This PDF is a selection from a published volume from the National Bureau of Economic Research

Volume Title: Fiscal Policy after the Financial Crisis

Volume Author/Editor: Alberto Alesina and Francesco Giavazzi, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-01844-X, 978-0-226-01844-7 (cloth)

Volume URL: http://www.nber.org/books/ales11-1

Conference Date: December 12-13, 2011

Publication Date: June 2013

Chapter Title: "Fiscal Devaluation" and Fiscal Consolidation: The VAT in Troubled Times

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Chapter URL: http://www.nber.org/chapters/c12646

Chapter pages in book: (p. 443 - 485)

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"Fiscal Devaluation" and Fiscal Consolidation
The VAT in Troubled Times

Ruud de Mooij and Michael Keen

11.1 Introduction

In the aftermath of the financial crisis and in the midst of sovereign debt tensions—amounting to full-blown crisis for some Eurozone members—fiscal policy in many advanced economies is a high-stakes game played under severe constraints. In order to achieve long-term fiscal sustainability, there is a need for substantial fiscal consolidation, to both reduce levels of public debt and provide space to address looming pension and (especially) health expenditure needs associated with aging.[1] Figure 11.1, setting out an illustrative adjustment path for the average advanced economy, illustrates the scope of the former challenge. At the same time, fostering growth is a key to both reducing hardship and improving debt dynamics.

For the shorter term, several countries face immediate and severe unemployment problems: above-average fiscal deficits are found along with above-average unemployment rates in the United States, France, Portugal, Greece, Ireland, Slovak Republic, and Spain (figure 11.2). For these countries, rapid

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We are grateful to Leon Bettendorf, Carlo Cottarelli, Julio Escolano, Alexander Klemm, Daniel Leigh, Jim Poterba, Mick Thackray, Florian Wöhlbier, and participants in the NBER conference, "Fiscal Policy after the Financial Crisis," for useful comments and suggestions, and to Oana Luca for excellent research assistance. Views expressed here are those of the authors and should not be attributed to the IMF, its executive board, or its management. For acknowledgments, sources of research support, and disclosure of the authors' material financial relationships, if any, please see http://www.nber.org/chapters/c12646.ack.

1. Public health care spending in advanced countries is projected to increase, on average, by about 3 percent of GDP over the next twenty years and by 6.5 percent over the next forty years (IMF 2010c). Public pension costs are expected to rise by 2.4 percent of GDP during the next fifty years in Europe (European Commission 2009).

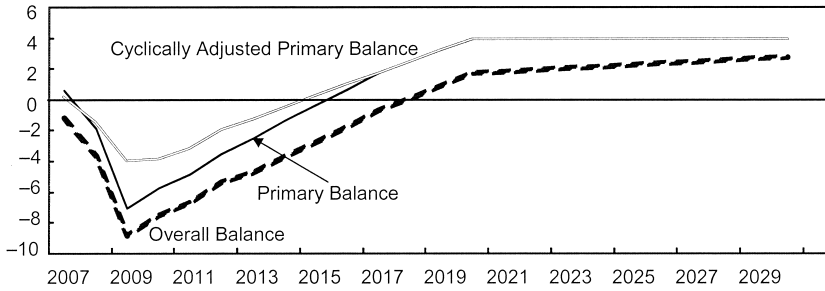

Fig. 11.1 Fiscal consolidation in advanced economies

Source: IMF (2011b).

Note: Figure shows a path of average balances that would reduce gross public debt to the lower of 60 percent or the precrisis level (and net debt to 80 percent of GDP in Japan).

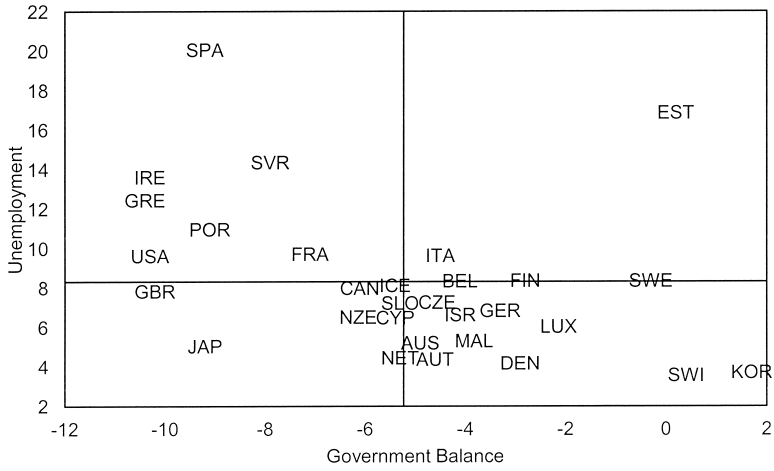

Fig. 11.2 Deficits and unemployment in advanced economies

Source: IMF World Economic Outlook database.

Notes: Data refer to 2010, except for Ireland where the projected deficit in 2011 is taken.

fiscal consolidation risks impeding economic recovery and raising unemployment, while slow adjustment risks losing market confidence, triggering higher spreads, and inducing a nasty circle of higher spending and worsening deficits. Over the medium and longer terms, growth is critical to improving the debt dynamics, reducing the relative scale of adjustment needed. And underlying poor growth performance in many countries are structural problems that are especially pronounced in some of the troubled Eurozone countries, and made evident in their sustained trade deficits: Greece and Portugal, for instance, ran trade deficits prior to their crises in the order of 11 percent of GDP.

All this poses substantial challenges for the detailed design of a wide range of tax and expenditure policies. For the latter, the core challenges are to reparameterize public pension schemes and, conceptually much harder, limit rising health costs. On the tax side—the focus of this chapter—the need is to identify reforms that strengthen the fiscal position while being, if not growth-promoting, at least minimally distortionary and growth-retarding, while respecting equity concerns.

The purpose here is not to review the full range of tax options to support fiscal sustainability: this is done, for instance, in IMF (2010b) and Cottarelli and Keen (2011). Instead the focus is on two key issues surrounding some of the core instruments that, ultimately, will have to bear the brunt of adjustment, and in the redesign of which can be seen real prospects for meeting the consolidation, growth, and structural challenges.

The first issue is the potential value and effectiveness of revenue-neutral tax shifts in addressing competitiveness and employment problems. Certainly there is strong evidence that labor taxation is harmful for employment (see, for instance, Nickell and Layard 1999; Bassanini and Duval 2006; and OECD 2011)—although there are several subtleties in this relationship and interactions with labor-market institutions are important—which has led to increased interest in reducing labor taxation in general and social contributions in particular. So too has the perception that high labor costs are a key structural problem in several of the troubled Eurozone countries, with their reduction seen as a way to ease and accelerate the needed adjustment. Measures of this sort have featured in stimulus programs and indeed in 2010 eight OECD countries reduced the social contribution rate (SCR) for employers. The difficulty, of course, is that cutting social contributions runs counter to consolidation objectives, and is quite simply not affordable in many of the countries in the upper left corner of figure 11.2. The question, then, is whether there exist "tax shifts" combining such a cut with increases in revenue from other sources that do not offset the beneficial labor market and competitiveness effects. In Europe, this has led to prominent proposals for "fiscal devaluations"—sometimes also referred to as "internal devaluations" or, in France, a "social VAT"—in the form of a revenue-neutral (or revenue-enhancing) shift from social contributions to the VAT (value added tax). This was a major element, for instance, of Portugal's initial arrangement with the IMF (International Monetary Fund). Section 11.2 explores the theoretical case for tax shifts of this kind, provides what appears to be the first empirical analysis of whether and how these and other tax shifts might affect trade performance, and discusses some of the detailed design issues that arise in practice.[2]

The second set of issues concern the VAT itself. This has already emerged as a focus of consolidation efforts in the EU, and its greater use or introduction are widely viewed as leading options (indispensible, in the views of

2. A brief account and an assessment can also be found in ECB (2011).

some) for fiscal sustainability in both Japan and the United States, respectively. In Europe, a strengthening of the VAT would be required for countries that aim at a substantial tax shift along the lines of a fiscal devaluation. The aim in section 11.3 is therefore to assess the merits of the VAT in achieving consolidation, growth, and fairness objectives and, more particularly, to develop and begin to apply a methodology for diagnosing weaknesses in VAT design and implementation so as to find ways to these ends that are likely to be less distortionary and fairer than raising the standard rate from levels that are in many cases already very high. Conclusions on these two issues are set out briefly in section 11.4.

11.2 Fiscal Devaluation: Tax Shifts to Promote Employment and Competitiveness

The rise in unemployment rates during the crisis has led many countries to implement job strategies to reverse these developments. These often include reductions in the social contributions paid by employers (SCR rates) as well as wage subsidy schemes. For instance, the OECD *Employment Outlook 2010* reports that twelve countries expanded their job subsidy programs in 2010, while, as noted earlier, another eight reduced their SCR rates. The underlying hope, of course, is that lower labor costs will raise labor demand, reduce unemployment, and (for Eurozone countries facing deep structural problems) improve international competitiveness. But, in direct terms at least, cutting SCR rates is revenue-losing. This raises the question of whether, without negating the hoped-for beneficial effects of an SCR cut, revenue could be preserved, or even increased, by at the same time increasing the VAT (or perhaps some other suitable revenue source). The potential effectiveness and design of such a fiscal devaluation has become an urgent issue: it has been presented as one of the few options left for Eurozone countries faced with dire fiscal, unemployment, and competitiveness problems.

11.2.1 Fiscal Devaluation—in Principle

The Basic Argument

The idea that tax changes can, to some degree, mimic the effect of a devaluation is not new. In 1931, Keynes noted that the combination of an import tariff and an export subsidy has much the same effect, raising the domestic price of importables and reducing the foreign price of exportables.[3] But explicit taxes on trade—tariffs in any event clearly ruled out for most countries by trade commitments—are not needed to have this effect: discussion of the appropriate regime for commodity taxation in the European Union

3. Laker (1981) provides an early review of the literature on fiscal measures to replicate a nominal devaluation.

prompted a recognition that moving from the taxation of final goods, at a uniform rate, on an origin basis—that is, according to where they are produced—to their taxation on a destination basis—according to where they are consumed—is essentially equivalent to an exchange rate devaluation: such a shift brings imports into tax, and takes exports out.[4] With such changes in commodity taxation ruled out by adoption of the destination base as the international norm for commodity taxation, the next device that suggests itself is to shift away from production-based taxes effectively levied on an origin basis, offsetting the revenue loss as need be by increasing broad-based destination-based taxes, the most obvious (but not only) candidate for the latter role being the VAT. This is the essence of a fiscal devaluation.

The classic form of fiscal devaluation as it has been discussed in Europe combines a reduction in the SCR with an increase in the VAT sufficient to at least preserve government revenue. The focus on the employers' social contribution—rather than the employee's, or even personal taxes on labor income—reflects a view that the relevant rigidity comes from contracts specified in terms of payment *net* of the SCR.[5] The reduction in the SCR is assumed to be fully passed on as a reduction in gross labor costs, and then into output prices, so that, with the exchange rate fixed, the foreign currency price of exports falls correspondingly; the increased VAT does not dampen this effect, since—as a destination-based tax—it simply does not apply to exports. The reduced SCR also reduces the producer price of domestically produced goods sold in the home market, while leaving the producer price of competing imports unaffected; and since the increased VAT applies equally to both imports and domestically produced goods, the combined effect is an increase in the relative consumer price of imported goods. Thus exports become cheaper abroad and imports more expensive at home. The effect is not precisely equivalent to an exchange rate depreciation:[6] there is no change, for instance, in the foreign currency value of assets denominated in the domestic currency, and the fiscal devaluation is likely to affect relative producer prices (reflecting differing labor intensities) in a way that a nominal devaluation would not. Nonetheless, the direct impact on the trade balance could be expected to be much the same.

The effectiveness of this strategy, it should be stressed, requires rigidity in *both* the exchange rate and the nominal wage. With a flexible exchange rate, the increased demand for exports and reduced demand for imports prompted by this tax shift would cause an appreciation of the nominal exchange rate that undoes its competitiveness impact. And even if the exchange rate is

4. Calmfors (1998) recognized long ago the potential for countries adopting the euro to engineer effective devaluations in this way.

5. If instead the net wage received by the worker were supposed fixed, a cut in the employee's contribution (SCE) or personal income tax (PIT) would do just as well.

6. Fahri, Gopinath, and Itskhoki (2011) establish conditions under which tax shifts of this kind can precisely replicate a nominal devaluation; with foreign holding of domestically-denominated assets of this kind, these include a partial default.

fixed, a fiscal devaluation will have no real effect if—or when—domestic wages adjust, as one would expect them to do: as workers find their real wage reduced by the increased VAT rate, they (or their unions) will aim to increase their nominal wages, moving the real producer wage back toward the pre-reform equilibrium (a process that any wage indexation, of course, would accelerate). In the meantime, a fiscal devaluation would be expected to reduce unemployment and improve the trade balance; but, because of this wage adjustment, to have little long-run impact on product or labor market outcomes.[7]

That the effects of a fiscal devaluation are likely to be largely temporary does not mean they must be unimportant. Temporary effects could last some time. Moreover, the case for fiscal devaluation may be especially strong when the economy, owing to downward rigidities in nominal wages, is initially in marked disequilibrium, with a highly overvalued real exchange rate and extensive involuntary unemployment. A fiscal devaluation could then accelerate needed adjustments. The end result—the point to which the real exchange rate and the unemployment rate converge in the long run—may not be much affected by the fiscal devaluation, but the convergence could be much faster. Quick improvement and adjustment is critical in countries where doubts may otherwise arise on the sustainability of the adjustment process under a pegged exchange rate.

