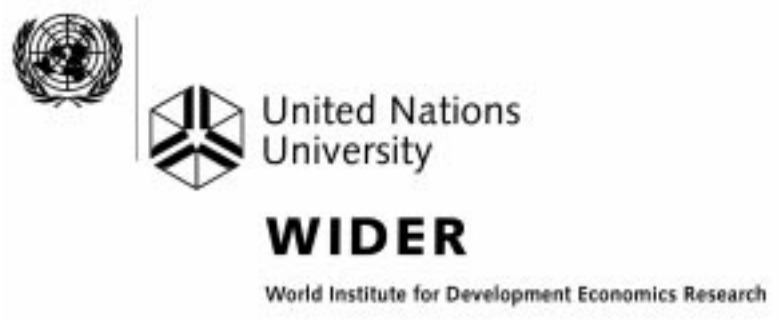

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Fiscal Policy in a Growth Framework

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Abstract

This paper assesses recent theorising and empirical evidence on the impact of fiscal policy—taxes, public expenditures and budget deficits—on long-run growth. It considers the relevance of recent advances in growth theory for low-income countries and compares the evidence for low-income countries with that for middle- and high-income (OECD) countries.

Recent advances in endogenous growth theory have demonstrated that fiscal policy can have long-run effects on economic growth rates where some taxes distort investment decisions in the private sector (negative effect) and/or where some 'productive' public expenditures compliment private investment (positive effect). Increasing budget deficits can be expected to reduce long-run growth rates, unless tax-payers fully anticipate fiscal policy changes and adjust their savings behaviour accordingly—a condition unlikely to hold in low-income countries. Recent theory particularly stresses the importance for growth of the following. …/…

Keywords: fiscal policy, public expenditure, taxation, economic growth

JEL classification: O23, O40

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- The composition of taxes and expenditures—distortionary versus non-distortionary taxes; productive versus unproductive expenditures.
- The government budget constraint (GBC)—growth effects of additional public spending inevitably must be balanced against the growth effects of the taxes or deficits which finance them.
- Distinguishing the short- and long-run. Since most growth models agree that fiscal-growth effects occur in the short-run, an important policy question becomes: for how long do fiscal-growth effects persist?

There is a great deal of empirical evidence on the effects of fiscal policy on long-run growth. Much of this however is methodologically weak rendering results unreliable. Research prior to around 1997 (and some thereafter) generally ignores the GBC when testing for fiscal effects and as a result produces non-comparable or apparently non-robust results. More consistent evidence is found (though almost all of this is for the OECD) when the growth effects of taxes, expenditures and deficits are examined simultaneously—as the GBC suggests. Negative effects of taxes which distort investment decisions (e.g. income taxes) and positive effects of 'productive' expenditures (e.g. capital spending such as infrastructure; education) are generally found. Taxes on domestic goods and services and government recurrent and/or welfare spending appear generally to have, at most, weak effects on long-run growth. Evidence on the effects of redistribution (of which fiscal policy is a part) on growth is ambiguous, consistent with the ambiguous predictions from current theorising. There is very little reliable evidence available for LICs; limited evidence for LDCs more generally suggests the possibility that fiscal-growth effects could be quite different from those observed in OECD countries. Robust evidence of a negative association between budget deficits and growth is beginning to emerge, though interpretations differ.

Introduction

Can fiscal policy[1] affect the long-term growth performance of low-income countries (LICs)? The traditional answer from economic theory (either short-run comparative static macro models or dynamic growth models such as Solow, 1956) to the more general question of whether fiscal policy can affect growth, is that it can, at most, affect the short-run growth rate of per capita income. As a result, over the long-run, the *level* of income could be raised or lowered by fiscal changes (relative to some initial fiscal policy stance) but in the long-run income growth will return to its initial rate.

Since the mid-1980s however, new endogenous growth models have proposed a number of channels through which fiscal policy could have 'permanent' growth effects, raising the prospect that fiscal policies could have much more substantial and enduring effects on income levels and growth rates. Key characteristics of these models are: (a) factor accumulation and/or technical progress are endogenously determined; and (b) reproducible factors (physical and human capital) are not subject to diminishing returns in aggregate. In this context, fiscal policy can have long-run effects to the extent that it (i) affects factor accumulation (e.g. capital income taxes, public investment) or (ii) influences technical progress (e.g. tax breaks for 'hi-tech' industries, public R&D). To assess the implications of this literature for fiscal policy in practice in LICs it is important to address a number of issues. For example, how valid are these new endogenous growth models likely to be to LICs? What fiscal policy prescriptions, if any, do they yield for LICs? What does the empirical evidence on fiscal-growth links suggest for LICs?

This paper will address these questions. Section 1 outlines recent theories proposing long-run fiscal-growth effects and considers their relevance to LICs. Section 2 then reviews the empirical evidence on the relationship between taxation, public expenditure, fiscal deficits and long-run growth assessing this in the light of both the theoretical predictions and the applicability of currently available evidence to LICs.

It would, of course, be wrong to expect uniformity of experience in the fiscal-growth relationship across LICs. Countries such as India and The Gambia, for example, as well as sharing some features in common, have many differences. It is therefore important to distinguish those aspects of fiscal policy which they might be expected to share from those which are likely to differ. Examining regional differences among LICs (as some of the evidence does) can help in this respect. Similarly, public finances generally interact with the economy's wider financial system, so that differences across LICs in the level of financial development and government regulation can be important sources of differences in fiscal-growth effects.

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1 Fiscal policy is defined here as the level and structure of taxes and public expenditures, and the extent of budget deficits. The latter is sometimes referred to as 'macro-fiscal' policy.

1 Theory

1.1 Neoclassical versus endogenous growth models

The neoclassical model, following Solow (1956), predicts that long-run growth is entirely determined by exogenous technical progress, typically assumed to grow at a constant rate in the 'steady-state'. Physical or human capital accumulation, (see Mankiw *et al*. 1992) can only affect growth during 'transitional' periods when the economy is out of its steady-state (e.g. following an increase in savings rates). In this case growth is temporarily faster as the economy moves to a new income trajectory involving higher income levels but the same long-run growth rate. Nevertheless, as Baxter and King (1993) show, based on simulating a neoclassical model for the US, though fiscal policy may not be able to change income growth permanently, its effects on income levels can be substantial and may take twenty years or more to be fully realised. In many LIC policy environments where time horizons are short (given the imperatives of poverty reduction or political uncertainties) potential growth gains over twenty years could seem very substantial even if there are no benefits beyond.

