violation would not be costless, as it would undermine the reputation of the nation or locality, and stop the inflow of investments in the future. However, the presence of counteracting arguments for and against violation of rights of outside investors means that selection of a good investment climate is in fact a *policy tradeoff*, which in principle could be resolved in various ways. This ambiguity leads to a potential multiplicity of outcomes, making the rule of law, or absence thereof, *endogenous* to the prevailing economic conditions and other factors relevant for the above cost-benefit comparisons.

2. Reverse causality

Numerous empirical studies (see e.g. Knack, Keefer, 1995; Clague et al., 1996) show strong correlation between the quality of institutions, including protection of property and contract rights, and economic prosperity and growth. While it was (and still is) common to believe that good institutions and governance are factors of economic growth, there are both theoretical arguments and empirical evidences pointing out that causality between quality of institutions and economic well-being might also be *reverse*, i.e. higher levels of income and rates of growth are prerequisites for better institutions (Clague et al., op. cit., Keefer, Knack, 1997; Chong, Calderon, 2000).

The reverse causality could be based upon various mechanisms and factors. For example, there should be a sufficiently large volume of transactions to support the cost of modern judiciary (Rosenberg, Birdzell, 1986). According to another argument, wealthier countries are more likely to have lasting democratic regimes (Helliwell, 1994), which in turn is good for the quality of economic institutions (Clague et al., op. cit). It is also plausible that economic health of the nation raises the value of its economic assets, and thus increases demand for secured property rights (Eggertson, 1990).

Protection of property and contract rights of outside investors also gives rise to reverse causality. Indeed, if a rational ruler, who is concerned about the well-being of his/her jurisdiction, is to make an ex post decision as to whether the rights of outside investors be violated, he/she weighs the benefits of one-time expropriation of returns to capital invested by outsiders against the losses that the economy would suffer when it is cut off from external financing. The outcome of such comparison clearly – and as it is shown later in the paper, critically – depends on the level of external investments which would be available in the future if the present commitments are honored and the rights of outsiders aren't violated.

By expropriating the investment income the government sacrifices the reputation of the nation or region. Such reputation is an economic asset, but its value depends on the expected scale of future investments, and/or their rate of growth, which could be rationally expected if the reputation is preserved. If anticipated future investments are large-scale, then the value of reputation is high, and this understanding disciplines an opportunistic government and prevents it from predation on investors already involved in the economy. Vice versa, if outside investors are skeptical, and venture capital barely trickles in, losing it in the future will not do a great harm to the economy, and the jurisdiction's reputation can be rationally sacrificed in pursuit of immediately available gains.

This interdependency suggests that the causality between economic policies and economic performance is in fact bilateral: not only economic prosperity is an outcome of good governance, but the latter (in its conventional understanding) might as well be prompted and sustained by a robust economy. When investors perceive the commitment of the government to honor contracts and property rights as credible, they are willing to pour resources in the economy, and this prospect in turn makes the government to abide ex post to the commitments ex ante, which makes positive expectations held by investors about future government policies rational. On the other hand, if the economy is viewed as a risky one for outside investors, the latter will either bypass it altogether, or at best will mitigate risks by seeking investment projects with exceptionally high potential return. The number of such projects is necessarily limited, which keeps the scale of outside investments low. This reduces the economic value of the jurisdiction's investment reputation. Weakened reputational concerns fail to prevent the government from predatory behavior, and the skepticism of investors thus turns out to be well-grounded. In other words, not only bad policies avert investments, but also low level of investments could prompt bad policies. Reversed causality thus co-exists with direct one.

3. Multiple equilibria and political economy of scale

The above described virtuous and vicious circles constitute multiple equlibria which remain stable over time. Some of these equilibria are "good": the economy is filled with investments up to its technological capacity, and the rights of investors are fully honored. Others are "bad"; in such equilibria the level of investments falls far short of what the economy could have efficiently absorbed, and the actually made investments, while potentially of high yield, are under a grave risk of expropriation. The nature of these equilibria reveals a *political economy of scale*: in equilibrium, a higher level of investments leads to better contract enforcement and protection of investors' rights.

Political economy of scale appears to be a broad phenomenon that can be observed in various contexts. Thus, according to (Rodrik, 1991), credibility of government's commitment to economic policy reforms depends on how actively investors respond to announcements of new policies. It is argued that investors' vigorous reaction makes a policy reversal less likely, e.g. because "entrenched interests will be created in favor of the continuation of reform" (op. cit., p. 237). Other mechanisms that could sustain this sort of political economy of scale are positive external and fiscal balances produced by an investment boom, which would arguably weaken the pressure to reverse reform policies. To obtain an equilibrium, one has to consider two curves, first describing how gross investments depend on the probability that government policies will not be reversed, and the second, capturing political economy of scale, relating this probability to the volume of investments.

This first of these curves (which is later in this paper referred to as a "demand" curve, as it shows what probability of non-violation of government commitments investors should expect in order to provide a certain amount of capital) is obviously positively sloped. Political economy of scale suggests that the second curve (a "supply" curve) could be positively sloped as well, which leads to possible multiplicity of equilibria (op. cit.)

However, in (Rodrik, 1991) political economy of scale remains a hypothesis, which is not based neither on sufficiently strong microfoundations nor on fully convincing political economy arguments[1]. This paper provides such foundations in the case when policies in question promise protection of property and contract rights of external investors.

Further, the paper shows that political economy of scale is predicated on several factors, including government's time preferences, and the pre-existed domestic production capacity that can be put in use regardless of external investments. The first of these factors is standard for the repeated Prisoners' Dilemma-type situations, when opportunistic behavior is rewarded at present and punished in the future (Axelrod, 1984). Other things being equal, the more impatient is a government, the more likely it will

[1] One could notice that the above cited arguments of positive external and fiscal balances could in fact be reversed: solid macroeconomic surpluses generated by a reform could be used as arguments that potentially painful policies are not required any more, and could therefore be terminated. Under good economic times government's incentives for reform often get weaker.

violate rights of investors, as the gains of such violation will be immediate, whereas losses will incurred later on. Therefore with impatient governments a bad equilibrium is a likelier outcome.

The second factor is specific for the present analysis. The pre-existed domestic capacity establishes a guaranteed "reservation output" level. If such capacity is high, it could be reverted to when external investments are curtailed, and thus provides a cushion against retaliation by irate investors. When the pre-existed production capacity is low, it could not serve as a potent "shock absorber", and investors' withdrawal from the economy becomes more painful. It means that, *ceteris paribus*, the larger is pre-existed capacity, the more likely is a bad equilibrium.

