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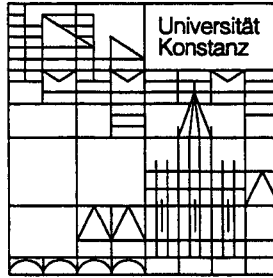
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**The Informal Sector as a
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**Martin Kolmar
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The Informal Sector as a Substitute for Social Security

Martin Kolmar and Sugata Marjit*

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Abstract

We consider an economy with two groups of individuals, rich and poor. A central authority can either directly redistribute income to the poor, or allow for some degree of informality in economic activities by not enforcing property rights. The optimal degree of informality depends upon the characteristics of the resources used by the poor if property rights are not perfectly enforced. It is shown that the degree of enforcement falls if the resource is becoming less rivalrous in use. Hence, the informal sector is a better substitute for social security, the more the resources used by the informal sector have the character of public goods. We explore the basic trade-offs and discuss the special cases of anarchy, perfect civil society and the absence of a welfare state. In addition to this we analyze the similarities and differences between a welfare-maximizing state and a predatory state.

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1 Introduction

The role of the state as an institution to conduct distributive goals is well known and well accepted. In this paper we are not concerned with the justification and establishment of normative criteria that legitimize redistribution, but rather with the interpretation of institutions given certain objectives of the state. In a way, the problem of redistribution needs to be solved in two steps. First, the state has to identify the targeted beneficiaries, the resource burden of transfers and figure out the administrative costs. The second problem is one of balancing the budget, to raise an adequate amount of revenue so that the social objective can be implemented as smoothly as possible.

Yet, tax evasion, rampant corruption and institutional complexities tend to affect the process of collection and redistribution of resources in the developing world. Several books and monographs such as Rose-Ackerman (1978), de Soto (1989), Jain (1998), and papers by Mookherjee and Png (1995), Mookherjee (1998), Mauro (1995), Marjit and Shi (1998), Marjit, Rajeev and Mukherjee (2000), Marjit, Mukherjee and Mukherjee (1999) extensively discuss the causes, consequences and remedies of corruption in the developing world. For example, an insignificant share of direct tax revenues in proportion to GDP and significant tax evasion are the characteristics of the Indian economy where only about fourteen million people (out of a total population of approximately nine hundred million) pay income taxes. Political authorities such as a government are usually hard pressed to undertake reforms which would have a lasting impact on the economy over the long run. But at the same time there is the short-run need to provide some type of a social safety net for the poor for whom the public treasury may not provide an adequate amount. What then is the effective strategy of the government of these poor nations? Our paper highlights one such strategy which has a rather innovative interpretation. This strategy has to do with the promotion and support of an “informal” sector which thrives in the surroundings of an “extra-legal” environment, where moderate violations of property rights, legal rules, and guidelines are tolerated by the state.

In a related paper Marcouillier and Young (1995) argue that the predatory state’s only incentive to provide public order is to encourage the tax-paying workers. Such a state may squeeze the formal and the informal sector simultaneously. They indicate that the tolerant and occasionally supportive attitude toward the informal economy

reflects the self-interest of a predatory state which eats into the surplus of the informal economy. Nevertheless, the tolerance of informal activities by the state depends on the relation of goods produced by formal and by informal activities. Thus, the driving force of the results according to Marcouillier and Young are the structure of individuals' preferences: broadly speaking, if there is a large degree of complementarity between goods that are formally and informally produced, the tolerance of informal activities may further increase government revenues.

This paper extends the idea of informality but makes the case of a new welfare state which, being incapable of generating and redistributing adequate amounts of transfers, uses a kind of "second-best" strategy which calls for imperfect enforcement of property rights. A reasonable size of the informal segment is preserved to sustain social order and avoid social anarchy. Given the costs of raising taxes and distributing transfers, maintaining social order by overlooking some infringements of property rights may turn out to be an optimizing decision. This becomes an inevitable escape route for the government constrained by either lack of political will, or support to pursue long-term development strategies.

Interestingly, it turns out that under certain conditions the optimal mix of explicit welfare and informality from the point of view of a welfare-maximizing state is also optimal for a predatory state. This holds true if the welfare maximizing state does not care for the poor and the predatory state is not restricted in maximizing graft. Hence, the states' objectives cannot necessarily be detected from the institutional structure of an economy. In the general case, however, a welfare maximizing state will run a larger explicit welfare state and in a number of cases also a larger informal sector. Hence, graft-maximizing states tend to reduce direct transfers and improve the enforcement of property rights.

In order to get a better understanding of what we mean by the non-enforcement of property rights, we distinguish between private and public resources with exclusion costs in the following manner. In both cases, the partial non-enforcement of property rights leads to some degree of free-riding. This free-riding is welfare-increasing as long as (a) the crowding out of legal users is low and (b) enforcement of property rights is costly. Hence, the welfare effects of the non-enforcement of property rights depend on the character of the goods that are illegally used. If they are non-rivalrous in consumption, the costs of non-enforcing property rights compared to the costs of direct transfers are relatively small compared to a situation where goods are

rivalrous in consumption. This makes the informal sector a good alternative in case the resources used are relatively non-rivalrous in use, whereas the classical welfare state has its advantage for the case of private resources where legal use is completely crowded out by the illegal use.

There is a close connection between our paper and the literature on anarchy and the origins of the state (for example Bush and Mayer (1974), Hirshleifer (1995), Konrad and Skaperdas (1999), and Skaperdas (1992)). These papers focus on the structure of equilibria in a situation of anarchy and the welfare-enhancing role of public order as well as the prerequisites for their establishment. Our paper reverses the logic of the argument. We start with a situation where an order is already established and property rights can be perfectly enforced in principle and argue that depending on the technical character of the goods and the size of enforcement costs it might be welfare-improving not to perfectly enforce the public order. Hence, some degree of anarchy might be optimal for a welfare-maximizing state. This result holds even for the case without any enforcement costs if the good is purely public.