As noted in the Introduction, endogenous growth models have challenged the long-run 'policy ineffectiveness' prediction by modifying neoclassical assumptions.[2] Among the main ways in which fiscal policy affects growth in these endogenous models are the following:

- production externalities—public capital/investment or education may enhance private sector production (e.g. via complementarities between public infrastructure and private investment. See Lucas, 1988; Barro, 1990; Cashin, 1995). These are modelled as externalities because private sector firms are assumed to ignore public 'inputs' in their profit-maximising decisions.
- productivity growth—fiscal policy may influence innovation, R&D etc. (Romer, 1987, 1990; Aghion and Howitt, 1992; Einersson and Marquis, 1997). In LICs, a more likely channel is the impact of fiscal policy on the acquisition of foreign technologies such as those embodied in imported capital and/or final goods.
- productivity differencespublic/private sector efficiency differences provide growth-affecting opportunities via inter-sectoral flows. (Ram, 1986; Dowrick, 1993). Such models involve *assumed* average and/or marginal productivity differences between government and private sectors.
- fiscal effects on factor accumulation—either indirectly via incentive effects on private accumulation or directly via public investment in physical or human capital. (Lucas, 1988; King and Rebelo, 1990; Rebelo, 1991; Stokey and Rebelo, 1995; Mendoza *et al*. 1997).
- crowding-out—to the extent that 'unproductive' public expenditures crowd-out 'productive' private or public investment (including education) long-run growth can be affected (Barro, 1990; Devarajan *et al*. 1996; Milesi-Ferretti and Roubini, 1998).

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2 For reviews of this literature, see Aghion and Howitt (1998, chapter 10) and Myles (2000) .

— Redistribution—policies aimed at redistribution can affect long-run growth by a number of mechanisms: altering savings rates; providing social insurance and overcoming capital market imperfections (Galor and Zeira, 1993; Perotti, 1993; Sinn, 1996); helping to enforce private property rights (Cashin, 1995); or via political economy factors such as median-voter effects (Persson and Tabellini, 1992; Alesina and Rodrik, 1994).

1.2 Growth effects of taxes and expenditures in a 'Barro model'

Most endogenous models of fiscal policy and growth have focused on one side of the government budget or the other—usually the tax side.[3] Barro (1990)[4] and Cashin (1995) analyse both taxes and expenditures simultaneously, though both models preclude deficit finance. For the purpose of evaluating the empirical literature on fiscal policy and growth, the Barro (1990) and Barro and Sala-i-Martin (1992) models provide a useful starting point. They adopt the standard Ramsey (1928) framework in which the consumption path of a representative consumer is obtained by maximising an inter-temporal utility function over an infinite horizon. There are *n* producers each producing output (*y*) according to the production function:

$$y = Ak^{1-\alpha}g^{\alpha} \tag{1}$$

where *k* represents private capital and *g* is a publicly provided input (per capita). There are therefore constant returns to *total* (public plus private) 'capital' inputs, $k+g$.[5] The government also produces consumption ('unproductive') goods per person, g_c, which enter utility functions but have no effect on production. The government balances its budget in each period by raising a proportional tax on output at rate τ and lump-sum taxes per person of *l*, giving the constraint (in per capita terms):

$$g + g_c = l + \tau y \tag{2}$$

Of course, lump-sum (or non-distortionary) taxes do not affect the private sector's incentive to invest in the input good, whereas the taxes on output do. Thus, with an isoelastic inter-temporal utility function, Barro and Sala-i-Martin (1992) show that the long-run growth rate in this model (γ) can be expressed as

$$\gamma = \lambda(1-\tau)(1-\alpha)A^{1/(1-\alpha)}(g/y)^{\alpha/(1-\alpha)} - \mu \tag{3}$$

where λ and μ are constants that reflect parameters in the utility function, or alternatively:

$$\gamma = \lambda(1-\tau)(1-\alpha)A^{1/(1-\alpha)}(\tau - \{\frac{g_C - l}{y}\})^{\alpha/(1-\alpha)} - \mu \tag{4}$$

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3 Devarajan *et al*. (1996) is one of few studies to concentrate on the expenditure structure.

4 See also Barro and Sala-i-Martin (1992) who develop extensions to the basic Barro (1990) model.

5 Notice however that public inputs are specified as a flow (investment) rather than a stock of capital, though this can readily be changed without altering the spirit of the model's outcomes.

Equations (3) and (4) show that the growth rate is decreasing in the rate of distortionary taxes (τ) and increasing in government productive expenditure (g), but is unaffected by non-distortionary taxes (l) or unproductive expenditure (g_c).[6]

These growth effects are summarised in the four cells in the north-west corner of the matrix in Table 1 below. Though Barro and Sala-i-Martin (1992) exclude the possibility of deficit finance, the framework is readily extended to include fiscal deficits: predicted effects are also shown in Table 1 (and discussed below).

Table 1

Growth Effects of Taxes and Expenditures

Financed by:		Public Spending: Productive	Public Spending: Unproductive	Deficits:
Taxes:	Distortionary	Positive/negative (at low/high government size)	Negative	Ambiguous
	Non-distort.	Positive	Zero	Negative
Deficits:		Ambiguous	Negative	—

Table 1 shows that not only do the predicted growth effects of taxes or expenditures depend on the *type* of tax/expenditure considered (and hence the tax/expenditure *mix*, as well as the total level), but the overall effect of a tax or expenditure change depends on how this is financed (compensating tax or expenditure change). This is reinforced when budget surpluses/deficits are allowed (see below). Even where all government expenditure is productive, the use of distortionary taxes to finance this can, at sufficiently large tax/expenditure levels, generate negative growth effects.[7]

In an extension to the expenditure side of the Barro (1990) model, Devarajan *et al.* (1996) consider the possibility of government expenditures which are productive to varying degrees. They define productive expenditure as 'that component of public expenditure an increase in whose share will raise the steady-state growth rate of the economy' (Devarajan *et al.* 1996, p.317). They then show that the growth rate is a function not just of the relative productivities of any two expenditure components, but also of the relative shares of these components in total expenditure. For example, in the two expenditure component case of (1) where

$$y = k^{1-\alpha_1-\alpha_2} g_1^{\alpha_1} g_2^{\alpha_2} \qquad (1')$$

6 Thus, in (4) the growth effects of an increase in unproductive expenditures, g_c, financed by lump-sum taxes, l, cancel.

