Financial, Taxation, and Regulatory Structures in Developing Countries

by

Roger Gordon and Wei Li
UCSD and *University of Virginia*

Economic policies in developing countries often differ sharply from those commonly advocated by economists, generating advice to adopt policies more consistent with both the successful practices in richer countries and/or those that appear best based on existing economic theories.

For example, economists advocate a stable currency and low tariff rates. Yet inflation rates in developing countries are often high, as are tariff rates.

Economists advocate setting up procedures to protect property rights, and establishing a rule of law in particular to aid in the legal enforcement of contracts and in dispute resolution. Yet, complaints by firms in developing countries about costly and time-consuming procedures, under-the-table fees, and arbitrary outcomes are common.

Economists strongly discourage state ownership of firms.[1] Yet in developing countries state ownership of firms is common. State ownership of banks is even more common.

Taxes certainly require some interference with market transactions, so the advice would be to enact taxes with a broad base and low rates so as to lessen the efficiency costs resulting from the distortions created by the tax structure. Broad-based taxes, such as a value-added tax, certainly do play an important role in poorer as well as richer countries. However, a much larger share of revenue in developing than in developed countries comes from taxes with a narrow base. Even when broad-based taxes are used, the evidence suggests that in practice revenue is collected from only a fraction of the activity that by statute should be covered.

In each case, economists normally advocate a shift towards policies that reduce interference in the functioning of markets.

If existing policies are so costly, though, why were such policies adopted to begin with? Why would a country choose to impose such costs on itself? How confident can we be

[1] Where monopoly power is present, exceptions might be made, though even here government regulatory oversight is typically preferred to government ownership.

that the problem is with the policies rather than with the models we use in deriving the best set of policies given the economic context faced in poorer countries?

A common explanation for such seemingly perverse policies in developing economies falls under the general category of "political economy" problems. Here, the presumption is that these policies are designed to benefit select groups within a country who have unusually strong political influence. In particular, a government can redistribute towards favored groups by designing the tax system to favor these groups, and perhaps by interfering with market allocations so as to alter equilibrium market prices in ways that benefit particular favored industries. But these policies may still impose large costs on the rest of the population, justifying altruistic intervention from outside.

Gordon and Li (2005) develop an alternative hypothesis for such policies. Here, the key hypothesis is that poorer countries face much more severe enforcement problems with their tax system. Enforcement depends heavily on the availability of information from outside a firm about the scale of any firm's economic activities. Such information, largely coming from the firm's recorded transactions through the financial sector, is essential to double-check the information reported by the firm. When firms use the financial sector, they leave a paper trail, facilitating tax enforcement. In contrast, cash transactions are virtually impossible to monitor and tax, to the point that the informal economy and the cash economy are often used as synonyms. When countries have both a financial sector that provides little value-added to firms, and firms with very heterogeneous benefits from using the financial sector, then the forecasted outcome is high tax rates in practice paid only by those firms strongly dependent on the financial sector, so a narrow tax base, with other firms avoiding tax through relying entirely on cash transactions. The result can be large intersectoral distortions favoring the informal economy.

Gordon and Li (2005) then argue that the government can lessen these intersectoral distortions through tariff protection of firms facing high effective tax rates, through inflation as a tax on firms that rely on cash to avoid tax, through controls on lending so as to redirect credit to heavily taxed sectors, and through red tape and fees that impose nontax costs on businesses that in practice pay little or no taxes.

Section 1 provides a derivation of the forecasted tax policy coming from a Grossman-Helpman (1994) style political economy model, and a comparison of these forecasts with those derived in Gordon-Li (2005). The forecasts from the two models differ in many respects. The political economy model certainly forecasts favorable tax treatment of sectors that can lobby the government effectively. However, the model forecasts favorable tax rates on the labor and/or capital income earned in this sector, but not tariff protection for this sector, inflation, or other forms of interference with market transactions. The theory would not forecast an informal (untaxed) sector, at least beyond the sectors that are effective in lobbying the government. To the extent that income tax rates cannot vary by sector to the extent desired, however, then the model does forecast tariff protection and subsidized credit to favored firms. Unlike in the Gordon-Li model,

tariff protection and subsidized credit should be for sectors that face relatively low tax rates, rather than relatively high tax rates.

In section 2, we look at the empirical evidence more closely to compare the evidence with the forecasts from these two models. Some forecasts are shared by the models and some contrast. Section 3 then contains a brief set of concluding remarks.

1. Alternative forecasts for economic policies

Conventional model

In this section, we develop the implications of a political economy model, and summarize the implications of the Gordon-Li model in a simple setting. To set the context, though, we first develop a model of policy in a more conventional setting.

Assume that the country is small and open, so is a price taker in the international market for the two consumption goods. These international prices are denoted by p_1 and p_2. Both goods are produced in the domestic economy, and the domestic wage rate, w, and domestic interest rate, r, adjust to clear factor markets. Assume that good 2 is imported and good 1 is exported.

The government is considering the choice of tax rates on the domestic output of the two goods, denoted by s_1 and s_2, along with a tariff at rate τ_2 on imports of good 2,[2] and a tax at rate t_K on domestic capital. Consumer prices are then equal to $p_i\ (1+\tau_i)$. The net-of-tax prices domestic firms face for output of the two goods are $p_i(1+\tau_i)(1-s_i)$, while the user cost of capital to a firm is $r+t_K$.

A conventional model for optimal tax policy assumes that the government chooses Pareto efficient policies, so maximizes a weighted sum of the welfare of individuals and the revenue of the government:[3]

$$(1) \qquad \max_{\tau_2,s_1,s_2,t_K} \{\sum_i V_i(p_1\ (1+\tau_1), p_2(1+\tau_2), r, w) + \lambda \sum_j p_j(f_j - C_j)\}.$$

Here, we assume that workers and capital can move without cost between the two domestic industries, so that there is one set of factor prices characterizing the economy as a whole. Using the aggregate economy's budget constraint, we set government revenue equal to domestic output minus domestic consumption.

---

[2] We also include in the notation a placeholder tariff on good 1, denoted τ_1, just to simplify some of the notation, even though we normalize the tariffs by setting $\tau_1 = 0.$

[3] The source of the value of government revenue is not specified here. It could reflect the value of government services to individuals, financed with this revenue. Alternatively it could reflect the weight government officials put on the personal benefits they receive from having control of this revenue. The model simultaneously captures the behavior of both "benevolent" and "malevolent" governments.

