Public Finance and Economic Development: 
Reflections based on the Experience in China

by

Roger H. Gordon*
UCSD

Public finance pressures are a central consideration in the policy debate over how best to stimulate growth in developing countries. The fiscal pressures are "simple": little tax revenue and high public expenditure needs. According to IMF figures, tax revenue as a fraction of GDP is roughly half as large among developing vs. developed economies. Yet the needs for public expenditures are much higher among developing economies. The existing infrastructure in poorer countries (e.g. roads, telecommunications, and port facilities) is so poor as to seriously limit economic growth, as does the poor education and health of their workers. Raising tax rates in order to generate additional revenue to finance these needed expenditures, however, can induce so much shifting of economic activity into the informal sector as to undercut any revenue gains. Fiscal problems as a result seriously hamper economic growth in poorer countries.

The low tax revenue in poorer countries reflects a narrow tax base, largely confined to imports, natural resources, and manufacturing. As described in section 1, this narrow tax base reflects the problems faced in poorer countries in monitoring economic activity, given the large potential size of the cash economy.

One type of response to this narrow tax base is to adopt any of a range of policies that shift more of the economy into the sectors where tax collection is easier. Such policies, described in section 2, include tariffs protecting the industries that face the highest tax rates, control over the allocation of credit and foreign exchange so as to favor these industries, policies such as license and registration fees focused on firms that otherwise pay little in taxes, and an inflation tax on the cash economy.

While these policies can be defended on second-best grounds, since they help compensate for tax distortions that unduly discourage activity in the more heavily taxed sectors, they also discourage the entry and growth of new firms that may be a key source of economic growth. Particularly if the potential rate of economic growth is high, countries could well consider the opposite direction for policy of sharply easing restrictions on the entry and growth of new firms. The most dramatic example of this alternative approach is in China. Starting in the early 1980's, China sharply scaled back existing restrictions on the entry and growth of new firms. The result was rapid growth,

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but also a sharp drop in tax revenue as a fraction of GDP: tax revenue fell from 31% of GDP in 1978 to 10% of GDP by the mid 1990's.

The objective of this paper is to examine this tension between current tax revenue and economic growth, trying to draw general lessons from the experiences in China. One immediate question is how China managed to induce such rapid growth in response to market liberalizations, given the mixed experiences elsewhere, particularly in Eastern Europe following a similar set of economic reforms there. China's protection of existing producers from a loss in markets and funding under the economic reforms was a key element preventing an economic downturn there. The resulting stable macroeconomic environment then provided an attractive opportunity for new entrants. The role of such partial reforms is described in section 3. Section 4 then describes why such reforms led to such a steep fall in tax revenue.

The main question the paper then focuses on is how China dealt with the fall in tax revenue, and the lessons for other developing countries. The choices are stark: use debt finance to replace lost tax revenue and hope to repay the debt out of future tax revenue, cut expenditures, or maintain expenditures where possible through user fees or private provision. China focused on this last option of user fees. The implications of each options are laid out in section 5 (debt), section 6 (cut in expenditures), and section 7 (user fees).

What if debt is issued to replace the lost tax revenue, in order to continue to finance essential educational services and infrastructure investments? If tax revenue will increase in the near-enough future due to the resulting economic growth, then the government and lenders may both hope that this debt can successfully be repaid without any future cutback in services, cutbacks that the debt was trying to avoid. The basic threat is that the resulting economic growth will not be strong enough and fast enough to generate additional tax revenue sufficient to repay the debt. If and when these fears materialize, lenders will seek a quick repayment of their debt, bringing on a financial crisis with all of the associated economic costs. We argue below that this threat of a financial crisis is likely to be high unless countries start with a per capita GDP higher than exists in virtually all developing countries.

A second possible response to the fall in tax revenue is simply to cut government expenditures. There are compelling problems with this approach. For one, the resulting cutbacks in investment in infrastructure and education can directly undermine economic growth. This policy response also likely undercuts the political support for the economic reforms from both government officials and poorer residents. Government officials presumably care about the size of the budget they oversee, as well as about the welfare of residents. If future tax revenue is insufficient to compensate for lost current tax revenue, as would be the case if debt finance isn't a feasible option, then it certainly is not sufficient to compensate officials who care about the size of the budget they oversee while in office --- officials will have an implicit discount rate much higher than the interest rate since they may not remain in office. Even if officials remain supportive of
the reforms, poorer residents in particular lose from the cutbacks in expenditures, and their discontent can threaten social and political stability.

A third response, and largely the one that China followed, was to employ user fees to finance education, health care, and critical infrastructure projects. In the case of infrastructure, the government contracted with private firms to construct the needed projects in return for user fees for a given number of years. Schools and health clinics imposed fees on students and patients to help finance their operations. With control over the allocation of contracts as well as control over tax revenue, officials should be particularly supportive of this response to the fall in revenue. However, as with "doing without", this approach likely generates political opposition from the poor, who still suffer from the change, now due to increased fees rather than reduced access. While China has been able to ride out the thousands of resulting political demonstrations, most countries would likely find this approach politically unsustainable. There are many examples of populist governments being elected based on the political support from those who lose from the economic reforms, leading to an end to the reforms.