4. Multiple federal equilibria

A version of the above arguments could explain multiplicity of outcomes of decentralization of economic policy making, when subnational governments have the discretion to honor or violate investors' rights. This can be illustrated by a comparison of the recent Russian and Chinese experience. In both countries subnational administrations were de facto at large in choosing their economic policies. In China this has led to the emergence of *market-preserving federalism, Chinese style* (Montinola, Qian and Weingast, 1995), with sufficiently secured rights of outside investors and a decade-long robust economic growth fueled by a steady inflow of investments. In Russia regions have failed to establish investor-friendly legal and regulatory regimes, and incidences of violation of investors' rights abound (Polishchuk, 2000). Quite predictably, investors *en masse* stay away from the Russian economy.

Without reliable rule of law - which is the case both in Russia and China - investments, once they have been made, lack credible legal protection and are at the mercy of opportunistic and potentially predatory regional governments. For investments to actually occur under such circumstances, investors should rationally expect ex ante that their rights will be honored ex post, and regional administrations should have incentives to behave in the expected ways.

Decentralization of economic policy making is usually expected to discipline regional governments, which have to compete against each other for mobile resources, and above everything else, for investments. However, in the fashion similar to the above described single government case, these reputational concerns are of significance only if "well-behaving" government can expect a sufficient reward. This is indeed the case when the economy at large is growing, and attracts massive investments available for competing regions (Qian, Roland, 1998). However, in a stagnating economy little or no investments are expected, and therefore an abrogation of rights of investors whose assets are already "locked in", goes practically unpunished[2]. In this case the expectation of little investment,

[2] In a telling illustration, trying to persuade the government of the Nizny Novgorod region to honors its obligations of external debt repayment, the Russian Minister of Finance warned regional executives that in

which underlies the legal and regulatory choices of regional governments, becomes self-fulfilled, since investors indeed stay away from a multi-regional economy with a bad collective reputation. Individual regions' efforts to establish regimes where investors' rights would be protected will not be sufficient to improve the bad collective reputation (Tirole, 1996), and thus won't bring about the desired (and deserved) reward. The reaction of investors to such efforts would hence be insignificant, and an increased flow of investment that would have made up for the forgone opportunities to expropriate the already made investments, will not materialize. As a result, regional governments rationally choose not to change their policies, leaving the economy locked in a low-level federal equilibrium.

A good equilibrium obtains similarly – an attempt to abrogate investors' rights would place the perpetrator outside of the massive and steady flow of future investment; this would entail losses that exceed one-shot gains. Again, the equilibrium is sustained.

5. The Model

In this section a stylized economic model is presented, featuring above described multiple equilibria. For the sake of exposition the model is stripped of details which would have complicated its analysis without affecting the main conclusions.

A. Technologies

Consider an economy with two technologies – modern and traditional. Both technologies employ labor, but only the modern one also requires capital[3]. Modern technology is described by a production function $Y = F(K, L)$, where K is capital and L – labor. The production technology is neo-classical, features constant returns to scale, and capital and labor are strategic complements in that $F_{KL} > 0$. Labor productivity of the traditional technology is assumed constant and equal w.

Suppose that the economy's stock of labor, which could be shared between the technologies, equals unity. For simplicity assume that all the capital is provided by outside investors.[4] The latter are entitled to the return to capital $K F_K(K, L)$, whereas

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case of failure to service the debt the region will have no chances to raise investment capital in the future. This argument, however, did not look particularly strong for the regional government, which acted on the assumption that a Russian region will have little prospects to allure investments in any case. "No one is paying [back debt] – and we won't either." (*Segodnia,* October 15, 1999).

[3] One could think of the traditional technology as a subsistence activity with zero capital intensity (Polishchuk, 1996).

[4] This assumption is a good proxy of realities that many developing and transition economies are faced with.

residents claim the rest of the total output, i.e. the return to locally supplied labor $L F_L(K, L)$.

Let the labor market of the economy be perfectly competitive. In this case for a given amount of capital *K* the unit stock of labor is efficiently allocated between the modern and traditional sectors. To describe such allocation, denote K_0 the level of capital such that when all the labor is employed in the modern sector, the marginal productivity of labor is the same as in the traditional sector: $F_L(K_0,1) = w$. If $K < K_0$, then K / K_0 units of labor will be employed in the modern sector, and the rest in the traditional one. The aggregate output in this case will be

$$Z = \frac{K}{K_0} F(K_{0,} 1) + w(1 - \frac{K}{K_0}).$$

Of the above amount, *w* accrues to the domestic labor, and the balance of $K F_K(K_0,1)$ is due to investors. If $K \geq K_0$, all the labor is employed in the modern sector, with the aggregate output $Z = F(K,1)$, of which $K F_K(K,1)$ accrues to investors, and $F_L(K,1)$ – to local labor.

Capital invested in the modern sector depreciates over time with the rate *r* = 1. In an equilibrium (to be described later) investors maintain a given stock of capital by continuously replenishing the depreciation as long as their rights aren't violated and they are able to repatriate in full the returns to invested capital[5]. If a violation happens, outside investors abandon the economy, which is left with an exponentially depreciating stock of earlier invested capital.

B. To Honor Or Not To Honor?

The government is assumed to be benevolent, with the infinite time horizon, and its utility at any given moment is equal to the domestic aggregate income. Let δ be the government's discount coefficient used for intertemporal utility comparisons.