A Closer Look

To explore further the analytics of a fiscal devaluation and guide the later empirics, this section considers the impact of a tax shift away from the SCR toward the VAT in the setting of a small, two-period open economy with a representative consumer, with features key to the previous argument. Production in period t is characterized by a revenue function $R(P_t, L_t)$ defined on and homogeneous of degree one in the N-vector[8] of world prices P_t (exogenous and fixed throughout) and labor use L; the fixed exchange rate is normalized at unity. For simplicity, the discount rate is assumed to be zero, so that the $2N$-vector of present value producer prices over the two periods is $P \equiv (P_1', P_2')'$. Labor supply in each period is inelastic in amount $\bar{L}$. In period 2 there is (for simplicity) no taxation of labor, and the labor market clears. In period 1, however, there is a fixed nominal wage W and a tax T^r (thought of as the SCR) levied on top of this, with the two leaving the price of labor above the market-clearing rate $R_L(P, \bar{L})$. Employment $L_1(T^r)$ is then determined from

$$R_L(P_1, L_1) = W + T^r, \tag{2.1}$$

7. To the extent that a VAT increase acts as a lump sum tax on accumulated assets at the time of the increase, there could be a permanent effect from a reduced need to use distorting taxes.

8. Vectors are column vectors, a prime indicating transposition. Derivatives are indicated by subscripts for functions of many variables, by a prime for functions of just one.

so that (suppressing P here and elsewhere)

$$L_1'(T^r) = \frac{1}{R_{LL}} < 0, \tag{2.2}$$

meaning that a cut in the SCR increases employment in the first period. Though in practice levied in ad valorem form, it is convenient to characterize the VAT as a vector of specific taxes, $T^v \equiv (T_1^{v'}, T_2^{v'})'$. Consumer prices,[9] assumed fully flexible to changes in VAT rates, are then $Q = P + T^v$. Preferences are characterized by an expenditure function $E(Q, U)$, U denoting utility; compensated demands are thus $E_Q(Q, U)$.

Revenue from the SCR and VAT is assumed to be returned to the consumer as a lump sum.[10] Since these are not the only taxes levied in practice, for structuring the empirics it is useful to allow for another tax instrument, the simplest way being to suppose that a lump sum tax in amount $(1 + \gamma)A_t$ is levied in period t but returned to the consumer only in amount A_t, with $\gamma \geq 0$ being an ad hoc characterization of some associated inefficiency. With perfect capital markets, the consumer's budget constraint thus implies

$$E(P + T^v, U) = R(\bar{L}) + R(L_1(T^r)) + T^{v'} E_Q(P + T^v, U) - \gamma A, \tag{2.3}$$

where $A \equiv A_1 + A_2$. The value at world prices of net exports in period 1[11] is thus (recalling that outputs are given by the price derivatives of the revenue function)

$$N_1 = P_1'(R_p(L_1(T^r) - E_{Q_1}(Q, U). \tag{2.4}$$

The question of interest is how N_1 is affected by reducing T^r and increasing T^v.

For this, it is shown in appendix A that, for arbitrary small changes in the available tax instruments,

$$dN = \beta_r dT^r + \beta_v' dT^v + \beta_A dA \tag{2.5}$$

where

$$\beta_r \equiv -\Omega\left(1 - \frac{P_1' E_{Q_1 U}}{P' E_{QU}}\right) L_1 \tag{2.6}$$

$$\beta_v' \equiv -P_1' E_{Q_1 Q} + (P_2' E_{Q_2 Q} + P_1' E_{Q_1 Q})\left(\frac{P_1' E_{Q_1 U}}{P' E_{QU}}\right) \tag{2.7}$$

9. With the fixed nominal wage, there is no need for an additional normalization of consumer prices.

10. Having revenues instead finance the provision of some good that enters preferences adds only complexities.

11. No assumption is made on the sign of net exports in period 1. Used in (2.3), linear homogeneity of the expenditure and revenue functions implies that trade is balanced over the two periods (aside from the γ term, since this is pure waste).

$$\beta_A \equiv \gamma\left(\frac{P_1' E_{Q_1 U}}{P' E_{QU}}\right) > 0, \tag{2.8}$$

and $\Omega \equiv -R_L/(LR_{LL}) > 0$ denotes the elasticity of labor demand.

To interpret the effects in equations (2.6) through (2.8), it is helpful to begin with that of an increase in the unmodeled "other" tax A. The distortionary impact of this lowers lifetime consumer welfare by γ, leading to reduced demand and so tending to increase net exports; how much of this reduced demand occurs in period 1, however—and thus increases the value of net exports then—depends on the proportion of that reduced expenditure that occurs in period 1, given by $P_1' E_{Q_1 U}/P' E_{QU}$; loosely, the improvement in period 1 net exports is greater the larger is the marginal propensity to consume in that period.

Turning to β_r, an increase in the employers' contribution tends to reduce period 1 net exports, and, as one would expect, by a larger amount the more elastic is the demand for labor. The effect is smaller, however, the greater is the marginal propensity to consume in period 1; this is because the distortionary effect of such an increase leads to a reduction in welfare that triggers demand effects of the kind just described, which tend to increase net exports. Under the very weak assumption that the marginal propensity to consume in period 2 is strictly positive, however, the direct effect through the demand for labor dominates, so that $\beta_r < 0$: a higher SCR unambiguously reduces net exports in period 1.

Equation (2.7) shows that an arbitrary change in the $2N$-vector of VAT rates T^v affects net exports in two ways. The first is the direct impact on period 1 demand, which, through the $(N \times 2N)$-matrix $E_{Q_1 Q}$, reflects not only within-period effects from changes in period 1 prices (through $E_{Q_1 Q_1}$) but also substitution effects from the change in period 2 prices (through $E_{Q_1 Q_2}$). The second channel is the impact on first period demand, again reflecting relative marginal propensities to consume, of the welfare loss from the distortions induced by the change in T^v. Unsurprisingly, the impact of a change dT^v in the VAT structure thus depends on the details of that change and on the structure of demand responses. Raising the tax on items with highly elastic compensated demand, for instance, will do more to reduce net exports than doing so on those in inelastic demand; and intertemporal substitution effects will come into play when consumer prices are raised by differing proportionate amounts in the two periods.

There is, however, one special case in which the effect of a VAT reform is unambiguous—that in which $dT^v = \mu Q$, for some scalar μ; that is, in which the effect is to increase all consumer prices by the same proportion. Since linear homogeneity of the expenditure function implies that $E_{Q_1 Q} Q = 0$, in this case $\beta_v' dT^v = 0$; there is then no effect on net exports, the reason being that such a tax change is equivalent to a lump sum tax. And the most obvious case in which a VAT reform cause an equiproportionate increase in all

consumer prices is when it is levied at a uniform (tax-exclusive) rate, τ, in both periods, so that $dT^v = Q(d\tau/(1 + \tau))$. This result—that increasing the rate of a VAT applied to all commodities has no impact on net exports—is elegant, but its practical relevance is open to doubt: most VATs are from being levied at a uniform rate.

What, then, is the effect of a fiscal devaluation, in the sense of a reduction in T^r combined with a change in T^v that maintains revenue unchanged? No general results appear to be available, in that while the cut in the employers' contribution increases net exports, simply imposing on dT^v the further requirement of maintaining overall revenue does not remove the dependence on the complexities of design and demand responses just discussed. In the special case of a uniform VAT (or, more generally, a reform that raises all consumer prices by the same proportion), however, the ambiguity vanishes, since then $dN = \beta_r dT_r > 0$: only the effect of the cut in the employer's contribution remains, and a fiscal devaluation—indeed, any shift toward the VAT, even if not revenue-neutral—increases period 1 net exports. It is also, as shown in appendix A, welfare-improving.[12]

Other Considerations

There are other important features of reality ignored in the model. Some affect the purposive design of tax shifts, and these are taken up in subsection 11.2.3, others impact the positive analysis of tax changes that may be reflected in the empirics.

Prominent among the latter is the neglect of nontradables. Feldstein and Krugman (1990) argue, for instance, that tradables are generally taxed more heavily under the VAT than are nontradables; and indeed nine EU Member States currently make use of special provisions enabling the application of reduced rates to specified nontradable labor-intensive services. In these circumstances, a higher standard VAT rate will reduce the relative consumer price of nontradables, encouraging substitution out of tradables. This is not the only possibility, however. In some cases, reduced VAT rates apply to tradables, such as zero-rated food in the United Kingdom. The net direction of the impact of an increase in the standard rate of VAT on net exports is then unclear. The presence of nontradables also complicates the impact of the SCR cut. If, as could plausibly be the case, the production of these is relatively labor-intensive, then the reduction in the SCR will differentially

12. This analysis is greatly simplified, it should be noted, by the assumption of inelastic labor supply: this means that labor supply effects have no impact on employment not only in period 1, when this is demand-determined, but in period 2 as well. Suppose, for instance, that labor supply is instead assumed sensitive (only) to the period 2 wage and consumer prices. Introducing a small, uniform rate VAT in the presence of a preexisting labor tax $T^r > 0$ will then tend to reduce both labor supply in period 2 and, because of the increased efficiency cost of the labor tax, lifetime welfare. Net exports in period 2 would then be expected to fall, with a corresponding increase in period 1 net exports that reflects the income effect on commodity demands.

promote their production. This, then, limits the tendency for an improved trade balance.

More generally, just as the VAT is far more complex than a tax applied at a single rate to all consumption (a point explored in more detail in section 11.3), so the structure of the employer's social contribution is often more complex than can be described, as the earlier theory presumes, by a single parameter. There may be an upper limit on contributions, for instance, and, still more fundamentally, to the extent that payment is requited by the expectation of future benefits, the incentive effects of social contributions may be quite different from those of a tax on labor (Disney 2004).

Issues of timing and compliance are also critical. For instance, a permanent VAT increase that is announced in advance may induce households to bring their consumption forward in anticipation of the higher consumer prices. This could have temporary adverse effects on net exports (experiences of this sort being recounted in section 11.3.3). On the other hand, a VAT increase that is implemented instantaneously and announced as being a temporary measure may lead consumers to postpone their consumption, so that the improvement in the current account will be reinforced. Tax compliance is generally negatively correlated with tax rates. Hence, increases in the standard VAT rate may exacerbate tax evasion and avoidance, while lower SCR rates may improve compliance. The net impact is not a priori clear, and is likely to vary with countries' circumstances and administrative capacity: greater noncompliance in the VAT may be especially problematic, for instance, where the standard VAT rate is already high and the capacity to collect taxes other than by withholding is weak.

It should be stressed also that the VAT, although it has been the focus of debate, is not the only way in which the revenue lost by a cut in SCR can be recouped without necessarily offsetting the impact on net exports. Broadly, any tax that does not directly affect labor costs would have the same effect, such as excises on the consumption of some particular commodity or taxes on residential property.[13] The wider issue raised by the fiscal devaluation debate—on which the empirical results will also be reported following—is that of how the full range of tax instruments may affect trade performance.

11.2.2 Tax Effects on Net Exports—Empirics

There is substantial evidence that reductions in labor taxation can increase employment. But there is almost no empirical evidence bearing on the likely trade impact of a fiscal devaluation, or on trade impacts of tax reforms more generally.

Several papers do, however, bear on some aspects of the issue. Poterba, Rotemberg, and Summers (1986) explore how the mix between taxes on

13. Keen and Syed (2006), for example, find a complex pattern of effects on net exports associated with changes in corporate taxation.

producers and consumers affects prices and wages, as a way of testing for the presence of nominal rigidities. They find such rigidities to be important, suggesting that assumptions underlying the case for a fiscal devaluation may indeed—or at least did—hold reasonably good in practice. Alesina and Perotti (1997) find that labor tax variables increase unit labor costs in a panel of OECD (Organization for Economic Cooperation and Development) countries, thus also supporting the presence of real wage rigidities. The effect, however, is only found to be significant in countries with an intermediate level of wage bargaining, as opposed to centralized or decentralized bargaining. Neither paper looks at the trade effects of the tax mix. Lane and Perotti (1998 and 2003) estimate net export equations using cross-country panels, but look only at total labor taxes and not at all at consumption taxes. Keen and Syed (2006) explore the impact of corporate taxes and the VAT on net exports, finding that the mix between the two matters significantly for the trade balance in the short run. But they do not include social contributions in their analysis. Franco (2011) estimates a number of VAR (vector autoregression) equations with Portuguese data and then simulates the impact of an SCR reduction and an offsetting increase in the VAT on both exports and imports. The analysis here is similar, but focuses on the full set of OECD countries, differences between exchange rate regimes, and a wider range of tax instruments.

Methodology

The aim in what follows is to look to the data for signs of whether tax changes appear to affect net exports in ways consistent with the rationale offered for fiscal devaluations, as set out earlier.

Allowing for the potentially complex dynamics, the previous analysis suggests regressions of the single equation error correction form:

$$\Delta N_{it} = \lambda N_{i,t-1} + \beta_{Dr}\Delta \mathrm{SCR}_{it} + \beta_{Dv}\Delta \mathrm{VAT}_{it} + \beta_{Lr}\mathrm{SCR}_{it-1} + \beta_{Lv}\mathrm{VAT}_{it-1} + \beta'_{DX}\Delta X_{i,t} + \beta'_{LX}X_{i,t-1} + \alpha_i + \varepsilon_t + u_{it}, \quad (2.9)$$

where i and t index, respectively, countries and time, N again denotes net exports, SCR indicates the employer's social contribution, and VAT the value added tax (both variously measured, as described later), and α_i and ε_t are country and time fixed effects. Among the controls in X are the revenue from other taxes, denoted A, and the government balance (positive for a surplus) BAL.[14] This structure allows for a rich dynamic pattern of responses to tax changes.[15] The contemporaneous impact of an increase in some tax variable k is given by the coefficient on the differenced tax variable, β_{Dk}, and

14. The real exchange rate is not included in the regressions, since this is the route through which tax changes are expected, at least in part, to take effect.