In response to the drop in tax revenue, policy then needs to steer between the Sylla of a financial crisis and the Carybdis of a populist government ending the reforms. Section 8 discusses options for trying to protect tax revenue, so as to ease these competing threats, while still encouraging entry and growth of new firms. Here, the Chinese approach of trying to protect the key sectors that were its primary source of tax revenue provides an interesting example of such a partial reform. This protection gradually eased as the government was increasingly able to collect revenue from a broader part of the economy. The partial reforms in China then not only helped in generating the initial growth but also helped in protecting future tax revenue, in both cases increasing the chance of success of the economic reforms.

Section 9 then provides a summary and conclusions.

1. Why such a narrow tax base among developing countries?

According to IMF figures, overall tax revenue in developing countries, as a fraction of GDP, is roughly half of that seen among developed countries. Figure 1 summarizes this IMF data on tax revenue as a fraction of GDP, broken down by per capita GDP, expressed in real 1995 US$.1 Here, we find that tax revenue is roughly stable, averaging 17% of GDP, until per capita GDP reaches roughly $10,000. Tax revenue then grows steadily to over 37% of GDP as per capita GDP grows to around $20,000, and then reaches a plateau. Apparently, as per capita productivity improves from $10,000 to $20,000, the government's ability to monitor economic activity improves quickly.

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1 I would like to thank Michael Keen for making these data available to me. Currency conversions are based on purchasing-power parity.
Yet, Gordon and Li (2005) find in a sample of 45 developed and developing economies that average statutory tax rates are remarkably similar among developing vs. developed economies. Together these figures imply that the tax base is much narrower in developing economies.

This narrow tax base arises in part because some firms are totally outside the tax base. According to the figures reported in Schneider and Enste (2000), the informal sector among poorer countries is roughly 35% of GDP, compared with an average among richer countries of about 15%.

These figures for the size of the informal economy, though, are not in themselves sufficient to explain the low tax revenue in developing countries. Evasion among firms in the formal economy must also be much higher among developing countries.

Why do poorer countries face such difficulties in enforcing their tax codes? Evasion is much easier when transactions take place in cash, to the point that the informal economy is often referred to as the cash economy. Cash sales leave no paper trail, so no evidence that the government can use to document a taxable transaction. When financial intermediaries are used instead for a transaction, bank records provide a back-stop source of information that the government (and private auditors) can use to double-check the reported sales and expense figures provided by firms. Some firms may operate entirely in the cash economy, but others may still hide substantial activity through cash transactions.

If firms de facto become taxable to the extent that they make use of financial intermediaries, then they must trade off these tax costs from use of financial intermediaries with any real economic benefits provided. The lower use of financial intermediaries in developing economies suggests that firms and individuals receive less value-added from use of these intermediaries. Perhaps the intermediaries are less productive, or perhaps the types of firms that are prevalent in poorer countries may have less need for financial intermediation. Banks may be more important, for example, to firms that are more capital intensive, since a firm’s use of a bank provides the bank documentation of the firm’s activity that hopefully is sufficient to induce the bank to help finance the firm's capital investments. A larger firm should receive greater value from use of a bank since its customers are more likely to be located at some distance, and banks help intermediate payments at a distance. Larger firms may also be less able to protect against theft of cash that accrues within the firm. Plausibly firms in poorer countries tend to have less need of capital investment and to rely primarily on local customers.

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2 If the shadow economy were the only explanation for lower tax revenue in developing countries, then tax revenue should equal \(0.65/0.85 = 76\%\) of the value in developed economies, as a percent of GDP, rather than under 50%.

3 If the formal sector as a fraction of the economy is 76% as large in poorer than in richer countries, tax rates are comparable, but tax revenue is only half as large, then a quick estimate of the evasion rate in the formal sector in developing countries is \(1 - 0.5/0.76 = 34\%\).
These pressures were reflected in the Chinese policies throughout the reform process. Prior to the reforms, the Chinese banned new entrants. When new entrants were allowed, following the beginning of the reform process, the national government ceded to local governments the control over collecting tax revenue from these firms. The available evidence suggests that local governments hid firm profits from the national government, colluding in helping these firms evade national taxes.

Financial intermediaries provide information to the government not only about firm activity but also about household savings. A comparable set of pressures exists in trying to tax household savings based on bank deposits, whether directly or implicitly through financial repression. The threat is that savings is withdrawn and invested in ways that the government cannot monitor, e.g. personal loans to firms operating in the cash economy or investment through an informal banking sector that does not share information with the government.

2. Possible policies to increase tax revenue

The tax base for the national government in China as in other poorer countries was largely confined to imports, natural resource industries, and manufacturing, particularly heavy industry. Imports in most countries can be monitored directly at the ports of entry. Natural resource extraction is relatively easy to monitor, given the fixed location and homogenous product. Manufacturing firms have a visible capital stock and often a high capital/labor ratio, so that the government has readily available information about the scale of operation of the firm. Manufacturing firms also are pressed to make use of the financial sector in order to facilitate trade over a broad geographic area, to avoid keeping excess cash within the firm where it might be stolen by employees, and to provide banks sufficient evidence of their activity to gain approval for bank loans to finance needed capital.