The paper proceeds as follows. Section 2 contains stylized facts on the interpretation of informal activities as a substitute for social security. Section 3 develops the basic conceptual framework and the model. Section 4 derives optimal policies for a welfare-maximizing government. Section 5 analyzes the relationship between the welfare-maximizing and the predatory state and Section 6 concludes.

2 Stylized facts

The following examples will give a better idea of how the non-enforcement of property rights for public and private goods can be a substitute for explicit benefits of a social-security system.

1. Free use of public goods: homeless people in railway stations. Until the privatization of railroad companies in European countries like Great Britain and Germany, train stations, railroad systems and goods as well as passenger traffic had been publicly owned and managed. During that time, the use of train stations and tracks by beggars and the homeless had been more or less tolerated by the personnel of the stations despite the fact that some travelers felt indisposed by the presence of beggars and the homeless and that some degree of criminality was present.

Legally, the state would have had the right to remove every person from the station's premises that was not going to use one of the services provided by the railroad company. Thus, the toleration of the people sleeping in the station must be seen as a non-enforcement of property rights by the management - and ultimately the owner - of the railroad company.

After the privatization of railroad companies during the 80s and 90s, the former bureaucratic firms had been transformed into corporations with profit-oriented managements despite the fact that at least for the near future the state remains the exclusive owner. The change in corporate policies following this transformation that is of interest here is that the new management began to restructure the old stations by supplying an environment where commercial zones can develop in profitable cities or to close economically unattractive stations or even stops. Both changes can be seen as an increase in the enforcement of property rights by no longer tolerating beggars and the homeless within the company's property. In the latter case, the shut down of stations excludes homeless people from their use. In the former case, the creation of shopping malls goes hand-in-hand with the exclusion of beggars and homeless people from these areas in order to make them more attractive for travelers and the general public.

The reason for this change is obvious: A public firm has more leeway to realize social targets or less incentive to maximize profits compared to a private firm. Both strategies have the same effect on the poor: their expected utility goes up either through the creation of places where homeless can sleep or indirectly through the provision of informal activities (begging or dealing goods). On the other hand, the expected utility of the general public goes down either by their feelings of indisposition or by an increased probability of being robbed. For a privately managed firm, beggars and homeless people will only be tolerated if their presence is not in conflict with profit maximization. Thus, in order to make this group of persons at least as well off as before, *ceteris paribus* the explicit benefits of the social-security system have to be increased.

2. Free use of private goods: the tapping of electricity mains. Another example of non-enforcement or imperfect enforcement has to do with public indifference to the violation of private property rights. In the streets of Calcutta, one of the most populated metropolis in the world, one finds small shop-owners, known as hawkers, illegally tapping electricity from the mains, where electricity is provided by a private

company. One does not find vigilant policing by the state to make sure that the private company is not cheated of its return. Hawkers occupy public space and almost never pay any legal fees to the state since their shops are not registered. In India state electricity boards (SEBs), owned and operated by the state governments, are often blamed by the central power supplying agencies, for being lenient to the illegal users. Such a strategy indirectly subsidises a large number of poor families in rural India.

3 The Model

Consider an economy that consists of two groups of people, those with relatively high and those with relatively low abilities. High-ability people work in the formal sector of the economy and earn an income. Their amount of income, x , depends on the amount of resources, $\tilde{R}$, used for production and the level of social order within the society, S , $x = x(\tilde{R}, S)$. Income is assumed to be increasing and convex with respect to resources and social order. Cross derivatives are assumed to be equal to zero. Denoting first and second partial derivatives by superscripts this means $x^{\tilde{R}} > 0$, $x^{\tilde{R}\tilde{R}} \leq 0$, $x^S > 0$, $x^{SS} \leq 0$, $x^{\tilde{R}S} = 0$.

The formal sector is characterized by well defined property and other legal rights that are enforced by a central authority (the state). Low-ability people cannot find employment in the formal sector and can therefore decide to participate in the centrally administered welfare state and to receive social assistance, T , and/or to engage in some informal activities yielding an income of y . The total costs of the welfare state are equal to $C_T(T)$ with $C_T^T(T) \geq 1$, $C_T^T(0) = 1$ (the first unit of transfers causes no distortion), and $C_T^{TT}(T) \geq 0$.

In order to focus the central idea of the paper as sharply as possible we neglect the possibility of social mobility and misuse in this paper. Social mobility would imply that the size of the formal and informal sector changes as a consequence of changes in policies. In addition to this, misuse would imply the illegal use of resources by high-ability people. Both phenomena might be important from an empirical point of view, but would not change the qualitative results. They both would tend to increase the costs of non-enforced property rights. Thus, our model tends to overemphasize the positive effects of non-enforced property rights compared to a model with both social mobility and misuse.

Income depends on the amount of resources $\tilde{R}$ used for production. The absence of enforced legal and property rights defines the informal sector of the economy. We denote by $h \in [0, 1]$ a measure for the enforcement of rights with the following interpretation: if $h = 1$, rights are perfectly enforced by the state, and if $h = 0$, rights are not enforced at all. The enforcement of rights has a cost $C_h(h)$, $C_h'(h) > 0$, $C_h''(h) > 0$. The enforcement of property rights has two effects on the overall performance of the formal sector and one effect on the performance of the informal sector. It influences the resource base of the formal sector as well as of the informal sector. To be more specific, if R is the total resource base of the economy and h is the enforcement of property rights, individuals in the informal sector receive $\tilde{R} = (1 - h)R$ from informal activities.¹

Resources can differ with respect to their degree of rivalry in use. Let $a \in [0, 1]$ be a parameter that measures this degree. Given a level of enforcement h , individuals in the formal sector can use $\tilde{R} = f(h, a)R$ of the resource. We use the convention that the degree of rivalry is increasing in a and that $a = 1$ denotes a perfectly rivalrous and $a = 0$ a perfectly nonrivalrous resource. Let $f^a(h, a) \leq 0$, $1 \geq f^h(h, a) \geq 0$ be the partial derivatives of f with respect to a and h and $f^{ha}(h, a) \geq 0$ the second cross derivative, which implies that the resource is becoming more public or less rivalrous for larger values of a . We can distinguish between two pure cases and one intermediate case.

