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Development-Oriented Tax Policy
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Tax

Development Oriented Tax Policy

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No public policy issue is of more importance than the *structure* and level of taxes. Tax reform has led governments to fall. Proposals to extend the VAT or increase its rates have been a source of political agitation in many countries, including Ecuador and Mexico. In many less developed countries, a shortage of funds impedes development efforts, and yet attempts to expand taxation not only meet enormous political resistance, but also often turn out to be futile. Simplistic recommendations to increase the power of the tax police often backfire—generating substantially more revenue for the tax collectors, but not much extra revenue for the public fisc.

Part of the problem surely lies in the fact that those providing advice on taxation to developing countries are not sensitive to the differences in economic and political structures between developed and less developed countries, to the administrative difficulties faced by developing countries, or to the differences in objectives. To take but two examples: Standard textbook expositions of the objectives of tax policy *for developed countries,* for instance, emphasize efficiency, and more recent expositions discuss problems of tax avoidance and evasion, but seldom make note of corruption. But corruption has increasingly come to be recognized as one of the major challenges facing developing countries. Designing institutions and policies, *including tax structures*, which reduce the scope for corruption—what I call *corruption resistant tax structures*—should thus be a central concern in tax design. Yet, while outside advisers often deliver

moralistic lectures on the need to improve tax administration and reduce corruption, they seldom address corruption as part of tax *design*. This provides an example where differences in the *structure of the economy* (where that term embraces institutional capacities—the ability to control corruption) dictates a difference in tax policy.

Objectives too differ. It is arguable that tax policy should be used to promote development, or at least be designed not to impede development.

Differences in economic structure interact with differences in objectives. One of the theses of this chapter is that, regardless of the virtues of a VAT for developed countries, for many developing countries, the VAT may be questionable. It is partially because it may undermine development (a difference in objectives); partially because differences in economic structures make it less successful in achieving commonly shared objectives: (a) it may have more adverse distributive impacts; (b) it may be less conducive to economic efficiency; and (c) it may be less "corruption resistant".

One important reason for this is that differences in economic structures affect the set of feasible taxes. Any particular tax can only be assessed relative to the set of feasible taxes (what is possible?), and in the context of *the totality of taxes* that are imposed.

Thus, while both developing and developed countries may see redistribution as one of the objectives of tax policy, the set of instruments available for redistribution may be more restricted in developing countries, which in turn may impact tax design. For instance, a well-known result holds that with an optimal income tax, there is (in a central case) no need to rely on commodity taxation for redistribution.[2] Because a large fraction of value added is generated in a relatively few large enterprises, and the VAT is collected from almost all sectors, it follows that the VAT is an efficient tax. In developed

countries, it can be combined with a progressive income tax as part of an "optimal" tax structure. By contrast, in most developing countries, the VAT is typically collected from only a fraction (often under 50 percent) of the economy. It is effectively a tax on the organized sector of the economy—it is a tax on development. Moreover, most developing countries find it difficult to implement a comprehensive progressive income tax. Accordingly, not only is it potentially highly distortionary, but also, heavy reliance on the VAT results in a regressive (or at least not highly progressive) income tax structure.

Moreover, one of the reasons that a VAT is "efficient" is that it is comprehensive; yet in most developing countries, the VAT is far from comprehensive—and that by itself means that it interferes with *productive efficiency*, encouraging movement of production into the informal economy.

Earlier, I noted the central importance in developing countries of designing corruption-resistant tax structures. One of the virtues of the VAT in more developed countries is the self-enforcing nature; taxes paid at a lower level are refundable at the next level, and so, it would seem, the downstream firm has an incentive to "report" purchases, which are, of course, sales to others. If both the upstream and downstream firms' incomes are not easily observable (they are based on cash payments), however, then it may be difficult to collect the VAT at any stage of production. The so-called self-enforcing property of the VAT can easily unravel—and it often does in developing countries, where farmers and small producers sell directly to consumers.

Similarly, if just some of the downstream firm's sales are cash, then it can claim a rebate on the VAT paid by the upstream firm. If rebates are given to firms reporting

negative value-added, the net revenue collected by government may be seriously undermined; but if the government does not grant rebates to firms reporting negative value-added, it may discourage legitimate negative value-added activities, such as start-ups.

Both developed and less-developed countries typically provide rebates on exports under the VAT. This is supposed to ensure that the tax is a tax on domestic consumption, not on domestic production. But country after country has encountered problems in their rebate system. Sometimes, there are long lags in providing the rebates; for firms facing a shortage of capital, this can be crippling. Even worse, the rebates have become a source of corruption, as fake documents have been used to get the government to provide large checks to corporations. (Kenya provided the most infamous example.)

Second best considerations and corrective taxation

Taxation is quintessentially a problem of second best. With full information, there would be optimal lump sum (non-distortive) taxation. Even distributive objectives could be achieved, because tax authorities could identify those with the capacity to earn higher income and impose higher lump sum taxes on them.