The tax structure chosen can strongly be affected by these limitations on the government's ability to monitor the economy, as argued in Gordon and Li (2005). To begin with, tax rates can vary by sector, with higher rates in those sectors that can less easily operate in the cash economy. To the extent that capital-intensive firms gain more from use of the financial sector, then capital taxes further help shift the tax burden towards those firms that can less easily operate in the cash economy. Labor taxes in the formal sector instead shift the tax burden towards those firms that can most easily shift to the informal sector.

Other sectors of the economy, including services, wholesale and retail trade, transportation, and agriculture, are commonly much harder to tax. Here, firms can more easily operate in the informal economy, avoiding tax entirely. For those that do choose to be part of the formal economy, this choice could easily change if the effective tax rate they face increases. The degree to which they evade taxes even while remaining part of

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4 This section draws heavily on Gordon and Li (2005).
5 Diamonds would be an obvious exception here.
the formal economy can also be sensitive to tax rates. This threat of activity shifting into
the informal economy keeps effective tax rates low in these sectors.6

Poorer countries, though, often do not have a comparative advantage in manufacturing,
since most manufacturing is technology intensive and relies on skilled labor for the
design, operation, and oversight of the sophisticated capital stock. With unrestricted
trade, the manufacturing sector in poorer countries would then atrophy, leading to a loss
of the country's tax base.7

Poorer countries face pressures to impose tariffs on manufacturing imports equivalent in
burden to the differential burden from all taxes imposed on domestic manufacturing
compared to other sectors.8 Other policies that shift economic activity from lightly taxed
to more heavily taxed industries can also make sense on second-best grounds. The
existing differential tax rates lead to too little activity in the more heavily taxed sectors,
so that any shift in activity towards these heavily taxed sectors in itself generates an
efficiency gain. Policies that generate such a shift include restrictions on entry of new
firms, particularly in the industries where the larger existing firms are an important
source of tax revenue, fees of various sorts on firms that are otherwise difficult to tax,
inflation as an implicit tax on the cash economy, control over the allocation of credit so
that the credit largely goes to the most heavily taxed sectors, and even perhaps
comparable controls over the allocation of foreign exchange.9 Countries may also
choose to restrict the operations of multinationals in industries where it is easy to tax
domestic firms, since multinationals can much more easily evade tax through transfer
pricing and other mechanisms. These policies implicitly attempt to offset the existing tax
distortions penalizing the sectors that are easier to tax, providing a second-best
justification for these interventions.

With the extra tax revenue generated by these policies, governments are able to finance
more infrastructure, more education, and other additional valued public services. These
extra services benefit firms as well as households, adding to productivity.

3. Market reforms to encourage growth

New firms likely generate externalities to the economy through testing new technologies,
new products, or new forms of organization, compared to those in current use in the
country. Successful firms will quickly be imitated while unsuccessful firms provide a

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6 See, for example, Piggott and Whalley (2001) and Emran and Stiglitz (2005) for further discussion.
7 With globalization, this pattern has become less true, with labor-intensive assembly occurring in poorer
countries even if the rest of the manufacturing process continues to be pursued in more developed
economies.
8 This would occur automatically under a VAT if the VAT is the only tax that applies to domestic
manufacturing firms.
9 In each case, these policies do not directly eliminate the differential in tax rates by sector, and create their
own distortions, limiting the extent of their use.
role model for other firms about what not to do. In either case, incentives encouraging entry of potential entrepreneurs can be too low. Externalities from new entrants are plausibly a major source of economic growth.

Policies that inhibit entry then reduce economic growth. Market reforms that ease the barriers restricting the entry of new firms, e.g. reduce the "license Raj," should then increase rates of innovation and growth. These reforms would be reinforced by further reforms that allow credit to be allocated by market forces, that eliminate tariff protection for the firms that had constituted the tax base, and that cut the inflation rate.

China undertook such reforms starting in the early 1980's. The result was a rapid rate of entry of township and village enterprises, collectives, and other permitted forms of new entrants. Aggregate growth rates reflected the benefits from this rapid rate of entry and innovation.

One immediate question is why these market reforms were so successful in China, whereas comparable reforms elsewhere, for example in Eastern Europe and in the former Soviet Union, were instead associated with a sharp economic downturn. One suggestive element of the Chinese reforms is that the planned allocations, requiring a given amount of output from firms and providing them a given amount of inputs, were left in place, preventing any fall in output due to the reforms. Existing firms, though, could take advantage of new market opportunities to increase output, and new firms could enter to take advantage of the same opportunities.

Without this floor on existing output, the end of protection for existing firms would for various reasons be expected to lead to a sharp fall in output from these existing firms. Li (1999) explores one reason for such a fall: Existing firms often have substantial monopoly power. With new freedom to choose levels of production, they will take full advantage of this market power.10

In addition, existing firms can expect quickly to become unprofitable, facing new competition from imports and more lightly taxed new entrants. Given these expectations, they would stop investment and new hiring, and may shed workers in anticipation of such drops in demand. The resulting fall in incomes among those working in existing firms will likely occur far more quickly than any rise in incomes from employees in new entrants. The associated economic downturn can make many of the potential new entrants unprofitable, given the resulting lack of a domestic market for their products.