- If $\tilde{R} = hR$ the resource is perfectly rivalrous in use and therefore purely private. Non-enforced property rights imply that some amount of the resource is stolen by the individuals in the informal sector without any punishment. The tapping of electricity is an example for this case.
- If $\tilde{R} = R$ the resource is perfectly nonrivalrous in use and therefore purely public. Non-enforced property rights imply that the resource is used to some extent by the individuals in the informal sector. The illegal use of market places is an example for this case.
- In all other cases the resource is mixed. (It has the character of both, private as well as public goods.) One can think of public infrastructure with congestion

¹This specification assumes that low-ability persons own no resources at all and therefore have no resource base if property rights are perfectly enforced. This assumption is for analytical convenience only and could be easily relaxed without changing the qualitative results.

(for example streets, relatively close to a pure public good) or technological knowledge with spill-overs (relatively close to a pure private good) where the illegal use by the individuals in the informal sector is crowding out some but not all of the use in the formal sector.

Note that we define a public good by its non-rivalry in use, not by its non-excludability. Exclusion depends on the costs of exclusion and is therefore taken into account by the structure of the cost function C_h . Non-excludability would imply $C_h(h) = \infty$. Figure 1 gives a graphical representation of f . In the figure the band of upward moving lines indicates differences in crowding of the resource for different levels of a . The higher the line, the less rivalrous the use of the resource.

– Insert Figure 1 around here –

The second effect of the enforcement of rights is on the level of social order S within the society. Social order has a direct effect on the productivity of the individuals in the formal sector because it allows them to engage in productive activities instead of defense:² if social order is low, individuals will spend part of their resources on the protection of their possession. This implies a reduction of the production of useful goods. It may also have a direct effect on the utility of the individuals.³ Social order increases in the enforcement of rights. On the other hand, we assume that social order is negatively influenced by some measure of poverty within the society: the larger the number of poor within the society and the lower their level of income, the less identification they have with the basic values and norms of the society. This increases the probability of disorder ranging from small violations of law to revolution. For simplicity we assume that the measure of poverty is equal to the income y of the poor individuals and that social order is normalized to be equal to the product of enforcement h and the income of the poor y , $S(h, y) = hy$. Earning opportunities in the informal sector are affected by the degree of social order to a smaller extent than in the formal sector because no authority guarantees the enforcement of obligations in this sector. On the contrary, the detection of informal activities might lead to punishments. There might, however, be a positive spill-over from the formal to the informal sector because a prosperous formal economy

²See Grossman and Kim (1996a,b).

³For example by the reduction of anxiety and stress, see Marcouiller and Young (1995).

facilitates earning abilities in the informal sector. We assume henceforth that this effect is equal to zero.

We normalize the income from informal activities to be $(1 - h)R$ and assume that the state cannot verify informal activities. Hence, it is always a dominant strategy for a representative poor individual to claim social assistance as well as to engage in informal activities. This implies that its total income is equal to $y = (1 - h)R + T$. The gross income of a representative individual in the formal sector is equal to $x = x(f(h, a)R, h((1 - h)R + T))$. Both groups are assumed to be risk neutral, implying that income is a representation of individual preferences.

The state can levy a proportional tax t on the individuals in the formal sector to finance the enforcement of rights and the welfare state. His budget constraint is $tx \geq C_h(h) + C_T(T)$. In the following we will distinguish between the *welfare-maximizing state* that maximizes the weighted sum of utilities for both groups and the *predatory state* that maximizes the difference between tax revenues and costs. In the former case the above budget constraint will be fulfilled with equality.

To summarize, the formal sector is defined by the following properties:

- Individuals pay a proportional tax on income
- They can legally use public goods
- In principle they can rely on the enforcement of their rights

The informal sector is defined by the following properties:

- Individuals do not pay taxes
- Their rights are not enforced
- Depending on the enforcement of rights in the formal sector they can illegally use resources from the formal sector

4 The welfare-maximizing state

We are now in a position to analyze optimal policies of the welfare-maximizing state in this economy. Assume that the state maximizes the weighted sum of both groups'

utilities by the choice of $\{t, T, h\}$ given that its budget balances. This function has either a normative interpretation as social-welfare function with welfare weights α, β or a positive interpretation as political-support function with α and β measuring the political influence of both groups in the decision-making process. We will focus on the normative interpretation of the model and will henceforth refer to these weights as the welfare weights of the two groups. Let λ be the Lagrange multiplier of the budget constraint. The Lagrangean of the state's optimization problem is

$$\begin{aligned}\mathcal{L}(t, T, h, \lambda) = & \alpha(1-t)x(f(h, a)R, h((1-h)R+T))) + \beta((1-h)R+T) \\ & + \lambda(tx(f(h)R, h((1-h)R+T))) - C_T(T) - C_h(h)).\end{aligned}\quad (1)$$

The first-order conditions with respect to t, T and h are:

$$\partial\mathcal{L}/\partial t = -\alpha x + \lambda x \leq 0, \quad (2)$$

$$\begin{aligned}\partial\mathcal{L}/\partial h = & (\alpha(1-t) + \lambda t) (Rx^{\bar{R}}f^h + x^S((1-2h)R+T)) \\ & - \beta R - \lambda C_h^h(h) \leq 0,\end{aligned}\quad (3)$$

$$\partial\mathcal{L}/\partial T = (\alpha(1-t) + \lambda t) x^S h + \beta \cdot 1 - \lambda C_T^T(T) \leq 0. \quad (4)$$