This model is the basic framework used in deriving optimal tax rates. To replicate a tax rate on labor income, there would need to be a uniform sales tax rate ($s_1 = s_2$) along with implicit expensing for capital investments ($rt_K = -s_1$). Taxes on capital income may well arise in such a derivation, and would appear through a tax rate on capital above this figure. Distortions to relative consumer prices could be implemented through a tariff along with an offsetting tax on domestic production of that good. Such distortions could arise, for example, if those with a low marginal utility of income have high relative demand for one of the two goods. To preserve productive efficiency, however, as forecast by Diamond and Mirrlees (1971), the model would require that

$$\frac{p_1(1-s_1)}{p_2(1+\tau_2)(1-s_2)} = \frac{p_1}{p_2}$$

so that good 2 faces a sales tax rate enough above that on good 1 to leave the net-of-tax price faced by producers unchanged by the introduction of the tariff.

In such a setting, there are no grounds for interfering further with market allocations: as forecast by Diamond-Mirrlees, production should remain efficient. As a result, the model cannot help explain state ownership of firms or banks, or any government regulations interfering with market allocations. As set up here, the model does not include a role for "money," so does not allow an analysis of the optimal inflation rate. One simplified way to introduce money into the model is by including real cash balances as a third consumer good. To replicate a proportional tax on labor income, the sales tax rates should again by equal across goods, implying an equal proportional mark-up over the real costs of each good. The real cost of money, as noted by Friedman (1956) is virtually zero, implying an inflation rate of virtually zero.

Gordon-Li model

Gordon and Li (2005) add one new issue into the above model: tax enforcement. They assume that firms can be monitored and taxed only if they make use of the financial sector, thereby leaving a paper trail. The real benefits of using the financial sector, per se, for a firm in industry *j* is assumed to equal $a_j p_j f_j$, so is proportional to output. The cost of using the financial sector is that the firm becomes subject to tax.[4] Since pretax output from a firm using the financial sector is $(1+a_j)(1+\tau_j)p_j f_j$, sales tax and capital tax payments would together equal $s_j p_j (1+\tau_j)(1+a_j) f_j + t_K K_j$. Firms then make use of the financial sector only if benefits exceed costs, or if

$$a_j(1+\tau_j)p_j f_j > s_j(1+\tau_j)p_j(1+a_j) + t_K K_j \qquad (2)$$

[4] Tariffs are collected regardless.

This adds to the conventional analysis a set of constraints on the feasible tax rates imposed on each industry. Any tax rates violating equation (2) will collect no revenue from that industry.

In richer countries, use of the financial sector may be valuable enough that none of these constraints are binding. In poorer countries, though, the financial sector may operate much less well (the a_j are smaller), so that these constraints become an important consideration in any discussion of tax policy. The lower are the a_j within a country, the lower are feasible tax rates and as a result the lower would be government revenue. As seen below, government revenue as a fraction of GDP is in fact much lower in poorer than in richer countries. The conventional model, in contrast, does not help explain this unless government revenue is less valued relative to the welfare of individuals in poorer countries.

The presumption in Gordon and Li is that capital-intensive industries will value much more the use of the financial sector, so have a higher a_j. To begin with, this will imply a higher s_j in capital-intensive industries when some of the constraints in equation (2) become binding.

When firms *within* each industry are homogeneous and the government can set a separate sales tax rate for each industry, then tax rates would be set so that all firms satisfy the constraints in equation (2). Any sales tax rate in an industry high enough to violate equation (2) would create a Pareto loss, since the government would lose its tax base in that industry while firms are left indifferent, relative to a rate that just satisfies equation (2).

When firms *within* an industry are heterogeneous, though, then a higher s_j will collect more revenue from some firms while inducing others to shift into the cash economy. Depending on the distribution of the a_j within an industry, tax rates can potentially be quite high, with some firms paying this high tax rate and others avoiding it through disintermediation. The conventional model does not include any structure sufficient to explain the presence of an informal economy.

Given differences in the optimal s_j across industries, Gordon and Li then explore the role of various other policies to lessen the misallocations resulting from the differences in the optimal s_j across industries in response to the constraints in equation (2). Tariffs may now be used even if they wouldn't be used otherwise. Not only can tariffs help collect additional revenue, but they can also lessen the distortions created by the differential sales tax rates by industry by shifting domestic production into the heavily taxed industries. If the heavily taxed good is imported, then these two potential benefits reinforce and trade will be discouraged. In contrast, if the heavily taxed good is exported then these two potential benefits conflict and trade may even be encouraged.

Money is now demanded in particular by firms that avoid taxes by joining the cash economy, so that inflation becomes a targeted tax on firms otherwise avoiding tax.[5] The larger the informal sector the higher the benefits relative to the costs of inflation.

Capital taxes can help focus tax liabilities on capital-intensive firms, who are the most tied to using the financial sector so the least likely to shift into the informal sector in response.

Given the efficiency costs arising from a shift of activity out of the most highly taxed (capital-intensive) sectors, one mechanism to reduce this shift is state ownership of the most capital-intensive firms. Through state-ownership, the government can in principle ensure that the sector has the efficient scale and capital intensity. This potential efficiency gain can quickly become large as tax rates increase, and with high enough tax rates can dominate the efficiency loss that occurs due to state ownership per se.

Another mechanism to increase the scale of activity in the heavily taxed sectors is to provide them cheap credit. This can be done through state-ownership of the banking sector. While providing cheap credit to heavily taxed firms results in losses for the state-owned banks, the government can in principle cover these losses through the resulting tax revenue collected from the extra capital invested in these heavily taxed sectors.[6]

Government red tape and regulatory controls on firm entry can be another mechanism to hinder activity in lightly taxed if not entirely untaxed sectors. Even if no revenue is collected directly through such intervention, to the extent domestic production shifts as a result into more heavily taxed sectors there can still be a net efficiency benefit from such policies.

To see this more formally, consider an individual's choice between being an employee in the formal sector vs. working in the informal sector. We assume that the individual makes this choice to maximize indirect utility of $V(w)$.[7] Within the formal sector, the effective wage rate for individual j is w_j. Let the effective wage rate in the informal sector be $(1+n_j)w_j$. Here, n_j is a parameter that varies by individual, perhaps reflecting that individual's opportunities and access to informal jobs, so can be either positive or negative. There is some joint density function $g(w_j,n_j)$ for w_j and n_j. Without government intervention, the individual shifts to the informal sector whenever $n_j > 0$.