If the government honors investors' rights, its aggregate utility for the period $[0,\infty)$ will be $\frac{1}{\delta} F_L(K,1)$ (under the assumption $K > K_0$, which, as it will be shown below, usually holds in equilibrium). Suppose now that the rights of investors are violated at *t* = 0 (if the government is better off after violating investors' rights at some moment *t* > 0, it will be optimal to expropriate invested capital at *t* = 0). In this case capital will be depreciating

[5] It is assumed that the initial investments level determines the investment *capacity* of the economy. This capacity establishes an upper bound for future investments. Therefore the initial level of capital K can be maintained hereafter, but not expanded. This is the simplest way to reflect the fact that there are physical constraints on the rate of growth of investments, especially in the fixed capital.

with unity rate, starting from the initial level *K*. Let t_0 be such that $K\exp(-t_0) = K_0$ (assumption $K > K_0$ is kept); under this notation, for $t \le t_0$ diminishing capital is still sufficient to employ of the economy's labor force, whereas for $t > t_0$ this is not true any more, and labor increasingly is reverted to the traditional technology. The payoff of the government in this case will be

$$\int_0^{t_0} F(Ke^{-t},1)\,e^{-\delta t}dt \;+\; \int_{t_0}^{\infty} (w + Ke^{-t}\,F_K(K_0,1))e^{-\delta t}\,dt \;=$$

$$\int_0^{t_0} F(Ke^{-t},1)\,e^{-\delta t}dt \;+\frac{1}{\delta} w e^{-\delta t_0} \;+\frac{KF_K(K_0,1)}{\delta+1} e^{-(\delta+1)t_0}.$$

Violation of the rights of outside investors for a period of time increases aggregate domestic income over the level that would have been maintained if the rights of investors were honored. However, beyond that period the aggregate domestic income falls below the steady-state level in case of non-violation. A "rationally opportunistic" government weighs such gains and losses against each other. The outcome of this comparison clearly depends on how future is discounted against the present. An "impatient" government with a high discount coefficient will prefer violation of rights of outside investors, whereas a sufficiently "patient" one will refrain from such actions out of the fear of subsequent retaliation.

PROPOSITION 1. There exists a unique value δ_0 such that for $\delta < \delta_0$ investors' rights will be honored, and for $\delta > \delta_0$ these rights will be violated. •

The threshold value δ_0 satisfies the following equation:

$$\frac{1}{\delta_0} F_L(K,1) \;=\; \int_0^{t_0} F(Ke^{-t},1)\,e^{-\delta_0 t}dt \;+\frac{1}{\delta_0} w e^{-\delta_0 t_0} \;+\frac{KF_K(K_0,1)}{\delta_0+1} e^{-(\delta_0+1)t_0}. \qquad (1)$$

C. Comparative Statics

Dependence of δ_0 on the (initial) capital level *K* is of critical importance for the theory presented in this paper. According to the earlier outlined intuition, the higher is the level of capital, the stronger is the disciplining effect of threat of investors' withdrawal from the economy that does not ensure protection of property and contract rights. Notice that existence of the traditional technology is essential for this intuition to be valid. Indeed, for a relatively low capital stock the traditional technology guarantees a reservation

income, which is not much less than the one available when investors' rights are secured. However, if capital stock is high, so is the return to labor in the modern sector of the economy, and if labor productivity falls to a much lower level available in the traditional sector, losses of aggregate domestic income would be severe.

One can therefore expect that the higher the level of *K*, the more impatient has to be a government which still prefers violation of investors' rights to honoring these rights. If the level of investments *K* equals K_0 or falls below this threshold, then an opportunistic government, which is concerned about well-being of the local population, will invariably violate rights of external investors, regardless of time preferences. Indeed, with $K \le K_0$ the level of local income *w* is assured regardless of whether investors are present or not, and confiscation of the investments allows to increase this level.

The following proposition shows that, with some qualifications, the above conclusions indeed hold.

PROPOSITION 2. As long as

$$\delta_0 < \frac{F_{LK}(K,1)}{F_K(K,1)} = \varepsilon_L F_K, \qquad (2)$$

δ_0 depends positively on *K*. When $K = K_0$, $\delta_0 = 0$. •

Proposition 2 is illustrated by Fig. 1, which shows dynamics of aggregate domestic income in case of violation and non-violation of rights of external investors for two different levels of capital K_1 and K_2, $K_1 > K_2$ (other components of the model remain the same). It is clear from the illustration that gains available in case of violation of investors' rights are relatively smaller in comparison with subsequent losses for the higher level of capital, which means that the higher is the level of capital, the more impatient will have to be the government to elect to violate investors' rights.

Consider as an example a Cobb-Douglas modern sector technology $F(K,L) = K^{\alpha} L^{1-\alpha}$. In this case the threshold discount coefficient δ_0 satisfies the following equation:

$$(\delta_0 + 1)(1 - \alpha - \delta_0)(1-\alpha)^{\delta_0/\alpha} K^{\alpha+\delta_0} = w^{1+\frac{\delta_0}{\alpha}}. \qquad (3)$$

Inspection of equation (3) shows that δ_0 is indeed a monotonically increasing function of *K* such that $\lim_{K \to K_0} \delta_0 = 0$, $\lim_{K \to \infty} \delta_0 = 1 - \alpha$. Notice that in this case the upper bound of the range of variation of δ_0 coincides with the right-hand side of estimate (2), and therefore the monotone dependence of δ_0 on *K* can be deduced from Proposition 2. If the discount

coefficient exceeds the upper bound of $1-\alpha$, investors' rights will be violated no matter what is the level of invested capital *K*.

Consider next the relation of the threshold discount level δ_0 to labor productivity *w* of the traditional sector. According to the arguments presented above, the higher is this productivity, the less vulnerable is the economy to possible retaliation of outside investors when the latter's rights are violated. This means that, *ceteris paribus*, an increase in *w* should reduce the (non)violation discount threshold.

PROPOSITION 3. Threshold δ_0 depends negatively on *w*. •

Proposition 3 can be illustrated by Fig. 2. It is clear from the illustration, that for a lower labor productivity in the traditional sector ($w_2 < w_1$), losses in case of violation of investors' rights will be, *ceteris paribus*, greater in relation to temporarily available gains – hence Proposition 3.

6. Equilibria

When investment decisions are made, investors are faced with two possible scenarios. In the first investors' rights will be honored, level of capital *K* will be maintained indefinitely, and investors will earn a steady gross rate of return to invested capital equal $F_K(K,1)$ if $K \geq K_0$, and $F_K(K_0,1)$ otherwise. In the second scenario investments will be confiscated, and the invested capital will earn no return. In other words, by an initial investment of a unit of capital an investor acquires ex ante a risky asset. Ex post net valuation of this asset could be either $(F_K(K,1)-1)/r$ ($(F_K(K_0,1)-1)/r$, if $K < K_0$) or zero, where *r* is the global market interest rate (recall that invested capital depreciates with rate 1).