7 As Bajo-Rubio (2000) shows, a similar 'inverted-U' relationship between the growth rate and government size is also consistent with an augmented Solow model (i.e. constant returns to total capital are not required), though this only applies to transitional behaviour.

it is possible to 'over-allocate' resources to a 'more productive' public expenditure category (higher α), which will reduce growth. The intuition behind this result is that while more productive categories have higher *average* productivity in equilibrium, maximum steady-state growth is achieved where *marginal* productivities are equalised. This equality determines the growth maximising public expenditure shares which, if exceeded will cause lower marginal productivity (than elsewhere) in the 'over-expanded' category.[8] Therefore, in the Devarajan *et al.* model, the *mix* of different expenditures, as well as the growth-enhancing potential of each, is important for long-run growth outcomes.

For the Barro/Devarajan frameworks to be useful empirically, it is clearly important to be able to distinguish productive from unproductive expenditures and distortionary from non-distortionary taxes within public budgets in practice. On spending, a typical 'first approximation' is to treat government consumption spending as 'unproductive' (i.e. it affects consumers' welfare but not private production efficiency) and treat investment spending as 'productive'. The latter should perhaps include (some or all?) education and health spending because of their effects on human capital accumulation. The growth effects of public expenditure on current transfers such as social security remains a debated issue. If these merely affect welfare they can be treated analogously to other 'unproductive' expenditures. However, as noted above, transfers may affect savings rates, inequality, enforcement of property rights, etc. and could therefore be either growth enhancing or retarding depending on the empirical relevance of the various hypothesised growth mechanisms. If the results of Devarajan *et al.* (1996) are correct—though they may not be (see below)—then this 'first approximation' may turn out to be quite misleading in poorer economies.

On taxation, in the Barro (1990) model 'distortionary' taxes are those distorting the decision to invest—essentially capital and labour income taxes. With no labour-leisure-education choices, consumption taxes are non-distorting. However, as Mendoza *et al.* (1997) show, human capital investment can be affected by consumption taxes when labour supply is endogenous. Clearly, in practice, almost all taxes are distortionary to some degree and the key issue in searching for long-run effects of various taxes is whether these distortions can be expected to be substantial or minor with respect to the main determinants of long-run growth, such as investment, education and training, or technical progress.

1.3 Budget deficits and growth

In extensions to the Barro-type model allowing budget deficits, whether these affect growth depends on whether Ricardian Equivalence (RE) is assumed to hold—that is, whether the private sector anticipates future taxes and adjusts its savings to compensate fully for changes in public sector savings—and on whether all deficit-financed spending is 'productive'. If both these conditions hold, deficits are analogous to lump-sum taxes and have no long-run growth effects.

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8 It can be shown that the growth maximising expenditure shares are given by the ratio α_1 / α_2, for the Cobb-Douglas case in (1′).

Where RE does not hold (the assumption underlying Table 1), budget deficits are generally expected to be growth-retarding, *ceteris paribus*. This can arise because total savings are reduced (if the private sector does not fully adjust its savings or government borrowing finances consumption goods provision), hence reducing factor accumulation. Alternatively, as Tanzi and Zee (1997) argue, if deficits are perceived as unsustainable, then changes in tax/expenditure policy and/or monetary policy will be anticipated. Either is likely to retard growth via effects on investment from increases in expected inflation or uncertainties associated with possible fiscal policy changes. Even if monetary policy is designed to 'neutralise' the inflationary effects of a budget deficit, growth is still likely to be retarded by the associated increases in interest rates.

From Table 1, the net effect on growth of increasing the budget deficit depends on the simultaneous change in taxes and/or expenditures. For example, increasing the fiscal deficit in conjunction with a reduction in distortionary taxes *could be* growth-enhancing if the *ceteris paribus* growth-retarding effect of an increased deficit is out-weighed by the *ceteris paribus* growth-enhancing effect of reductions in distortionary taxes. In this case the method of financing the increased deficit could be important if alternative financing sources involve different impacts on private sector savings and accumulation decisions. Across LICs, this is likely to differ. Where governments (such as in India) can sell their debt willingly to debt holders on domestic or foreign markets, the crowding-out effects of deficits can be quite different compared to those in countries where a strong element of compulsion is associated with sales of new public debt.

1.4 How relevant are endogenous fiscal-growth models to LICs?

Sections 1.1-2 outlined alternative models capable of generating long-run growth effects of fiscal policy, focussing on the Barro (1990) framework upon which most subsequent models have been built. But are these models relevant to LICs? At first sight it may appear that the notion of a representative consumer optimising inter-temporally and governments setting fiscal parameters accordingly is inappropriate in an LIC context, where even static optimisation by consumers has been questioned. Similarly, is it reasonable to assume non-diminishing returns to public and private capital in aggregate? In fact, while the Ramsey inter-temporal framework is analytically convenient it is not essential for endogenous growth outcomes. As Rebelo (1991) shows, in models with an exogenous savings rate, endogenous long-run growth which is a positive function of savings (and hence accumulation), can still be obtained.

On the issue of constant returns to capital, Rebelo (1991) also demonstrates that in models with multiple capital goods, endogenous growth requires only that there are non-diminishing returns for a 'core' of capital goods, with diminishing returns possible in remaining capital and/or consumption goods sectors. Thus, for example, an equation such as (1) could apply to the production of private capital or education. These arguments are enhanced if externalities exist such that there are increasing returns at the aggregate level. The question remains however over whether these 'Ak' type models are likely to apply to LICs.[9] Could the productivity of aggregate public plus private capital approach constant returns? Empirical evidence on this is, as yet, unclear. There may well be relatively high returns to physical and human capital accumulation in many

9 Equation (1) represents an 'Ak' model expressed in terms of aggregate private-plus-public capital.

LDCs, and there are potentially considerable complementarities between government and private investment. However since many LDCs are also almost certainly some distance from their production frontiers, current growth evidence of apparently high returns to accumulation could reflect transitional behaviour as those LDCs acquire best-practice technology.

This is especially relevant to African countries where negative shocks such as drought, wars and internal strife lead to low or negative growth during the episode, followed by high growth recovery periods. These latter episodes can sometimes be misinterpreted as representing long-run performance whereas they actually represent temporary 'catch-up', as spare capacity is used or rebuilt.

A related issue concerns the relevance to LICs of the distortionary/non-distortionary and productive/unproductive distinctions in the Barro-type models. Distortionary taxes, for example, have generally been associated with income taxes in OECD countries, with consumption taxes regarded as non-distortionary (or at least 'less distortionary'). LICs however make relatively little use of income taxes and often have an assortment of indirect taxes. This suggests the need for careful application, rather than rejection, of the Barro/Devarajan framework to LICs.