The government is affected by this choice, though, given that output in the formal sector is taxable whereas output in the informal sector is not. If output in the formal sector is subject to a sales tax at rate s, then tax revenue drops by $sw_jL_j/(1-s)$ if the individual

[5] The feasible "inflation" tax would itself be constrained, though, by the option firms have to use a foreign rather than a domestic currency for transactions.
[6] State banks are not in a position, however, to offset tax distortions affecting the size of the firm's labor force.
[7] The other arguments of *V* are surpressed, to economize on notation.

leaves the formal sector. Individual choices are then inefficient, since they ignore this fiscal externality.

What if at some cost, F, the government can hire tax inspectors to locate and identify businesses operating in the informal sector? We assume that these inspectors cannot observe $(1+n_j)w_j$, nor hours of work, but only the fact that the individual is working in the informal sector.

Given the limited information observable to the inspectors, one option is to impose a tax, say T, on any individual caught working in the informal sector. Assume for simplicity that individuals are caught for sure, so the only policy choice is the size of T. Based on a first-order approximation of the indirect utility function, the individual now shifts into the informal sector if and only if $n_j w_j L > T$.[8] Primarily the lowest skilled individuals then remain in the formal sector. The government does collect revenue T from each individual who enters the informal sector. Expected tax revenue, as a function of skill level w_j is graphed in Figure 1. Since individuals always have the option to pay just T by shifting to the informal sector, expected revenue asymptotes at T per individual as skill levels increase. Sales taxes on the formal sector now fall largely on the least skilled individuals, making such taxes less attractive. For higher skilled individuals, at least, the tax system approximates a lump-sum tax.

We can show that the optimal value of T is positive. For any T, the value of the government objective function is

$$W = \int_0^\infty \left(\int_{-\infty}^{T/wL} V(w) g(w,n) dn + \int_{T/wL}^{\infty} V(w(1+n);-T) g(w,n) dn \right) dw$$
$$+ \lambda \int_0^\infty \left(\int_{-\infty}^{T/wL} \frac{s}{1-s} wLg(w,n) dn + \int_{T/wL}^{\infty} Tg(w,n) dn \right) dw$$

The first-order condition for T is:

$$(3) \qquad \int_0^\infty \int_{T/wL}^{\infty} (\lambda - V_I) g(w,n) dn dw + \lambda \int_0^\infty \left(\frac{s}{1-s} - \frac{T}{wL} \right) g(w, T/wL) dw = 0,$$

where V_I measures the marginal utility of income. Evaluated at $T = 0$, the first term on the left-hand side is necessarily positive if the government is using a lump-sum tax/transfer optimally, since in contrast to a lump-sum tax the poorest individuals do not pay T. The second term, measuring the revenue effect of any shift of individuals from the informal to the formal sector, is also necessarily positive evaluated at $T = 0$. Therefore, a marginal increase of T from zero necessarily raises welfare. So $T > 0$.

At the overall optimum, the first term remains positive, so that the second term in equation (3) must be negative at the optimal T. Therefore, the shift of firms into the

[8] For simplicity in the following derivation, we assume that labor supply is fixed, to focus on other complications.

formal sector resulting from a marginal increase in *T* must result in a net *loss* of tax revenue.

Such tax inspectors will be hired, though, only if the overall gain is at least as large as the cost, λF . Note that this can occur even if the inspectors do not collect enough money from the informal sector to cover their collective salaries, *F*. In addition to the revenue collected from the informal sector, there is a further gain from having more formal sector activity, and a further cost due to the loss to individuals from paying *T*. The sum of these further effects plus the revenue collected by inspectors net of their salaries must be positive, but the revenue collected from the informal sector may not be sufficient in itself to cover the cost *F*.

Assume in addition that the government can impose a time cost of H on each individual in the informal sector through creating red tape, while still collecting revenue of only *T*. Then the individual shifts into the informal sector if and only if $n_j w_j L > (1+n_j)w_j H + T$. If the government just used *H,* expected tax revenue as a function of skill levels is graphed in Figure 2. Now, the overall tax system becomes a proportional income tax but with the added efficiency cost of wasted hours H for those who do shift into the informal sector.

Even though red tape imposes costs on those in the informal sector while collecting no revenue directly, still the government may well choose to create red tape. The key gain is the resulting shift of higher skilled individuals into the formal sector, with the resulting increase in tax revenue.

In particular, starting from $H = 0$, the change in the government's objective function from a marginal increase in *H* is:

$$-\int_0^\infty \int_{T/wL}^\infty V_I (1+n) w g(w,n) dn dw + \lambda \int_0^\infty \left(\frac{s}{1-s} - \frac{T}{wL} \right) wL \frac{\partial n^*}{\partial H} g(w, T/wL) dw ,$$

where $n^* = (wH+T)/(wL-wH)$ represents the skill level just indifferent between being in the formal or the informal sectors, so that $\partial n^* / \partial H = (wL+T)/[w(L-H)^2]$.
Now costs and benefits are both weighted by *w*, compared with the equivalent terms in equation (3). This gives greater weight to individuals creating large benefits when they shift into the formal sector, yet whose marginal utility of consumption is low. It can easily occur that these two terms together are now positive, even though we no longer have the remaining term in equation (3) reflecting revenue from the tax *T*. If so, then $H > 0$.

The Gordon-Li model took the range of values of the a_j, measuring the value to each firm *j* of making use of the financial sector as exogenous. While the state of skills and technology within the financial sector are largely outside of the direct control of the government, the government does control the regulatory environment under which the financial sector operates. Changes such as providing deposit insurance, or speeding the

clearing of interbank payments, presumably will shift up the distribution of the a_j. Surprisingly, the government does not necessarily have an incentive to adopt such policies, even given the objective function we have assumed. Consider the welfare effects of an increase in the values of a_j in industries at the bottom end of the distribution, sufficient to pull firms in these industries into the formal sector. They now pay at least some taxes, in itself a welfare gain.[9] By documenting their activity with a bank, firms entering the formal sector should also now qualify for bank credit that they would not previously have had access to. This credit comes at the expense of loans to firms in industries already in the formal sector, who in this example face higher tax rates. On net, tax revenue could well fall, with the drop in payments from high-taxed sectors perhaps more than offsetting the taxes paid by firms newly entering the formal sector. When the behavioral responses lead to a fall in tax revenue, efficiency falls as well, so that such an improvement in the performance of the financial sector may not be an attractive option to the government.