The partial reform in China, allowing new entry and new production from existing firms but no drop in output from existing firms, may then have played a key role in generating the high growth seen in response to the reforms in China.

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10 When one monopoly sells to another, in vertical chains of production, the result is a drop in output even below the level that would be chosen by a single monopoly.
4. Implications of market reforms for tax revenue

An economic reform that relaxes restrictions on entry of new firms should of course lead to new entry. Yet, at least in poorer countries, these new entrants largely operate in the cash economy, and to that extent are not part of the tax base.

In China, they instead largely operated under the control of local governments. While these local governments did seem able to monitor and tax these new entrants, in part perhaps by forcing these new entrants to employ someone who would directly monitor the activity of the firm, the national government was not able to monitor these firms and received relatively little revenue from the new entrants.

The resulting shift of economic activity out of the formal sector inevitably leads to a fall in tax revenue. The new entrants directly compete with the firms in the formal sector, leading to lower market prices and higher costs of inputs, lowering the profits in the formal sector.

In short, with the market reforms, economic activity can much more readily respond to the differential tax rates faced in the formal and informal sectors, leading to a jump in the resulting efficiency costs from these tax distortions and a fall in tax revenue.

The fall in tax revenue in China was dramatic as seen in Figure 2. This figure replicates the graph in Figure 1 of tax revenue/GDP as a function of real GDP, but using IMF International Finance Statistics data solely for China, for 1978-2003. Prior to the reforms, tax revenue/GDP was over 30%, so much higher than the average among other developing countries, presumably due to the more intense controls in pre-reform China. As the reforms were phased in, first in agriculture and then in other sectors, tax revenue fell to virtually half of the average in other developing countries, presumably due to a shift to having much weaker controls than elsewhere. As per capita GDP has grown, though, tax revenue/GDP has started to recover, roughly in line with the pattern seen in Figure 1.

Only future research can judge to what extent this forecasted fall in tax revenue when barriers to entry of new firms are eased is a general phenomenon, occurring not just in China. Part of the difficulty in judging this is that "market reforms" are very heterogeneous. The key reason why revenues would be expected to fall is newly available opportunities for resources to shift from the formal to the informal sector, given an easing of controls on new entrants. In contrast, for example, reforms that shift from nontariff to tariff barriers should per se raise tax revenue while not changing the incentives for activity to occur in the formal vs. informal sectors. Similarly, a shift from excise taxes and tariffs to a VAT should leave revenue and formal vs. informal activity unchanged, at least ignoring changes in relative tax rates across industries.
5. Reduced tax revenue offset by debt finance

How should a country deal with the resulting fall in revenue? One possible response to the drop in government revenue is to borrow in order to replace the lost tax revenue, with the hope that the economic growth induced by market-oriented reforms will generate extra tax revenue in the future sufficient to repay this debt. Without such growth in future tax revenue, the government will be forced to cut future expenditures even when it found it politically too difficult to cut current expenditures, making the promised repayment of dubious credibility.

If successful, such borrowing allows the government to maintain its rate of investment in infrastructure and education, and maintain existing transfers to the poor. Maintaining political support for the reforms may in fact require not just constant but growing expenditures, relative to GDP, given the extra volatility in individual incomes brought on by a major change in government policies and the likely initial losses experienced by the poor as a result of the reforms. Economic growth may also lead to bottlenecks in the existing infrastructure, generating demand for additional infrastructure in response. This extra investment would require increased borrowing.

The risk when undertaking such borrowing is that the hoped for growth does not materialize, at least fast enough to maintain the confidence of investors that they will ultimately be repaid. When new information makes investors less certain about eventual repayment, the country faces the risk of a financial crisis, with potentially high resulting costs.

When would it be plausible that future economic growth will yield sufficient tax revenue to repay the money borrowed? Consider the following back-of-the-envelope calculations, based on a stylized summary of the data in Figure 1. Assume in particular that tax revenue (and expenditures) as a fraction of GDP equals 19% for countries with GDP below $10,000 that maintain controls restricting entry of new firms, as we presume is the norm for these countries.11 If economic reforms are introduced, eliminating a range of controls that had been in place to protect the government's tax base, assume that tax revenue falls to \( \alpha \% \) of what it would have been otherwise. (Recall that tax revenue fell to one third of its pre-reform level in China.) If tax revenue remains at this new fraction of GDP, then the present value of tax revenue equals \( 19\alpha Y/(r - g) \) due to the reforms, assuming a real growth rate under the reforms equal to \( g \) and a real interest rate equal to \( r \). If expenditures are to remain at 19% of GDP, then the long-run fiscal deficit has a present value of \( 19(1 - \alpha)Y/(r - g) \).

Debt finance is then sustainable only if growth leads to an increase in the tax base sufficient in present value to finance this deficit. Drawing on Figure 1, assume not only

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11 This figure (and the 37% figure used below) represents the fractions of GDP collected in tax revenue just below $10,000 (just above $20,000) GDP per capita, according to the IMF data.
that tax revenue as a fraction of GDP falls at the date of the reform from 19% of GDP to \(19\alpha\)% of GDP, but that it remains at this lower level as long as GDP per capita is below $10,000, grows from \(19\alpha\)% to 37% of GDP as per capita GDP grows from $10,000 to $20,000 and then remains at 37% of GDP as GDP grows further.