But modern tax theory has been based on the recognition that tax authorities never have the requisite information. They base taxes on observables (like income), and as a result taxation is necessarily distortionary. All taxation is thus an exercise in the economics of the second best. That is why simplistic arguments, such as that an income tax (which taxes interest income, and thus affects intertemporal trade-offs) is worse than a consumption tax (which just affects only the consumption leisure choice) because it involves an extra distortion are just wrong. The conclusion may be right, but it must be

based on a much more subtle and complete analysis. What is remarkable about the modern theory of taxation is that in spite of the complexity of second best economics, it has been able to derive a number of precise results.

Much of modern tax theory, while recognizing the distortionary nature of taxation, has assumed that in the absence of taxation, markets would be perfectly efficient. But another important strand of research over the past quarter century has analyzed a large number of market imperfections, including those derived from imperfect and asymmetric information. Tax distortions may interact with market distortions in a variety of ways. In particular, there is the possibility that taxes may be used to correct market distortions: one distortion may (at least partly) undo the effects of the other.

Modern tax theory emphasizes the role of corrective taxation—taxes designed to "correct" market failures, such as those associated with externalities. If market failures are more pervasive in developing countries, it means that there may be more scope for corrective taxation.

Discussions of corrective taxation have, for the most part, been relegated to environmental issues. Yet in developing countries, market failures (including imperfections of information and incomplete markets, associated with pervasive unemployment and capital market imperfections) provide a much wider scope for corrective taxation. Recent work on imperfections of information and incompleteness of markets has emphasized how a variety of actions/choices give rise to externality-like effects.[3] Many of the endogenous growth models[4] recognize the existence of returns to scale and externalities.

Remarkably, however, discussions of tax policy have often ignored the role that corrective taxes might play, generating revenues as they *improve* economic efficiency.[5] A case in point is short term capital flows, which have been shown to be a major source of instability in developing countries. Chilean-style taxes on capital inflows can thus play an important role in stabilizing the economy, thereby promoting economic growth at the same time that they raise revenue.[6]

Similarly, many developing countries are marked by pervasive unemployment. Efficiency wage models have provided a convincing explanation of this unemployment. But market equilibrium in efficiency wage models is, in general, not Pareto efficient, providing scope for corrective taxation which would simultaneously raise revenue and increase market efficiency.

Information and the set of admissible tax structures

Imperfections of information are at the core of many of the market failures prevalent in developing countries (including the efficiency wage models just discussed). But *information* is at the core of what are "admissible" tax structures: one can only tax what one can observe.[7] The reason that optimal lump sum redistributive taxes are not feasible is that the government cannot directly observe individuals' abilities; it can only observe surrogates, like income, and the use of such surrogates gives rise to distortions. In the informal sector, market transactions are typically not easily observable by the government.

New technologies and organizational structures have changed the calculus of observability. Large organizations need to record many transactions—people are "replaceable parts"—leaving a trail of observability for tax authorities. Modern

computers have made information "control" easier, and, at the same time, have eased the burden of the tax collector. It is difficult for firms to maintain two sets of books (and, outside of certain limited areas, illegal), so that information provided to investors—intended to increase share market value—has to jibe with information provided to the tax collector—designed to minimize tax burden—and that in turn has to jibe with the *true* information required for managing the organization.[8] The convenience of credit cards has provided an audit trail that makes collecting taxes from retailers far easier, and the use of bank accounts has become so pervasive that there is automatic suspicion of someone who relies only or largely on cash.

Yet, these changes have largely bypassed developing countries. Financial depth is limited, and credit card usage is the exception. It is not just that many individuals might hide income from the tax collector; individuals do not know their income. They may know their savings—how much they have to left over at the end of the year—but have no records that show how much of the revenues are spent on consumption and how much is used to purchase inputs into production. For an American or European firm, there would be a great burden not to have such information; for the typical African, barely literate farmer, there would be an enormous burden to maintain such records.

In the earlier stages of development, considerable reliance was placed on tariffs; one reason being that imports often have to go through a limited number of ports (the cost of not going through such ports, of smuggling, can often be quite high). That made it easy to monitor—and that in turn made it easier to tax. Of course, industrial tariffs quintessentially represented a development-oriented tax structure, as explicitly recognized in the heated debates surrounding those tariffs in nineteenth-century America.

By the same token, until quite recently, even in advanced industrial countries like the United States, tax avoidance[9] among the self-employed was rampant (and even today, aggregate reported incomes of partnerships in some recent years in the U.S. is negative, though that has more to do with taking advantage of certain tax loopholes than to non-reporting). In developing countries, small businesses are the dominant form of economic organization. Why should we expect that they have greater success in tax collection from small businesses than does the United States or other advanced industrial countries?