Political Economy model

There are a variety of modeling approaches taken within the political economy literature to characterize the nature of the political pressures pushing towards particular policies. The approach we take is inspired by the work of Grossman and Helpman (1994), who assume that special interests that have solved their internal free-rider problem can provide "contributions" to a party in power linked at the margin to the degree to which the party aids that interest group. The result is that the government puts more weight on the utility of that interest group than it otherwise would.

To explain more perverse policies in developing countries, the presumption is then that these contributions distort policy more severely in developing than in developed countries. Distortions are least costly in the Grossman-Helpman framework when either no industries or all industries contribute, since in either case the weights remain undistorted across industries. If we assume that most all industries in developed countries actively lobby the government, then developing countries end up with worse policies if a smaller fraction of industries are able to lobby effectively.

Solving the free-rider problem within an industry is easier when there are fewer members of the group. We presume that capital-intensive industries have larger individual firms and fewer firms in the industry as a whole, so that the subset of industries able to lobby the government will largely represent the most capital-intensive sectors.

One issue, though, is how to capture the benefits going to an industry from any given government policies, since in the above model the income of any individual simply depends on the amounts of labor and capital they provide to the market, and not on which

[9] When firms just become willing to shift into the formal sector, by construction they are just indifferent. But the government receives extra revenue, so that there is a gain in overall welfare, and in efficiency.

industry they work for or invest in. In order to capture this, we instead assume that at the date that policy is being set factors cannot change industries, even if the supply of factors to their current industry can adjust in response to policy changes. In addition, for simplicity we assume that individuals work and invest in the same industry.

To capture the effects of political pressures favoring one industry over another, we then assume that the government assigns more weight to the utility of individuals working or investing in a favored industry. Let α_j capture the weight assigned to individuals working (and investing) in industry *j*, so that the objective function is now

$$\max_{\tau_2,s_1,s_2,t_K}\{\sum_j \alpha_j V_j(p_1(1+\tau_1),p_2(1+\tau_2),r_j,w_j)+\lambda(\sum_j p_j(f_j-C_j)\},$$

where we implicitly have a composite individual working for each industry. We assume that α_j is higher in more capital-intensive industries.

The resulting first-order conditions for s_k equals

$$\lambda\sum_j p_j\left(\frac{\partial f_j}{\partial s_k}-\frac{\partial C_j}{\partial s_k}\right)-\alpha_k V_{kI}\left(p_k(1+\tau_k)f_k\right)=0, \tag{4}$$

where V_{kI} denotes the marginal utility of income for the *k*'th individual.

The individuals' collective budget constraint equals
$\sum_j p_j(1+\tau_j)C_j=\sum_j p_j(1-s_j)(1+\tau_j)f_j-t_K K$, implying that

$$\sum_j p_j\left(\frac{\partial f_j}{\partial s_k}-\frac{\partial C_j}{\partial s_k}\right)=p_k(1+\tau_k)f_k+\sum_j p_j\tau_j\frac{\partial C_{jk}}{\partial s_k}+t_K\frac{\partial K_k}{\partial s_k}+p_k(s_k(1+\tau_k)-\tau_k)\frac{\partial f_k}{\partial s_k} \tag{5}$$

Substituting equation (5) into equation (4), it is straight-forward to show that

$$(1-\frac{\alpha_k V_{kI}}{\lambda})-\sum_j p_j\tau_j\varepsilon_I^{C_{jk}}\frac{C_{jk}}{I}-t_K\varepsilon_{p_k^*}^{K_k}\frac{K_k}{p_k^* f_k}=\frac{s_k(1+\tau_k)-\tau_k}{(1-s_k)(1+\tau_k)}\varepsilon_{p_k^*}^{f_k}, \tag{6}$$

where, ε_Y^X represents the elasticity of *X* with respect to Y, where
$p_k^*\equiv p_k(1+\tau_k)(1-s_k)$ and where $I=p_k^* f_k-t_K K$.

If the three elasticities in equation (6) are the same across industries, then we conclude that the effective tax rate, $s_k(1+\tau_k)-\tau_k$, should be lower in more capital-intensive industries. In particular, the first term on the left-hand side of equation (6) is smaller because the government cares more about money taken from members of capital-intensive industries, the second term will be the same for all *k* if spending patterns are the same for members of different industries, and the third term is more negative for capital-intensive industries if $t_K\geq 0$.

This forecast of a lower tax rate on capital-intensive industries is one clear difference between the political economy model and the Gordon-Li model.

This political-economy model does less well in explaining the use of tariffs. Given the optimal value of $s_m(1+\tau_m)-\tau_m$ implied by equation (6), there is a separate choice about the values of s_m vs. τ_m. Consider the welfare effects of an increase in τ_m on imports of goods produced by favored industries, with a compensating increase in s_m so as to leave $s_m(1+\tau_m)-\tau_m$ consistent with equation (6). This combined change in tax rates has no effects on the factor incomes of any individual, so does not help per se to redistribute to individuals in favored industries. It does raise the consumer price for good *m* faced by all individuals, so helps to the extent that individuals in favored industries tend NOT to consume the output from favored industries. As discussed in Saez (2002), such a tariff may also be used if a drop in consumption of good *m* leads to increases in factor supplies beyond what happens simply due to income effects.

Neither of these justifications for a tariff would exist if the utility function is weakly separable between consumption and factor supplies, e.g. $U(L,K,h(C_1,C_2))$, and if the utility function is the same for individuals in different industries. Even if these assumptions are violated, there is no reason to expect that individuals working in favored industries tend NOT to consumer output from these industries, or that factor supplies are more responsive to the prices of goods produced by capital-intensive industries. The model does not then help to explain the existence of tariffs protecting favored industries.

To what degree would subsidies to capital ($t_K < 0$) be used to aid capital-intensive industries? Even better targeted would be a subsidy to capital invested in favored industries, implemented for example through subsidized loans restricted to these industries.[10] Note that a reduction in the output tax rate, s_k, affecting favored industries is equivalent to a proportional subsidy to both capital and labor employed within this industry. When could a further subsidy just to capital in the industry be justified?

If all individuals working in the industry are equally favored in the government's objective function, whether they supply capital or labor to the industry, then a capital subsidy per se makes sense only if it has favorable efficiency effects.[11] This could occur if the supply elasticity of capital is less than that for labor or if keeping capital for

[10] To induce banks to provide subsidized credit to particular customers, explicit subsidies to such loans, or loan guarantees, would be one approach. State ownership of the banking sector, with the government covering losses incurred on subsidized loans, is another.