First notice that (2) holds with equality as long as some government activity is optimal (which we assume throughout the paper). This implies $\lambda = \alpha$, the shadow value of public funds equals the welfare weight of the rich. Equation (3) defines the optimal level of enforcement of rights. Using $\alpha = \lambda$ we get

$$\partial\mathcal{L}/\partial h = \alpha (Rx^{\bar{R}}f^h + x^S((1-2h)R+T)) - \beta R - \alpha C_h^h(h) \leq 0.$$

An increase in h has three effects. A *property effect* in the *formal* and in the *informal sector* and a *social-order effect* in the formal sector. First, the property effect is positive in the formal sector because of the increased protection of property, $Rx^{\bar{R}}f^h \geq 0$, (as long as the resource is not purely public) and other rights, $x^S S^h > 0$. Second, the property effect is negative in the informal sector because of the fact that it is getting harder to earn money, $-\beta R$. Third, this effect bounces back to the formal sector by a decrease in social order. This decrease is counterbalanced by the increase in the general protection of rights. Hence, the total effect on social order, $x^S((1-2h)R+T)$, is ambiguous. At the optimum the sum of these three effects has to be equal to the marginal costs of providing protection of rights.

Equation (4) defines the optimal level of social assistance. Again using $\alpha = \lambda$ we get

$$\partial\mathcal{L}/\partial T = \alpha x^S h + \beta \cdot 1 - \alpha C_T^T(T) \leq 0.$$

An increase in transfers, T , has an *income effect* in the informal sector and a *social-order effect* in the formal sector. First, the income effect increases the income of the poor directly. Second, the social-order effect is positive because the increase in income in the informal sector bounces back to the formal sector by an increase in social order, $x^S h \geq 0$. There are two reasons for the existence of a welfare state in this model. First, there is the standard effect because of the distributional concern as a choice between different Pareto optima implicit in the objective function: if the relative weight of the poor exceeds one, $\beta/\alpha > C_T^T(0) = 1$, transfers will be paid to the poor. The second effect is on social order and can be attributed to Buchanan (1975). Assume, for example, that the political weight of the poor is equal to zero. In this case direct transfers will be paid as long as their effect on social order increases income in the formal sector. Hence, transfers will be paid in order to ‘buy’ the acceptance of the social rules by the poor.

As a benchmark we will first analyze the optimum allocation for the two special cases of pure private and pure public goods. For the case of a purely public good, (3) becomes

$$\alpha x^S ((1 - 2h)R + T) - \beta R - \alpha C_h^h(h) \leq 0,$$

and for the case of a pure private good it becomes

$$\alpha \left(\frac{1}{2} R x^{\bar{R}} + x^S ((1 - 2h)R + T) \right) - \beta R - \alpha C_h^h(h) \leq 0.$$

In the case of a pure public good, the positive effect on property of an increase in enforcement is negated. The opposite is true if the resource is a pure private good. Hence, free-riding on the resource is becoming less costly for those in the formal sector if the good is purely public. In this case the informal sector is a less costly alternative to a welfare state compared to a purely private resource.

This insight is closely related to the standard theory of public goods. Efficiency for the provision of pure public goods requires that the number of people using the good is maximal because every additional user has a positive utility from the use of the public good and his use implies no costs for the other users. The financing of the good is irrelevant for this result, even the financing by a single person is efficient as long as the tax is lump-sum and the efficient amount of the good is known. Exclusion is one institutional way to solve the preference-revelation problem if the central authority either does not know the true preferences for the public good or does not have sufficient coercive power to extract lump-sum payments from

the individuals. Because individuals in the informal sector cannot contribute to the financing of the public good by definition, their exclusion implies a waste of resources for the society.

4.1 The degree of publicness of resources

The solution to (2)-(4) gives rise to functions $h(a)$, $t(a)$, and $T(a)$ and an optimal value function $V(a) = \max_{t,T,h} \alpha(1-t)x(f(h,a)R, S(h, (1-h)R+T)) + \beta((1-h)R+T)$ s.t. $tx(f(h,a)R, S(h, (1-h)R+T)) - C_T(T) - C_h(h)$ depending on the degree of publicness of the resource. In this section we study the effects of the degree of publicness on both the levels of transfers and enforcement, and the value of V . In order to do so we will henceforth assume that an interior solution exists.

First, the effect of a on the overall level of welfare can be derived using the envelope theorem. It follows that

$$\partial V / \partial a = \alpha R x^{\bar{R}} f^a \geq 0. \quad (5)$$

An increase in the publicness of the resource increases overall welfare. It implies that the use of the resource by the poor is less harmful for the rich. For a given level of misuse $(1-h)R$, the production possibilities of the rich increase if the resource becomes more public. This has a positive effect on total production and hence on welfare.

What are the effects of a change in a on the enforcement of rights and social assistance? The following proposition summarizes the main findings. The proof is delegated to the appendix:

Proposition 1: With a welfare maximizing state, an increase in the degree of rivalry of the resource:

- Increases the enforcement of rights, $h^a \leq 0$
- Reduces the level of social assistance if x is not too convex in S ,
 $T^a \leq 0$ if $x^S + x^{SS}((1-2h)R+T) \geq 0$

As we have argued above, if the resource becomes more public, the opportunity costs of enforcing rights increase because exclusion becomes increasingly wasteful from a social point of view. This leads to a decrease in the enforcement of rights.

The convexity of x with respect to S is a measure of the substitutability of h and T . A reduction in T reduces social order by h . This has an impact on income that is equal to the marginal productivity of social order. As we have mentioned above, a decrease in h has two counterbalancing effects on social order. First, social order goes down because of a more lax enforcement of rights. Second, social order goes up because of the increase in poor individuals' income. The net effect has an impact on the marginal productivity of social order. If the net effect is positive, there is room for a decrease in social assistance. If it is negative, the total effect is ambiguous. If the change in marginal productivity of social order is not too large, there is room left for a reduction in social assistance.