Thus, not only is information at the root of admissible tax structures, information is at the root of problems of enforcement, including the related issues of corruption. If there were perfect information, corruption would not be a problem. It would be known who was bribing the tax official, and it would presumably be relatively easy to control. Corruption is a problem because it is so hard to observe. Understanding the limitations on available information is at the core of the design of corruption-resistant tax structures.

Many developing countries face a fine balance because the value of encoded information of the kind that can be used by tax authorities may be less, sometimes far less, than in the advanced industrial countries. Basing such taxes on this information (e.g. information contained in bank accounts) is more likely to destroy the information—the tax authorities get no more revenue, but economic efficiency is impeded. It is noteworthy that the Chinese and Korean governments deliberately decided to foreswear the use of such information, by allowing no-name bank accounts; this allowed proportional taxation of savings, but made it impossible for the government to use banking information for more general tax purposes, e.g. for the imposition of progressive taxation.

Neoclassical economics and the design of tax structures

I should emphasize that while this paper focused on developing countries, much of the analysis is also applicable to developed countries as well. Modern tax theory (and in particular optimal tax theory) has developed within the framework of standard neoclassical models, in which market failures play no role. Increasingly, we have come to realize that such models cannot explain key market phenomena. Interactions between market failures and tax distortions can be of first order importance.

Variations among countries

While this chapter focuses on differences between developing and developed countries, we should emphasize the importance of differences *among* developing countries. This paper argues that economic and political structures which affect, for instance, the set of admissible taxes and the extent of market failures are of first order importance in the design of taxation. But different countries face different constraints, implying that a tax structure that might be desirable for one country might not be for another. A few countries have been able to implement an effective progressive income tax, and hence the redistributive argument against the VAT is not relevant for such countries. A few countries may have other instruments to offset the adverse development impacts of the VAT, making such a critique of the VAT irrelevant.

General equilibrium incidence analysis of the kind attempted here is always complicated. Even the distributive effects of a VAT are not always obvious. While if it were uniformly enforced, it would be equivalent to a wage tax—the reason it is resoundly criticized by many developed countries—in developing countries it is typically not imposed on the rural sector, in which the poorest people reside. This "unintended"

exception may make the tax on net progressive, or at least not as regressive as critics suggest.

Moreover, advocates of the VAT often argue that it is better than the existing tax structures, e.g. that the VAT may be an improvement over a corruptly enforced set of tariffs. The question, though, is what are the relevant set of alternatives? Could a VAT be "improved" upon by the imposition of a tax on luxury imports at a higher rate? (Since there may be no domestic production of the luxury good, such a tax is equivalent to an excise consumption tax.) In many developing countries, a tax on oligopoly profits would be better both for efficiency and equity than an increase in the VAT tax.

In many developing countries, a VAT may be a *part* of a well-designed tax structure. In a sense, this chapter is a critique of the excess zeal of VAT advocates, who sometimes suggest that there should *just* be a uniform tax on all goods. This chapter argues that that is seldom the case. There should, in general, be differential taxation. It may be desirable to impose differential taxes on imports, including to promote development. It may be desirable to impose differential taxes on luxuries or oligopolies, including to promote equity.

The VAT as Distortionary Taxation

As noted earlier, advocates of the VAT argue both for its efficiency and its ease of administration. It is efficient because it is comprehensive. These advantages, it is contended, more than offset a major disadvantage, its lack of progressivity. The question is, is it efficient?

Economists have long recognized that any market taxation encourages non-market production, which can constitute a significant distortion. For instance, whether a family decides to buy a dishwasher to wash dishes (entailing a market transaction) can be affected by the tax rate. "Labor" inside the family (washing dishes) is not taxed; labor in the market (working to buy a dishwasher) is taxed. The high elasticity of labor supply associated with secondary workers may reflect the fact that, to some extent, the secondary worker is simply buying goods which are a substitute for the services that the secondary worker would otherwise provide at home. As a result of the high elasticity, taxes on wages of secondary workers are highly distortionary.

Similar issues arise in developing countries – except it is not only labor within the household that escapes taxation, but work in the informal sector, which typically cannot easily be monitored, or monitored at all. Accordingly, a VAT shifts resources away from the formal sector into the informal sector, leading to an inefficient allocation of resources.