These assumptions are portrayed graphically in Figure 3, where the dotted line describes the presumed path of tax revenue/GDP for a country that institutes market reforms starting from a GDP equal to $5,000, while the heavy solid line represents presumed expenditures as a fraction of GDP, which need to be financed in present value out of tax revenue.

The budget is just balanced in the long run, maintaining the initial fraction of GDP in government expenditures and taking into account the changes in the fraction of GDP collected in tax revenue as the country grows, if

\[
\frac{19}{r-g} = \frac{19\alpha}{r-g} + \int_{T_1}^{T_2} \left( \frac{.37 - 19\alpha}{10000} Ye^{gT} - 10000 \right) Ye^{-(r-g)t} dt + \int_{T_2}^{\infty} 37 Ye^{-(r-g)t} dt
\]

Here, \(T_1\) designates the year in which per capita GDP reaches $10,000, while \(T_2\) denotes the year it reaches $20,000.

Table 1 provides some sample calculations, based on this formula. In the base case figures in column 1, we assume that the interest rate on the debt equals \(r = .1\) and that tax revenue falls by a third due to the market-oriented reforms (\(\alpha = .67\)). The Table then measures how high the initial per capita GDP must be for the country to be just able to maintain government expenditures at the initial fraction of GDP, financing these expenditures in present value out of future tax revenue. In particular, for any given values of \(\alpha\), \(r\), and \(g\), we find the initial value of \(Y\) that solves equation (1), solving in the process for \(T_1\) and \(T_2\) such that \(Ye^{gT_1} = 10,000\) and \(Ye^{gT_2} = 20,000\).

Each row represents a different assumption about the resulting growth rate of GDP. With higher resulting growth rates, countries with lower initial GDP can still ultimately just finance the initial level of government expenditures, for any given resulting initial fall in tax revenue. While column 1 assumes that the fiscal gap is one third of 19% (6.3%) of GDP, column 2 assumes that it is 3.8% of GDP.\(^\text{12}\) In column 3, we report results for a different market interest rate that must be paid on the debt.

The figure for the initial GDP required so that countries on average break even depends on each of the assumed parameters. Countries with close to these levels of initial GDP could easily find ex post that they are not able to repay the debt, leading to default with all the associated costs. To lessen these risks, assume instead that countries absorb one third of the fall in tax revenue with a cut in expenditures and two thirds of the fall with

\(^\text{12}\) The size of the fiscal gap would reflect both the initial fall in tax revenue that is replaced with debt finance plus any increase in expenditures required both to compensate net losers from the reforms and also to deal with bottlenecks in infrastructure brought on by the reforms.
debt finance, thereby trading off the risks of a political crisis with those of a financial crisis. Then the levels of initial per capita GDP that will generate the present value of tax revenue just sufficient to repay this lower level of debt is described in Table 1a. The required levels of per capita GDP are about $600 lower in each cell than for the comparable figures in Table 1, but the qualitative story remains unchanged.

Of course, all of the figures would be higher if the country hopes to have some cushion by having somewhat more than enough future tax revenue to finance repayment of the debt. Jones and Olken (forthcoming) provide evidence that growth rates fluctuate substantially over longer periods of time among developing countries, with frequent periods of both rapid growth and stagnant growth, pushing for such precautionary policies.

If a country will not in the end by able to repay the debt without cutting expenditures, then lenders will not credibly expect to be repaid and then not be willing to lend. With uncertainty about the growth rate that a country will have under the reforms, the interest rate on any debt extended will be higher. A higher interest rate raises the probability of default, and there may again be no interest rate at which lenders will be willing to lend.

The per capita figures in Table 1 and 1a are above the GDP of most all developing countries. In the IMF data set used in constructing Figure 1, the only developing countries with GDP per capita in the relevant range for most of these figures are Argentina and a few oil producers. Argentina, for example, had real per capita GDP during 1975-2000 ranging from $6,000 to just over $8,000. That Argentina ended up experiencing a financial crisis recently is consistent with our estimate that it was close to the margin in terms of its ability to use debt in order to maintain expenditures during a market reform. These figures therefore suggest that debt finance, at least by itself, is not a viable approach for dealing with the revenue loss brought on by market-oriented reforms.

6. Reduced tax revenue offset by reduced expenditures

A second strategy, in response to the fall in tax revenue, is simply to reduce government expenditures accordingly. One immediate problem is that the resulting drop in expenditures on infrastructure, education, and health imposes direct costs on the rest of the economy, creating bottlenecks that can restrict economic activity and economic growth.\textsuperscript{13}

The drop in tax revenue and expenditures can also easily lead to political opposition to such market-oriented reforms both from within as well as from outside the government, even if the country is growing quickly. Presumably the reforms initially benefit most

\textsuperscript{13} Barro (1991) for example finds that economic growth is a hump-shaped function of a country's effective tax rate, suggesting that at low tax rates the economic return to government expenditures more than outweighs the economic costs of a higher tax rate.
heavily those with the skills and energy to take advantage of them, while the poor receive fewer public services and transfer payments and may well receive reduced incomes, e.g. farmers face more intense competition from agricultural imports.