Investors factor in investment risks by assigning probability *p* to non-violation of their rights, and calculating the expected value[6] of a unit of invested capital as $\frac{p}{r}(F_K(K,1)-1)$ ($\frac{p}{r}(F_K(K_0,1)-1)$ if $K < K_0$). Under these assumptions, investments up to capacity *K* will indeed be made if the above expected value is greater that or equal to the value of risk-free investment at the market interest rate, i.e. 1. In equilibrium both values should be equal to each other (no-arbitrage condition), and the following equality thus holds:

[6] Investors are thus assumed risk-neutral (e.g. investments are made by large-scale mutual funds with diversified portfolios). Rodrik (1991) assumes similar reaction of investors to non-violation of earlier announced rules. The equilibrium model presented in this section can be modified to account for more sophisticated patterns of attitude to risk, for example within the CAPM framework, and such modifications won't affect the qualitative conclusions of the paper.

$$r = \begin{cases} p(F_K(K,1)-1), & K \geq K_0 \\ p(F_K(K_0,1)-1), & K < K_0. \end{cases} \quad (4)$$

The equilibrium model could be completed using two nominally different assumptions, which lead to the same analytical setup. Under the first assumption, investors hold ex ante *beliefs* about the type of the government that will be in charge of enforcement of property and contract rights. The government could be either of two general types – honest or opportunistic. An honest government respects the sanctity of contracts regardless of the payoffs available in case of violation or non-violation of investors' rights. An opportunistic government chooses its policies depending on the comparisons of these payoffs. Such decisions, in their turn, depend on the discount coefficient, which underlie intertemporal preferences of an opportunistic government. The discount coefficient $\delta \geq 0$ thus characterizes the *type* of the opportunistic government; honest governments' type is denoted by *.[7]

Let investors' beliefs about the type of government they will be dealing with be described by probability $\pi \geq 0$ that a government is honest, and cumulative distribution function $\Phi(\cdot)$ such that for any given $\delta \geq 0$ the probability that a government is opportunistic and its type is less than δ equals $(1-\pi)\Phi(\delta)$.

If the level of investments is *K*, and $\delta_0 = \delta_0(K)$ is the discount threshold found from equation (1), then an opportunistic government of the type $\delta \leq \delta_0(K)$ will not violate rights of outside investors[8], whereas in case $\delta > \delta_0(K)$ investments will be confiscated. Therefore the expected probability *p=p(K)* of non-violation of investors' rights is calculated as follows:

$$p(K) = \pi + (1-\pi)\Phi(\delta_0(K)). \quad (5)$$

A Bayes-Nash equilibrium can now be characterized by invested capital level *K* such that with *p=p(K)* the non-arbitrage equation (4) holds. There could also be a no-investment equilibrium, when

$$\pi(F_k(K_0,1)-1) < r. \quad (6)$$

Alternatively the same equilibria can be obtained under the assumption that capital is invested into a portfolio, which is equally distributed between investment projects in a large number of jurisdictions. In this case probability π and function Φ characterize

[7] One could expect that honest governments might be included in the continuum of opportunistic governments with discount zero, so that honesty would be identical to "infinite patience". This, however, is not true, because if $K < K_0$, then an honest government will still respect rights of outside investors, whereas an opportunistic one with $\delta = 0$ will violate investors' rights.

[8] Assume that if an opportunistic government is not to gain from violation of the rights of outside investors, then such rights will be honored.

distribution of government types across jurisdictions. Under this assumption, a standard Nash equilibrium in the game of investors with *all* governments of the involved jurisdictions, leads to the same equilibrium conditions (1), (4), (5).

It is easy to see that under natural regularity conditions an equilibrium always exists.

7. Structure of equilibria

It is assumed in this section that function $\delta_0(K)$ implicitly defined by equation (1) is monotonically non-decreasing (recall that $\delta_0(K) = 0$ for $K \le K_0$). This assumption is consistent with Proposition 1, and corroborated by the example of the Cobb-Douglas technology. We also assume that the probability π that a government is honest is positive, albeit small.

Two counteracting effects determine the structure of equilibria in the model. The first is the conventional diseconomy of scale in production. As *K* grows, the marginal return to capital declines, and this pulls down the nominal rate of return available to investors if their rights are not violated. This effect puts an upper bound on the resultant investment capacity. The second is the political economy of scale – the larger is the investment level, the stronger are the incentive for involved governments to honor investors' rights. This raises the cut-off discount level $\delta_0(K)$ and therefore pushes up the probability *p* that there will be no attempts on investors' rights. Therefore as *K* goes up, investments become less lucrative, but more secure, and political economy scale indeed obtains.

This tradeoff, similarly to (Rodrik, 1991), could produce different types of equilibria. Some of these equilibria are risk-free. In such equilibria investors disregard the risk of violation of their rights, and these expectations turn out to be rational. If no investment risks are factored in, venture capital will fill the economy up to its *natural capacity* $\overline{K}$, when the net rate of return to invested capital equals the global market benchmark *r*. The natural capacity satisfies the following equation: $F_k(\overline{K},1) = 1 + r$. A risk-free equilibrium obtains if the natural capacity level of capital is sufficiently high to prevent even the most impatient governments from attempts on investors' rights, i.e. $\Phi(\delta_0(\overline{K})) = 1.$ In this case investors' expectations ex ante that the economy is risk-free are confirmed ex post.

Equilibria could also involve investment risks, in which case investments, if at all, will be below the natural capacity. In a risky equilibrium investors expect that only honest governments and a fraction of those most patient among opportunistic ones will not confiscate invested capital. The investment risks present in such situation can be offset by a nominal rate of return, which would be sufficiently in excess of the market benchmark. This precautionary attitude in its turn restricts the scale of investments, and as a result impatient governments indeed find it more profitable to confiscate outside investments

once they have been made. This proves investors' ex ante apprehensions well grounded, and a risky equilibrium obtains.

A convenient way to illustrate equilibria[9] is to put in (*K*,*p*) axes two curves, one of them given by equation (4), and another, which is a replica of the lower portion of the diagram on Fig. 1 – by equation (5). Equation (4) produces a "demand" curve for secured property rights – it shows what probability of non-violation of property rights investors should expect in order to provide a given amount of venture capital. Equation (5) generates a "supply" curve, which shows the actual probability of non-violation of property rights for a given level of capital. Intersections of these curves correspond to equilibria. Notice that both "supply" and "demand" curves are monotonically increasing (which allows for multiple equilibria) and flat in the range $[0, K_0]$.

Fig. 3 illustrates a single risk-free equilibrium, and Fig. 4 – single no-investment equilibrium. In the case presented by Fig. 5 risk-free and no-investment equilibria co-exist with each other (a third equilibrium between the two is unstable and of no practical interest). This is an example of multiple equilibria.