Which particular taxes are distortionary and which expenditures are productive is an empirical matter to be guided by *a priori* reasoning. For LICs, attention needs to be paid to identifying which public expenditures are expected to be 'productive'. For example, in countries recovering from shocks such as wars, rebuilding human capital may be crucial and much of this expenditure may appear as 'recurrent' rather than 'capital'. Indeed, a common misperception is to regard wage payments as 'consumption expenditures' and therefore 'unproductive' whereas in fact a large portion of this is the return to human capital accumulation. A 'capital/recurrent' distinction should not be identified with a 'productive/unproductive' distinction.

In LICs where indirect taxes dominate the important issue is to identify possible distortions to investment which might arise from these. The wide disparity in trade tax, and domestic goods and service tax, rates may induce a variety of investment distortions (e.g. sectoral misallocations) with consequent growth effects. Similarly, so-called consumption spending, for example on social welfare, may have greater positive externalities for private sector production than wasteful public capital spending (as, indeed, Devarajan *et al.* 1996, allege—see below). Thus, with sensitivity to country-specific circumstances, the tax/expenditure distinctions suggested by endogenous growth theory provide valuable insights for LICs.

Apart from factor accumulation, alternative endogenous growth models stress the process of knowledge creation and the design and application of new ideas which raise productivity, as the source of endogenous growth. Key ingredients of these models are typically R&D expenditures and/or the supply of 'scientists and engineers'—the human capital necessary for innovation. While most LICs clearly are not likely to be at the forefront of new knowledge creation, these models also stress the importance of *adoption* of new technologies, or their adaptation to local conditions (see, for example, Bernard and Jones, 1996). Thus fiscal policy in LICs which inhibits or encourages the adoption of new technologies may have the potential for long-run growth effects. To the extent that the acquisition of new technology involves trade or 'openness', fiscal policy (especially trade-related) may have substantive growth effects. This analysis suggest

that, whereas in OECD countries tax credits for R&D and activities and innovation might be growth-enhancing, in LICs tax incentives to particular foreign investments might be more appropriate.

Considering its potential importance there is surprisingly little direct evidence on the technology transfer-growth relationship for LDCs (though evidence for OECD countries is encouraging). There is, of course, an extensive literature on technology transfer via foreign direct investment (FDI)—some relating to LDCs—and whether this is associated with trade or openness. (Blomstrom and Kokko, 1997, provide an LDC-specific survey). Balasubramanyam *et al*. (1996) and Taylor (2000) find some evidence that FDI is more growth enhancing in relatively 'open' economies though this could be proxying for a number of features (such as competitiveness), and fiscal dimensions of openness (e.g. trade taxes) may be relatively unimportant. Recent evidence on the spillovers from FDI in LDCs is more encouraging than some early studies suggested but a consensus on the magnitudes and mechanisms of FDI spillovers seems some way off.[10] In addition, much of this evidence relates to manufacturing technology whereas for some LICs *agricultural* technology transfer is most relevant—an under-research aspect of the FDI/technology transfer debate.

Section 1.1 highlighed a further set of models which allow for the possibility that government is less efficient than the private sector (e.g. Ram 1986; Dowrick, 1993). Care needs to be taken in applying these models since they are typically designed to capture the notion of two otherwise identical goods being produced in different sectors, whereas in practice government and private sector activities may be quite different. The technologies available for these different activities might therefore dictate that average productivity is lower in the government sector (though, in the absence of barriers to inter-sectoral flows, marginal productivities could be equalised). Where *marginal* productivity is lower in government activities, growth can be enhanced by an expenditure (and tax) reducing policy, shifting resources to higher productivity private activities. This is clearly a case where the range of objectives of fiscal policy (including growth) need to be considered carefully to identify policy trade-offs.

Do the models considered in Section 1 yield specific guidance on the appropriate or 'optimal' fiscal policy for growth in LICs? It is self-evident that substituting taxes which avoid investment distortions for those which distort investment decisions, and reallocating expenditures towards 'productive' categories (where the latter are below the 'optimum') will enhance growth. Beyond this however, care needs to be exercised in drawing out fiscal policy prescriptions. For example, a recent literature has begun to examine whether, or in what circumstances, it is optimal to set low or zero capital income tax rates, in order to avoid growth-inhibiting distortions to investment. It turns out the appropriate capital income tax policy is sensitive to several model assumptions including the exogeneity or otherwise of fertility—a debated issue for LICs.[11]

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10 See Moran (1998) for an interesting assessment of the contribution of FDI to development.

11 Myles (2000) provides a helpful discussion of these capital tax issues.

2 Reviewing the empirical evidence

This section reviews evidence on the long-run fiscal-growth effects which emerge from the 'growth regression' literature, beginning with discussion of some methodological issues.

2.1 Methodological issues

The empirical fiscal-growth literature is of highly variable quality and has generally yielded non-robust results. To some extent this reflects changes in empirical methodologies over time and a tendency for many studies to test various *ad hoc* hypotheses or give insufficient attention to theoretical, as well as econometric, specifications. Of course, the growth regression methodology in general has been the subject of numerous criticisms (reviewed in detail by Temple, 1999). Most of these apply also to tests for fiscal effects and will not be repeated here. However, a few issues especially relevant to the fiscal-growth context deserve some discussion.

First, data constraints are particularly severe both because suitable data on fiscal variables are unavailable for many countries, and because of the quality of available data, the most reliable source being the IMF's Government Finance Statistics. Devarajan *et al.* (1996), probably the most comprehensive study of this type for LDCs, (but using only public expenditure related variables) are able to include 43 LDCs (including 19 LICs; 18 sub-Saharan African countries). However, when tax variables are also required, much less data are available—Miller and Russek (1997) for example are restricted to 22 LDCs (of which only 3 are LICs). An additional problem with fiscal variables is that the conceptual variable being tested is generally a marginal tax rate or the marginal contribution of public expenditure to growth, whereas available data typically relate to *average* tax rates or expenditure/ GDP ratios.[12] As a result empirical investigators often experiment with alternative fiscal indicators which sometimes produce inconsistent results (see, for example, Easterly and Rebelo, 1993).

Second, the regression specifications of many studies are inadequate. While few studies follow the dubious practice of Fischer (1993) by including only a single variable in a growth regression (the budget surplus, in his case), many studies have explored fiscal effects by adding a single fiscal variables to a growth regression including an assortment of control variables. Levine and Renelt (1992) demonstrate the non-robust outcomes that this procedure generates. In addition, few empirical studies have tackled the problem of the endogeneity of fiscal policy—that fiscal variables respond to growth as well as *vice versa* (either 'automatically' or due to discretionary government actions). Those which do attempt to deal with endogeneity typically find it hard to identify suitable instruments so that their instrumental variable (IV) methods may not be reliable.