The question naturally arises, is there an alternative, less distortionary tax structure? The answer is yes, and Emram and Stiglitz provide a more complete analysis. The following discussion provides a heuristic. Assume there exists an imported intermediate input, used both in the formal and the informal sector. While we cannot

monitor the output of the informal sector, and therefore cannot tax it directly, we may be able to tax it indirectly, by taxing the usage of the imported intermediate good. A standard result of optimal tax theory – when all outputs can be taxed – is that one should not tax intermediate inputs, including imported inputs.[10] But as Dasgupta and Stiglitz [1971, 1973, 1974] showed, in the more reasonable case where not all outputs can be taxed, it may be desirable to tax intermediate inputs. Assume, at the extreme case, that a unit of output requires a unit of this imported intermediate input. In this case, a tax on the intermediate input is equivalent to a tax on the output – in both the formal and the informal sector. The tax is completely non-distortionary. Converting this tax on imports into a value added tax introduces a distortion: the formal sector faces a tax on its total value added, while the informal sector faces a tax only on its intermediate input (assuming it does not get a rebate on its input).[11]

More generally, of course, taxing the intermediate input does introduce a distortion – there is a substitution away from the use of this intermediate input (and towards others, in the simplest case, labor). But introducing a surtax on imports into a situation where only the formal sector pays the VAT always increases output, since the surtax reduces the effective differential tax rates between the formal and the informal sectors. In short, *it is never optimal to rely solely on a value added tax.* (See Appendix A.)

This is one example in which tax policy for developing countries differs from that in developed countries. Another example is provided by Ramsey's classic result in optimal tax theory, suggesting that taxes should be levied at a rate inversely proportional to the elasticity of demand. Atkinson and Stiglitz [1976] showed that Ramsey's result

depended on the absence of an optimal redistributive income tax, and Stiglitz [2008] showed that even with a simple linear income tax, the benefits of Ramsey taxation were very limited. The conclusion was that Ramsey's analysis was of limited relevance to developed countries. In developing countries, on the other hand, where income taxation is very limited, Ramsey's analysis is relevant. Again, this goes against the spirit of the VAT, which suggests that one should not have differential taxation on different commodities. In particular, the tax rate should be lower on those formal industries that can most easily shift into the informal sector.

The essential point of the Atkinson-Stiglitz analysis is that each tax needs to be viewed as part of the overall tax structure, and in particular, in light of what other taxes can be imposed. That, in turn, depends on what is observable. For instance, it is difficult to observe hours worked, which limits the use of an optimal wage tax – which might be better, in some respects, than an optimal income tax. It is difficult to observe consumption of any individual of particular commodities, and this limits the ability to use commodity-specific non-linear consumption taxes. (Electricity is an exception, and we do use non-linear taxes there.)

Much of the advocacy of the VAT is based on pre-Ramsey reasoning – uniform taxes are less distortionary than differentiated taxes. Pre-Ramsey reasoning turned out to be approximately correct, for advanced industrial countries, for reasons that have little to do with the simplistic analyses employed by the advocates of VAT, but it is wrong in the context of developing countries.

How the VAT may Impede Growth

The previous section showed how the VAT lowers national income. It may also lower

growth, of particular concern to developing countries.

To see this, assume that the rate of productivity growth is higher in the formal

sector. The simple case is that where there is no productivity growth in the rural

(informal) sector. Assume $Q_u = F(\lambda L_u)$, where Q_u is output in the formal sector, L_u is

labor input, and λ is the productivity measure. Then the rate of increase in national

output can be written $g_Q = g_\lambda$ sm, where s is share of formal sector in national output, g_λ

is the rate of increase in λ, and $m \equiv F'\lambda L_u /F$ (the share of labor in the formal sector. It is

immediate that the larger m, the higher the rate of growth of national output, provided

that as labor shifts into the formal sector, the share of labor does not decrease too much.

The effect is even stronger if we introduce learning by doing. With learning by doing, g_λ

$= \xi (L_u)$, $\xi' > 0$, so that the larger the size of the formal sector, the faster the rate of

growth of productivity.[12]

How the VAT may Result in Increased Unemployment[13]

Typically, the incidence of alternative taxes is analyzed within simple, competitive

equilibrium models of the economy. While it is widely recognized that market

economies differ in important ways from the competitive ideal, there is no widely

accepted alternative model, and incidence analysis in models of the economy with

oligopoly, incomplete markets, monopolistic competition, and imperfect information is

sufficiently complicated that there has been a strong preference within the economics profession for being precisely and simply wrong rather than imprecisely and "complexly" correct. But developing countries are typically developing not just because they have few resources; markets, information, and institutions are often much less perfect. The imperfections cannot, or at least should not, be ignored.

Many developing countries are characterized by high levels of urban unemployment, itself associated with efficiency wages and costly migration.[14] A VAT imposed only on the urban sector (or collected more extensively in the urban sector than in the rural) effectively is a tax on urban wages.

In a standard migration equilibrium model with efficiency wages, labor productivity is higher in the urban than in the rural sector. Hence a VAT lowers overall output as labor is induced to move to the low productivity sector. If there are diminishing returns in the rural sector, a VAT leads to lower wages in the rural sector. Firms in the urban sector will then not have to pay workers as much to induce them to work hard. The equilibrium will entail not only lower urban wages, but also higher unemployment. Thus, once again, the VAT has both adverse efficiency and distributional consequences.