There could be other configurations of multiple equilibria which differ from each other by levels of risk and invested capital. Since all equilibria belong to the same positively sloped (in axes (*K*,*p*)) demand (or supply) curve, level of capital is inversely related to the involved investment risk. Notice also that multiple equilibria are Pareto-ranked from the viewpoints of involved governments and investors[10]: an equilibrium with higher level of investments (and lower risk) Pareto-dominates another one, where the amount of invested capital is smaller, and risks are higher. Indeed, for both equilibria investors earn the same expected rate of return. As for a government, if it does or does not violate investors' rights in both equilibria, then obviously such government is better off if the level of capital is higher. Suppose now that in one equilibrium (with lower *K*) a government violates investors' rights, whereas in another one, where *K* is higher, it does not. Then in the second equilibrium the government is better-off when it honors investors' rights than it would have been if such rights were violated. But the payoff to the government in the hypothetical case of violation of investors' with larger *K* would be higher than the same payoff when *K* is smaller. We conclude that such a government is also better-off in the case of the second equilibrium.

Multiplicity of Pareto-ranked equilibria indicates a *coordination failure*: in a lower-level equilibrium investors are skeptical about protection of their rights, and keep level of investments low. Opportunistic governments, in their turn, do not have sufficient incentives to honor investors' rights, as their good behavior will not be duly rewarded. As a result, the economy could be locked in a low-level equilibrium, where economic stagnation and bad policies feed upon each other.

[9] First used in (Rodrik, 1991).
[10] Such ranking is often observed in models with asymmetric information.

8. Breaking the Deadlock: The Impact of Traditional Sector

Equilibria described in the previous section sustain over time as long as the model's exogenous parameters remain unchanged. However, the economy could experience external shocks, which have the potential of unraveling the equilibrium structure that existed prior to the shock. In particular, a shock could eliminate a low-level equilibrium, and put in motion forces that would lead the economy out a deadlock of self-perpetuating poverty and lack of the rule of law.

In this section the possibility of such shocks is illustrated by a parametric analysis of the equilibrium structure depending on the (relative) productivity of the traditional sector *w*. It turns out that an increase in this parameter is detrimental for the quality of equilibria – it could derail good equilibria, if they existed prior to a shock, and lead to emergence of those with high level of investment risks and lower volumes of investments. Vice versa, when the relative productivity of the traditional sector declines, an equilibrium structure improves, erasing Pareto-inferior equilibria.

These conclusions are based on the comparative statics analysis presented earlier in the model. It was shown that a decrease in *w* leads to a higher threshold discount level δ_0, and thus increases the likelihood that investors' rights will be honored. This obviously improves the structure of equilibria. Indeed, according to Proposition 3, a decrease in *w* pushes up the "supply curve". These positive changes are reinforced by those on the "demand" side. According to equation (4), the "demand curve" is affected by a drop in *w* through the level of investments K_0, beyond which all of the economy's labor force is employed in the modern sector. According to its definition and due to the fact that capital and labor are strategic complements, K_0 declines alongside with *w*. This affects the flat part of the "demand" curve by pulling it downwards.

Possible results of such changes could be an emergence of a risk-free equilibrium, which could not be sustained before the shock, and/or disappearance of a no-investment equilibrium. To illustrate the second possibility with more details, introduce *w* as a variable on which thresholds δ_0 and K_0 depends: $\delta_0 = \delta_0(K, w)$, $K_0 = K_0(w)$. Let w_1 and w_2 be the old and new values of productivity of the traditional sector, and $w_2 < w_1$. Suppose that $\Phi(\delta_0(\overline{K}, w_1)) = 1$, $\dfrac{r}{F_K(K_0(w_1),1) - 1} > \pi$. In this case there are two equilibria before the shock – one of them risk-free, with investments filling economy up to its natural capacity, and another one with no investments at all. It is clear that at the new level of productivity of the traditional sector the risk-free equilibrium will be sustained. If in addition $\dfrac{r}{F_K(K_0(w_2),1) - 1} < \pi$, the no-investment equilibrium disappears from the scene (Fig. 6).

What could underpin an external shock akin to the one described above? One possibility is a devaluation of the local currency that reduces the value of the output of the traditional

sector, which has no market abroad, unlike potentially exportable products of the modern sector. This increases the relative importance of external investments, and makes the punishment that will be forthcoming if investors' rights were violated, more severe than before the devaluation. As a result governments have stronger incentives to treat investors well, and low-level equilibria are less likely to appear.

9. Benevolent Government vs. Leviathan

It was assumed so far that government's policies towards outside investors are underpinned by concerns about the aggregate income of residents. This assumption is a proxy for a benevolent democratic government, which represents interests of the society at large. An alternative is a government-Leviathan, which is interested in maximizing its revenues. Such a government could still provide production inputs, including protection of property and contracts rights, to the extent that this would help to extract income from the economy (McGuire, Olson, 1996).

Although the interests of the Leviathan clearly diverge from those promoting aggregate economic efficiency, it remains unclear, which of these two types of regimes offers better conditions for economic growth (Bardhan, 1993). The standard economic concern about representative democracy is that it leads to suboptimal economic decisions, which benefit a pivotal social group, possibly at a loss for the society as a whole. Here we will illustrate another possibility, namely that a benevolent democratic government which represents *all of the society* could nonetheless produce a regime less conducive for outside investments than the one established by a Leviathan-type autocrat. Somewhat counter-intuitively (Olson, 2000) narrow interests of an autocrat appear to be more investors-friendly than the encompassing interests of all residents collectively. The explanation of this paradox is, of course, in the fact that neither of these regimes represents outsiders.

Suppose that a government-Leviathan maximizes its revenues subject to two constraints: first, the government is constitutionally confined to proportional income tax[11] (Brennan, Buchanan, 1980), although it could set different tax rates for different types of income, and second, it cannot tax the traditional sector[12]. If investments in the modern sector are kept at level $K > K_0(w)$, and investors' rights are honored, then the government collects a steady flow of income at the rate not less than $F_L(K,1) - w$. Indeed, first of all, straightforward calculations show that the optimal tax rate on investment income, which accrues to investors, is zero; this is a standard result for a small open economy which draws a resource from the global market where this resource earns a given rate of return (see e.g. Oates, Schwab, 1988). It means that the government will collect all of its revenues by taxing solely the labor income. Since the traditional sector provides a shelter

[11] This assumption can be relaxed without affecting the conclusions of this section.