Third, an important specification issue which casts doubt on the reliability of almost all fiscal-growth regressions for LDCs is their failure to deal adequately with the

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[12] Problems with using tax/GDP ratios are compounded by the fact that these reflect both the impact of differences in tax rates (the variable of interest) and tax bases. For expenditure/GDP ratios, all studies assume that the *marginal* growth impact is captured by these *average* ratios.

government budget constraint (GBC). In particular, *either* taxes *or* expenditures (or some sub-sets of each) are included in most regressions with the result that regression evidence can be mis-interpreted. Kneller *et al.* (1999) and Bleaney *et al*. (2001), show the importance of this for empirical estimates for OECD countries and formalise a methodology for incorporating the GBC which is related explicitly to the kinds of theoretical models by Barro (1990) and Mendoza *et al.* (1997) discussed above.

The basis of their argument is that the parameters on fiscal variables included in regressions should be interpreted as the growth effect of those fiscal categories, *financed by any omitted fiscal categories*. To avoid mis-specification problems, only 'neutral' fiscal categories (those predicted to have a zero growth impact in Table 1) should be omitted from regressions. Empirical tests should therefore first establish which categories are neutral and these can legitimately be omitted from regressions. The parameters on included fiscal variables can then be interpreted as the ceteris paribus impact of the relevant included categories.[13] Unfortunately, most studies prior to Kneller *et al*. (1999) are imprecise in their specification of the GBC and generally omit non-neutral as well as neutral fiscal categories from regressions. As the review of empirical studies below shows, Miller and Russek (1997) is the only study including LDCs to attempt to address the GBC issue. They report results for 22 LDCs but fiscal categories omitted from their regressions are probably not all neutral.

In addition to the numerous studies which address the question of the impact of fiscal policy on growth directly, many studies have included fiscal (or 'macro-fiscal') policy variables in regressions where the main focus is on other sources of growth. These studies are especially subject to the GBC problem discussed above. Thus for example, a 'government share' variable (usually the ratio of government consumption expenditures to GDP) is frequently included among conditioning variables (e.g. Barro and Sala-i-Martin 1995). Similarly, studies of the broader impact of 'policy' on growth (see Mosley, 2000, for discussion and examples) and the recent aid-growth literature commonly include either a government size measure or budget deficit (the latter often presumed to capture macroeconomic stability).[14] Since these are usually the only government measure included in regressions they will capture some composite of all the possible effects identified in Table 1, and signs/significance become impossible to interpret.

Finally, Easterly and Rebelo (1993) point to an important testing problem—the optimality (or otherwise) of government policy. That is, the expected relationship between fiscal policy and growth may depend on whether governments set tax rates (and, by extension, other fiscal variables) optimally. For example, as we have seen, the Barro (1990) model predicts an inverted-U relationship between government size and the economy's growth rate (when this involves productive expenditure and distortionary taxes). In cross-country regressions, *if* governments choose tax/expenditure levels randomly, we might expect to observe countries at various points on the inverted-U

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13 Miller and Russek (1997) also discuss this 'financing' issue but fail to identify 'neutral' categories either *a priori* or empirically.

14 Early examples include Easterly (1993) and Fischer (1993). On the inclusion of policy variables in the aid-growth literature, see Burnside and Dollar (2001), Collier and Dollar (2000), Hansen and Tarp (1999).

curve and should test accordingly. However, if governments attempt to set fiscal parameters at the growth-maximising optimum, countries can be expected to be clustered around this government-growth combination. Of course, if the efficiency with which governments deliver services or raise taxes differs (i.e. the production function in (1) differs across countries) then very different growth rate-government size combinations may be observed which could give rise to a positive or a negative relationship. It then becomes impossible to sign predicted fiscal parameters in a cross-country growth regression.

Overall therefore, the empirical evidence on the links between fiscal policy and growth should be regarded with some caution. There are several methodological weaknesses associated with most studies. Though these are being addressed in current research it remains unclear whether existing evidence of non-robust fiscal-growth impacts reflect genuinely different experience in different countries/time periods, or are the result of testing weaknesses, or both.

2.2 Evidence on the growth effects of taxes and expenditures

Given the methodological problems discussed above most empirical fiscal-growth estimates must be regarded as unreliable and in some case are positively misleading. For example, as de la Fuente (1997) and Kneller *et al.* (1999) demonstrate, including fiscal variables in a growth regression one at a time can lead to changes in parameter signs and significance compared to more fully specified regressions. As an aid to evaluating results, we split the literature into *First, Second* and *Third Generation* studies; Table 2 provides a summary of results from studies including taxes and/or public expenditures.

First Generation studies essentially pre-date endogenous growth models of Romer (1986, 1987) and Barro (1990) and test a variety of more ad hoc hypotheses related to the impact of government on growth. Many of these grew out of public choice concerns over government growth during the 1960s and 1970s. They are generally poorly specified, use limited data, and employ econometric techniques which would now be regarded as unreliable. Unsurprisingly, results are non-robust or non-comparable.

Second Generation studies have typically been inspired by the predictions of neoclassical and/or endogenous growth models involving fiscal policy. Econometric methods are generally more sophisticated than first generation studies (at least for the more recent ones) with some attempts to deal with endogeneity problems. However, the empirical specifications of second generation studies are generally only loosely tied to the theories which inspire them. In particular, most papers in this group test for *either* tax *or* public expenditure or fiscal deficit effects on growth, ignoring the role of the government budget constraint and the importance of implicit (tax or debt) financing of expenditures as summarised in Table 1 above. Second generation studies also, with a few exceptions, rely on cross-section methods.

To qualify as a *'Third Generation'* study in Table 2, investigations must: (a) recognise (implicitly or explicitly) the role of the government budget constraint when testing for fiscal effects, by examining at least two of tax/expenditure/deficit effects simultaneously rather than separately; and (b) adopt recent advances in panel or time-series econometrics, including testing for the endogeneity of fiscal policy.

As Table 2 demonstrates, results from first and second generation studies reveal non-robustness with similar fiscal variables apparently producing strong positive, negative or no significant effects. To some extent this probably reflects the different samples, the variety of variables used and methods of measuring a given variable. However, as the papers by Agell *et al*. (1997, 1999) and Folster and Henrekson (1997) reveal, even when the same dataset and variables are used, econometric specification differences can lead to widely differing outcomes.