Appendix 2 provides a formal model showing this, and demonstrates that there are alternative tax frameworks without these adverse effects.

Concluding Remarks on the VAT

The usual argument for the VAT is that the VAT is not progressive, but it is efficient. Government should resort to other instruments for dealing with distribution

But for developing countries, the VAT is not an efficient tax; it can, furthermore, lower growth and increase unemployment. Given the absence of other progressive taxes, however, the lack of progressivity of the VAT is of particular concern.

Our analysis shows not only that a VAT is not optimal, but also that a country should tax imported goods differentially. If imported goods are disproportionately consumed by the well-off, such differentiation introduces an element of progressivity.[15]

Even with WTO restrictions on discrimination against imported goods, it may be possible to differentiate tax rates between *final* goods produced at home and imported final goods because they may differ in certain characteristics, e.g. imported goods may, on average, be of higher quality (price). The country can impose a higher excise tax on luxury biscuits than on ordinary biscuits; this discrimination may, at the same time, have favorable distributional consequences.

The Design of Corruption-Resistant Tax Structures

Recent policy discussions have focused on problems of corruption in general and in tax systems in particular. Interestingly, traditional tax policy discussions have paid little attention to corruption.

Corruption takes on many forms, including underreporting incomes by rich taxpayers, sometimes with the connivance of government officials; and insisting on bribes not to over report incomes of "honest" tax payers.

Corruption can be viewed as a problem in observability. That is, if the income could be costlessly and objectively observed, then it would presumably be easy to devise

administrative structures to ensure that every taxpayer paid exactly the amount that he should.

Some tax structures provide less opportunity for corruption than others. Some bases of taxation are easier to observe and verify. Consider, for instance, the window tax imposed in medieval England. The tax was very distortionary – it led to dark homes. It did have one advantage. It was easy to count the number of windows. It would be easy to check on the collection efforts of any tax official: a random check would quickly ascertain whether he had by and large counted the number of windows correctly. If a tax official tried to charge a tax payer for having too many windows, the aggrieved taxpayer could appeal to a court, which could, in turn, verify the number of windows.

In today's world, there are other bases of taxation which can similarly be (relatively) easily verified – the number and size of cars, the square meters of a house. It may be easier to design institutional arrangements for the collection of such taxes without corruption.

These "reforms" stand in marked contrast to many of the standard approaches to curbing corruption, which have often failed. For instance, one response to the failure of taxpayers to pay what they should has been to give the government strengthened powers of enforcement. Such policies enable corrupt tax police to extract more money from private sector, inhibiting development, often without generating much revenue for government

Modeling corruption-resistant tax structures is beyond the scope of this essay, but centers around not just the issue of *observability* but also *verification*. Tax collectors must not just "know" the income of the taxpayer, but be able to "prove" it in a judicial

proceeding. By the same token, those trying to circumscribe corruption among government officials must not just "know" that some government official has acted corruptly, but be able to verify it before a judicial proceeding. One must be able to distinguish between "honest" errors in judgment and outright corruption. There must be some confidence in the integrity of the judicial proceeding. But no judicial proceeding is without error, however. There have to be penalties, but the penalties must be designed with recognition that there may be errors in judgment.

Global General Equilibrium Effects

If the VAT is imposed in all developing countries, it increases output of goods produced in informal sector, with global general equilibrium effects – the price of the *commodities* produced in the informal sector falls. To the extent that there are differences between these goods and goods produced in the formal sector, there can be global effects on prices. Many of the goods produced in the informal sector are inputs into production processes in the advanced industrial countries, while many of the goods produced in the formal sector are substitutes for goods produced in developed countries. To the extent that this is true, at a global scale, the VAT shifts the distribution of income/welfare to benefit developed countries at the expense of developing countries.

Concluding Comments

This essay – and this book – focuses on the many ways in which tax policy in developing countries needs to be different from tax policy in developed countries. The objectives of tax policy, the structures of the economy, and the administrative capacities differ. The essays in this book highlight these differences.

In this paper, we have focused on the VAT, in part because it illustrates so well the difference between the design of tax policies in developed and less developed countries. For developed countries, the VAT is efficient, but regressive (or at least not progressive). But, in theory at least, the lack of progressivity made up for by progressive income taxes. In developing countries, typically there is no effective income tax to make up for lack of progressivity. The VAT is also not efficient, however, and may impede development; and when imposed in *all* developing countries, it may have adverse terms of trade effects.

One of the key issues that tax policy for developing countries should focus on is promoting development. Promoting development entails shifting resources into sectors with faster economic growth, and more spillovers. Every successful country has imposed industrial policies. Under WTO rules, it may be more difficult for countries to use tariffs. This may imply that tax policies will take on increasing importance in the design of industrial policies.