[12] For example, traditional sector could comprise subsistence activities with products not intended for market exchange and thus more difficult to tax. Another possibility is that the traditional sector is less transparent than the modern one, and thus offers broader opportunities to conceal income form the government. See alos (Bardhan, Udry, 1999).

against taxes, and guarantees income *w*, the government can choose its labor tax rate such that the after tax income in the modern sector will be just marginally above *w*, and thus will indeed collect revenues equal $F_L(K,1)-w$. (Notice that due to $K > K_0(w)$ condition the pre-tax labor income is greater than *w*, and with the above-described labor income tax the modern sector still employs all of the labor). This tax rate needs not to be optimal, and therefore $F_L(K,1)-w$ indeed provides a lower bound for tax revenues of the Leviathan which honors rights of outside investors. Notice that this lower bound equals to the aggregate income of resident when a government is benevolent, net of *w*.

Suppose now that the government has confiscated the invested capital, and in addition to taxing labor collects all the returns to investments. The latter depreciate over time with rate 1. The government adjusts its labor tax rate to the diminishing capital stock in the modern sector so that at every moment of time it maximizes its total revenues. In this case, however, Leviathan's optimal revenues at any given moment of time are *not more* than the aggregate income of residents, available when investors' rights have been violated by a benevolent government, less *w*. This can be established as follows: the government that has confiscated investments is the residual claimant of all of the GDP, less *w*. Because of the distortionary taxation the GDP with a government-Leviathan is at a suboptimal level, and therefore the take of the government is indeed less than the above described upper bound.

Now the impact of the change of government incentives for security of the rights of outside investors is clear. If the lower and upper bounds just described are increased by the same amount *w*, it becomes clear that if a benevolent government with discount coefficient δ is indifferent for a given level of capital *K* between honoring and violating investors' rights (i.e. if $\delta = \delta_0(K)$), then in the same situation government-Leviathan *will honor* rights of investors, as its gains in this case will be higher, and in case of violation – lower that the gains of a benevolent government. It means that the threshold discount for the Leviathan $\tilde{\delta}_0(K)$ will be higher than $\delta_0(K)$, which pushes up the "supply" curve and thus improves an equilibrium structure.

We conclude that other things being equal, if a government-Leviathan violates rights of outside investors, a benevolent government will do the same, but not vice versa.

Note that due the political economy of scale involved, violation of investors' rights by both types of government are likelier for lower levels of investments, and therefore one could expect that the advantage of a revenue-maximizing autocracy over representative democracy in protection of investors' rights should be observed at lower levels of economic development. And indeed, according to (Clague at al., 1996), for countries with low level of per capita income lasting autocracies[13] clearly outperform democracies of similar duration in terms of international country risk and business environmental risks indicators. It is noteworthy that for richer countries lasting democracies assume a slight lead. This is also consistent with the conclusions of the paper, because in the higher range

[13] Long horizon of regime is consistent with the model used in this paper.

of investments and income the political economy of scale effects work in support of secured property rights both for democracies and autocracies, and the matter is decided by other factors, suppressed by the political economy of scale effects dominant at lower levels of development.

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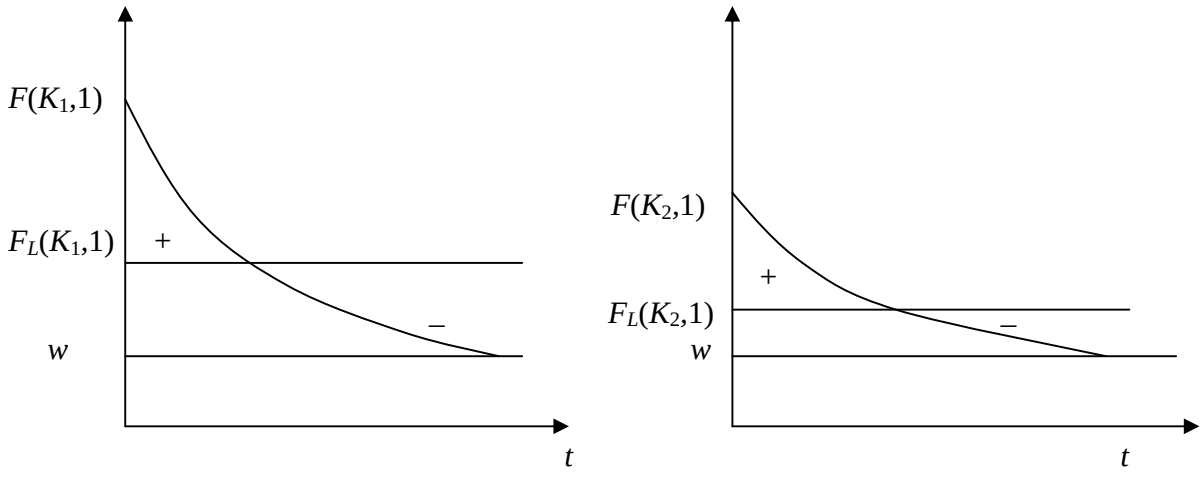

Fig 1.

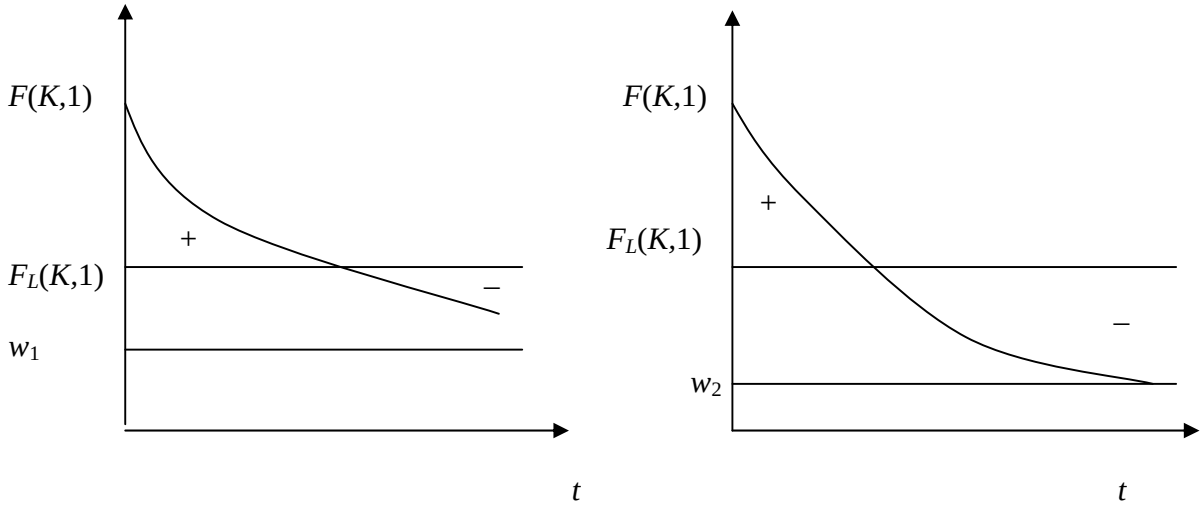

Fig 2.