[11] If the government gives more weight only to capital owners in an industry, then it does have an incentive to manipulate the returns to labor vs. capital in the industry. Natural policies suggested by such an objective are subsidized loans to the industry or a tax structure within the industry favoring capital over labor income. Note, however, that the incidence of such policies does not necessarily aid capital. For example, if the supply of capital is highly elastic, as it would be in the longer run, while the supply of labor is inelastic, then labor ends up receiving the benefits of any subsidy to the industry, whether it is given to capital or labor.

personal use (and using subsidized credit instead to finance investment) implies increased demand for consumer goods subject to tariff protection. As noted by Judd (1987), while the very short-run supply of capital is extremely inelastic, the long run supply in contrast should be extremely elastic, suggesting if anything attempts to restrict taxes/subsidies to labor whenever the government has a longer time perspective.

Such an incentive to shift the tax base to labor income, however, would exist equally in both industries. This political-economy model then forecasts high tax rates on labor income in disfavored compared with favored industries, with little or no taxes on capital income and no clear forecasts about tariff rates. This result contrasts with the forecasts from the Gordon-Li model, which forecasts capital taxes as a way to focus the tax burden on firms that are most dependent on the financial sector.

If the government for some reason could not set a lower s_k (or labor-income tax rate) for the favored capital-intensive industries, however, then tariffs and capital subsidies together become a second-best way of favoring these industries. A tariff is second best since not only does it raise the returns earned within that industry but it also distorts consumer choices in ways that in general are not desired. A capital subsidy is second best since it also distorts input choices. Both in this case would be used in order to keep each unwanted distortion smaller. In contrast to the Gordon-Li model, tariff protection and subsidized credit would be given to sectors facing the lowest rather than the highest tax rates.

In the Grossman-Helpman model, lobbying depresses overall tax revenue, by raising the implicit weight on the utility of (some) individuals relative to the value attached to government revenue. This forecast of lower revenue corresponds to that in the Gordon-Li model, but arises from a very different source.

Within this setting, there are no incentives per se to use inflation – there is no motivation for use of cash beyond those in the standard model. Similarly, there are no grounds for introducing red tape and other nontax forms of harassment. If activity in unfavored sectors is to be penalized, better to do it through the tax structure and collect revenue in the process.

2. Data on behavior of poorer vs. richer countries

We turn next to an analysis of available data on tax and related policies among a group of 125 countries for which we could obtain adequate data.[12] In the Appendix, we list our data sources and the definition of the variables used in this paper. In reporting data, we have grouped these countries into four quartiles based on their GDP per capita in 1990 measured in constant 2000 U.S. dollar. Quartile 1 represents the richest countries, and quartile 4 the poorest.

[12] We would very much like to thank Andrei Shleifer for making available to us the data used in La Porta et al (2002) and Friedrich Schneider for making available to us his estimates of the size of informal economy.

We focus first on the evidence regarding forecasts from the Gordon-Li and the "political economy" models when they are the same, and then turn to forecasts that conflict between the two models.

Similar forecasts in the two models

Table 1 provides information regarding several forecasts that are comparable in the two models, even if the rationales are very different.

For one, both models forecast that tax revenue will be smaller as a fraction of GDP among poorer countries. The evidence is reported in column 2 of Table 1. Here, we find that revenue as a fraction of GDP in the richest quartile is double that in the poorest quartile, and a strongly increasing function of per capita GDP.

Another common forecast is that tariffs will be used more aggressively in poorer countries. In the Gordon-Li model, this forecast arises clearly only if the country is a net importer of capital-intensive goods.[13] In the political economy model, tariffs play an obvious role only if the country cannot help capital-intensive industries as much as it would like through differential income or sales tax rates. The evidence on tariffs is reported in column 3 of Table 1, and clearly does show that tariffs are used far more heavily in poorer countries.

A third forecast in common is that the tax structure in poorer countries will make far more use of taxes with differential rates by industry, so rely less on broad-based income taxes and more on other taxes (e.g. excise or production taxes) where rates can more easily be varied by industry. In the Gordon-Li model, tax rates will be higher on the capital-intensive industries, since they will not so quickly shift into the informal sector. In the political economy model, tax rates will be lower for capital-intensive industries, responding to their more effective lobbying efforts. So both models forecast rate differences by industry, though the direction of the forecasted rate differences are opposite.

Data on the share of (personal plus corporate) income tax revenue in overall tax revenue are reported in column 4 of Table 1. The data show much less reliance on income taxes in poorer countries. Since the value-added tax rates vary based on *consumption* of a good rather than *production* of a good, the VAT is also not as effective a way to aid particular industries as say an excise tax. In column 5 of Table 1, we report the share of revenue coming from income taxes and the VAT. Results are similar.

Unfortunately, at this point we have no data sufficient to test the conflicting forecasts between the two theories regarding which industries face lower vs. higher tax rates. While our understanding is that poorer countries rely heavily on revenue from capital-intensive industries, particularly oil, mining, and other extractive industries, where tax

[13] In standard trade models, poor countries specialize in labor-intensive industries, so should be importers of capital-intensive goods.

collection is particularly easy, we have not at this point found data to confirm this impression.

Both models also suggest that poorer countries could well use state-owned banks as a mechanism to provide cheap credit to capital-intensive firms. In the Gordon-Li model, this is done to redirect credit to sectors paying high tax rates. In the political-economy model, this is done to aid favored sectors, which also pay low tax rates. As seen in column 6 in Table 1, the fraction of the ten largest banks owned by the government is substantially higher in poorer than in richer countries, though state ownership of banks is still nontrivial even in rich countries. No data are available on whether firms receiving subsidized loans pay unusually low or unusually high tax rates.

Both models to some extent forecast more state ownership of firms in poorer countries. In the Gordon-Li model, the government may take over ownership of the most capital-intensive firms, to ensure that they continue to invest in spite of the high tax rates they face. In the political economy model, a government take-over of a sector may provide an easier means to aid workers in the sector, and depending on the method of nationalization may have helped capital owners in the industry as well. Data on the fraction of output produced by state-owned firms are listed in column 5 of Table 2, and do show more state ownership in poorer countries.