Sometimes it is suggested that it is a lack of political will that explains the slowness of developing countries to make the tax reforms advised by the IMF – to adopt the VAT Politics does matter, but it may be that the developing countries sense that the VAT is neither fair nor efficient, and does not promote their development. It may be that they also recognize that there are other more important tax "reforms" – such as taxing the

rents of oligopolies and monopolies, which might at the same time increase both equity and efficiency. In most cases, politics helps explain the failure to tax these sectors – the vested interests use their resources to influence the political process. It might be well if the international community in general, and the IMF in particular, devoted more of its efforts to these tax reforms.

It is not the intention of this book to provide all the answers, or even to provide a simple template: indeed, the tax policy which is appropriate to one developing country may differ markedly from that of another. Rather, our intent is to open up the debate on tax policy which has too often been too narrowly circumscribed, with developing countries being encouraged to follow a simplistic formula – adopt a VAT – and to enhance understanding of how developing countries have been striving to raise taxes in a fair and efficient way.

Appendix A

Proof of the Inefficiency of the VAT

We present a simple, heuristic argument showing why it is in general desirable to impose a differential tax on an imported good, used in both sectors, enabling one to lower the VAT tax rate *applied non-uniformly because of the unobservability of output in the informal sector.* The higher input tax serves as an indirect tax on the output of the informal sector, which otherwise would have escaped taxation.

For simplicity, we assume constant returns in the formal sector, and decreasing returns (but homotheticity) in the informal sector:

$$Q_u = F(X_u, L_u)$$

$$Q_r = G(X_r, L_r) \,,$$

where Q_i is the output in the ith sector, X_i is the input of the imported good, and L is input of labor. The dualality of the formal sector production function is written

$$P_Q = \Phi (w, p_X)$$

where P_Q is the (producer) price of output, p_X is the price of the input, and w is the wage.

The international price of traded input and output are both assumed to be unity, which implies that before taxes, the function

$$1 = \Phi (w, 1),$$

determines the real domestic wage in the formal sector. If the value added tax is imposed to be non-trade-distorting, i.e. there is full rebates of the tax for goods which are exported, then the above equation still holds.

On the other hand, the price facing domestic consumers with a value added tax is

$$q = 1 + t$$

where t is the value added tax. By assumption, the value added tax is not collected on the output of the rural sector, but is imposed on the imported intermediate good that is used in its production. Thus producers in the rural sector maximize

$$qG - wL - x(1 + t)$$

so that

$$G_X = 1$$

$$G_L = w/1 + t$$

The value added tax thus shifts production towards the informal sector, and distorts the input mix in the rural sector towards labor. It is clearly distortionary.

We now ask, what happens if we add a surtax on imported intermediate goods (fully rebated in the formal sector, upon payment of the value added tax) at the rate τ, which allows a reduction in the value added tax rate (keeping government revenue constant). The revenue raised by the value added tax is equal to the value of the output of the formal sector that is not exported. We assume trade balance, so that exports equal imports. Hence the value added tax revenue is $t(F - X)) + t X_r$. The net revenue raised by the import duty surtax is τX_r. Hence total revenue is

$$R = t(F - X) + (\tau + t)X_r,$$

and at $\tau = 0$,

$$d\tau/ dt = - \{[F - X] ((1 - t\eta_C) + X_r(1 - t\eta\gamma)\} / X_r$$

where

η_C is the (absolute value of the) elasticity of formal sector net output that is not exported with respect to the tax rate and $\eta\gamma$ is the elasticity of imports used in the informal sector with respect to the tax rate. As the value added tax increases, more output shifts to the untaxed sector, so that normally we would expect value added tax revenue to be reduced.[16]

We can assess social welfare by an indirect social welfare function

$$V = V(q, \pi(q,(1 + t + \tau)),$$

where π is the rent in the rural sector. An increase in the surtax on imports allows a reduction in the value added tax, which lowers q, which increases welfare. On the other hand, it will normally lower rents in the rural sector. *If we put little weight on the welfare of landlords (rents), then it is clear that it is desirable to have a tax on imported inputs.* Even if we put full weight on the income of landlords, however, normally a tax on imported inputs is desirable, because the gain in welfare to consumers from the lowering of the value added tax outweighs the loss in landlord rents:

$$dV/dt = V_q + V_\pi \{\pi_q + \pi_{PX} (1 + d\tau/dt)\}$$

$$= - V_I \{ F + G - X - [G - X_r (1 - \{[F - X] ((1 - t\eta_C) + X_r(1 - t\eta\gamma)\} / X_r)]\}$$

$$= - V_I \{X_r + [F - X] t\eta_C + X_r(1 - t\eta\gamma)\} \quad < 0$$

Appendix B

Impact of VAT on Unemployment in Efficiency Wage Model

In this appendix we analyze the impact of a VAT on unemployment, using the Shapiro-Stiglitz efficiency wage model. It is easy to derive (using the equilibrium migration constraint and the no shirking constraint) that there is a simple relationship between the equilibrium wage and the unemployment rate: [17]

$$w^s = w^r(L^u/1- u)) \, g(h(w^s)).$$

Moreover, since in equilibrium $u = h(w^s)$, we have what might be called a generalized no-shirking constraint, which we simplify as

$$w^s = \psi \, (L^u)$$

On the other hand, the labor demand equation gives

$$L^u = z(w^u)$$

In equilibrium $w^u = w^s$, so the equilibrium (before tax) is given by

$$w^* = \psi \, (z(w^*)) \, .$$

The effect of a value added tax (imposed only on the formal sector) is to shift down the urban demand curve for labor.