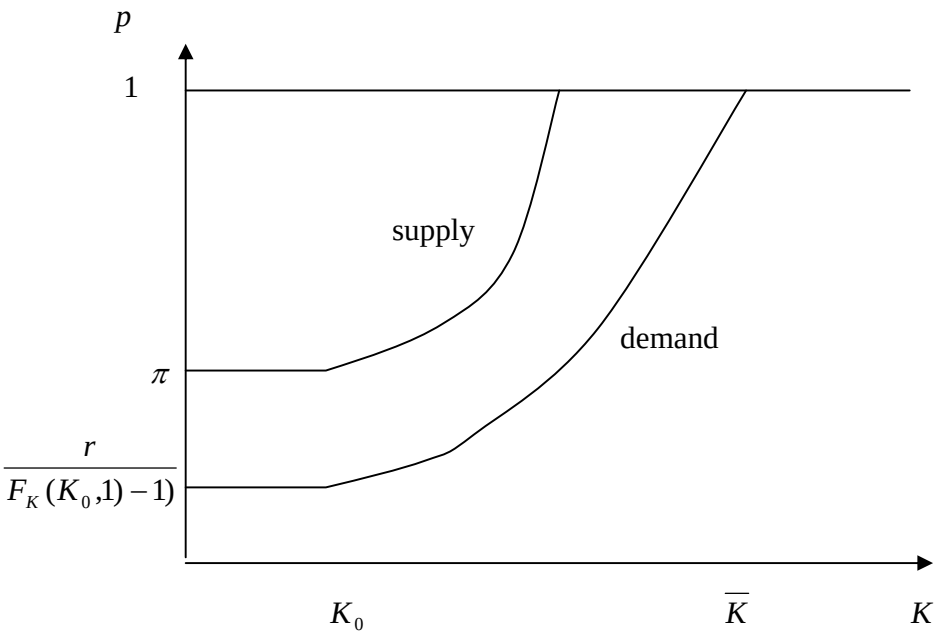
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Fig. 3

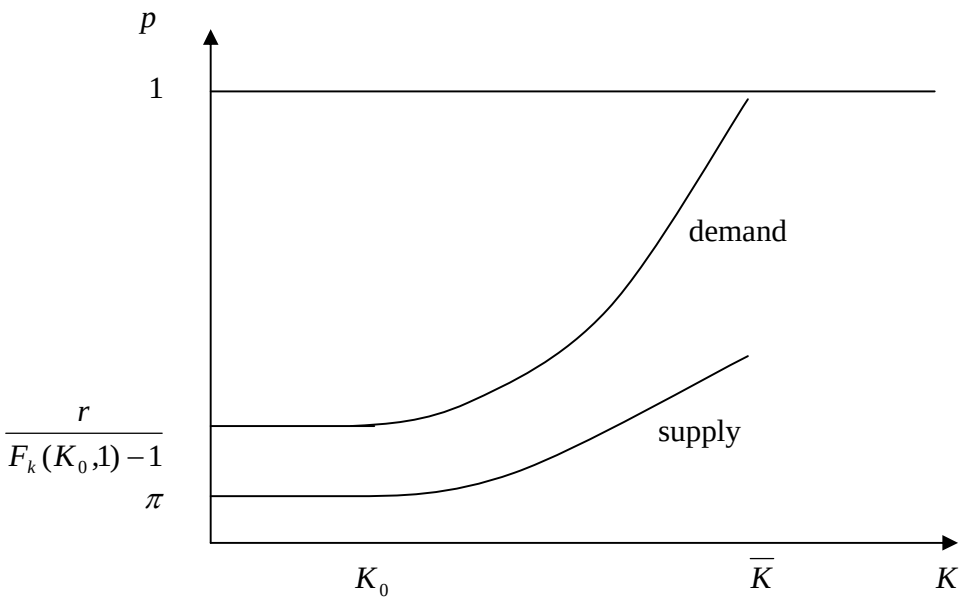
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Fig. 4