The findings of this section show that the basic trade-off between the welfare state and the informal sector crucially depends on the type of goods used by the poor. If these goods are relatively public, the informal sector is a good alternative for an explicit welfare state. If the goods are relatively private, informal activities are relatively costly, hence an explicit welfare state does comparably better.

4.2 Special cases

The perfect civil society

The standard case analyzed in the literature (for example in general equilibrium models) can be described by a perfect enforcement of rights, $h = 1$. In this section we will derive implications of perfect enforcement and conditions under which it is optimal.

Definition 1: A *perfect civil society* is a state with perfectly enforced rights ($h = 1$), and hence no informal sector.

Assume that h is equal to 1. In a perfect civil society all taxes are used to finance direct transfers to the poor. The first order conditions imply

$$x^S = C_T^T(T) - \frac{\beta}{\alpha} \quad \wedge \quad t = \frac{C^T}{x}. \quad (6)$$

For $h = 1$ a one-unit increase in direct transfers increases social order by one unit. This has an effect on the income of the rich of size x^S . In addition to this the transfer has a direct redistributive effect that is evaluated by β/α . Social assistance is paid

as long as its effect on social order exceeds the adjusted marginal costs of transfers. Marginal costs are adjusted by the welfare weights of the rich and the poor. Assume that transfers have no effect on social order. In this case, transfers are only paid if the weight of the poor β exceed the weight of the rich α . On the other hand, if the weight of the poor is zero, transfers are positive only if the marginal effect of transfers on the income of the rich exceeds 1 at $h = 1$. This might be the case if the social-order effect is important for the income in the formal sector. This is the “Buchanan case” for social security mentioned above: the rich pay transfers in order to buy the acceptance of the social order by the poor.

We can next derive the conditions for the optimality of a perfect civil society. It follows from (3) that for $h = 1$ to be optimal it must be that

$$Rx^R f^h + (T - R)x^S - \frac{\beta}{\alpha}R \geq C_h^h(1). \quad (7)$$

Using (6) we get

$$Rx^R f^h + (T - R)C_T T(T) - \frac{\beta}{\alpha}T \geq C_h^h(1). \quad (8)$$

Assume that $R \geq T$ holds at the optimum. A perfect civil society will be optimal if (i) the property effect in the formal sector is large, (ii) direct transfers are cheap, (iii) the weight on the poor is small, and/or (iv) enforcement is cheap. We summarize our findings in the following proposition:

Proposition 2: In a perfect civil society a welfare state exists if enforcement of rights has a large impact on the income of the rich and is relatively cheap, direct transfers are relatively cheap and the weight on the poor is relatively small. In this case, social assistance is paid as long as its marginal effect on the income of the rich because of the increase in social order is equal to its (adjusted) marginal costs.

In the case of a pure, non-excludable public good, it follows that the RHS of (8) tends to infinity. We immediately get the following corollary:

Corollary 1: A perfect civil society can never be optimal if the resource is a pure, non-excludable public good. The same result holds for a pure, non-excludable private good.

The non-welfare state

A second interesting case is the non-welfare state.

Definition 2: A *non-welfare state* is a state without any direct transfers ($T = 0$).

Assume that T is exogenously fixed to be equal to 0. In this case, the poor can only earn income in the informal sector. The optimal enforcement is given by

$$R(x^R f^h + x^S(1 - 2h) - \frac{\beta}{\alpha}) = C_h^h. \quad (9)$$

Hence, without any transfers, rights are enforced until the income effects in the formal and informal sectors and the social-order effect are equal to the marginal costs of transfers. A non-welfare state is optimal if

$$x^S h + \frac{\beta}{\alpha} < C_T^T(0). \quad (10)$$

Proposition 3: A non-welfare state is optimal if the costs of transfers are large, social order has no large effect on the income of the rich, and the weight of the poor is small.

Anarchy

The next special case that we are going to analyze in greater detail is the anarchic society.

Definition 3: An *anarchy* is a state without either enforcement of rights ($h = 1$) or direct transfers ($T = 0$).

For an anarchy to be optimal it must be

$$R(x^R f^h + x^S) \leq C_h^h(0) + R \frac{\beta}{\alpha}, \quad (11)$$

$$\beta \leq \alpha. \quad (12)$$

The first inequality states that the utility of the enforcement of rights has to be smaller than its cost. Enforcement increases welfare because of its positive property and social-order effect on the income of the rich. It decreases welfare because of the negative property effect in the informal sector and the costs of enforcement. If the former effect is relatively weak and the costs of enforcement are large or the weight of the poor is large, anarchy might be optimal. Note that anarchy becomes more likely the less rivalrous the resource.

Proposition 4: Anarchy is optimal if the poor have smaller weight than the rich and if the utility of enforcement is small relative to its costs.

Analogous to the former cases we can analyze the case of non-excludability:

Corollary 2: Anarchy is optimal if the poor have smaller weight than the rich and if the resource is a pure, non-excludable public good. The same holds for a pure, non-excludable private good.