Consider first the situation of government officials. These officials presumably prefer to have control over a larger budget, given the perks and other benefits they receive implicitly tied to the size of the budget they control. At least based on the Chinese experience, market-oriented reforms result in a sharp fall in tax revenue. The expectation is that the resulting economic growth will eventually raise tax revenue as a fraction of GDP, given the figures seen in Figure 1. However, this eventual compensating growth in tax revenue as a fraction of GDP may not occur for many years.

A plausible measure of the utility received by officials would be something like the following:

\[
\int e^{-(r+\rho)t} \left( \sum_{i} U_{it} + \lambda R_t \right) + \int e^{-rt} (1 - e^{-\rho t}) V
\]

Here, \(\sum_{i} U_{it} + \lambda R_t\) measures the utility an official receives in period \(t\) if the official is still in office. This expression consists of a conventional sum of utilities of all residents in the country plus some weight \(\lambda\) times government revenue (as a fraction of GDP) in year \(t\), denoted \(R_t\). If the official is not in office, the official's utility is some arbitrary value \(V\), which by assumption is lower than the utility received while in office. For ease of interpretation, we have assumed that there is some probability \(\rho\) in any year that the official leaves office, a probability that of course can depend on the official's actions. The official then chooses policies to maximize this expression.

In the extreme case where the official cares only about tax revenue while in office, and the probability of leaving office is exogenous, then policies would be chosen to maximize the discounted stream of tax revenue, but discounting at the rate \(r + \rho\) rather than \(r\). In contrast, Table 1 reports figures for initial GDP above which the present value of tax revenue increases due to economic reforms (and conversely), where the discounting is at rate \(r\). With an initial fall in tax revenue, and a hoped for increase in tax revenue in the future, the level of initial GDP where officials who care only about tax revenue will support economic reforms will be much higher than those seen in Table 1, due to the extra discounting due to the probability of leaving office and not benefiting from the higher future tax revenue. Of course, preferences of officials differ depending on their likelihood of remaining in office long enough to benefit from a future increase in tax revenue, with more stable governments being more supportive of reforms. Preferences of officials could also change at some point during the reforms if officials find they now have a higher chance of leaving office. In response, they may find it in their personal self interest to re-impose controls in order to recoup tax revenue while they are still in office, now worrying less about the implications of the end of the reforms for future tax revenue.
To the degree that officials care as well about the welfare of residents, either directly or through their implications for the probability of remaining in office, then benefits residents receive from the reform may be sufficient to induce officials to support the reforms in spite of the losses they otherwise experience due to the fall in tax revenue they control.

But do the reforms increase the chances of remaining in office? The drop in public expenditures is a loss particularly to poorer families, who depend heavily on government transfer payments as well as publicly provided education and health care. A recent survey by Goldberg and Pavcnik (2007) provides evidence that poorer families often lose directly from globalization (a key dimension of market-oriented reforms), at least in the initial years of the reforms, presumably since they lack the skills and capital needed to participate in the new firms that enter to take advantage of the new opportunities.\textsuperscript{14}

Even if the economic gains experienced by skilled workers are large, the initial losses experienced by poor families due to the reforms may be sufficient that the survival of a market-reform oriented government is put at risk. A "populist" government can attract support from the poor by advocating re-imposing economic controls in order to gain revenue from the economic activity that has already developed due to the reforms, or even simply to restore the situation prior to the reforms. The result would be an end to the undistorted incentives that were the underpinning of the economic growth. Such a political backlash due to the economic costs imposed on the poor by the reforms seems broadly descriptive of a number of observed changes in government, particularly in Latin America.

Governments vary in their vulnerability to such political opposition. The Chinese government for example has faced tens of thousands of demonstrations per year, largely in poor rural areas. While these demonstrations have lead to changes in policy such as a repeal of the tax on agriculture and increased spending in inland provinces, these demonstrations have not been a serious threat to the overall direction of the economic reforms. Among the countries that have successfully maintained market-oriented reforms over many years, such as Korea, Taiwan, Hong Kong, and Chile, it is striking the frequency of autocratic regimes during the initial years of the reforms, allowing the governments to more easily withstand such political opposition.

7. User fees as a supplementary source of revenue

Rather than cutting government expenditures in response to a fall in tax revenue, an alternative strategy is to finance continuing government expenditures with user fees. While this is not a feasible option when financing transfer payments, schools can charge tuition, health clinics can require fees for health care, roads can charge tolls, while other projects can charge equivalent user fees. Rather than having the government itself

\textsuperscript{14} As further evidence, Hanson (2004) documents that NAFTA lead to wage gains primarily for the most skilled in Mexico.
borrow to finance the initial investments, the government can contract with private firms to finance these projects, in return for the firms' right to collect user fees of some amount for some stated time period. This is largely the strategy that China followed during the initial years of the reform.

With this strategy, infrastructure and education are no longer bottlenecks that hinder future economic growth. Of course, the user fees can substantially exceed the marginal cost of an extra user, leading to underutilization of the facilities. However, any alternative tax used to finance a project would have its own efficiency costs, and user fees may well be the only feasible source of finance.