Contrasting forecasts in the two models

One clear difference in the forecasts from the two models regards the tax treatment of capital. The Gordon-Li model forecasts positive taxes on capital, in order to shift the tax burden onto the firms that are least likely to shift into the informal sector in response. The political economy model can forecast subsidies to capital as an indirect way to aid capital-intensive industries if more direct ways are not so readily available. We presume that the corporate income tax represents the main tax on income from capital and report the share of revenue coming from the corporate income tax in column 1 of Table 2. This share shows a weak pattern of being higher in poorer countries, but the evidence is not dramatic.

Another forecast that differs across the two models regards inflation. The Gordon-Li model forecasts inflation as a way to tax the informal sector, since it represents the only sector relying heavily on cash transactions. The political economy model follows the conventional optimal tax model in forecasting no use of an inflation tax. The size of seignorage as a fraction of GDP is reported in column 2 of Table 2. Here we do find that poorer countries rely far more heavily on inflation taxes than do richer countries.

A further difference regards the use of red tape to hinder activity in labor-intensive sectors, and in the informal sector. Such policies fall out naturally in the Gordon-Li model as ways to deal with sectors that pay little or no taxes since they can easily shift into the cash economy. In the political economy model, regular income and sales taxes dominate use of red tape. In columns 3 and 4 of Table 2 we report data on two indicators

of red tape: a) the cost to register a new business, and b) the time required to start a business legally. Both types of costs are clearly higher in poorer countries.

The two models focus on very different attributes of an economy in making forecasts for policy. In the Gordon-Li model, the driving force is a poorly functioning financial sector, making it all too easy for firms to shift into the cash economy in order to avoid taxes. We should then see poorer countries having much larger informal sectors, because of their more poorly functioning financial sectors. In the political economy model, rather than having the small firms that tend to constitute the informal sector being de facto tax exempt, taxes should fall primarily on these firms. Data on the size of the informal sector are reported in column 5 of Table 2. The size of the informal sector as a fraction of GDP in the poorest quartile is more than double that in the richest quartile.

To test for evidence that the informal sector tends to be large when the financial sector functions poorly, we ran a regression forecasting the size of the informal sector as a function of one or another indicator of the quality of the financial sector, along with log(per capita GDP), average literacy, and population density as control variables. Results are reported in Table 3. A poorly functioning financial sector strongly predicts a large informal sector, whereas the other control variables play little role.

In the political-economy model, the key driving force of course is political lobbying pressures leading governments to favor one sector over another. If politics is playing such a dominant role in the choice of tax policy, then we would expect to see very different tax policies chosen by governments that are classified as left-wing vs. right-wing. To provide some evidence on this, we recalculate the figures on tax policy reported in Table 1, instead classifying countries into four quartiles based on their ideological orientation with quartile 1 being the most right-wing and quartile 4 being the most left-wing. Here, we find that ideology has no obvious connection to tax policy, except perhaps for a higher reliance on tariffs by the most left-wing governments.

3. Conclusions

Tax policies in practice differ dramatically between poorer and richer countries. Richer countries rely primarily on broad-based income and consumption taxes, and make little use of tariffs or seignorage as sources of revenue. Poorer countries, in contrast, make much less use of broad-based taxes, relying instead on excise taxes and other taxes on production, as well as on tariffs and seignorage. In the process, though, they collect much less revenue as a fraction of GDP than is collected in richer countries. Corruption and red tape are also far more common in poorer countries.

The question this paper focuses on is why these policy differences arise. We develop the implications of two alternative models for such policy differences. One, a model initially developed in Gordon-Li (2005), focuses on the tax enforcement problems that arise when firms find it easy to shift into the cash economy, thereby avoiding leaving any paper trail and making tax enforcement extremely difficult. The government is then left relying for

revenue on the remaining industries that cannot so easily shift into the cash economy to evade tax. With such large differential tax rates, a wide range of other policies may make sense as second-best means to lessen the resulting misallocations. Within this model, the policies forecast are "third" best, handling as well as is feasible the informational problems faced in collecting revenue.

The second model assumes that the political pressures faced in poorer countries are very different than in richer countries, leading to a very different set of policy choices. If particular industries in poorer countries have been able to lobby the government effectively for protection, then the chosen policies can be very different than when political support for the government is more broad-based, at least across industries. If such political pressures explain the perverse policies chosen in poorer countries, then there are clear grounds for using international agencies to help induce countries to shift to policies more in the interests of their population as a whole.

In this paper, we explore the implications of such a political-economy model in detail, building on the framework developed in Grossman-Helpman (1994). While such a model easily forecasts more favorable sales tax rates or income tax rates on labor and capital employed in favored industries, it does not so easily explain tariffs, seignorage or red tape. Only if sales or income tax rates cannot vary by industry to the extent desired might tariffs make sense.

The paper then reexamines the data to see to what degree each model is consistent with the data. Some forecasts are naturally in common, since both models were developed to explain certain aspects of the data. Other forecasts are very different. Unfortunately, some of the key differences are not at this point testable, e.g. the Gordon-Li model forecasts that the highest tax rates will be paid by capital-intensive industries (that find it hardest to shift to the cash economy), whereas in the political economy model these industries should face the lowest tax rates (since they can most easily solve the internal free-rider problems and lobby the government for support).

The paper instead examines data related to the key underpinnings of each model. In the Gordon-Li model, a weak financial sector implies that little is lost by a firm from shifting to the cash economy as a means of evading taxes. Countries with a poorly functioning financial sector should then as a result have a large informal economy, and with a large informal economy choose a "perverse" tax structure to deal with the resulting pressures. We document both such relationships.

In the political-economy model, tax policy should depend heavily on the nature of the political pressures faced by the government. Left-wing governments represent ones that face very different pressures than right-wing governments, so should choose very different tax policies. We examine to what degree this is true, and find little difference in tax policies across governments of different ideologies.

The data at this point are limited, so no tests are definitive. That the implications of the two models for policy are so different implies that much is at stake in such tests. Within

the political-economy model, the key problem is "simply" the nature of the political process. Democratic reforms, or controls limiting lobbying power, should be key in generating tax policies more in line with those seen in the richest countries, while outside pressure to adopt more conventional tax policies can aid the population as a whole. In the Gordon-Li model, in contrast, the key problem is a weak financial sector, making tax evasion easy. Reform efforts then need to focus on improving the quality of the financial sector. Outside pressure to shift to more conventional tax policies, without simultaneously improving the financial sector, will likely cause more harm than good.

There certainly is a large body of empirical work at this point suggesting the importance of financial sector reforms in economic growth. The Gordon-Li model provides a different underpinning for the role financial reform plays, arguing that financial reform improves not only the allocation of credit across firms but also induces a shift in government policies more broadly to ones that create fewer distortions to market allocations.