Costless enforcement of rights

Finally we will discuss the case where $C_h(h) = 0$, the enforcement of rights is costless. In this case, (3) becomes

$$Rx^R f^h + x^S ((1 - 2h)R + T) - \beta/\alpha R \leq 0. \quad (13)$$

In this case we can explicitly solve for the optimal value of h :

$$h = \min \left\{ 1, \frac{Rx^R f^h + (T + R)x^S - \beta/\alpha R}{2x^S R} \right\}. \quad (14)$$

It is a priori unclear whether this expression is smaller or equal to 1. Take, for example, the case of a pure public good with $\beta = 0$. Condition (13) modifies to

$$h = \min \left\{ 1, \frac{T + R}{2R} \right\}. \quad (15)$$

Hence, if $T < R$ the state will not perfectly enforce rights despite the fact that enforcement is costless and the weight of the poor is zero. The reason for this is intuitive. In setting optimal policies, the state has to compare the opportunity costs of different policies. For a given level of income for the rich the state can reduce the total costs by reducing enforcement because this reduces the level of direct transfers. This result is interesting because it shows that it is not the costs of enforcing rights that create the incentive for partial non-enforcement but the quality of the resources used. Property rights and their enforcement are a means to implement an efficient allocation. The analysis shows that the use of public resources should not depend on the payment of contributions. In this case, however, exclusion is part of the institutional design whose only aim is to guarantee the payment of some kind of user fee.

5 The predatory state

The assumption of welfare- or political-support maximization may portray a too optimistic picture of state activities. Alternatively, the state can be assumed to maximize graft (Marcouiller and Young 1995, Grossman 1996). In this section we will look for the implications of this alternative assumption. The predatory state maximizes graft G that is the difference between tax revenues and costs. Without further restrictions this would imply that he would fully expropriate the formal sector in our model. In consequence, the net-of tax income in the formal sector would be below the income in the informal sector. This outcome seems to be unrealistic and we will therefore assume that the state has to respect the restriction that the income of an individual in the formal sector state may not fall short of the income of an individual in the informal sector.⁴ This restriction can, for example, be motivated by concerns for the preservation of power. The resulting optimization problem of the state is as follows:

$$\max_{t,T,h} G(t,T,h) = tx(f(h)R, h((1-h)R+T)) - C_T(T) - C_h(h) \quad (16)$$

$$s.t. \quad (1-t)x(f(h)R, h((1-h)R+T)) \geq (1-h)R+T. \quad (17)$$

Let λ be the Langrange parameter for the restriction. The first-order conditions of the Lagrangean

$$\begin{aligned} \mathcal{L} = & \quad tx(f(h)R, h((1-h)R+T)) - C_T(T) - C_h(h) \\ & + \lambda ((1-t)x(f(h)R, h((1-h)R+T)) - (1-h)R+T) \end{aligned} \quad (18)$$

are as follows:

$$\partial \mathcal{L} / \partial t = (1-\lambda)x \leq 0, \quad (19)$$

$$\begin{aligned} \partial \mathcal{L} / \partial h = & \quad (t + (1-t)\lambda) (Rx^{\bar{R}}f^h + x^S((1-2h)R+T)) \\ & + \lambda R - C_h^h(h) \leq 0, \end{aligned} \quad (20)$$

$$\partial \mathcal{L} / \partial T = (t + (1-t)\lambda) x^S h - \lambda - C_T^T(T) \leq 0. \quad (21)$$

The first order conditions can be interpreted in the same way as in section 4. We want to concentrate on a comparison between the solutions of a welfare-maximizing

⁴None of our results would change if we would require that there must be a minimum distance between both income levels.

state and a predatory state in the following. In order to do so first notice that (19) implies that t is equal to the maximum value t^{max} compatible with the constraint as long as $\lambda < 1$. $-\lambda$ measures the marginal value for the predatory state of a marginal increase in the income of the poor y . If $\lambda = 1$ the predatory state is indifferent between tax rates which implies that it is unable to extract any rent at all. In addition to this it is easy to see that $\lambda \in [0, 1]$. As already mentioned, it is equal to 1 if the state cannot expropriate any rents at all. It is equal to zero if the formal sector can be fully expropriated.

In order to make the comparison easier we denote by dx/dh and dx/dT the total derivatives of x with respect to h and T . With this notation, the first order conditions of the welfare maximizing state (3) and (4) are (assuming an interior solution)

$$h^{wel} : \quad \frac{dx}{dh} - \frac{\beta}{\alpha} R = C_h^h, \quad (22)$$

$$T^{wel} : \quad \frac{dx}{dT} + \frac{\beta}{\alpha} = C_T^T, \quad (23)$$

whereas the first-order conditions of the graft-maximizing state are

$$h^{pre} : \quad (t + (1-t)\lambda) \frac{dx}{dh} + \lambda R = C_h^h, \quad (24)$$

$$T^{pre} : \quad (t + (1-t)\lambda) \frac{dx}{dT} - \lambda = C_T^T. \quad (25)$$

We are now ready to derive conditions under which both solutions coincide:

Proposition 5: A predatory state that can fully expropriate the formal sector and a welfare-maximizing state that puts no weight on the interests of the poor choose the same policies.

Proof: The predatory state that can fully expropriate the formal sector does not have to respect any restriction on the minimum income of the formal sector. This implies that $\lambda = 0$. By the same token, $t^{max} = 1$. Using $\beta = 0$, a comparison of (22) with (24) and (23) with (25) gives the result. qed.

The result implies that under certain conditions it is impossible to deduce the motivation of the government from observable institutional structures. Unrestricted power for predation and concentration on the welfare of the poor both yield identical structures of the welfare state.

This conclusion, however, does no longer hold under more general conditions. If $\beta > 0$ but still $\lambda = 0$ we can easily see that the welfare maximizing state will have both larger direct transfers and laxer enforcement of property rights. In this case, a comparison of the first order conditions with respect to T of the welfare maximizing and the predatory state shows that both are identical up to the positive constant β/α . Because of the concavity of the cost function this implies $T^{pre} < T^{wel}$. A comparison of the first order conditions with respect to h shows that both are identical up to the negative constant $(\beta/\alpha)R$. Because of the concavity of the cost function this implies $h^{pre} > h^{wel}$.