15. Tax changes may also have indirect effects on net exports by affecting future values of (endogenous but predetermined) variables in X: they might induce a reduction in growth, for instance, that leads, indirectly, to a future effect on net exports. These are not captured here.

the long-run impact is given by the coefficient on the lagged tax variable relative to that on the lagged dependent variable, $\beta_{Lk}/-\lambda$ (unless $\lambda = 0$, in which case the short- and long-run effects are the same).

The arguments in subsection 11.2.1 give reason to expect both SCR-related coefficients β_{Dr} and β_{Lr} to be negative; the immediate impact of a VAT increase β_{Dv}, might be expected to be small or zero, while the longer-term impact β_{Lv}, reflecting the unwinding of effects in the labor market, might be negative. The earlier arguments also imply that β_A be positive but perhaps small. While the previous model allows no role for BAL, it is included in the empirics to allow for non-Ricardian effects: empirical studies generally report a positive effect of the government balance on the current account (see, for example, chapter 4 of IMF 2011b). Including the government balance means that the coefficients on the tax terms are to be interpreted as identifying effects conditional on other measures to maintain the government balance unchanged. Also included among the controls X are variables that have become fairly standard in the international trade literature,[16] such as the dependency ratio (DEP, the population over sixty-five relative to that between fifteen and sixty-five), the growth rate of GDP (GROWTH), and, in some regressions, unemployment (UNEMPL).

Following Lane and Perotti (1998 and 2003), we allow responses in (2.9) to differ according to the exchange rate regime. Given the particular interest in fiscal devaluation in Eurozone countries, we distinguish between country-years of Eurozone membership and its complement. Coefficients related to the SCR and VAT, and on the lagged dependent variable, are estimated separately for euro and non-euro observations by interacting them with respective dummies.[17] To check the importance of the restriction imposed by this approach, of identical coefficients for euro and non-euro observations for all other variables (including other taxes and the fiscal balance), appendix B reports results where the sample is split into Eurozone and non-Eurozone countries, allowing all coefficients to vary between the two sets: the results are somewhat less robust than those in the following text.

The data set, described in appendix C, is an unbalanced panel of thirty OECD countries between 1965 and 2009. For the net export series, the Im-Pesaran-Shin statistic suggests that not all countries have a unit root. Looking at the individual time series, a unit root cannot be rejected for eighteen countries, including many of those currently in the Eurozone; for non-euro countries, however, the unit root is typically rejected. This is as one might expect—shocks to net exports are more persistent when the nomi-

16. See, for example, Chinn and Prasad (2003), Gruber and Kamin (2007), and Lee et al. (2008).

17. We also ran regressions for an alternative classification of exchange rate regimes, based on Ilzetzki, Reinhart, and Rogoff (2008). The results are partially consistent with larger effects in fixed exchange rate regimes, but not for all regimes. However, the sample size for some categories is rather small, so that results might be less reliable.

nal exchange rate cannot move—and allowing the coefficient on the lagged dependent variable to differ across the two regimes provides room for this effect. These time series properties also suggest that wages are not flexible enough to offset the effect of a rigid exchange rate, providing tentative indication of scope for a fiscal devaluation to have some effect.

In estimating (2.9), two alternative measures of the tax variables of central interest, SCR and VAT, are used. First, we use data on the shares of their respective revenues in GDP, based on either actual or cyclically adjusted data. This has two significant advantages. The first is that the revenue raised by some tax instrument is a summary indicator of the whole range of complex features of its rate and base. The second is that the impact on net exports of a shift between revenue sources that leaves total revenue unchanged can be seen easily by combining coefficients. The short-run impact of reducing the employers' social contribution by 1 percent of GDP and recovering the revenue from increasing the VAT, for instance, is simply the difference in the coefficients on the changes in tax revenues from these sources:

$$\theta_S = \beta_{D,\mathrm{VAT}} - \beta_{D,\mathrm{SCR}}, \tag{2.10}$$

while the long-run effect, from the lagged terms, is:

$$\theta_L = -\left(\frac{\beta_{L,\mathrm{SCR}} - \beta_{L,\mathrm{VAT}}}{\lambda}\right). \tag{2.11}$$

The second approach is to use the main statutory rates of SCR and VAT. These do not capture changes in the base of either the VAT or the SCR, or in changes other than the standard rates at which they are charged, that might be expected to have effects similar to those set out in the previous model. Moreover, the impact of a shift between revenue sources on net exports cannot be read directly from the regressions; instead, assumptions must be made on the expected revenue from changes in tax rates and impacts inferred from combinations of rate changes that would be expected to be revenue-neutral. This approach may, however, have merit in addressing endogeneity issues.

Endogeneity is a pervasive and well-known problem in macro regressions of the kind explored here, calling for great caution in interpreting causality. The ratio of actual tax revenue to GDP, in particular, may well be correlated with the error term u, leading to biased and inconsistent estimators: shocks that cause export demand to fall, for instance, might also result in lower social contributions as employment falls. We cannot claim to have resolved the problem, but do seek to mitigate the endogeneity bias in several ways. First, the inclusion of GDP growth as a control should to some degree reduce biases from this source. Second, so should estimation by the system GMM (generalized method of moments) method of Arellano and Bover (1995) and Blundell and Bond (1998), which uses a system comprising both the first-differenced equation and the model in levels to estimate (2.9); this also addresses potential inconsistency arising from correlation of the lagged

dependent variable with the fixed effects. The standard rate of VAT and the marginal SCR rate are used as external instruments in these regressions. Third, we use in our preferred regressions cyclically adjusted revenue data, reported in the OECD *Economic Outlook,* as an alternative to actual revenue data. By filtering revenues for cyclical effects, this corrects for one important source of endogeneity in the independent variable. It does not entirely remove the possibility of endogeneity, however, since policy responses that affect the cyclically adjusted balance may be made in light of expected developments in net exports. For this reason, as well as for comparability with the results using actual revenue data,[18] we again report results using the system GMM estimator. However, in this case we also report fixed effects regressions in which tax variables are not instrumented (but in which GDP growth is instrumented with its lagged value). Finally, using tax rates, rather than revenues, may be the best way to avoid endogeneity since it eliminates effects working directly though common shocks affecting tax bases (though the issue of endogenous policy responses remains). This potential advantage of using tax rates must be weighed, however, against their potential inadequacy in summarizing policy or administrative measures affecting these instruments.

Results

Table 11.1 reports estimates of (2.9). Regressions using raw revenue data are presented in column (1), those using cyclically adjusted revenue data in columns (2), (3), and (4), and those using statutory rates in (5).[19] The Sargan test for overidentification and Arellano-Bond statistic for second-order serial correlation are encouraging, except for the raw data in column (1) where the Sargan test cannot reject overidentification. In all cases, and despite efforts to minimize the number of instruments, the very high Hansen statistic points to weak instruments and potential finite sample bias (toward the least squares results), although the Hansen falls noticeably below 1 in column (5). This is likely a lesser concern in columns (2) to (5), insofar as these alternative revenue measures seem inherently less prone to endogeneity issues.

Control variables contribute little to the regressions in table 11.1. One might expect a higher dependency ratio to be associated with lower net exports as a result of net dissaving by the elderly. The coefficient is indeed negative, but insignificant. Perhaps more surprising is that GDP growth is insignificant. Revenue from sources other than the SCR and VAT is insignifi-

18. This, however, may not be too great a concern given the fairly long time dimension.

19. Time effects are not included in the results reported here. Their inclusion does not greatly change the results, as GDP growth picks up common trends. The coefficient on SCR becomes slightly larger, suggesting that part of the trade effect associated with tax changes operates through changed GDP growth, but there is a sizable reduction in degrees of freedom and the diagnostics for second-order serial correlation and overidentification become poorer.

Table 11.1 **Fiscal devaluation and net exports**

	Tax-GDP ratios		Cyclically adjusted series						Tax rates	
	(1)		(2)		(3)		(4)		(5)	
L.N × Euro	–0.18***	(0.07)	–0.10**	(0.05)	–0.09***	(0.03)	–0.15***	(0.03)	–0.24	(0.28)
L.N × Non-E	–0.27*	(0.15)	–0.21*	(0.12)	–0.13	(0.09)	–0.22***	(0.05)	–0.25	(0.21)
ΔSCR × Euro	–2.97*	(1.59)	–3.42***	(1.26)	–2.66***	(0.78)	–0.75*	(0.44)	–0.11	(0.12)
L.SCR × Euro	–0.22**	(0.10)	–0.13	(0.10)	–0.23	(0.19)	–0.16	(0.13)	–0.08	(0.10)
ΔVAT × Euro	0.47	(0.92)	0.56	(1.00)	–0.04	(0.49)	–0.39	(0.27)	0.23**	(0.11)
L.VAT × Euro	0.10	(0.14)	0.05	(0.17)	0.09	(0.10)	0.07	(0.13)	0.10	(0.16)
ΔSCR × Non-E	–2.49	(1.56)	–2.84**	(1.30)	–2.11***	(0.81)	–0.65**	(0.27)	0.03	(0.12)
L.SCR × Non-E	0.03	(0.14)	–0.06	(0.11)	–0.17	(0.23)	–0.06	(0.08)	–0.02	(0.03)
ΔVAT × Non-E	–0.01	(0.92)	–0.05	(0.94)	–0.62	(0.54)	–0.49***	(0.13)	0.01	(0.09)
L.VAT × Non-E	–0.11	(0.23)	–0.03	(0.17)	0.05	(0.14)	–0.01	(0.06)	0.01	(0.08)
ΔUNEMPL					0.79	(0.72)				
L.UNEMPL					–0.10	(0.20)				
ΔSCR × UNEMPL					–0.02	(0.08)				
L.SCR × UNEMPL					0.01	(0.02)				
ΔDEP	–26.2	53.4	–31.9	(52.8)	–12.6	(40.5)	–21.1	(30.3)	–5.7	(43.6)
L.DEP	–6.06	7.63	–11.63	(8.11)	–5.03	(4.40)	1.60	(6.10)	–15.5	(13.5)
ΔBAL	0.11	0.17	–0.09	(0.23)	0.24	(0.16)	0.11	(0.10)	–0.37	(0.35)
L.BAL	0.12	0.11	–0.13	(0.09)	0.00	(0.05)	–0.00	(0.05)	–0.15	(0.16)
ΔA	0.22	0.24	0.16	(0.39)	–0.00	(0.44)	–0.18	(0.12)	0.83	(0.95)
L.A	0.18**	0.08	0.18	(0.12)	0.11	(0.09)	0.07	(0.06)	0.30	(0.21)
ΔGROWTH	–0.18	0.16	–0.16	(0.11)	0.02	(0.16)	0.06	(0.26)	–0.15	(0.32)
L.GROWTH	–0.07	0.13	–0.09	(0.11)	0.09	(0.14)	–0.07	(0.17)	–0.14	(0.25)

(*continued*)

Table 11.1 (continued)

	Tax-GDP ratios (1)		Cyclically adjusted series (2)		(3)		(4)		Tax rates (5)	
Number of obs.	337		369		349		638		3.69	
AB AR (1)	0.00		0.02		0.02				0.04	
AB AR (2)	0.06		0.22		0.31				0.35	
Sargan	0.02		0.18		0.21				0.19	
Hansen	0.99		0.99		1.00				0.84	
F-test Euro	0.13		0.02		0.00		0.00			
F-test Non-Euro	0.27		0.09		0.02		0.00			
				Fiscal devaluation						
θ_S Euro	3.44**	(1.72)	3.98***	(1.55)			0.35	(0.66)	0.90*	(0.52)
θ_L Euro	1.80*	(0.92)	1.92	(2.05)			1.54	(1.43)	3.81	(5.87)
θ_S Non-Euro	2.48	(1.66)	2.80*	(1.58)			0.15	(0.26)	–0.05	(0.48)
θ_L Non-Euro	–0.52	(1.23)	0.18	(1.11)			0.21	(0.43)	–0.22	(1.91)
F-test E = Non-E	0.01		0.00		0.00		0.71		0.00	

Notes: Single equation error correction model, controlled for country fixed effects. Estimation is by one step robust system GMM (except in column (4) where it is by fixed effects with only growth instrumented by its own lagged values), treating lagged and tax-rate variables as predetermined and with rates for VAT and SCR as external instruments in (1) to (3). Laglimits (2, 3) and instruments collapsed. Heteroskedasticity robust standard errors in brackets. The *F*-tests report the *p*-value for *F*-statistic on the null hypotheses that the coefficients on both ΔSCR and ΔVAT are zero (*F*-test Euro and *F*-test Non-Euro) and the null that the short-term effect of a fiscal devaluation in the euro sample is equal to that in the non-Euro (F-test E-Non–E). Calculation of θ's in column (5) based on point estimates multiplied by a factor to translate into a change of 1 percent of GDP.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

cant in changes, but in column (1) enters positively in lag—broadly consistent with the earlier prediction of a lasting positive effect to the extent that these other sources are distortionary. Perhaps surprisingly, but consistent with the simple model from before, the government balance has no significant impact in any of the regressions.

Interest centers, of course, on the coefficients related to VAT and SCR. On this, the results in column (1) are strikingly different for Eurozone and non-Eurozone countries.[20] For the non-Eurozone, no significant effects emerge, either in change or lagged; and the *F*-test does not reject the null that both coefficients on the tax changes are zero. For the euro countries, in contrast, both the change in and the lags of the SCR variable show a significant negative effect on net exports, consistent with the theory. And the effects are quite large: a reduction in the share of GDP taken in the employers' social contribution—offset by other (non-VAT) measures to keep the government balance unchanged—increases net exports, in the short term, by almost 3 percent of GDP. The differenced VAT variable has a positive impact for the euro observations, but this effect is far from significant. Indeed, the VAT is rarely significant in any of the results in table 11.1, reminiscent of the theoretical implication of no short-run impact of an increase in the VAT if applied uniformly to all commodities—strikingly so, indeed, given how nonuniform VATs are in practice.