References

Beck, Thorsten, Asli Demirgüç-Kunt and Ross Levine, (1999), "A New Database on Financial Development and Structure," Policy Research Working Paper No. 2146, Washington DC: World Bank.

Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. 2001. "New tools in comparative political economy: The Database of Political Institutions." 15:1, pp. 165-176, *World Bank Economic Review*.

Diamond, Peter and James Mirrlees. 1971. "Optimal Taxation and Public Production," *American Economic Review* 61, pp. 8-27.

Djankov, Simeon, Rafael La Porta, Florencio Lopez de Silanes, and Andrei Shleifer. 2002. "The Regulation of Entry," *Quarterly Journal of Economics,* February.

Friedman, Milton. 1969. "The Optimal Quantity of Money." In *The Optimal Quantity of Money and Other Essays,* edited by Milton Friedman. Chicago: Aldine Publishing Company.

Gordon, Roger and Wei Li. 2005. "Tax Structure in Developing Countries: Many Puzzles and a Possible Explanation," NBER Working Paper No. 11267.

Grossman, Gene and Elhanan Helpman. 1994. "Protection for Sale," *American Economic Review* 84, pp. 833-50.

La Porta, Rafael, Florencio Lopez de Silanes, and Andrei Shleifer. 2002. "Government Ownership of Banks," *Journal of Finance*, February.

International Monetary Fund. 2004. *Government Financial Statistics*, CD-ROM (May).

International Monetary Fund. 2005. *International Finance Statistics*, IFS Online, accessed between February and April 2005.

Judd, Kenneth. 1987. "The Welfare Cost of Factor Taxation in a Perfect-Foresight Model," *Journal of Political Economy* 95, pp. 675-709.

Saez, Emmanuel. 2002. "The Desirability of Commodity Taxation under Non-linear Income Taxation and Heterogeneous Tastes," *Journal of Public Economics* 83, pp. 217-30.

Schneider, Friedrich and Dominik Enste. 2000. "Shadow economies: Size, causes, and consequences," *Journal of Economic Literature* 38/1, pp. 77-114.

Schneider, Friedrich. 2004. “The Size of Shadow Economies in 145 Countries from 1999 to 2003,” mimeo, Johannes Kepler University of Linz, Austria.

World Bank. 2005. *World Development Indicators*, WDI Online, accessed March and April, 2005.

Figure 1

Expected Tax Payments vs. Individual Ability
(Fees assessed on informal sector)

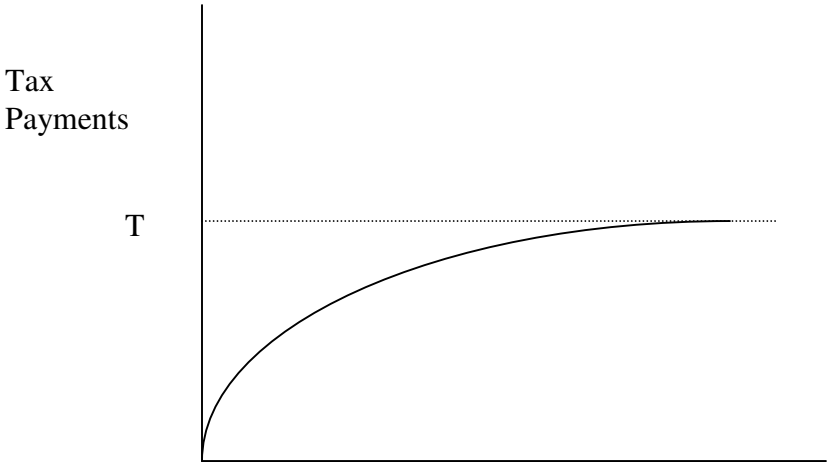

Figure 2
Expected Tax Payments vs. Individual Ability
(Red Tape imposed on informal sector)

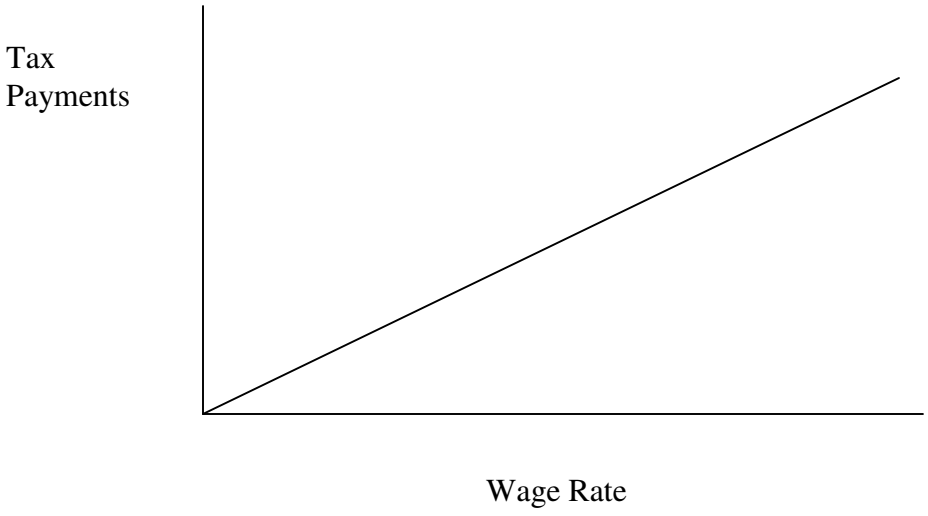

Table 1
Tests when Forecasts are Similar

Countries are classified by GDP per capita in 1990 into four quartiles with Quartile 1 the richest and Quartile 4 the poorest. The number in each cell is the average of each listed variable among countries in each income quartile.

	GDP per capital in 1990 (2000 $)	Tax Revenue (% of GDP, 1990-2001 average)	Tariff Revenue (% of GDP, 1990-2001 average)	Income taxes (% of revenue, 1990-2001 average)	Income Taxes + VAT (% of revenue, 1990-2001 average)	Government Ownership of Banks, 1995	SOE Output % of GDP
Quartile 1	20768	26.6	6.0	39.1	56.5	24.2%	0.1
Quartile 2	3834	21.4	17.7	31.9	45.9	40.5%	1.8
Quartile 3	1451	17.5	22.3	25.2	31.7	47.0%	1.5
Quartile 4	436	13.3	28.8	23.7	29.7	67.2%	8.4

Table 2
Tests when Forecasts Differ

Countries are classified by GDP per capita in 1990 into four quartiles with Quartile 1 the richest and Quartile 4 the poorest. The number in each cell is the average of each listed variable among countries in each income quartile.