The opposite case of $\lambda = 1$ corresponds to a situation where the predatory state cannot expropriate the formal sector at all. It follows that $dx/dh + R = C_h^h$, $dx/dT - 1 = C_T^T$ are the first-order conditions of the predatory state. A comparison with (22) and (23) shows that $T^{pre} < T^{wel}$ and $h^{pre} > h^{wel}$. What is the intuition for this result? An increase in T or a decrease in h implies that the income of the poor increases. For a predatory state this is bad because it tightens the constraint of its optimization problem. Any increase in the income of the poor yields an increase in the income of the rich: less can be expropriated. On the other hand, the increase in income of the poor adds to the objective function of the welfare-maximizing state. Both types of governments face exactly contrary incentives with respect to the income of the poor.

In the intermediate case of $\lambda \in (0, 1)$ the above conclusion is robust with respect to direct transfers but no general conclusion can be drawn for the enforcement of rights: first note that the above opposite effects of the income of the poor do still exist. In addition to these effects, however, there is an additional effect that stems from the “rent-sharing” effect between the predatory state and the formal sector: in (25) as well as in (24), the total effects dx/dT , dx/dh are multiplied by $(t + (1 - t)\lambda) < 1$ because $t \in (0, 1)$ from the participation constraint. In both polar cases of $\lambda = 1$ and $\lambda = 0$, this factor is equal to one indicating that an additional unit of production is either totally expropriated or not expropriated at all. In the intermediate case, this effect is diluted. Ceteris paribus, the effect of this dilution is to decrease direct transfers as well as the enforcement of rights compared to welfare maximization. Hence, both effects work in the same direction for changes in T , whereas they work in opposite directions for changes in h .

Proposition 6: The graft-maximizing state pays less direct transfers

then the welfare-maximizing state. In addition to this it tolerates only a smaller informal sector if

- It can fully exploit the formal sector or
- He cannot exploit the formal sector at all

In all other cases the informal sector can be either larger or smaller.

6 Conclusions

In this paper we have developed a theory of the informal sector as a substitute for social security. The main idea was that if social security as well as the enforcement of property rights is costly, a rational state will allow for some informal activities of the poor to increase their income. In order to do so it dispenses with the complete enforcement of property rights. The rationality of this strategy depends on the character of the goods that are illegally used in the informal sector. The more rivalrous these goods are, the larger will be the enforcement of property rights. With pure public goods there is no crowding out of their owners as a result of a lack of enforcement. Hence, the non-enforcement of property rights has a relatively low cost. With pure private goods, however, the legal use of goods is completely crowded out by the illegal use and therefore the non-enforcement of rights has a relatively high cost. Hence, the informal sector is a good alternative to a formal welfare state if the goods used are relatively close to public goods. The results are invariant with respect to the government's objective function. They hold for the case of a welfare-maximizing state as well as for the case of a predatory state. A predatory state, however, will create a smaller formal welfare state and in a number of cases also a smaller informal sector than a welfare-maximizing state.

Our approach can be extended in a few directions. So far we have not talked about the direct interaction between the formal and the informal sector. The cost borne by the rich because of the imperfect enforcement of rights is likely to be mitigated to some extent if a subsidized informal sector benefits the formal sector in any other way. For example, if the rich use the services provided by the poor.

We have abstracted from the case that a fraction of the 'informal' can be rich and the informal sector generates institutions such as 'the mafia.' The economics

and politics of organized crime is an important issue and should be incorporated in an expanded framework. But the concept of a “new welfare state” which sustains a part of the informal sector for redistributive purposes still remains valid and is worthwhile to explore analytically.

Appendix

A. Proof of Proposition 1

In order to derive the partial derivatives of t, h, T with respect to a , we totally differentiate the first order conditions with respect to a . This gives the following system:

$$\begin{bmatrix} \mathcal{L}^{tt} & \mathcal{L}^{th} & \mathcal{L}^{tT} & \mathcal{L}^{t\lambda} \\ \mathcal{L}^{ht} & \mathcal{L}^{hh} & \mathcal{L}^{hT} & \mathcal{L}^{h\lambda} \\ \mathcal{L}^{Tt} & \mathcal{L}^{Th} & \mathcal{L}^{TT} & \mathcal{L}^{T\lambda} \\ \mathcal{L}^{\lambda t} & \mathcal{L}^{\lambda h} & \mathcal{L}^{\lambda T} & \mathcal{L}^{\lambda\lambda} \end{bmatrix} \begin{bmatrix} t^a \\ h^a \\ T^a \\ \lambda^a \end{bmatrix} = \begin{bmatrix} \mathcal{L}^{ta} \\ \mathcal{L}^{ha} \\ \mathcal{L}^{Ta} \\ \mathcal{L}^{\lambda a} \end{bmatrix}.$$

It is easy to verify that $\mathcal{L}^{tt} = \mathcal{L}^{th} = \mathcal{L}^{tT} = \mathcal{L}^{ht} = \mathcal{L}^{Tt} = \mathcal{L}^{ta} = \mathcal{L}^{\lambda\lambda} = 0$. Furthermore, $\mathcal{L}^{\lambda t} = \mathcal{L}^{t\lambda} = x$. Thus, (A.1) simplifies to

$$\begin{bmatrix} 0 & 0 & 0 & x \\ 0 & \mathcal{L}^{hh} & \mathcal{L}^{hT} & \mathcal{L}^{h\lambda} \\ 0 & \mathcal{L}^{Th} & \mathcal{L}^{TT} & \mathcal{L}^{T\lambda} \\ x & \mathcal{L}^{\lambda h} & \mathcal{L}^{\lambda T} & 0 \end{bmatrix} \begin{bmatrix} t^a \\ h^a \\ T^a \\ \lambda^a \end{bmatrix} = \begin{bmatrix} 0 \\ \mathcal{L}^{ha} \\ \mathcal{L}^{Ta} \\ \mathcal{L}^{\lambda a} \end{bmatrix}.$$