The difference in coefficients for ΔSCR and ΔVAT suggests that a fiscal devaluation in euro countries would indeed increase net exports. As reported at the bottom of the table, the point estimate of θ_S implies that a shift of 1 percent of GDP from SCR to VAT would increase net exports by 3.44 percent of GDP, and the effect is statistically significant at 5 percent. For non-euro observations, the point estimates suggest an effect that is not only smaller but also statistically insignificant. The long-run impact of a fiscal devaluation, θ_L, is positive for euro countries (contrasting with the theoretical presumption of no permanent effect) but this is significant only at 10 percent. For non-euro countries, it is insignificant. The *F*-test firmly rejects the null that θ_S is the same for Eurozone and non-Eurozone countries.

The results point to a fairly complex time profile of effects, which differs between the Eurozone and non-Eurozone countries. In particular, the smaller coefficient for lagged net exports in Eurozone countries suggests that the adjustment toward the new equilibrium is more sluggish—any impact from the fiscal devaluation lasts longer—than in non-Eurozone countries. For instance, the coefficients imply a half life for euro countries of 3.5 years, while for non-euro countries it is 2.2 years: so, for instance, 3.5 years after a fiscal devaluation in a Eurozone country, net exports still remain higher than they would otherwise have been by around 1 3/4 percent of GDP.

20. For brevity we speak here and later as if the sample were partitioned by country; current Eurozone members, however, are of course in the "non-euro" subsample prior to their entry.

The second column of table 11.1 reports results using the cyclically adjusted revenue data. The diagnostics are more reassuring than when using raw revenue data. For the euro countries, the coefficient on the change in SCR is somewhat larger and noticeably more precise, being significant at 1 percent, while that on the lag becomes insignificant. Now, the coefficient for the change in the SCR variable is also significantly negative for non-euro countries. For the VAT, there is again no significant effect, for either change or the lag, in either group. The *F*-test rejects that both tax coefficients are zero for Eurozone countries, but cannot reject this for non-Eurozone observations at 5 percent (but can do so at the 10 percent level).

Point estimates of the short-run impact of a pure fiscal devaluation suggest an increase in net exports of 4 percent of GDP in Eurozone countries, significant at 1 percent. For non-Eurozone observation the effect is smaller at 2.8 percent of GDP and significant only at 10 percent. The implication is that while a fiscal devaluation might also have an impact outside the Eurozone, the effect seems smaller and more uncertain. Also, adjustment is again more sluggish for the Eurozone, with a lagged net export coefficient of –0.10, compared to –0.21 for non-euro countries (implying half lives of 6.6 years in the Eurozone and 2.9 years in the non-euro countries). The estimates of θ_L indicate that a fiscal devaluation has no long-run effect in either euro or non-euro countries.

Column (3) in table 11.1 adds to the regression in column (2) unemployment as a control variable, as well as the interaction of the SCR variables with unemployment. The latter is intended to capture the possibility, raised earlier, that changes in the SCR may have a bigger effect on trade if unemployment is high, perhaps because wages adjust less rapidly. There is, however, little support for this: the interaction term is insignificant. Other results are qualitatively unaffected.[21]

Column (4) is the same as column (2), but adopts a standard fixed-effects regression in which only growth is instrumented with its lagged value. The regression thus differs primarily in the instruments used: it neither uses tax rates as external instruments nor the lagged internal variables used in system GMM. The results indicate that the instruments matter greatly. The coefficient for the differenced SCR variable is much smaller and only significant at 10 percent for Eurozone countries. For non-euro countries, the coefficient is small too, but significant at 5 percent. There is now also a significant negative coefficient on the lagged VAT variable, but only in non-Eurozone countries. The effects of a fiscal devaluation are now all insignificant, both in the short run and in the long run, and the *F*-test cannot reject the null that the effects of a fiscal devaluation are the same for euro and non-euro countries. This

21. Note that the SCR variables for Eurozone and non-Eurozone countries should be interpreted differently, since the total impact of changes in the SCR also depend on the coefficient of the interaction between unemployment and the change in SCR. We therefore do not report effects of a fiscal devaluation in column (3).

qualitative pattern of results is hard to explain, and, with the diagnostics, one (perhaps charitable) interpretation is that endogeneity is indeed a real issue, and system GMM goes a good way toward addressing it.

The last column of table 11.1 shows results using statutory tax rates, rather than revenue ratios.[22] The diagnostics provide support for the choice of instruments and the Hansen statistic is no longer close to 1. All tax effects are in this case insignificant, however, except for a positive impact of the differenced VAT in the Eurozone. It is of some interest, nonetheless, to combine the coefficient point estimates with information on tax bases to gauge the implied impact of a revenue-neutral fiscal devaluation of 1 percent of GDP. The implied VAT base[23] in non-euro countries is 38 percent of GDP, and the implied SCR base is 35 percent. A shift from SCR to VAT by 1 percent of GDP would therefore require raising the VAT rate by 2.5 percentage points and reducing the SCR rate by 2.9 percentage points. For euro observations, a VAT increase of 2.7 percentage points and an SCR reduction of 2.6 percentage points would be needed. The point estimates then imply that a fiscal devaluation in the Eurozone would generate a short-run increase in net exports of about 0.9 percent of GDP, and this effect is significant at 10 percent. The estimated long-run effect is larger, but statistically insignificant. The effects for non-Eurozone countries are of opposite sign but very small and insignificant. The *F*-test rejects the null of equal effects between Eurozone and non-Eurozone countries, largely consistent with the result in column (2), except that now the effects are smaller and fiscal devaluation has no effect outside the Eurozone.

As stressed earlier, the VAT is not the only way in which an SCR reduction might be financed, so that a range of alternative forms of fiscal devaluation could be envisaged. Table 11.2 addresses this, and the wider issue of how a variety of tax instruments appear to affect net exports. It reports the results of estimating a specification along the lines of column (2) in table 11.1, using cyclically adjusted data, but including, in addition to SCR and VAT, the personal income tax (PIT), employee's social contribution (SCE), and corporate income tax (CIT). For brevity, only the coefficients for the differenced tax variables are reported, capturing the short-term impact of a tax change. The regression reported also makes no distinction between Eurozone and non-Eurozone countries.

A relatively strong negative effect from the SCR term again emerges, but it now lacks significance. The effect from the VAT is positive, but also insignifi-

22. We have also explored using the average tax wedge (including SCR and employee social contributions as well as personal income tax, evaluated at 67 percent of the average wage) instead of the SCR rate. This variable consistently shows a significant positive coefficient, contrary to the theory. However, the inclusion of employee contributions and PIT makes this variable less suitable for regressions on fiscal devaluation.

23. Meaning VAT revenue in percent of GDP divided by the standard rate; and for the SCR, revenue divided by the SCR rate.

Table 11.2 Short-term effects of a wider range of taxes

	ΔTax-coefficient		Impact on net exports of SCR-cut financed by	
SCR	–1.74	(1.14)		
PIT	–0.52	(0.57)	1.22	(1.21)
CIT	1.44	(0.86)	3.18**	(1.64)
SCE	0.89	(1.69)	2.64	(1.82)
VAT	0.81	(1.69)	2.56*	(1.57)

Note: Specification and estimation as in column (2) of table 11.1, but with no distinction between coefficients for Eurozone and non-Eurozone coefficients.

cant. Increases in PIT have an adverse effect on net exports, but less marked than those for SCR. For both the SCE and the CIT, the coefficient is positive but insignificant The final column of table 11.2 shows the impact of cutting the SCR rate and preserving revenue by increasing one of the other four taxes: the analogue, that is, of θ_S. Financing the SCR reduction by either a higher SCE or a higher PIT does not significantly increase net exports. Doing so by a higher VAT, however, increases net exports by 2.56 percent of GDP, with statistical significance of 10 percent. A conventional form of fiscal devaluation thus appears both to have a marked effect and, in terms of net exports, does so more than some alternatives. But even better for short-term net exports, the results in table 11.2 imply, is financing the SCR cut by increased reliance on corporate taxation. This is consistent with Keen and Syed (2006), who also find positive short-term effects of such a tax shift on the trade balance. Intuitively, increases in the CIT are likely to induce a net outflow of capital abroad in the short run, which comes along with short-run increases in net exports. However, these effects can be expected to reverse as the income from investments abroad subsequently increases.

What, then, is one to conclude from these results? Although in some respects problematic, the empirics do tend to confirm that, at least for countries in the Eurozone, domestic tax reforms can have significant effects, of broadly the kind that the theory set out previously predicts, on trade performance. Some of the results imply a quite sizable effect, with the short-run increase in net exports from a shift of 1 percent of GDP ranging between 1 and 4 percent of GDP. There is also good reason to suppose, however, that any effects of a fiscal devaluation will be temporary.

11.2.3 Policy Implications

Both analytics and empirics thus suggest that judicious tax shifts can have a noticeable impact on trade performance. In building on this to derive policy prescriptions, however, several issues arise that are not captured in the analytical framework above.

First, the assumption of a representative consumer masks important

distributional impacts from such tax shifts and the likely need for accompanying measures. The increased VAT component of the fiscal devaluation reduces the value to consumers of their non-labor income, whether from transfers or capital income. To the extent that out-of-work benefits to the unemployed are not updated to reflect the increased VAT, most labor market models suggest a long-term fall in structural unemployment. This suggests still stronger effects on employment and output. But there will also be a reduction in the real value, for instance, of pensions. And increasing the VAT may also give rise to other equity concerns, perhaps especially so if—as the analysis in the next section suggests would be the best approach in many countries—it took the form of an increase in reduced rates, since these are often (albeit unwisely) motivated by distributional concerns. This means that there is likely to be pressure to increase some social benefits to address equity concerns, diluting the net revenue raised by the VAT increase and so allowing only a smaller reduction in the SCR and hence also a smaller gain in employment and labor supply. The distributional impact of the reform will also depend on the precise way in which the SCR is cut: on whether or not, for instance, the upper limit on contributions that some countries impose is also reduced.

Second, across-the-board cuts in SCRs are expensive, and more targeted measures may give a larger bang-for-buck in output and employment effects. In the job plans proposed or implemented in OECD countries, SCR relief is often targeted to specific categories of job or worker. Reduced labor costs for low wage earners may be particularly attractive to relax constraints induced by minimum wage legislation or by sectoral minimum wages agreed-upon by trade unions and employers. Moreover, employment of this group tends to be relatively sensitive to tax considerations. Targeting SCR relief to low-wage earners may thus reinforce the impact of a fiscal devaluation on employment, output, and the trade balance. Two other common forms of targeting SCR cuts (or equivalent financial incentives to employers)—on new employment, and on small firms—are more problematic (see appendix E).

Third, the payment of social contributions is generally linked—albeit in many cases very weakly—with entitlement to benefits. If the value of the latter is to be maintained while the SCR is cut, two options arise. One is to decouple the two, and move toward tax-based finance of social benefits: this risks worsening labor supply distortions, if contributions are indeed seen as a form of forced savings (but has been advocated for the United Kingdom, for instance, in the recent Mirrlees review[24]). The alternative—feasible if cumbersome—is to maintain the link and make transfers from general revenue to provide workers with explicit credits for the SCR not directly paid (as done, for instance, with the social security holiday in the United States).

Fourth, it is important to remember that other taxes can also have a role

24. Mirrlees et al. (2011).

in recouping revenue lost from cutting the SCR. One particular possibility beyond those noted earlier—not included in the empirical exercise of table 11.1 given the absence of cyclically adjusted revenue data—is residential property taxation, the appeal of which in this context is that this has little direct impact on production costs. There is indeed some evidence that this is a relatively growth-friendly source of finance (Arnold 2008), with untapped revenue potential in many countries, often non-Anglophone.

Finally, the analysis may suggest a coordination problem. A fiscal devaluation could indeed appeal simultaneously to many countries; but if all or many undertake it, the impact on the net exports of each is diminished. Thus, there may seem to be a risk of competitive fiscal devaluations as a form of international tax competition. One important reason for adoption of the euro was to eliminate the opportunity for countries to pursue such competitive devaluations. There is an important difference, however, from standard results on the harm suffered, for instance, from tax competition to attract mobile capital. There, damage arises from the undertaxation of a base that is much less mobile from the collective perspective than from the national: the outcome of the consequent game between countries, in which all ultimately set lower tax rates on capital than is collectively optimal, leaves them all worse off.[25] For a fiscal devaluation, however, the endpoint is an increase in the rate of consumption taxation and a reduction in the taxation of labor. Empirically, there is some evidence that, at least in the OECD, heavier reliance on consumption rather than income taxation is associated with faster growth (Kneller, Bleaney, and Gemmell 1999). In this respect, the downside of fiscal devaluation is limited: even a fiscal devaluation that has no effect on net exports, perhaps because of the adoption of similar reforms elsewhere, may ultimately lead to a more efficient tax structure.

This somewhat optimistic view of fiscal devaluation does not mean, of course, that tax policy is the best or only way to address the structural problems underlying wage rigidities. The point is, rather, that it can perhaps provide some temporary mitigation, while more fundamental reforms are considered.