Several problems remain with this strategy. For one, private firms face the risk that the government will renege on its contracted promise of revenue from future user fees. Default can be implicit, through new taxes on the firm's revenue, or construction of competing infrastructure that undermines the expected revenue from the initial project. Officials have an incentive to honor the initial contracts if they need to rely on private financing for future such projects and if they have a long enough time in office for these considerations to be of importance. Otherwise, the incentive to renege can be strong: this is simply an example of time inconsistency.

Some of the same political pressures described in section 6 remain. The poor no longer receive free government services as a result of the reforms and instead now face potentially high user fees for education, health, and transportation. Again, they may find themselves worse off during the initial years of the economic reforms, leading to the threat of strong political opposition to the market-oriented reforms.

Officials, though, may be particularly supportive of the reforms when such user fees are used to supplement revenue. By controlling the allocation of contracts, officials can extract in side payments an amount linked to the benefits received by the winning firm over the life of the contract, even if that particular official is in office for only a much shorter time period. In contrast, control over tax revenue used to finance projects run by the government benefits officials only while they remain in office. Officials with a short-time horizon are then likely to gain from reforms if there will be contracting with private firms.

While the privately financed infrastructure projects facilitate a higher economic growth rate, the resulting new entry and the resulting expansion in imports can still undermine government revenue, by inducing a shift in resources away from the sectors that can easily be taxed into sectors where evasion is high and by creating new competition for the firms that can most easily be taxed. As a result, government officials still face the temptation to re-impose restrictions on this new entry, in order to generate additional

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15 See Wallack and Singh (2007) for evidence that this fear has hindered attempts in India to contract with private firms to invest in major infrastructure projects. Engel et al (1997) discuss possible hold-up problems in these contracts with private firms, and alternative contract terms that would be less vulnerable to these problems.
revenue while they are surely in office, fearing that future tax revenue will not increase by enough (or soon enough) to compensate.

8. Partial reforms

A fall in tax revenue due to market reforms therefore leads to one or another threat to the continuation of the market reforms. If debt finance is used to maintain current government expenditures, in spite of the fall in tax revenue, the country faces a risk of a financial crisis. If it cuts back on current government expenditures to absorb the loss in current tax revenue, it faces infrastructure bottlenecks, and political opposition both from the poor and from lower level government officials, who both benefited from these government expenditures. Finally, maintaining public services through user fees or contracting with private providers may gain the support of lower level government officials who benefit from overseeing the contracting with private providers. However, the poor still lose, now from having to pay user fees for services that were free prior to the reforms, still leaving a threat that the resulting political opposition can undermine the reforms.

All of these pressures arise from a fall in tax revenue, suggesting that reforms that protect existing tax revenue can easily have a greater chance of success even if they result in a lower growth rate. What types of policies might be effective at preserving much of the initial tax revenue while still encouraging economic growth?

The key to the economic growth presumably is the elimination of any restrictions on the entry and growth of new firms. Key to preserving the initial tax revenue is protecting the financial position of the large manufacturing firms that provided the bulk of the initial tax revenue.

The main policies that had been used to protect the initial manufacturing tax base include protection of these firms from foreign competition through tariffs, limits on the entry of smaller domestic firms and multinationals into these particular industries, and access to credit at terms these firms can afford in spite of the high tax rates they face. If these firms are sold to foreign owners, the sale may include restrictions preserving the scale of operation of these firms, so as to preserve the existing tax base.

Policies fitting this description are commonly seen, not just in China but also in a variety of other successful reforming economies. For example, Korea restricted foreign ownership of domestic firms in sectors that constituted the bulk of the country's tax base. Many countries maintain some government control over the allocation of credit, e.g. through a state-owned bank, with larger and more easily taxed firms commonly receiving favored access to credit.

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16 Any interest-rate subsidies needed to make this credit attractive to the firms are self-financing if the new investment financed by the loan generates future tax revenue at least equal in present value to the size of the interest-rate subsidy. See Gordon (2003) for further discussion.

17 See Jun (forthcoming) for further discussion.
The successful entry of new firms will still undermine the profits of the firms that comprised the initial tax base, by raising the wage rate they must pay to their workers. In addition, any new entry in the same industries will reduce the market-clearing price for their output, further eroding their profits. In the face of these pressures, the government would need to reduce the tax rate these firms face, if they are to remain profitable.\textsuperscript{18} Imports then become less competitive, leading to a fall in tariff revenue, unless tariff rates fall as well. The hope is that by this date tax revenue from the newly entered firms can start to fill in for the erosion in tax revenue from the domestic manufacturing firms.

If tax revenue still erodes even with this more limited set of market-oriented reforms, the more gradual reforms should lead to smaller fiscal pressures, so less of a cutback in infrastructure investment and education and/or less build-up in government debt. The policy trades off a slower growth rate with a higher chance that the reforms will be sustainable, through lowering the risks of a financial crisis or a political crisis.