Using Laplace expansion and Cramers' rule we get

$$t^a = \frac{\mathcal{L}^{ha} \mathcal{L}^{Th} \mathcal{L}^{\lambda T} + \mathcal{L}^{hh} \mathcal{L}^{TT} \mathcal{L}^{\lambda a} + \mathcal{L}^{hT} \mathcal{L}^{Ta} \mathcal{L}^{\lambda h} - \mathcal{L}^{hT} \mathcal{L}^{Th} \mathcal{L}^{\lambda a} - \mathcal{L}^{\lambda T} \mathcal{L}^{hh} \mathcal{L}^{Ta}}{x(\mathcal{L}^{hh} \mathcal{L}^{TT} - (\mathcal{L}^{hT})^2)}, \quad (\text{A.1})$$

$$h^a = \frac{\mathcal{L}^{ha} \mathcal{L}^{TT} - \mathcal{L}^{hT} \mathcal{L}^{Ta}}{\mathcal{L}^{hh} \mathcal{L}^{TT} - (\mathcal{L}^{hT})^2}, \quad (\text{A.2})$$

$$T^a = \frac{\mathcal{L}^{hh} \mathcal{L}^{Ta} - \mathcal{L}^{ha} \mathcal{L}^{Th}}{\mathcal{L}^{hh} \mathcal{L}^{TT} - (\mathcal{L}^{hT})^2}, \quad (\text{A.3})$$

$$\lambda^a = 0, \quad (\text{A.4})$$

by the symmetry of the matrix. The remaining terms are as follows:

$$\mathcal{L}^{hh} = \alpha \left(R^2 x^{RR} f^h f^a + R x^R f^{hh} + x^{SS} ((1-2h)R + T)^2 - 2R x^S - C_h^{hh} \right), \quad (\text{A.5})$$

$$\mathcal{L}^{TT} = \alpha (x^{SS} h^2 - C_T^{TT}), \quad (\text{A.6})$$

$$\mathcal{L}^{hT} = \alpha (x^S + x^{SS} ((1-2h)R + T)), \quad (\text{A.7})$$

$$\mathcal{L}^{ha} = \alpha (R^2 x^{RR} f^h f^a + R x^R f^{ha}), \quad (\text{A.8})$$

$$\mathcal{L}^{Ta} = 0, \quad (\text{A.9})$$

$$\mathcal{L}^{\lambda T} = tx^S h - C_T^T, \quad (\text{A.10})$$

$$\mathcal{L}^{\lambda a} = tx^R R f^a, \quad (\text{A.11})$$

$$\mathcal{L}^{\lambda h} = t(Rx^R f^h + x^S((1-2h)R + T)). \quad (\text{A.12})$$

According to the principal-minor criterion the denominator has to be negative for a maximum. The numerator in (A.2) is equal to

$$\alpha^2 (R^2 x^{RR} f^a f^h + Rx^R f^{ha}) (x^{SS} h^2 - C_T^{TT}), \quad (\text{A.13})$$

which is weakly negative. Hence, $h^a \geq 0$. The numerator in (A.3) is equal to

$$-\alpha^2 (R^2 x^{RR} f^a f^h + Rx^R f^{ha}) (x^S + hx^{SS}((1-2h)R + T)). \quad (\text{A.14})$$

The first term in brackets of (A.14) is positive, whereas the second term is positive if $(1-2h)R + T \leq 0$. Hence, $T^a \leq 0$ if $(1-2h)R + T \leq 0$, and may be positive or negative in the other case. In the latter case, if $((1-2h)R + T)x^{SS} \leq x^S/h$ the first term dominates the second and T^a is negative. *qed.*

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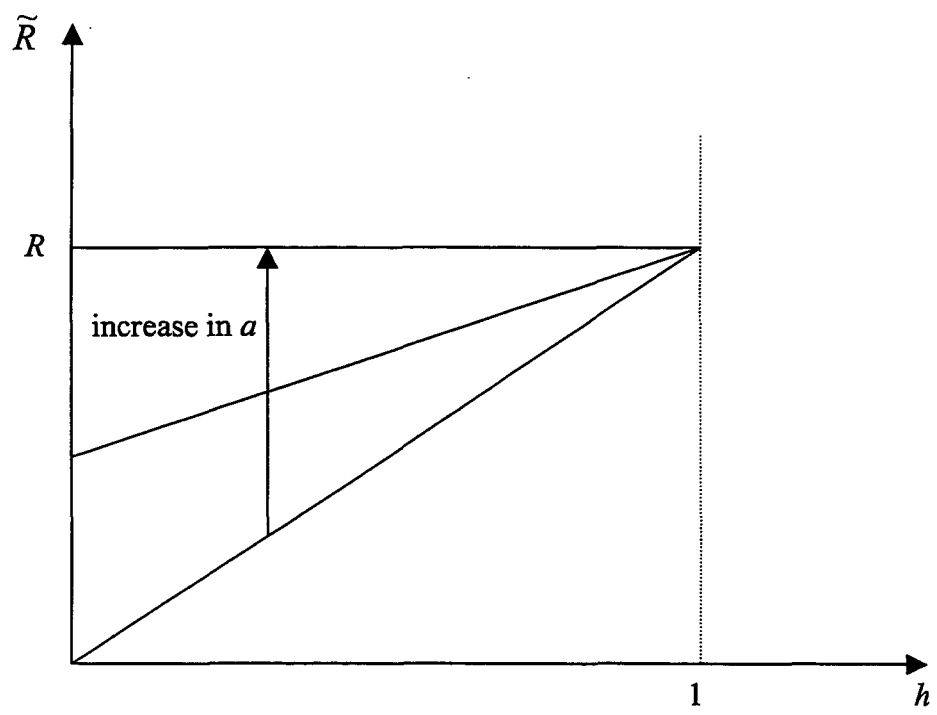


Figure 1: Degree of rivalry.