Figure 1.1 shows the standard equilibrium in the urban labor market with a demand curve for labor and the "no shirking constraint." In panel A, the rural wage is fixed, and the no shirking wage can, accordingly, be drawn as a horizontal line. The VAT has the effect of shifting the demand curve for labor down, lowering urban employment, but leaving the wage unchanged. That means, of course, that the

unemployment rate is also changed. The tax simply shifts labor from the formal sector to the informal sector. National output,

$$Q = F(L^u) + w^r(N - L^u/1 - u*)$$

is lower as L^u is lowered, since (under the hypothesis that the urban rural migration equilibrium condition takes the form $w^r/w^u = 1 - u$)

$$dQ/ dL^u = [F' - w^r/1 - u*] = tF'$$

where t is the value added tax rate.[18] Thus, even though each individual's labor supply is inelastic (so that in a standard model, the VAT, which is equivalent to a tax on labor, would have no adverse effect on output) here it clearly does.

In the case where the rural wage is not fixed, then the value added not only lowers the urban wage, but as it drives workers into the rural sector, it lowers the rural wage, so much so that the equilibrium unemployment rate actually rises. Let $G(L^r)$ represent rural output, where N^r is rural employment, then
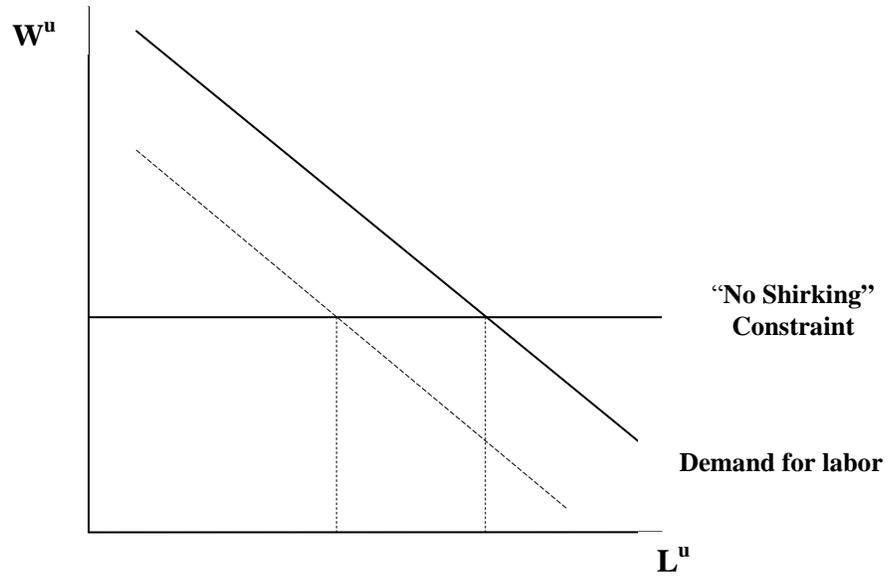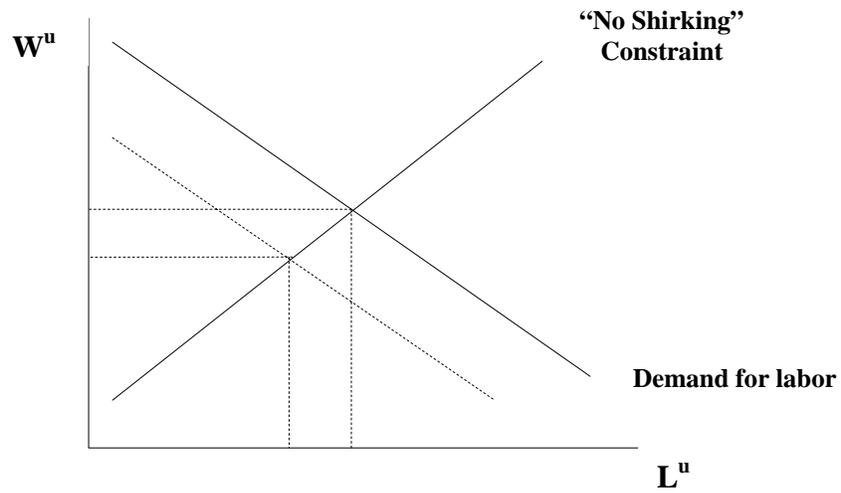
$$Q = F + G$$

and

$$dQ/dt = (\partial Q/ \partial L^u)(dL^u/ dt)_{u = u*} - w^r L^u/(1 - u)^2 du/dt$$

which is even more negative, since not only does labor move from the more productive to the less productive sector, but also more labor moves into unemployment (zero productivity.)