11.3 The Role of the Value Added Tax in Fiscal Consolidation

The VAT has already played a prominent part in fiscal consolidation efforts in Europe. Between 2009 and 2011, thirteen of the twenty-seven EU member states raised their standard rate of VAT; in the two years to 2008, in contrast, only one did so.[26] And the increases are in several cases substantial:

25. This oversimplifies: some countries, particularly small ones, may benefit from tax competition of this kind.

26. As a stimulus measure, the United Kingdom preannounced a temporary reduction in the standard rate from 17.5 to 15 percent in 2009; it was subsequently raised to 20 percent. The exception noted is Germany, which increased the standard rate by 3 points in 2006.

Greece and Portugal, for instance, raised their standard rates by 4 and 3 percentage points, respectively, to 23 percent. Further increases in standard VAT rates now look problematic for many European countries, including in terms of increased risk of noncompliance, and there is a general agreement between EU Member States (though not a legally binding one) not to exceed a maximum of 25 percent.[27]

In other prominent fiscally challenged countries, however, the situation is the converse. The possibility of substantially increasing revenue from the VAT is technically clear in both Japan and the United States: at 5 percent, the former has almost the lowest VAT rate in the world,[28] and the latter remains the only OECD country without a VAT. But attempting to realize this potential has proved close to politically suicidal.

This section considers the place of the VAT in fiscal consolidation, and how the very different obstacles in Europe and the no/low VAT countries could be overcome.[29]

11.3.1 The Case for the VAT

There is a large literature on the comparison between consumption and income-based taxation, which need not be reviewed here.[30] To some extent, it is for present purposes beside the point: almost all countries have both, and—even leaving aside standard optimal tax theoretic considerations—do so for good practical reasons: to diversify compliance risks and exploit economies of scope in application.[31]

But the case for the VAT over alternative forms of consumption taxation—notably the retail sales tax (RST)—is still sometimes questioned, at least in the United States. When each functions perfectly, they are equivalent in taxing only final consumption; and both then have the appeal of excluding intermediate transactions from tax, consistent with the Diamond-Mirrlees (1971) result that production efficiency is a necessary condition for Pareto-efficiency.[32] The difference arises when enforcement is imperfect. Suppose,

27. Some have found evidence of Laffer-type effects for the VAT: Matthews (2003), for instance, reports an estimated revenue-maximizing VAT rate in the EU of around 19 percent.

28. Iran has the lowest, at 3 percent.

29. More issues of design and implementation arise than can be discussed here. For a sense of these, see the following: on general design issues arising under EU VAT rules, Crawford, Keen, and Smith (2010) and Cnossen (2003); on Japan, Keen et al. (2011); on the United States the papers in *Tax Law Review* (2010), vol. 28.

30. See, for instance, Auerbach (2006) and Banks and Diamond (2010).

31. Boadway, Marchand, and Pestieau (1994) show that with imperfect compliance it is generally optimal to deploy both a sales tax and a wage tax even under circumstances under which, with full compliance, they would be equivalent. A further practical consideration is that information obtained from one tax can be used to help enforce the other: opposition against the VAT in many countries often comes from small traders whose primary fear is that it improves the effectiveness of the income tax.

32. The conditions for the Diamond-Mirrlees theorem are strong—including perfect competition and the ability to tax rents at any rate—but few simple rules emerge when they fail, leaving it as the practicable first guide to policy design.

for instance, that some retailer fails to remit tax. Under an RST, no tax is collected at all; under a VAT, however—the essence of which is that tax is payable on the entirety of every firm's sales, but with a credit or refund of tax it has itself been charged on its inputs—the tax collected on purchases by the retailer remains. In this sense revenue is more secure under the VAT. This comes at some potential cost to production efficiency, of course, but with a presumption that the consequent input-taxation is not too bad a substitute for the missing taxation on value-added at the final stage.[33]

The structure of the VAT also introduces an element of self-enforcement into the system: if firm A's supplier is VAT-compliant, that reduces A's gain from not being VAT compliant itself (because registering for the VAT enables it to reclaim that tax); and if A's customer is VAT-compliant, A has an incentive to register and charge tax (because that customer will be able to reclaim the tax A charges them, and along the way A can reclaim the tax it has been charged on its own inputs). The point should not, however, be overstated: if A's customer is not VAT-compliant, then A has an incentive not to comply either.[34] Nonetheless, given also other haphazard features of RSTs in practice—including particular difficulty in taxing services (largely excluded from most state VATs in the United States) and a tendency to levy substantial charges on business inputs[35]—the technical superiority of the VAT, at least when substantial revenue must be raised,[36] seems clear. A rule of thumb has been that noncompliance difficulties make RSTs at rates of more than 10 percent seriously problematic.[37]

There are signs that these theoretical merits of the VAT have to some extent been realized in practice. If the VAT is indeed a particularly efficient form of taxation, as these and other considerations suggest, one would expect countries with a VAT—since they have a lower marginal social cost of raising revenue—to collect more total tax revenue, all else equal, than those without. The evidence is that, for high income countries, this is indeed the case (Keen and Lockwood 2010).

11.3.2 Diagnosing the VAT

In practice, VATs differ widely in their design and implementation, as can be seen from table 11.3, which summarizes key features of those in the OECD in 2008—the latest year for which comparable data are available (and

33. Newbery (1986) shows that it may be optimal to tax intermediate goods when not all final goods can be taxed.

34. The possibility of "bad" VAT chains forming is analyzed by de Paula and Scheinkman (2007), who find evidence of such an effect in Brazil.

35. Ring (1989) found that around 40 percent of revenue from state sales taxes in the United States was collected from sales to businesses.

36. A fuller account of the comparison between the VAT and RST is in Cnossen (1987).

37. While figures cited for a federal VAT in the United States are often lower than this (6.5 percent for the Domenici-Rivlin plan [Bipartisan Policy Center 2010], for instance), state and local sales taxes (ranging from around 4 to 12 percent where present) need to be added in order to arrive at effective RST rates.

Table 11.3 Key features of OECD VATs, 2008

Country	Standard rate	Reduced rates	Revenue (percent of GDP)	C-efficiency
Australia	10.0	0.0	3.4	49
Austria	20.0	10.0/12.0	7.8	61
Belgium	21.0	0.0/6.0/12.0	7.0	49
Canada[a]	5.0	0.0	2.7	74
Chile	19.0	—	8.9	75
Czech Republic	20.0	10.0	7.1	59
Denmark	25.0	0.0	10.1	62
Finland	22.0	0.0/8.0/13.0	8.4	58
France	19.6	2.1/5.5	7.0	49
Germany	19.0	7.0	7.1	55
Greece	19.0	4.9/9.0	7.2	46
Hungary	25.0	5.0/18.0	7.7	57
Iceland	25.5	0.0/7.0	9.1	54
Ireland	21.0	0.0/4.8/13.5	7.1	55
Israel	16.0	—	7.8	68
Italy	20.0	4.0/10.0	6.0	41
Japan	5.0	—	2.5	67
Korea	10.0	0.0	4.3	65
Luxembourg	15.0	3.0/6.0/12.0	5.8	93
Mexico	16.0	0.0	3.8	35
Netherlands	19.0	6.0	7.2	60
New Zealand	12.5	0.0	8.6	98
Norway	25.0	0.0/8.0/14.0	7.3	57
Poland	22.0	0.0/7.0	7.9	49
Portugal	20.0	5.0/12.0	8.4	51
Slovak Republic	19.0	10.0	6.9	54
Slovenia	20.0	8.0/8.5	8.5	68
Spain	16.0	4.0/7.0	5.3	46
Sweden	25.0	0.0/6.0/12.0	9.3	58
Switzerland	7.6	0.0/2.4/3.6	3.7	77
Turkey	18.0	1.0/8.0	4.9	35
United Kingdom[b]	17.5	0.0/5.0	6.4	46

Source: OECD (2011).

Notes: Rates applicable on January 1, 2008. Special rates applying to regions are not shown. "Revenue" and "C-efficiency" refer to 2008.

[a]Newfoundland and Labrador, New Brunswick, and Nova Scotia have harmonized their provincial sales taxes with the federal Goods and Services Tax and levy a rate of GST/HST of 13 percent. Other Canadian provinces, with the exception of Alberta, apply a provincial tax to certain goods and services. These provincial taxes apply in addition to GST. (HST stands for harmonized sales tax.)

[b]The standard rate of VAT was temporarily reduced from 17.5 percent to 15.0 percent for the period December 1, 2008–December 31, 2009 inclusive and reverted to 17.5 percent with effect from January 2010.

predating many of the recent standard rate increases noted above). The final column reports a handy indicator for assessing the performance of a VAT. This is its C-efficiency, E^C, defined as the ratio of the revenue it yields to the product of consumption and the standard rate of VAT, τ_S:

$$E^C \equiv \frac{\text{VAT revenue}}{\tau_S \times \text{Consumption}}. \tag{3.1}$$

For a perfectly enforced VAT levied at a single rate on all consumption, C-efficiency would be 100 percent. But this is no more than a convenient benchmark. A VAT, for instance, that did not refund exporters the tax charged on their inputs could score a very high E^C even though it consequently acts in part as a tax on exports rather than on consumption.

Despite this and other conceptual limitations,[38] the C-efficiency ratios reported in table 11.3 are suggestive. Two observations stand out. First, C-efficiency in many European countries is very low, with the example of New Zealand—held in the highest esteem by VAT specialists—showing scope for a significant increase. This means that considerably more revenue could be raised from the VAT even without increasing the standard rate. If Italy, for instance, were to increase its C-efficiency to the level found in France, it would increase its VAT revenue by about 1.2 percent of GDP. Second, C-efficiency is, in contrast, rather high in Japan: so a significant increase in revenue is likely to require increasing the standard rate.

But low C-efficiency can arise from either poor implementation, poor policy design, or both. While, as in the case of Italy, it can quickly indicate scope for improvement (in the sense of increasing revenue without raising the standard rate), a low C-efficiency ratio gives little clue as to how to do it. For this, more is needed. To this end, it is shown in appendix D that C-efficiency can be decomposed as

$$E^C = (1 - \text{policy gap}) \times (1 - \text{compliance gap}), \tag{3.2}$$

where (formal characterization of these terms being in the appendix) the compliance gap reflects the difference between actual VAT collected and that theoretically due, while the policy gap relates to aspects of design, and can be further decomposed as

$$(1 - \text{policy gap}) = (1 - \text{rate differentiation}) \times (1 - \text{exemptions}), \tag{3.3}$$

where the first term on the right reflects departures from a uniform rate structure and the second the impact of exemptions.[39]

38. These are discussed in Ebrill et al. (2001) and OECD (2011).

39. Some VAT terminology is needed here. Under both "exemption" and "zero-rating," no VAT is charged on sales; the difference is that input tax can be recovered under zero-rating but not under exemption (sometimes referred to for this reason as "input taxation"). Exemptions levied other than at final sale tend to increase tax revenue, since the unrecovered tax cascades into the tax paid on the further sales, so that the exemption effect in (3.3) may in principle be negative.

Table 11.4 Decomposing C-efficiency

Country	C-efficiency	Compliance gap	Policy gap	Decomposing the policy gap: Rate differentiation	Decomposing the policy gap: Exemptions
Austria	61	13	30	14	19
Belgium	50	12	43	19	30
Denmark	63	7	33	0	33
Finland	60	5	36	10	29
France	51	7	45	22	30
Germany	54	14	37	8	31
Greece	44	29	38	21	22
Ireland	67	4	30	28	3
Italy	41	27	44	25	26
Luxembourg	89	2	9	26	–23
Netherlands	58	6	38	17	26
Portugal	52	8	43	22	27
Spain	57	8	38	32	10
Sweden	55	4	43	14	34
United Kingdom	48	15	44	22	28

Sources: "C-efficiency" (for 2004) from table 5.14 of European Commission (2011); "Compliance gap" (for 2006) from Reckon (2009); "Rate differentiation" (for 2003) from table 5 of Mathis (2004). Incompleteness of coverage reflects gaps in the last of these. See appendix D for a full account of the decomposition.

Equations (3.2) and (3.3) in principle provide an elegant decomposition of C-efficiency that could be a powerful tool for diagnosing VAT performance. They also have the convenient feature that independent estimates of all gaps are not needed: in principle, any one can be estimated as a residual given information on all the others. In practice, however, and perhaps surprisingly, the information required to decompose C-efficiency in this way is rarely available. By way of illustration, table 11.4 assembles information from disparate sources on the situation in several European countries in around 2005 that at least provides an illustration of the method.[40]

What emerges is that the primary issue in most of these countries is (or at least was) in design, rather than implementation—which to some extent runs counter, for instance, to the emphasis often placed on issues of carousel[41] and other forms of fraud and evasion in the EU. There are some cases, most notably Greece and Italy, in which noncompliance seems far

40. Note that the C-efficiency figures in table 11.4 differ from those in table 11.3: they are for an earlier year (so as to be roughly synchronous with such information on other items needed for the decomposition as is available).

41. Frauds of this kind are explained and discussed, along with VAT noncompliance issues more generally, in Keen and Smith (2006b), one aspect being that the revenue loss is, in some cases, in principle unbounded. The publicity such schemes have attracted is, in part, an aspect of administration's compliance strategies.

higher than in peer groups, and so naturally attracts attention as an area for improvement. Mostly, however, it is the scope for improving the uniformity and coverage of the VAT that stands out.

As between the two elements of the policy gap, the significance of exemptions suggested in table 11.4 is both striking and surprising. Being calculated as a residual, it seems in part to reflect estimated noncompliance that in many countries seems almost implausibly low. The calculations of the rate differentiation effect also require closer evaluation. Other estimates for the United Kingdom, for example, suggest that the statutory rate dispersion effect is 48 percent and the exemption effect is 8 percent. It is thus the rate structure—and above all the zero-rating of food and other items, which takes almost half of consumer spending out of the VAT base—that should be the focus of attention in considering any further increase in revenue from the VAT. What is perhaps most shocking, however, is that—with few exceptions, among which the United Kingdom is prominent—the information needed for this kind of exercise is generally not available, even, it seems, within governments.