	Corporate Income Taxes (% of tax revenue, 1990-2001 average)	Seignorage (% of GDP, 1990-2001 average)	Cost to Register a Business (% of GNI per capita, 2001-02 average)	Time to Start a Business (days, 2001-02 average)	Informal Economy (% of GDP, 1990/91)
Quartile 1	9.5	0.5	0.11	32	13.5
Quartile 2	17.9	1.7	0.21	57	26.9
Quartile 3	14.2	2.1	0.50	63	34.2
Quartile 4	14.2	2.3	1.97	66	28.8

Table 3
Factors Affecting Size of Informal Economy

Columns (1) and (2) show estimates of coefficients and their standard errors resulting from ordinary least squares regressions on the cross-section of countries. The dependent variable is the size of informal economy in 2001. Numbers in parentheses are standard errors. *** indicates 1% level of significance, while * indicates 10% level of significance.

	(1)	**(2)**
Overhead costs	2.12 (0.059)***	
Interest rate spread		1.28 (0.52)***
Log(GDP per capita)	-0.021 (0.014)*	-0.020 (0.016)
Adult literacy rate	-0.122 (0.093)	-0.063 (0.095)
Log(population density)	-0.002 (0.01)	-0.004 (0.01)
Number of observations	64	64
Adjusted R^2	0.261	0.181

Table 4
Tests for Role of Ideology in Tax Policy

Countries are classified into four quartiles by the average ideological orientation of the chief executive's party in the period 1980 to 1989 with Quartile 1 the most right-wing and Quartile 4 the most left-wing. The number in each cell is the average of each listed variable among countries in each income quartile.

	GDP per capital 1990 (2000 $)	**Tax Revenue (% of GDP)**	**Tariff Revenue (% of GDP)**	**Income taxes (% of revenue)**	**Income Taxes + VAT (% of revenue)**
Quartile 1	6956	20.0	15.8	31.9	45.6
Quartile 2	10778	22.3	13.6	36.2	48.9
Quartile 3	8465	23.9	11.3	31.7	48.3
Quartile 4	2556	17.7	26.3	30.5	46.1

Appendix
Description of the variables

Variable name	Description and source
	Taxation
Tax revenue (% of GDP)	Tax revenue (GFS line 11) as a proportion of GDP, average for the period 1990 to 2001. Source: Authors' calculation based on IMF (2004), *Government Finance Statistics* (May 2004 CD-ROM).
Tariff revenue (% of GDP)	Taxes on international trade and transactions (GFS line 115) as a proportion of GDP, average for the period 1990 to 2001. Source: Authors' calculation based on IMF (2004), *Government Finance Statistics* (May 2004 CD-ROM),
Income taxes (% of revenue)	Sum of personal and corporate income taxes (GFS line 1111 and 1112) as a proportion of tax revenue (GFS line 11), average for the period 1990 to 2001. Source: Authors' calculation based on IMF (2004), *Government Finance Statistics* (May 2004 CD-ROM).
VAT (% of revenue)	Value-added taxes (GFS line 11411) as a proportion of tax revenue (line 11), average for the period 1990 to 2001.
Corporate income taxes (% of revenue)	Corporate income taxes (GFS line 1112) as a proportion of tax revenue (GFS line 11), average for the period 1990 to 2001. Source: Authors' calculation based on IMF (2004), *Government Finance Statistics* (May 2004 CD-ROM).
Seignorage (% of revenue)	Seignorage is measured as the increase in reserve money (IFS line 14). Source: Authors' calculation based IFS On-Line published by the International Monetary Fund, accessed between February and April 2005.
	Regulation of Entry
Cost to Register a Business (% of GNI per capita)	The cost of obtaining legal status to operate a firm as a share of per capita GNI, average for 2001 and 2002. It includes all identifiable official expenses. Source: World Development Indicators 2005 On-Line Edition, accessed in March and April, 2005. For data methodology, see Djankov, La Porta, Lopez-de-Silanes and Shleifer (2002).
Time to Start a Business (days)	The time it takes to obtain legal status to operate a firm, in business days, average for 2001 and 2002. Source: World Development Indicators 2005 On-Line Edition, accessed in March and April, 2005. For data methodology, see Djankov, La Porta, Lopez-de-Silanes and Shleifer (2002).

	Informal economy
Size of informal economy (% of GDP)	Measured as the size of shadow economy estimated by Schneider (2004), using methodology documented in Schneider and Enste (2000). Estimates for 1990-91 and 2001-02 are used in this paper.
	Government ownership
Government ownership of banks in 1995	Share of the assets of the top 10 banks in a given country owned by the government of that country in 1995. Source: La Porta, Lopez-De-Silanes and Shleifer (2002)
SOE output (% of GDP)	SOE value added of all non-financial SOEs as a proportion of GDP of the economy at market prices, average for the period 1978 to 1981. Source: The World Bank (1995), La Porta, Lopez-De-Silanes and Shleifer (2002).
	Quality of the financial sector
Overhead costs, 1980-89	Accounting value of a bank's overhead costs as a share of its total assets, average for the period 1980 to 1989. Source: Beck, Demirgüç-Kunt and Levine (1999), updated data published March 14, 2005.
Interest rate spread, 1980-89	Accounting value of bank's net interest revenue as a share of its interest-bearing (total earning) assets, average for the period 1980 to 1989. Source: Beck, Demirgüç-Kunt and Levine (1999), updated data published March 14, 2005.
	Ideology
Right wing ideology, 1980-89	Average of the ideological orientation of the chief executive's party for the period 1980 to 1989. The ideological orientation is coded as 1 for right, 0 for center, and -1 for left.
	Other variables
GDP per capita, 1990	GDP per capita in 2000 constant dollar, converted using market or official exchange rate. Source: World Development Indicators 2005 On-Line Edition, published by the World Bank, accessed in March and April, 2005.
Adult literacy rate, 1980-89	Percent of people ages 15 and above who are literate, average for the period 1980 to 1989. Source: World Development Indicators 2005 On-Line Edition, published by the World Bank, accessed in March and April, 2005.
Population density, 1980-89	Number of people per square kilometer, average for the period 1980 to 1989. Source: World Development Indicators 2005 On-Line Edition, published by the World Bank, accessed in March and April, 2005.