The failure of these studies to control for the GBC undoubtedly contributes to the apparently non-robust outcomes. Not only are GBC elements omitted from regression specifications but included fiscal elements are given a variety of interpretations, often acting as a proxy for some conceptual variable derived from a growth model. Thus, Easterly (1993) for example, proposes a formal/informal sector model in which tax rates differ across sectors. In his empirical testing he includes government consumption as 'an indicator of high taxes on the formal sector' (p. 201). Whether a significant negative parameter estimate should be interpreted as 'government consumption spending is harmful for growth' or 'high formal sector taxes are harmful for growth' or both is unclear, but with numerous other interpretations possible it would be dangerous to draw any conclusions from such flawed regression evidence. Unfortunately, this conflation of tax with expenditure variables is commonplace among first and second generation studies.[15]

With the exception of Kneller *et al*. (1999) and Bleaney *et al*. (2001), most third generation studies are imprecise in their application of the GBC and/or the incorporation of the GBC is not related explicitly to the kinds of theoretical models proposed by Barro (1990) and Mendoza *et al*. (1997). Thus, when unspecified (but probably non-neutral) fiscal variables are omitted from regressions it becomes difficult to interpret results reliably. In addition, as Table 2 shows, almost all third generation studies relate to OECD countries, with Miller and Russek (1997) an exception (though, as noted above, their omitted fiscal categories are probably not all neutral).

Nevertheless, it can be seen in Table 2 that the results of third generation research appear to be more robust. In general, the taxes tested have negative growth effects while at least some public investment spending impacts positively on growth. Consumption and social security spending are found to have zero or negative growth effects, except Cashin (1995) who finds a positive growth stimulus from welfare spending. This latter result could however arise from the omission of consumption spending and/or government deficits from his estimating equations. As the results in Miller and Russek (1997), de la Fuente (1997) and Kneller *et al*. (1999) demonstrate, mis-specifying the GBC by omitting non-neutral fiscal categories, can lead to very different parameters on included fiscal variables (including sign changes) but this need not imply non-robustness. Rather it may reflect differences in the implicit financing categories which are omitted.

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15 This issue is further complicated by the existence of 'unofficial taxes' in the form of bribes. If higher official taxes allow improved employee compensation such that bribes are reduced, the net effect could be more positive than a focus on formal tax rates would suggest. See Wei (1997) for evidence of such effects on foreign investment.

Table 1 indicated that the impact of productive government spending on growth (financed by distortionary taxes) can be expected to be first positive and then negative as government size increases (subject to the caveats mentioned above). De la Fuente (1997) is the only study to allow explicitly for this non-linearity and, using quadratic terms in regressions, he finds strong supporting evidence for this prediction with reference to public capital spending.[16] Unfortunately, this study relates only to OECD countries. There is no comparable evidence on whether there is some growth-maximising size of public expenditures relevant to LICs.

2.3 Evidence on the growth effects of budget deficits

Empirical evidence on the impact of budget deficits is not identified in Table 2. Where these have been tested explicitly, they have often revealed significantly negative growth effects (positive effects of surpluses). Among early studies, Martin and Fardmanesh (1990) and Easterly and Rebelo (1993) find negative deficit-growth effects, and various subsequent studies which have added a budget deficit variable to a growth regression (often as a macroeconomic stability proxy or as one of a set of 'policy' measures) have found a negative correlation (see Easterly *et al*. 1993, 1994; Devarajan *et al*. 1999; Mosley, 2000).

In fact, despite the methodological weaknesses, one of the more robust pieces of evidence from fiscal-growth regressions is the negative association between growth and budget deficits, which is supported by the third generation studies of Miller and Russek (1997), de la Fuente (1997), Kneller *et al*. (1999) and Bleaney *et al*. (2001). With many of these results coming from a variety of mis-specified equations (so that deficits may capture the combined effects of taxes, expenditures and deficit financing), their robustness is perhaps all the more noteworthy.

One interpretation of this evidence is that, regardless of whether government size is large or small, and regardless of the mix of taxes and expenditures, budget deficits are bad for growth. It remains unclear however whether budget deficits in growth regressions represent a proxy for an unsustainable fiscal stance (signalling growing public debt) or poor macroeconomic policy more generally or both. In any case, any deficit-growth effects are likely to depend on the nature of the financial market for government debt. Where repressed financial markets prevail and/or where there is little foreign demand for government debt, crowding-out could be greater than where government paper is readily traded.

Finally, the deficit-growth relationship is one likely to be especially subject to endogeneity problems with low growth precipitating higher deficits as governments attempt to smooth consumption. Separating long- and short-run effects of deficits then becomes an important empirical testing issue but one that has received little attention.

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16 Spending on potentially productive health and education appear to be treated as consumption spending in de la Fuente's dataset. Quadratic effects are therefore not investigated for those expenditures.

3.4 Fiscal policy, redistribution and growth

The primary objective of much fiscal policy is often income redistribution. So, does fiscal policy aimed at redistribution help or hinder growth? We saw in Section 1 that theory is ambiguous on this question. Direct tests of redistribution-growth hypotheses are likely to be difficult because of the problem of separating the redistributive from other aspects of fiscal policy. Most attempts to answer this question have either assumed that social welfare spending captures this aspect or have tested the relationship between *inequality* and growth.

Evidence from recent research on social welfare spending on growth generally finds weak or ambiguous effects (see Table 2). On inequality-growth effects, it would be dangerous to conclude from any observed relationship that fiscal policy with an explicitly redistributive objective would necessarily enhance or hinder growth. Such a policy is likely simultaneously to have other effects (e.g. via tax distortions), and the growth effects of policy-induced changes in inequality may differ from those arising from other sources (e.g. technical progress). In addition, while until recently some consensus seemed to be emerging of a virtuous circle of faster growth and reduced inequality, new evidence from Forbes (2000) suggests that such a conclusion may be premature.

Paying careful attention to endogeneity problems, Forbes shows that while a negative correlation between growth and inequality may exist across countries (countries with lower inequality have faster growth, *ceteris paribus*), over time, reductions in inequality appear to be associated, *ceteris paribus*, with slower growth at least in the medium term.

Much of this evidence relates to LDCs and is likely to be particularly relevant to LICs. Unfortunately since fiscal policy variables are not considered explicitly in the analysis, it remains unclear how much of any changes in inequality (and associated growth effects) can be attributed to fiscal policy actions. However, since the inequality measures used in this context are typically measures of the distribution of pre-tax incomes, it is doubtful that this is substantially affected by tax/expenditure policies. Nevertheless, any direct adverse growth effects of reduced inequality could be compounded if this reduces the tax base (below what it otherwise would have been) and hence reduces productive public expenditure.