Figure 1.1. Standard Equilibrium in the Urban Labor Market

W^u

"No Shirking"
Constraint

Demand for labor

L^u

Panel A: Fixed rural wage

"No Shirking"
Constraint

W^u

Demand for labor

L^u

Panel B: Flexible rural wage

Alternative Taxes

There may be alternative tax structures with less adverse effects on output and welfare. One obvious candidate is a tax on land, which leaves unaffected all the relations described in this model.

Similarly, a tax on imported consumption goods (which are not at the same time produced within the country), consumed by the rentier classes, again leaves all the relationships unchanged, and thus is non-distortionary.

Taxes on goods consumed by rentiers, but produced within the country, or consumed by workers, have more complicated effects. A tax on imports of a good consumed by rentiers, but produced within the country, drives up the price of the domestically produced goods, shifting, in effect, the demand curve for labor. This has exactly the opposite effect of a VAT tax, increasing national output and lowering unemployment.

By contrast, a *uniform* tax, both on the production and import of the good, has the effect of leaving the demand curve for urban labor unaffected, and thus there is no labor reallocation effect,[19] except to the extent that the higher price of the good shifts demand towards or away from goods produced in the urban sector. If non-traded domestically produced goods are complements of the taxed imported good, then the demand curve for urban labor shifts downs, with adverse effects on rural wages, workers' welfare, and unemployment.

Notes

[2] See, e.g. Atkinson and Stiglitz [1976], Mirrlees, 1975, or Stiglitz, 1998.

[3] Indeed, Greenwald and Stiglitz [1986, 1988] show that whenever information is imperfect and markets are incomplete, actions of competitive agents give rise to externality like effects.

[4] e.g. Lucas [1988] , Roemer [1986].

[5] See, e.g. Stiglitz (1998).

[6] See, e.g Stiglitz, *et al,* 2006.

[7] These ideas are developed further in the general theory of pareto efficient taxation. See Stiglitz [1987] and Brito *et al,* 1990.

[8] See, e.g. Stiglitz and Wolfson [1988].

[9] Or evasion – the boundaries in this arena are tenuous.

[10] Diamond and Mirrlees, 1971.

[11] See Emran, M. S. and J. Stiglitz 2003, 2004 and Knud J. Munk.

[12] See, e.g. B. Greenwald and J. E. Stiglitz, 2006, where it is explained why one might expect the pace of productivity growth to be higher in the formal sector than in the informal sector. Of course, if there are high costs to entering the formal sector, those with entrepreneurial skills (and learning abilities) might be concentrated in the informal sector, in which case the adverse consequences that we have identified might not arise.

[13] See also Stiglitz 1999.

[14] See, e.g. Sah and Stigltiz [1992], Anam and Chiang [2007], Yabuuchi [2007], and Yang [2006].

[15] In a sense, this analysis can be viewed as a special case of Dasgupta and Stiglitz [1971], which showed that the Diamond- Mirrlees result [1971] that there should not be differential taxes was not true if there are restrictions on taxes that can be imposed (here, the restriction is on taxes in the informal sector.)

[16] Obviously, this could be reversed if informal sector production is sufficiently more import intensive than formal sector production, but normally, we would expect the opposite, reinforcing the general conclusion that the shift towards informal sector production reduces VAT revenue.

[17] It is easiest to construct the no-shirking constraint in the case of a fixed rural wage, but one can construct the curve with a wage in the rural sector that depends on the number of rural workers.

As in Shaprio-Stiglitz [1984], the no shirking wage is a function of the unemployment rate (given an unemployment benefit, which for most developing countries can be assumed zero).

$w^s = f(u)$, $f' < 0$,

or inverting

$u = h(w^s)$

The equilibrium unemployment rate in turn is a function of the urban and rural wages:

$w^u/w^r = g(u)$.

or

$w^u = w^r (L) g(u)$

where L is the number of urban job seekers (If the total population is N, then the number of rural workers is $N - L$). We focus, in particular, on the Harris-Todaro model, where

$w^r/w^u = 1 - u$

By definition

$L^u /L = 1 - u$,

where L^u is urban employment, or substituting once again, we obtain the generalized no shirking constraint, where L^u is urban employment,

$w^s = w^r(L^u/1- u)) g(h(w^s))$

[18] In equilibrium, the urban wage is equal to the marginal product of labor, after tax, i.e. $w^u = (1 -t) F'$.

[19] Production of the good occurs to the point where the international price equals the marginal cost of production.

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