11.3.3 Obstacles

There is, then, clearly a case for many advanced economies to look at the VAT for a substantial part of their consolidation needs. While significant changes have been made in Europe, these have focused largely on raising the standard rate, tending to reduce C-efficiency rather than increase it.[42] And in Japan, no changes have yet been made.[43] This section considers some of the key obstacles to the kind of reforms discussed before.

Distributional Issues and Rate Differentiation

One obstacle common to both European circumstances and those of Japan and the United States is the perception that the VAT is a particularly regressive tax. This is much less true, of course, if regressivity is assessed relative not to current income but to current expenditure, the latter being a better indicator of lifetime welfare to the extent that it reflects permanent income (see, for instance, Metcalf 1994). More fundamentally, however, it is the distributional effect of the tax-spending system as a whole, not of any individual component, that ultimately matters. And advanced economies generally have much better instruments with which to pursue their distributional objectives than differential rates of commodity taxation. The best way to help the poor and vulnerable is not by setting a low tax rate on, say, food—the largest monetary benefit from that goes to the rich, since they

42. Items have also in some cases been moved from standard to reduced rates, amplifying the departure from uniformity.

43. Japan did, however, announce in January 2012 its intention to raise the VAT rate to 8 percent in 2014, and to 10 percent in 2015.

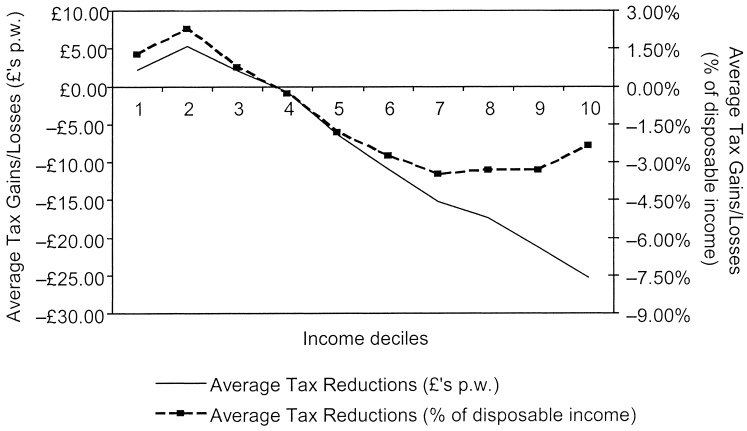

Fig. 11.3 Distributional impact of a VAT reform package in the United Kingdom
Source: Crawford, Keen, and Smith (2010).

spend a larger absolute amount on food than the poor even though it is a smaller share of their budget—but by supporting them through targeted transfers.

Take, for example, the United Kingdom. Figure 11.3 shows the distributional impact of eliminating zero- and reduced rates (unifying them at 17.5 percent), but at the same time increasing a range of social benefits. The three lowest income deciles are winners from the package. Moreover, revenue—net of the increased social support costs—is increased by about 11 billion pounds, which is around 14 percent of initial VAT revenue.

As in this example, dealing with the distributional implications of VAT reform may well reduce the net revenue finally available for consolidation or other purposes. In Japan too, for instance, the revenue gain from increasing the VAT rate would be reduced by automatic indexation of pension benefits. The key point, however, is that hesitation in raising or eliminating reduced VAT rates for fear of the distributional consequences—and, by the same token any inclination to include such reduced rates in a new VAT—is essentially misplaced for most advanced economies.

While the reform shown in figure 11.3 addresses the distributional concerns associated with a VAT reform of this kind, it does raise marginal effective tax rates on earned income—reflecting the impact of the full tax-benefit system—in the lowest deciles: tighter targeting of social support has a cost. And it does alter relative consumer prices and hence demand patterns. The question, then, is whether rate differentiation might have served a useful efficiency role in reconciling revenue needs with work incentives.

Broadly, a reduced rate of taxation on some commodity or activity can be justified on efficiency grounds if it is a substitute for untaxed work effort,

whether in the home or marketplace.[44] Existing empirical knowledge gives little reason, however, for confident differentiation on these grounds. Food itself (eaten at home), for example, seems from results in Crawford, Keen, and Smith (2010) to be, if anything, a candidate for higher rather than lower taxation. An argument can be made for some reduced rates on these grounds: for child care, for instance, due to its complementarity with working and (an argument that has led the European Commission to allow reduced rates for a few such items) labor-intensive services. But these are minor concerns, and experience in the EU is that the reduced rates have done little to increase compliance or employment.[45] The presumption for uniformity under the VAT seems strong on efficiency grounds as well as distributional ones.

Aggregate Demand Effects

Especially when countries are experiencing unemployment at the levels many show in figure 11.2, a natural concern in raising the VAT, whether by widening the base or increasing the standard rate, is that there will be an adverse impact on the level of activity through aggregate demand effects. This worry may, however, be overstated—even leaving aside any beneficial confidence effects through an improved fiscal position.

First, a preannouncement of future VAT increases would be to expected stimulate current consumption, with the expectation of a jump in the price level, leading consumers to bring forward their consumption, especially of large durables. In effect, the expected increase in the price level tends to reduce the real return on saving, and so, through an intertemporal substitution effect, to increase current consumption. There is indeed now substantial evidence of such frontloading of consumption in advance of moderately sizable VAT increases. Ito and Mishkin (2006), for instance, find that before Japan increased its VAT rate in 1997 from 3 to 5 percent, consumers accelerated their spending in the preceding quarter by about 1.5 percent. In 2009, the United Kingdom reduced its VAT rate from 17.5 to 15 percent as an explicitly temporary one-year measure.[46] Though there has as yet been no ex post study of this event, Crossley, Low, and Wakefield (2009) estimated a likely boost in consumer spending in 2009 of 1.25 percent. Also, German consumers who were anticipating a 3 percentage point VAT increase in 2007 brought forward their consumption by one year. To some extent this effect may be mitigated as firms adapt their pricing policies: Carare and Danninger (2008) show that the rise in demand in 2006 allowed German firms to increase their prices well before the actual VAT increase took place. The impression, nonetheless, is that intertemporal shifting of consumption can be significant, albeit largely confined to particular durable sectors.

44. Crawford, Keen, and Smith (2010) provide a summary of the theory on commodity tax differentiation and an analysis of the efficiency arguments for rate differentiation.

45. Copenhagen Economics (2007).

46. The standard rate was subsequently (January 2011) raised to 20 percent.

Indeed, some have suggested deliberately using a phased VAT increase to stimulate consumption. Feldstein (2002) in particular argues that a phased increase in the VAT accompanied by a gradual cut in the income tax—to render the increase revenue neutral—could raise demand through this intertemporal substitution effect, advocating this for Japan in particular. However, simulations suggest that these effects are likely small and would not substantially accelerate an exit from deflation (Auerbach and Obstfeld 2004).

Second, the evidence suggests that any lasting impact on aggregate demand—beyond reversal of the bringing forward of some consumption noted earlier—is likely to be small. In Japan, for instance, resistance to a further increase in the rate of the consumption tax largely reflects a perception that the increase in the rate from 3 to 5 percent in 1997 contributed to its falling back into recession later. But consumption picked up only one quarter after the tax increase. Looking at the household level data, moreover, Cashin and Unayama (2011) find only a very modest impact on spending levels beyond the shifting noted before. Other factors, notably the onset of the Asian financial crisis, seem to have played a much bigger role.

And measures can, of course, be taken to limit aggregate demand effects. Indeed, accompanying VAT reform with targeted protection of the poorest consumers, of the type discussed in figure 11.4, will automatically limit the impact on those likely to have the highest marginal propensity to consume.

Political Economy

Despite the strong counterarguments sketched before, the popular perception of the VAT as inherently regressive persists, impeding both base-broadening in Europe and rate-raising or introduction in Japan and the United States, and fostering a willingness to deploy reduced rates. It would be comforting to believe that resistance of this kind will be overcome by good analysis communicated effectively. But these points have been well-known (to key policymakers at least) for many years and yet no real progress has been made.

Why resistance is so deep remains somewhat mysterious. Perhaps it is the very costliness of supporting the poor through reduced rates that makes doing so a means by which politicians can signal the depth of their concern for the vulnerable. In any event, something more than enlightenment seems needed if VAT policies are to be improved.

Part of the difficulty may be that of credibly presenting reform as a package: in the United Kingdom example, for instance, consumers may doubt whether support through the tax-benefit system to offset the impact of eliminating zero-rating really would be forthcoming or sustained. One recurrent suggestion for addressing such doubts is to earmark the proceeds of a reformed VAT for some valued purpose. Burman (2009), for instance, proposes earmarking the proceeds of a VAT in the United States for health-

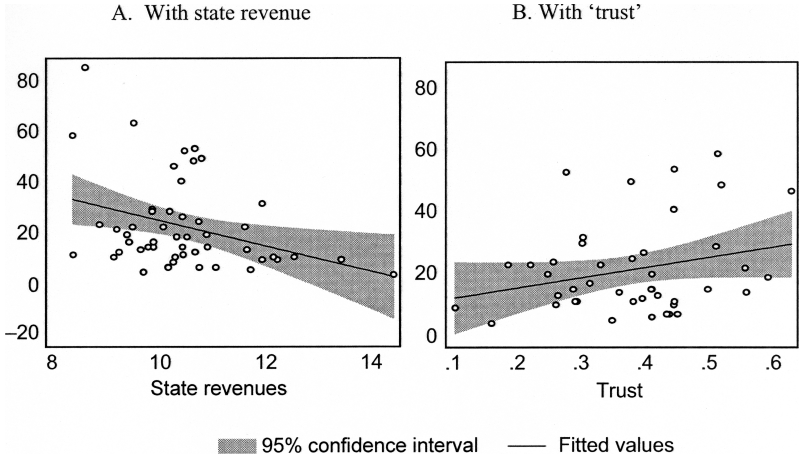

Fig. 11.4 Correlates of earmarking in the US states

Notes: Percentage of state revenues earmarked, for 1997, from Pérez (2008); state revenues (in percent of personal income), for 1997, from Tax Policy Center, http://www.taxpolicycenter.org/taxfacts/; trust indicator from Uslaner (2006).

care costs. In Japan it has been suggested to earmark the proceeds from an increased rate to social security spending. Earmarking is, however, unattractive in standard public financial management terms: either it genuinely constrains spending on the favored item, in which case it impedes efficient resource allocation, or it does not, in which case it risks being an exercise in "misleading taxpayers rather than expanding democracy" (IFS 1993, 65). These disadvantages may in principle be outweighed if earmarking does indeed secure approval for some tax measure that would otherwise be blocked by voters distrustful of government.[47] Empirically, however, little is known about the causes or consequences of earmarking. Simple correlations for the US states—the only case, it seems, in which good data on the extent of earmarking are available—raise more questions than they answer: panel A of figure 11.4, for instance, shows that revenue is lower in states that earmark more (so that earmarking does not seem to be used to squeeze out an increase in already high revenues). And panel B shows—contrary to the idea that "[t]he prevalence of earmarking indicates a lack of confidence in the governmental system and the budgetary process"[48]—that earmarking is actually more extensive where trust in the state government is higher.

These are clearly issues on which understanding remains very limited. There are certainly examples of tax systems that have become harmfully fragmented through excessive earmarking, as in Korea for instance. At a

47. Brett and Keen (2000).
48. Goode (1984, 12).

minimum, labeling may be important, as with the Domenici-Rivlin Commission naming their proposed VAT a 'Debt Reduction Sales Tax.' If, however, earmarking is ultimately the only way in which fundamental resistance to inherently sensible tax measures can be overcome, it may be a pragmatic price worth paying.

The most powerful force overcoming resistance to deep VAT reform, however, is likely to be dire fiscal need. In this setting, the (informal) EU agreement on a maximum VAT rate—which may have seemed misplaced some years back, when the more evident concern was the risk of downward tax competition—has come to seem a useful commitment device for ensuring that, beyond some point, increased revenue needs will be met not by raising the standard rate but by base-broadening and improving implementation.

In the particular context of the United States, there is, it should be noted, a particular technical and political challenge that would need to be faced in introducing a federal VAT: that of determining its interaction with existing state- and local-level sales taxes.[49] It might seem natural to convert those taxes into VATs too, but the VAT is not well-suited to implementation at lower levels in federal systems. This is because the zero-rating of exports (and bringing into tax of imports) commonly relies on border controls not desired within federations.[50] It is no coincidence that the other prominent latecomers to the VAT—Australia and India—are both federal states. Technical solutions can be found, for instance in the form of a VIVAT (viable integrated VAT), under which all sales between registered businesses are taxed at a common, federation-wide rate, while lower levels add on an additional charge for sales to final consumers.[51] The massive variation in the bases and structures of current state and local sales taxes in the United States, however, make this much more easily said than done.

But the United States also has an advantage to exploit. This is the possibility of learning from the experiences of other countries and from the intellectual advances made. The most prominent example may be in the area of financial services, where it is now clear that there are alternatives to the increasingly problematic exemption[52] approach adopted by the EU. Perhaps

49. Another striking feature of the political debate on VAT adoption in the United States is the concern that it would prove to be a "money machine." This is explored in Keen and Lockwood (2006), who find some evidence that the VAT has indeed looked like an innovation leading to government growth, rather than a consequence of an increase in desired government size. Fiscal rules, however, seem a better way to impose aggregate constraints than foregoing the use of efficient tax instruments.

50. These difficulties have come to the fore in the EU since the removal of internal fiscal frontiers, a prominent example being the "carousel fraud" mentioned before; which—a thought developed furthest in Aujean (2011)—the VIVAT described later could also go a long way to resolve.