3.4 Are LDCs different?

Since almost all of the methodologically more reliable evidence comes form OECD countries, can we expect this evidence to apply also to LDCs in general or LICs in particular? Two pieces of evidence suggest caution. First, Miller and Russek (1997)—who include a range of taxes and expenditures in their growth regressions—find opposite results for the LDCs in their sample compared to those for developed countries. Whereas education spending is found to raise growth across OECD countries it is associated with lower growth in LDCs. Of course, this result could reflect inefficiency in education spending (e.g. favouring higher education when primary/secondary education are more growth enhancing) and would therefore imply a reallocation, rather than reduction, in education spending to achieve faster growth.

Other public 'investment' spending items, such as defence and health, also appear to be associated with lower growth in LDCs but not in the OECD. Equally controversially, income taxes appear to be associated with reduced growth in the OECD but raise it in LDCs.

Second, Devarajan *et al.* (1996)—who ignore taxes in their analysis—also find that although public capital spending boosts growth while consumption spending reduces it in OECD countries, the reverse appears to hold in LDCs. For an African sample of mainly LICs, Devarajan *et al*. (1999) and Calamitsis *et al.* (1999) find little or no evidence of growth effects from public investment (though budget deficits have significant negative effects).[17] This expenditure evidence is broadly consistent with Miller and Russek, despite very different specifications, and is worrying for those wishing to derive policy conclusions for LDCs or LICs. It suggests fiscal effects which are the reverse of those predicted by theory and of those found (by third generation studies) in developed countries. For African countries, however, Khan and Kumar (1997) and Hadjimichael *et al*. (1995) find stronger evidence of positive growth effects from public investment spending.

The current picture is therefore one of some confusion and may well arise partly from data quality problems. Only with respect to budget deficits is some consistency found, with Miller and Russek generally finding (implicitly) that deficit-financed increases in public expenditures are harmful for growth. Devarajan *et al*. (1999) find similar evidence for a sub-Saharan African sample (using a very limited regression specification).

Without more extensive and reliable evidence for LDCs/LICs it would be premature to draw policy conclusions. Nevertheless, current evidence is consistent with the view, often expressed, that aid donors insistence on *capital* spending without adequate provision for the accompanying recurrent expenditure, has led to a misallocation in the capital/recurrent mix of public spending which is harmful for growth. In addition, where public investment has supported low return activities (e.g. via SOEs, 'prestige' projects, import-substitution) it is not surprising if positive growth effects from public investment cannot be identified. An interesting issue remains whether trade and fiscal reforms in many LDCs in the last decade or so has changed this situation—an issue on which current evidence is silent.

Finally, it may be that if fiscal-growth effects exist and are mediated through private investment (the Barro model mechanism), more reliable empirical evidence will emerge by investigating the links between fiscal policy and investment on the one hand, and investment and growth on the other, rather than the reduced-form relationship between fiscal policy and output growth. Notwithstanding the current debate over the impact of private investment on growth in African LICs, it is possible, even if this link is strong, that fiscal policy has minimal impact on private investment.[18]

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17 The Devarajan *et al.* (1999) public investment definition is very broad and the quality/reliability of the data is probably low.

18 On the latter, see Hermes and Lensink (2000).

3 Conclusions

This paper has reviewed the recent literature on the relationship between fiscal policy variables—taxes, public expenditures and budget deficits—on growth, focusing on recent advances in theory and on empirical evidence. It has also sought to assess the relevance of this literature for the fiscal policy-growth relationship in LICs.

On theory, endogenous growth models developed in the last decade or so suggest the possibility of long-run steady-state effects of fiscal policy on growth, drawing important distinctions between taxes which distort the decision to invest (including investment in education) and those which do not, and public expenditures which affect private production rather than consumer's utility. Interestingly, recent extensions to neoclassical growth models point in a similar direction though long term fiscal effects on growth in these models rely on economies being away from their steady-states for extended periods of time. The question of whether observed growth in OECD or developing countries over past decades represents transitional dynamics or steady-state behaviour remains contentious. Though the framework underlying many of these models involves fairly restrictive assumptions, this paper has suggested nevertheless that there are useful insights regarding the impact of fiscal variables on growth in LICs. In many cases these dynamic models stress the same kinds of factors emphasised in standard static optimising models—for example, stressing the need to examine the potential distortions arising from different taxes and the possibilities of externalities between public expenditures and private production.

What can we learn from the existing empirical literature? First, results from first and second generation studies should be treated with extreme caution both because of their failure to deal correctly with government budget constraint issues and because, in many cases, cross-section econometric methods are now regarded as of questionable reliability. The apparent non-robustness of those studies may simply reflect the net effects of alternative methods of financing tax/expenditure changes, where non-neutral fiscal categories have been omitted. It is clear however that it makes no sense to analyse the growth impact of any one fiscal change without simultaneously assessing the effects of the opposing fiscal changes associated with it.

Second, there remain sufficient doubts over the reliability and generality of the more consistent OECD results that further work is required before fiscal-growth effects can be reliably identified for policy advice purposes in LICs. In addition, the confusing evidence on the effects of government spending and macro policy variables such as budget deficits in LICs may reflect the fact that, for many (e.g. African) countries, sharp changes in policy every few years mean that there is simply too much short-term 'noise' in existing data to discern long-run effects. This compounds the problem referred of more volatile in LICs for exogenous reasons, with growth 'collapses' and 'recoveries' common in some African countries. Further, research relating to relatively short periods (e.g. Devarajan *et al*., 1999) are probably best interpreted as transitional effects of uncertain duration.

Overall, the literature reviewed in this paper suggests that, although theory increasingly provides guidance on the kinds of growth responses to fiscal policy which might be expected in LICs, few models address LIC conditions directly. Caution must therefore be exercise in applying these models to LIC contexts. On the empirical side, evidence so far is, in general, either lacking or inadequate as a guide to policy advice in practice.

Economists advising LDC governments on how policy can be improved to foster growth should generally be wary of anticipating long-run growth benefits from fiscal changes, based on currently available evidence. This is not to deny the apparent short-term gains from rectifying obvious fiscal inefficiencies such as unsustainable budget deficits.