Of course, the design of policies in a second-best context is necessarily more complicated. The first-best set of policies is clear, but these policies are no longer appropriate once the differential tax rate inevitably faced by larger manufacturing firms compared with most of the rest of the economy is taken into account. Due to these differential tax rates, some controls on entry can be justified on efficiency grounds. The too easy solution of simply eliminating the differential tax rates assumes an idealized world without any problems of monitoring and collecting taxes on the cash economy. Instead, the second-best design of policies involves many uncomfortable trade-offs.

9. Conclusions

Public-finance economists appropriately argue for a broad-based tax that imposes the same tax rate on all economic activity in the economy, thereby avoiding any intersectoral distortions. With such a broad tax, tax revenue simply depends on total sales or total income, but not on the specific allocation of resources within the economy. Government officials should then find it in their own personal self-interest to support market-oriented policies, since by raising economic efficiency the tax base and tax revenue will increase.

Enforcing a broad-based tax, though, requires that the government be able to monitor economic activity throughout the economy. Firms and individuals have no incentive to report taxable activity unless the government has some chance of detecting evasion. When transactions occur in cash, however, there is no paper trail that the government can use to document and tax such transactions. When transactions instead occur through the financial sector, whether through checks, credit-cards or bank deposits by firms of their net cash revenue each day, the government does have an independent source of information about the size of economic activity, allowing it to monitor and tax this activity.

\footnote{In China, this cut in the tax rates faced by manufacturing firms occurred roughly fifteen years into the reform period.}
Among developed economies, the information available from financial records is sufficient to allow countries to come close to an idealized broad tax.\(^{19}\) However, among developing countries, the size of the cash economy is large, leading to a very narrow tax base. As a result, any given tax rate implies much higher efficiency costs given the resulting intersectoral distortions.

On net, poorer countries collect only about half as much revenue as a fraction of GDP as do developed countries, with the result being poor infrastructure and poor educational facilities. In an attempt to collect more revenue, governments are pushed to adopt policies that protect their existing tax base. This can involve tariff protection of the industries that comprise the bulk of their tax base, government controls on the allocation of credit so as to favor the heavily taxed firms, and controls over the entry of new firms that compete for resources with the more easily taxed firms.

These controls, though, by limiting the entry and growth of new firms, discourage the innovation that leads to economic growth. The result is a tension between policies that generate tax revenue now and policies that encourage economic growth.

Market-oriented reforms, which encourage the entry and growth of new firms, also encourage a shift in economic activity away from sectors that can easily be taxed. The resulting loss in tax revenue poses a dilemma for countries. In response, they can cut government expenditures, use debt finance to cover the costs of continuing the provision of the same level of public services, or find new sources of revenue such as user fees for schools, highways and other public services previously provided without charge.

In this paper, we examine each of these options and argue that none are likely to yield sustainable market-oriented reforms, at least in countries with GDP below roughly $10,000 per capita (1995 US$). If expenditures are cut (or the government finances them through user fees), poorer residents are much more likely to oppose the reforms, since they depended heavily on these expenditures. The result can be a shift in government, with the new government adopting more populist policies, undoing the market-oriented reforms. If debt finance is used as a means of avoiding a cutback in services, the risk is that future tax revenue will prove to be insufficient to repay this debt. Loans may not then be available, and if credit is extended the country faces a risk of a future financial crisis. These problems seems inevitable for countries with initial GDP per capita below about $10,000.

The remaining alternative is a more gradual introduction of market reforms, adopting policies that encourage the entry and growth of new firms while at the same time trying to protect the position of the firms that constitute the bulk of the country's tax base. This protection can take the form of tariffs, preferential access to credit, or barriers to entry of less easily taxed firms in the industries where these more easily taxed firms are dominant.

\(^{19}\) Andreoni et al (1998) report, though, that the evasion rate in the U.S. among proprietorships and small firms more generally is still very high, likely because of the extensive use of cash transactions by these firms.
The reforms trade off a slower growth rate with a smaller chance of either a financial crisis due to excessive debt or a political crisis due to cutbacks in public expenditures.

These more gradual reforms can also potentially be defended on efficiency grounds. When some sectors can be taxed much more easily than others, a full adoption of market-oriented policies will lead to an excessive shift of economic activity out of the sectors that can most easily be taxed. Policies that limit the shift in resources out of the more heavily taxed sectors can then be defended on second-best grounds.

The cost is that the recommended package of reforms becomes more complicated, and loses the clear intellectual appeal of a full set of market-oriented reforms. However, the messier second-best policies may both be more efficient and have a much greater chance of ultimate success.
REFERENCES


### Table 1
**Required initial GDP**
**Full Debt Finance**

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### Table 1a
**Required initial GDP**
**80% Debt Finance**

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Figure 1

tax revenue/GDP vs. per capita GDP

The graph shows the relationship between tax revenue as a percentage of GDP and per capita GDP. As per capita GDP increases, there is a general increase in the tax revenue/GDP ratio, though there are some fluctuations. The data points suggest a trend that peaks around a per capita GDP of 25,000 and then stabilizes at around 22%. This indicates that as countries become more developed, their tax revenue as a percentage of GDP tends to stabilize.
Figure 2

Chinese Tax Revenue/GDP
Figure 3

Assumed Tax Revenue/GDP under Economic Reforms