51. Keen (2001) proposes such a scheme operating across all states and McLure (2010) proposes one operating across localities within states.

52. Exemption results in overtaxation of business use of financial services (from unrecovered VAT on purchases by financial institutions) and undertaxation of use by final consumers (because of the exclusion of the value added by financial institutions). It is now understood how, at least in principle, to bring financial services more fully into the VAT: Crawford, Keen,

the most important lesson to learn, however, is again political: initial decisions about VAT design, for instance, in providing reduced rates on equity grounds, are extraordinarily hard to change.

11.4 Conclusion

The deep fiscal challenges that many advanced economies face will require adjusting a wide range of tax and spending instruments, and the appropriate mix will vary widely across them. This chapter has focused on just two broad issues within this much wider set. But they are ones that are already to the fore in almost all of these economies, and are likely to be of continuing importance.

The first is a very immediate focus of concern in many Eurozone countries: the possibility of adjusting to an overvalued real exchange rate not by a nominal depreciation or painful and sluggish price adjustment but, at least in part, by a fiscal devaluation. The empirical evidence presented here, though by no means entirely robust and subject to lingering endogeneity concerns, suggests that revenue-neutral shifts from the employers' social contribution toward the VAT in Eurozone countries could indeed improve the trade balance, with quite sizable short-run effects. As expected, the effects seem to disappear in the long run, so that the case for such shifts rest largely on their potential to accelerate adjustment to deeper underlying problems. What is important, however, is that the data do seem to show evidence of the effects that theory predicts.

The second issue addressed here is the scope for more effective deployment of the VAT as an instrument for fiscal consolidation, not least where (as in many EU members) the standard rate is now so high that further increases are problematic. A simple diagnostic tool has been set out that could help identify where the scope for improvement is most likely to lie, but surprisingly and depressingly, the information needed to apply this, while very basic, is generally unavailable. Clearly there is potential for substantially improving understanding of where the weaknesses of VAT design and implementation lie. Reviewing such evidence as is available, however, the VAT in many countries—and not just those that currently have low rates, or no VAT at all—still appears to have considerable untapped potential. Indeed this (and not least the particularly strong case in advanced economies for a single-rate VAT on a broad base) is widely recognized, including by many policymakers. The difficulty is overcoming the political resistance to such reforms that nonetheless persists. For that, something more than technically compelling arguments are needed.

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and Smith (2010) outline the issues and possible solutions, and IMF (2010a) proposes a Financial Activities Tax (on the sum of wages and profits of financial institutions) that could go some way to mitigate the problems created by exemption.

Appendix A

Derivation of (2.5) to (2.8)

Perturbing (2.3), normalizing $E_U = 1$ gives

$$dU = R_L L_1' dT^r + T^{v'} E_{QQ} dT^v + T^{v'} E_{QU} dU - \lambda dA. \tag{A1}$$

Recalling (2.3) and noting that (since $Q' E_{QU} = E_U$ by linear homogeneity of the expenditure function) $T^{v\prime} E_{QU} = (Q - P)' E_{QU} = 1 - P' E_{QU}$, this implies that

$$(P' E_{QU}) dU = \left(\frac{R_L}{RLL} \right) dT^r + T^{v'} E_{QQ} T^v - \lambda dA. \tag{A2}$$

Perturbing net exports in (2.4):

$$dN_1 = P_1' (P_{PL} dL_1 - E_{Q_1 Q} dT^v - E_{Q_1 U} dU). \tag{A3}$$

Substituting dU from (A2) into (A3), the result follows on using (2.3), the implication of linear homogeneity of the revenue function that $P' R_P = R_{LL}$ (because $P' R_p = R$) and noting that

$$T^{v'} E_{QQ} = (Q - P)' E_{QQ} = -P' E_{QQ} = -(P_1' E_{Q_1 Q} + P_2' E_{Q_2 Q}). \tag{A4}$$

That a reform combining in a cut in T^r with an increased uniform VAT rate is welfare-improving follows from (A2), since then $E_{QQ} dT^v = E_{QQ} d\tau / (1 + \tau) = 0$.

Appendix B

Separate Regressions for Eurozone and Non-Eurozone Countries

Table 11B.1 **Taxation and net exports**

	Cyclically adjusted data		Tax rate data	
	Non-Euro	Euro	Non-Euro	Euro
L. Net exports	–0.21** (0.106)	–0.03 (0.05)	–0.30* (0.16)	–0.23 (0.24)
ΔSCR	–2.52 (1.62)	–2.81* (1.64)	–0.08 (0.14)	–0.11 (0.67)
L.SCR	–0.07 (0.11)	–0.06 (0.07)	0.00 (0.05)	–0.09 (0.07)
ΔVAT	0.10 (0.96)	–0.78 (0.88)	–0.09 (0.09)	0.28 (0.17)
L.VAT	0.02 (0.21)	–0.45*** (0.09)	0.03 (0.12)	–0.14 (0.12)
ΔDEP	–0.38 (0.69)	0.23 (0.45)	–51.63 (66.56)	5.78 (47.55)
L.DEP	–0.12 (0.09)	–.07 (0.07)	28.20 (42.08)	–11.1 (15.53)
ΔA	0.49 (0.77)	–0.49 (0.36)	1.21 (1.08)	–0.25 (0.81)
L.A	0.21 (0.16)	0.11*** (0.03)	–0.22 (0.40)	0.31 (0.29)
ΔGROWTH	–0.13 (0.13)	–0.06 (0.12)		
L. GROWTH	–0.11 (0.14)	–0.03 (0.06)		

(*continued*)

Table 11B.1 (continued)

	Cyclically adjusted data		Tax rate data	
	Non-Euro	Euro	Non-Euro	Euro
ΔBAL	0.00 (0.35)	0.11 (0.28)	0.31 (0.47)	–0.14 (0.20)
L.BAL	–0.08 (0.10)	–0.25*** (0.10)	0.28 (0.21)	–0.07 (0.19)
No. of obs.	265	94	232	94
AB AR(1)	0.03	0.01	0.04	0.04
AB AR(2)	0.33	0.97	0.54	0.31
Sargan	0.44	0.16	0.13	0.65
Hansen	0.91	1.00	0.25	0.99
Short-run	2.62 (1.83)	2.03 (2.34)	0.01	1.04
Long-run	1.39 (1.21)	–11.26 (16.67)		
F-test	0.29	0.00		

Notes: Single equation error correction model, controlled for country fixed effects. Estimation is by one step robust system GMM, including fixed effects, treating lagged and tax-rate variables as predetermined and with tax rates as external instruments. Laglimits (2, 3) and instruments collapsed. The *F*-test reports the *p*-value for the *F*-statistic on the null hypothesis that the coefficients on both ΔSCR and ΔVAT are zero.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Appendix C

Data

The data on net exports are from the world development indicators of the World Bank. Data on tax revenues in percent of GDP are from the OECD *Revenue Statistics.* The key variables of interest are the series for "employer social security contributions" (number 2200 in the OECD classification) and "value added taxes" (5111 in the OECD classification). The data on total tax revenue, GDP growth, and the government balance are also from the OECD, as are the population data used to compute old-age dependency ratio. Data on the standard VAT rate and the employer social contributions are from various sources.

The cyclically adjusted revenue data, however, are not available on as disaggregated a basis as the raw revenue data. For instance, there is only one cyclically adjusted series for social contributions and one for indirect taxes. Under the assumption that the same adjustment applies to subcomponents of these series, we create cyclically adjusted series for the SCR and VAT by dividing the cyclically adjusted by the nonadjusted series for total social contributions and total indirect taxes (respectively, OECD classifi-

cation 2000 and 5000) and using the result to scale the raw revenue data for the SCR and VAT (respectively, OECD classification 2200 and 5111). Although the adjusted and nonadjusted series try to capture the same set of taxes, the cyclically adjusted series contains a slightly broader set than the non-cyclically adjusted series, implying that the ratio between them is somewhat larger than 1. This explains why there are somewhat higher numbers for the tax-to-GDP ratios of the cyclically adjusted series in table 11B.1, as compared to the nonadjusted series. The variation in the cyclically adjusted series, however, should properly reflect the variation in the underlying data.

Table 11B.1 shows some descriptive statistics. Net exports are zero on average across country-year observations, ranging from –34 percent of GDP to 33 percent of GDP positive. The government balance is –2 percent of GDP on average, with a standard deviation of 4.2 percent. Substantially fewer observations are available, however, for the government balance than for total tax and net exports. The tax-to-GDP ratio lies between 9 and 52 percent, with an average of 32. Excluding revenue from VAT and SCR, the average declines to slightly less than 23 percent of GDP. The statutory SCR rate varies between 0.9 percent and 51 percent, with an average of 22.38. Standard VAT rates vary from 3 to 30 percent, while the average is 17.2 percent.

The PIT on average raises most revenue, at more than 9 percent of GDP. The VAT raises almost 5 percent of GDP, while SCR on average raises 4.6 percent of GDP. The corresponding averages for the cyclically adjusted series are somewhat higher, for reasons explained earlier.

Table 11C.1 Summary statistics of data

Variable	No. obs	Mean	Std. dev.	Minimum	Maximum
In percent of GDP					
Net exports	1,241	–.00	6.635	–34.681	33.240
Gross exports	1,241	35.99	22.84	5.206	179.77
Gov. balance	754	–1.99	4.166	–15.593	19.087
Total tax	1,248	32.44	8.898	9.278	52.246
Tax ex VAT/SCR	1,126	23.89	5.715	7.964	40.767
VAT base	865	37.84	8.591	0	70.541
SCR base	521	35.83	32.43	10.957	50.700
Revenue in percent of GDP					
PIT	1,177	9.370	4.848	0	26.545
CIT	1,080	2.518	1.672	–.463	12.954
ESC	1,192	2.629	1.977	0	11.445
SCR	1,192	4.600	3.347	0	14.005
VAT	1,181	4.856	3.239	0	11.282
Cyclically adjusted series					
Government balance	779	–.107	2.963	–15.298	7.4704
PIT	732	11.24	5.127	2.384	29.181
CIT	668	2.607	1.340	–.497	6.5574
ESC	715	3.380	2.125	0	11.878

(*continued*)

Table 11C.1 (continued)

Variable	No. obs	Mean	Std. dev.	Minimum	Maximum
SCR	715	6.195	3.526	.0003	14.219
VAT	734	6.636	3.167	0	13.445
Statutory tax rates					
SCR rate	583	22.38	12.270	.87	51
VAT rate	914	17.20	5.148	3	30
Average tax	330	32.39	11.246	7	51.37
Marginal tax	330	40.97	13.560	7	71.311
Other					
GDP growth	1,197	3.13	3.083	–11.615	14.787
Dependency ratio	1,340	18.68	5.050	5.596	35.592

Appendix D

Decomposing C-Efficiency

Denote by C_i and C_i^*, respectively, the values of the true consumption of commodity i and the part that is brought into tax, (possibly at a zero rate), the difference between the two reflecting imperfect implementation; and by T_i and T_i^* the statutory and effective rates of tax on final consumption of i, the latter reflecting not only of tax levied directly on i but also of indirect effects through exemptions on intermediate inputs (mediated by the input-output structure, as described, for instance, in Ebrill et al. (2001). Total revenue, for instance, is thus $\sum_i T_i^* C_i^*$. Equations (3.2) and (3.3) then follow on writing

$$E^C \equiv \frac{\sum_i T_i^* C_i^*}{\tau_S \sum_i C_i} = \left(\frac{\sum_i T_i^* C_i^*}{\sum_i T_i C_i^*}\right)\left(\frac{\sum_i T_i C_i^*}{\sum_i T_i C_i}\right)\left(\frac{\sum_i T_i C_i}{\tau_S \sum_i C_i}\right), \tag{D1}$$

which bears the interpretation in the text with:

$$\text{Exemptions} \equiv \frac{\sum_i (T_i - T_i^*) C_i^*}{\sum_i T_i C_i^*} \tag{D2}$$

$$\text{Compliance gap} \equiv \frac{\sum_i T_i (C_i - C_i^*)}{\sum_i T_i C_i} \tag{D3}$$

$$\text{Rate Differentiation} \equiv 1 - \frac{\sum_i T_i C_i}{\tau_S \sum_i C_i} = \frac{\tau_S - \sum_i T_i \omega_i}{\tau_S} \tag{D4}$$

where

$$\omega_i \equiv \frac{c_i}{\sum c_j^*}.$$

The impact of exemptions is thus measured by the loss of revenue from taxing at effective rather than statutory rates—which may be negative, given the cascading effect of exempting intermediate transactions (an instance of poor design that leads to higher C-efficiency). The compliance gap is measured simply as the revenue loss (at nominal tax rates) from failing to bring some final consumption into tax. And the rate differentiation effect reflects the extent to which the weighted average VAT rate is lower than the standard rate—which could also in principle be negative, though (since $\tau_s - \Sigma_i T_i \omega_i = (\tau_s - E[T]) + \mathrm{cov}(T, \omega)$) is sure to be positive if reduced rates are prevalent (so that nonstandard rates are on average lower than standard) and positively correlated with budget shares.

Appendix E

Should Social Contribution Cuts Be Targeted on New Employment and Small Firms?

A number of schemes—including the Obama jobs plan—limit SCR cuts (or provide analogous financial incentives to employers) to "new" employment. This has the intuitive appeal of avoiding a revenue loss on inframarginal employees, and maintains the impact on producer prices to the extent that these are driven by marginal rather than average cost. But such schemes are not without difficulty. Deadweight loss still arises to the extent that new employment would also have emerged without the relief. Moreover, targeting to new employment may have displacement effects: newly hired employees may replace existing employees. Some studies report that these effects can be as large as 65 percent (Dahlberg and Forslund 2005). These schemes can also create perverse incentives (for instance, in laying off workers in any period between announcement and reference date relative to which increased employment is measured). They can also have high transaction costs, and are inevitably somewhat complex, provision being needed to ensure that enterprises do not relabel themselves so as to count all employment as new. Experience has been that take-up rates can be low, especially among smaller firms: Chirinko and Wilson (2010) provide an extensive analysis of the impact of such schemes operated by the US states, where they have been quite common, and conclude that the net employment effects are positive, but very small.