Finally, can foreign aid to LICs overcome the fiscal budget constraints stressed in this paper? The simple answer to this question is 'no': aid alters the precise specification of the budget constraint but foreign aid should be thought of like any other budget financing element, together with any public expenditure implications associated with the aid inflow. Even if we assume that private sector behaviour (e.g. savings rates) is unaffected by the inflow, aid generally represents a form of public borrowing with an associated future cost. The growth effects of aid-financed expenditures should therefore be assessed in the light of the same kind of cost-benefit calculations which would underlie any borrowing-financed increase in public expenditure, including potential crowding-out effects.

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Table 2

Estimated relationship between taxes, public expenditures and growth in empirical studies

Author(s)	Countries	Years (period average)	Econometric Method	Main Findings:			
				Taxation	Investment Spending	Consumption Spending	Social Welfare Spending
FIRST GENERATION STUDIES							
Marsden (1983)	10 pairs, matched GDP	1970s	pairwise comparisons	low tax countr-ies grow faster than high tax			
Korpi (1985)	OECD	1970-87 (18 years)	panel				significant negative effect
Landau (1985)	16 OECD	1952-76 (annual)	panel/ cross-section				no significant effect
Landau (1983, 1986)	104 & LDC sample	1961-76 & 1960-88 (16/19 yrs)	cross-section		*education, defence, capital expenditure*: no significant effect	significant negative effect	
Ram (1986)	115	1960-80 (10 years)	cross-section, time series		significant positive effect (*total expenditure*)		
Weede (1986)	19 OECD	1960-82 (7 years)	panel/ cross-section				significant positive effect
Koester, Korm - endi (1989)	63	1970-79 (10 years)	cross-section	no significant effect			
Barth, Bradley (1988)	16 OECD	1971-83 (13 years)	cross-section		no significant effect		
McCallum, Blais (1987)	17 OECD	1960-83 (7 years)	panel/ cross-section				significant negative effect
Grier, Tullock (1989)	115	1950-81 (5 years)	panel			significant negative effect	

SECOND GENERATION STUDIES

Author(s)	**Countries**	**Years (period average)**	**Econometric Method**	**Taxation**	**Investment Spending**	**Consumption Spending**	**Social Welfare Spending**
Barro (1989)	72	1960-85 (26 years)	cross-section		significant positive effect		
Romer (1989)	94	1960-85 (26 years)	cross-section			significant positive effect	
Romer (1990)	90	1960-85 (26 years)	cross-section			significant positive effect	
Alexander (1990)	13 OECD	1959-84 (annual)	panel			significant negative effect	
Castles, Dowrick (1990)	18 OECD	1960-85 (6 years)	panel				significant negative effect
Barro (1991)	98	1960-85 (26 years)	cross-section		*total*: no significant effect; *t&c* significant positive effect	significant negative effect	
Weede (1991)	19 OECD	1960-85 (7 years)	panel				significant positive effect
Engen, Skinner (1992)	107	1970-85 (16 years)	cross-section	Significant negative effect			
Nordstrum (1992)	14 OECD	1970-89 (20 years)	cross-section				significant positive effect
Dowrick (1993)	24 OECD	1960-85 (26 years)	cross-section			no significant effect	

Author(s)	Countries	Years (period average)	Econometric Method	Taxation	Investment Spending	Consumption Spending	Social Welfare Spending
Easterly, Rebelo (1993)	100	1970-88 (19 years)	cross-section	*Income taxes*: significant negative effect; others: non-robust	*t&c.*: significant positive effect; *total inv., education, health*: not significant		
Persson, Tabellini (1994)	14 OECD	1960-85 (26 years)	cross-section				significant positive effect
Hansson, Henrekson (1994)	OECD	1970-87 (18 years)	cross-section				no significant effect
Barro, Sala-i-Martin (1995)	87/97	1965-85 (10 years)	cross-section (IV)		*education*: significant positive effect	significant negative effect	
Devarajan *et al.* (1996)	21 OECD	1970-1990 (5 year moving average)	panel		*health t&c*: significant positive effect	significant negative effect	
	43 LDCs				significant negative (esp. *t&c?, health*?)	significant positive	
Nazmi, Ramirez (1997)	Mexico	1950-90 (annual)	time-series		significant positive effect	no significant effect	
Mendoza *et al.* (1997)	18 OECD	1965-91 5 years; annual)	panel	No significant effects (*cap., lab., cons. Taxes*)			
Agell *et al.* (1997; 1999)	23 OECD	1970-92 (21 years)	cross-section & panel (IV)	No significant effect (*excl. gov. exp.*)	total expenditure share: no significant effect (*excl. taxes*)		
Folster, Henrekson (1999)	23 OECD	1970-95 (5 years)	panel	Significant negative effect (*excl. gov. exp.*)	total expenditure share: significant negative effect (*excl. taxes*)		
Mosley (2000)	87 LDCs	1980-95 (16 years)	Cross-section			no significant effect	

THIRD GENERATION STUDIES							
Author(s)	**Countries**	**Years (period average)**	**Econometric Method**	**Taxation**	**Investment Spending**	**Consumption Spending**	**Social Welfare Spending**
Cashin (1995)	23 OECD	1971-88 (5 years)	panel	Significant negative effect	significant positive effect		significant positive effect
Miller, Russek (1997)	16 OECD	1975-84 (annual)	panel	*Total, income and soc. sec. taxes:* negative effects	*total:* no significant effect; *education*: significant positive effect		
	23 LDCs			*Total & inc taxes:* positive effects	*total:* significant negative effect; *education, defence, social security*: significant negative effects		
Kocherlakota, Yi (1997a)	US	1917-88 (annual)	time-series	not significant (exp. Excluded)	'structures'/infra-structure: signif-icantly positive		
Kocherlakota, Yi (1997b)	US, UK	1891-1991 1831-1991 (annual, 10 lags)	time-series	Significantly negative (*exp. variables incl*; otherwise taxes insignificant)	significantly positive (*tax variables included*; otherwise inv. insignificant)		
Fuente (1997)	21 OECD	1965-95 (5 years)	panel	Significant negative effect	significant positive effect	*total*: significant negative effect; *cons. exp.*: no significant effect	no significant effect
Kneller *et al.* (1999)	21 OECD	1970-94 (5 years)	panel	'*distortionary' tax.*: significant negative effect; *'non-dist' tax.*: no effect	*'productive' exp.*: significant positive effect	no significant effect	no significant effect
Bleaney *et al.* (2000)	21 OECD	1970-94 (annual, 8 lags)	panel (static & dynamic)	as KBG (1999)	*health, education exp.*: significant positive effect	no significant effect	no significant effect

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