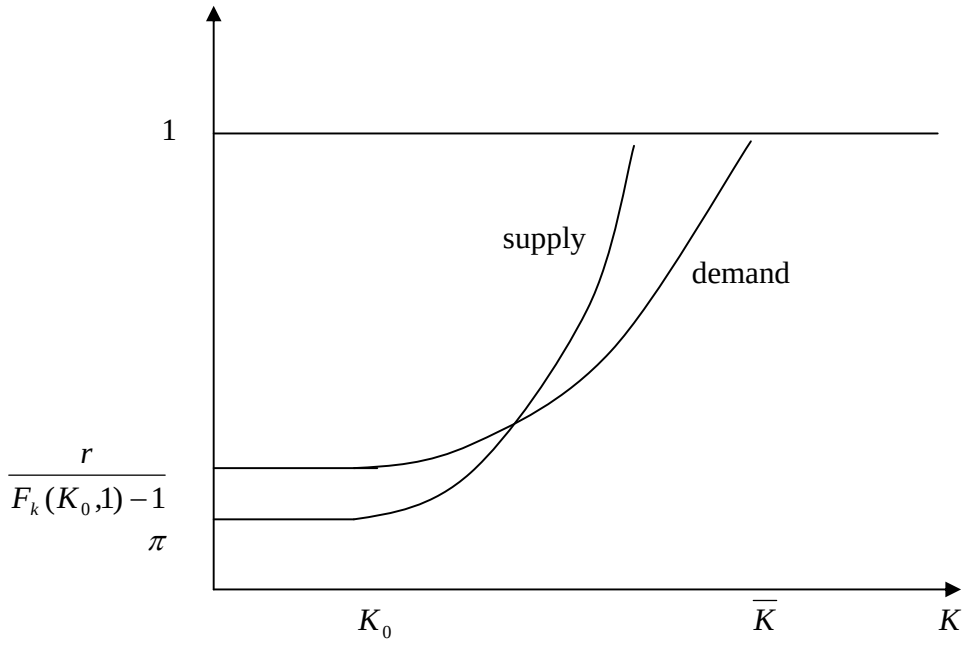
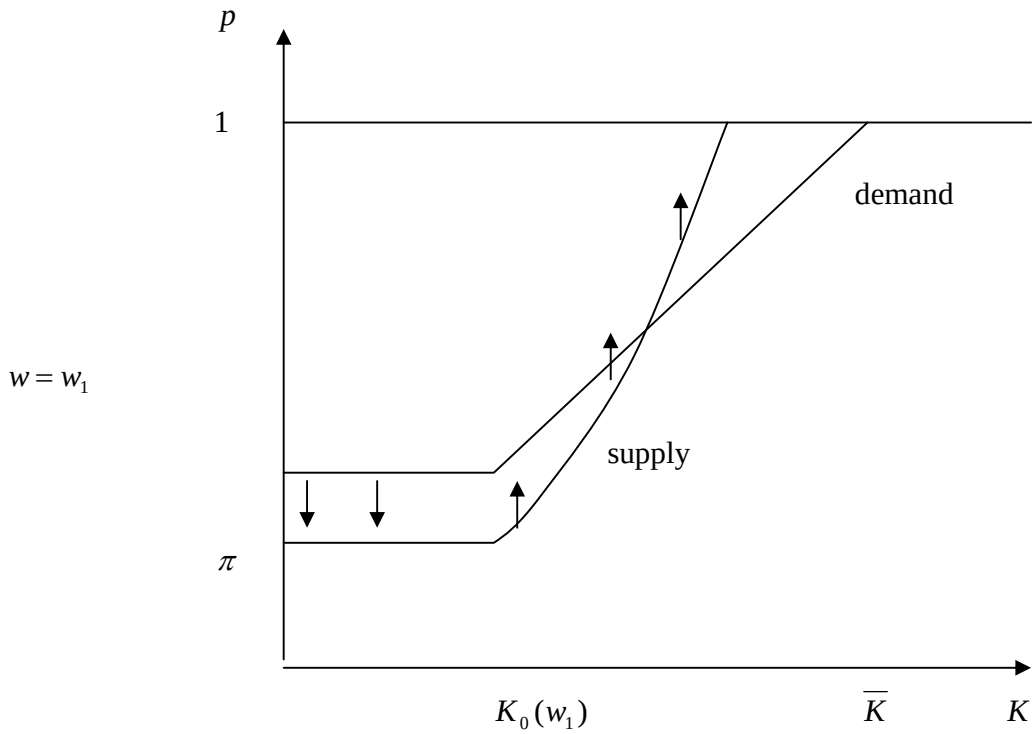
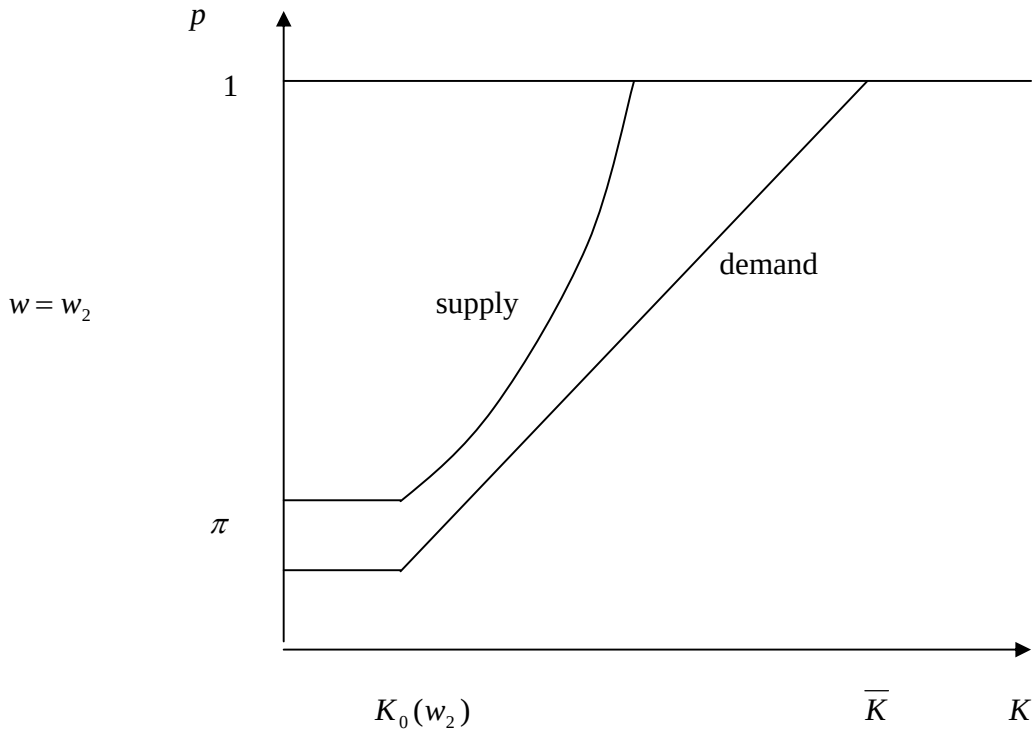


Fig. 5

Fig. 6





â€œThe Political Economy of Rural Property Rights and the Persistence of the Dual Economyâ€, Journal of Development Economics 103, pp. 167-181. 5. * Acemoglu, Daron (2008). â€œOligarchic versus Democratic Societiesâ€, Journal of the European Economic Association 6 (1), pp. 1-44.Â It will also introduce ideas related to endogenous institutions and laws. We will focus on dynamic, game-theoretic models. 5. 3 Identifying endogenous fiscal rules. 4 Application of the identification scheme.Â 3 Identifying endogenous fiscal rules 3.1 Developing intuition via a basic macro model 3.1.1 The model 3.1.2 Characterising the stable manifold of the model 3.1.3 Computing an explicit model-based rule 3.2 Generalisation of the discussion in linear models 3.2.1 Standard stability analysis theory 3.2.2 The identification procedure.Â Up to now, scal rules in leading large-scale macroeconomic forecasting models have been imposed exogenously, and in this sense are not necessarily compatible with the formulation of other sectors of these models. An example of the derivation procedure, including some illustrative results, is provided using a small calibrated macro model.