Some countries target SCR relief to small firms. There is widespread belief among policymakers that small companies are the main source of job growth. Early writers indeed report evidence supporting this claim for the United States (see, for example, Birch 1987). This has led governments to introduce special tax relief measures for small companies. However, more

recent evidence casts doubt on these claims. Davis, Haltiwanger, and Schuh (1996) discuss statistical and measurement problems and stress the need to distinguish between gross and net job creation. Accounting for such pitfalls, Neumark, Wall, and Zhang (2011) find that small firms actually contribute less to net job growth than do large firms. Haltiwanger, Jarmin, and Miranda (2011) find that, when one controls for firm age, there is no systematic relationship between firm size and employment growth in the United States. Instead, job growth comes more than proportionally from young firms and start-ups.

References

Alesina, Alberto, and Roberto Perotti. 1997. "The Welfare State and Competitiveness." *American Economic Review* 87:921–39.

Arellano, Manuel, and Olympia Bover. 1995. "Another Look at the Instrumental Variable Estimation of Error-Component Models." *Journal of Econometrics* 68 (1): 29–51.

Arnold, Jens. 2008. "Do Tax Structures Affect Aggregate Economic Growth? Empirical Evidence from a Panel of OECD Countries." OECD Working Paper no. 643. Paris: Organization for Economic Cooperation and Development.

Auerbach, Alan J. 2006. "The Choice between Income and Consumption Taxes: A Primer." NBER Working Paper no. 12307. Cambridge, MA: National Bureau of Economic Research.

Auerbach, Alan J., and Maurice Obstfeld. 2004. "Monetary and Fiscal Remedies for Deflation." *American Economic Review* 94 (2): 71–75.

Aujean, Michel. 2011. "Towards a Modern EU VAT system: Associating VIVAT and Electronic Invoicing." *EC Tax Review* 2011/5:211–16.

Banks, James, and Peter Diamond. 2010. "The Base for Direct Taxation." In *Dimensions of Tax Design: The Mirrlees Review,* edited by James Mirrlees et al., 548–648. Oxford: Oxford University Press, Institute for Fiscal Studies.

Bassanini, Andrea, and Romain Duval. 2006. "Employment Patterns in OECD Countries: Reassessing the Role of Policies and Institutions." OECD Social, Employment and Migration Working Paper no. 35. Paris: OECD.

Bipartisan Policy Center. 2010. *Restoring America's Future.* Report of the Debt Reduction Task Force, Co-Chairs Pete Domenici and Alice Rivlin. Washington, DC.

Birch, David L. 1987. *Job Creation in America: How Our Smallest Companies Put the Most People to Work.* New York: The Free Press.

Blundell, Richard, and Stephen Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87:115–43.

Boadway, Robin, Maurice Marchand, and Pierre Pestieau. 1994. "Toward a Theory of the Direct-Indirect Tax Mix." *Journal of Public Economics* 55:71–88.

Brett, Craig, and Michael Keen. 2000. "Political Uncertainty and the Earmarking of Environmental Taxes." *Journal of Public Economics* 75:315–40.

Burman, Leonard E. 2009. "Blueprint for Tax Reform and Health Reform." *Virginia Tax Review* 28:287–323.

Cashin, David, and Takashi Unayama. 2011. "The Intertemporal Substitution and

Income Effects of a VAT Rate Increase: Evidence from Japan." Discussion Paper 11045, Research Institute of Economy, Trade and Industry (RIETI).
Calmfors, Lars. 1998. "Macroeconomic Policy, Wage Setting, and Employment—What Difference Does the EMU Make?" *Oxford Review of Economic Policy* 14:125–51.
Carare, Alina, and Stephan Danninger. 2008. "Inflation Smoothing and the Modest Effect of VAT in Germany." IMF Working Paper no. 08/175. Washington, DC: International Monetary Fund.
Chinn, Menzie D., and Eswar S. Prasad. 2003. "Medium-Term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration." *Journal of International Economics* 59:47–76.
Chirinko, Robert S., and Daniel J. Wilson. 2010. "Job Creation Tax Credits and Job Growth: Whether, When, and Where?" Working Paper Series 2010-25, Federal Reserve Bank of San Francisco.
Cnossen, Sijbren. 1987. "VAT and RST: A Comparison." *Canadian Tax Journal* 35 (3): 559–615.
———. 2003. "Is the VAT's Sixth Directive Becoming an Anachronism?" *European Taxation* 43 (12): 434–42.
Copenhagen Economics. 2007. *Study on Reduced VAT Applied to Goods and Services in the Member States of the European Union.* Prepared for DG Taxud, European Commission.
Cottarelli, Carlo, and Michael Keen. 2011. "Fiscal Policy and Growth: Overcoming the Constraints." In *Ascent after Decline: Regrowing Global Economies after the Great Recession,* edited by Oliviano Canuto and Danny Leipziger, 87–133. Washington, DC: World Bank.
Crawford, Ian, Michael Keen, and Stephen Smith. 2010. "VAT and Excises." In *Dimensions of Tax Design: The Mirrlees Review,* edited by James Mirrlees et al., 275–362. Oxford: Oxford University Press, Institute for Fiscal Studies.
Crossley, Thomas, Hamish Low, and Matthew Wakefield. 2009. "The Economics of a Temporary VAT Cut." *Fiscal Studies* 30 (1): 3–16.
Dahlberg, Matz, and Anders Forslund. 2005. "Direct Displacement Effects of Labor Market Programs." *Scandinavian Journal of Economics* 107:475–94.
Davis, Steven J., John Haltiwanger, and Scott Schuh. 1996. "Small Business and Job Creation: Dissecting the Myth and Reassessing the Facts." *Small Business Economics* 8:297–315.
de Paula, Áureo, and José A. Scheinkman. 2007. "The Informal Sector." PIER Working Paper 07-033, Penn Institute for Economic Research, Department of Economics, University of Pennsylvania.
Diamond, Peter, and James A. Mirrlees. 1971. "Optimal Taxation and Public Production I: Production Efficiency, II: Tax Rules." *American Economic Review* 61:8–27, 261–78.
Disney, Richard. 2004. "Are Contributions to Public Pension Programs a Tax on Employment?" *Economic Policy* 19:267–311.
Ebrill, Liam, Jean-Paul Bodin, Michael Keen, and Victoria Summers. 2001. *The Modern VAT.* Washington, DC: International Monetary Fund.
European Central Bank. 2011. *Monthly Bulletin,* box 12, p. 101. December.
European Commission. 2009. "The 2009 Ageing Report: Economic and Budgetary Projections for the EU-27 Member States (2008–60)." *European Economy* 2, April.
———. 2011. "Tax Reforms in EU Member States." Taxation Papers, Working Paper no. 28.
Farhi, Emmanuel, Gita Gopinath, and Oleg Itskhoki. 2011. "Fiscal Devaluations." CEPR Discussion Paper no. 8721, Harvard and Princeton.

Feldstein, Martin. 2002. "The Role for Discretionary Fiscal Policy in a Low Interest Rate Environment." NBER Working Paper no. 9203. Cambridge, MA: National Bureau of Economic Research.

Feldstein, Martin, and Paul Krugman. 1990. "International Trade Effects of Value-Added Taxation." In *Taxation in the Global Economy,* edited by A. Razin and J. Slemrod, 263–82. Chicago: University of Chicago Press.

Franco, Francesco. 2011. "Adjustment to External Imbalances within the EMU, the Case of Portugal." Unpublished Manuscript. University of Lisbon.

Goode, Richard. 1984. *Government Finance in Developing Countries.* Washington, DC: Brookings Institution.

Gruber, Joseph, and Steven Kamin. 2007. "Explaining the Global Pattern of Current Account Imbalances." *Journal of International Money and Finance* 26:500–22.

Haltiwanger, John, Ron S. Jarmin, and Javier Miranda. 2011. "Who Creates Jobs? Small vs. Large vs. Young." NBER Working Paper no. 16300. Cambridge, MA: National Bureau of Economic Research, August.

Ilzetzki, Ethan O., Carmen M. Reinhart, and Kenneth S. Rogoff. 2008. "Exchange Rate Arrangements into the 21st Century: Will the Anchor Currency Hold?" http://www.carmenreinhart.com/research/publications-by-topic/exchange-rates-and-dollarization.

Institute for Fiscal Studies (IFS). 1993. "Options for 1994: The Green Budget." *Commentary 40*. London: IFS. http://www.ifs.org.uk/publications/5613.

International Monetary Fund (IMF). 2010a. "A Fair and Substantial Contribution by the Financial Sector: Final Report to the G20." http://www.imf.org/external/np/g20/pdf/062710b.pdf.

———. 2010b. "From Stimulus to Consolidation: Revenue and Expenditure Policies in Advanced and Emerging Economies." IMF Policy Paper, April 20.

———. 2010c. "Macro-Fiscal Implications of Health Care Reform in Advanced and Emerging Economies." IMF Policy Paper, December 28.

———. 2011a. *Fiscal Monitor.* September.

———. 2011b. *World Economic Outlook.* September.

Ito, Takatoshi, and Fredric S. Mishkin. 2006. "Two Decades of Japanese Monetary Policy and the Deflation Problem." In *Monetary Policy with Very Low Inflation in the Pacific Rim*, edited by Takatoshi Ito and Andrew Rose, 131–93. Chicago: University of Chicago Press.

Keen, Michael. 2001. "States' Rights and the Value-Added Tax: How a VIVAT Would Work in the US." *Proceedings of the National Tax Association* 2001: 195–200.

Keen, Michael, and Ben Lockwood. 2006. "Is the VAT a Money Machine?" *National Tax Journal* 59:905–28.

———. 2010. "The Value-Added Tax: Its Causes and Consequences." *Journal of Development Economics* 92:138–51.

Keen, Michael, Mahmoud Pradhan, Kenneth Kang, and Ruud de Mooij. 2011. "Raising the Consumption Tax in Japan: Why, When and How?" Staff Discussion Note 11/13. Washington, DC: International Monetary Fund.

Keen, Michael, and Stephen Smith. 2006a. "The Future of Value-Added Tax in the European Union." *Economic Policy* 23:373–411, 419–20.

———. 2006b. "VAT Fraud and Evasion: What Do We Know and What Can Be Done?" *National Tax Journal* 59:861–87.

Keen, Michael, and Murtaza Syed. 2006. "Domestic Taxes and International Trade: Some Evidence." IMF Working Paper 06/47. Washington, DC: International Monetary Fund.

Kneller, Richard, Michael F. Bleaney, and Norman Gemmell. 1999. "Fiscal Policy and Growth: Evidence from OECD Countries." *Journal of Public Economics* 74:171–90.

Laker, John F. 1981. "Fiscal Proxies for Devaluation: A General Review." *Staff Papers, International Monetary Fund* 28:118–43.

Lane, Philip, and Roberto Perotti. 1998. "The Trade Balance and Fiscal Policy in the OECD." *European Economic Review* 42:887–95.

———. 2003. "The Importance of Composition of Fiscal Policy: Evidence from Different Exchange Rate Regimes." *Journal of Public Economics* 87:2253–79.

Lee, Jaewoo, Gian Maria Milesi-Ferretti, Jonathan D. Ostry, Alessandro Prati, and Lucca Ricci. 2008. "Exchange Rate Assessments: CGER Methodologies." IMF Occasional Paper no. 261. Washington, DC: International Monetary Fund.

Mathis, Alexandre. 2004. "VAT Indicators." Taxation Papers, Working Paper no. 2.

Matthews, Kent. 2003. "VAT Evasion and VAT Avoidance: Is There a European Laffer Curve for VAT?" *International Review of Applied Economics* 17:105–14.

McLure, Charles. 2010. "How to Coordinate State and Local Sales Taxes with a Federal Value Added Tax." *Tax Law Review* 60:639–704.

Metcalf, Gilbert. 1994. "Lifecycle vs. Annual Perspectives on the Incidence of a Value-Added Tax." In *Tax Policy and the Economy,* vol. 8, edited by James M. Poterba, 45–64. Cambridge, MA: MIT Press.

Mirrlees, James, Stuart Adam, Timothy Besley, Richard Blundell, Stephen Bond, Robert Chote, Malcolm Gammie, Paul Johnson, Gareth Myles, and James Poterba. 2011. *Tax by Design: The Mirrlees Review.* Oxford: Oxford University Press, Institute for Fiscal Studies.

Nickell, Stephen, and Richard Layard. 1999. "Labor Market Institutions and Economic Performance." In *Handbook of Labor Economics,* vol. 3C, edited by Orley Ashenfelter and David Card, 800. Amsterdam: North-Holland.

Neumark, David, Brandon Wall, and Jurfu Zhang. 2011. "Do Small Businesses Create More Jobs? New Evidence for the United States from the National Establishment Time Series." *Review of Economics and Statistics* 93 (1): 16–29.

Newbery, David M. 1986. "On the Desirability of Input Taxes." *Economics Letters* 20:267–70.

Organization for Economic Cooperation and Development. 2010. *Consumption Tax Trends.* Paris: OECD.

———. 2011. *Taxation and Employment.* OECD Tax Policy Studies no. 21. Paris: OECD.

Pérez, Arturo. 2008. *Earmarking State Taxes.* Washington, DC: National Conference of State Legislatures.

Poterba, James M., Julio Rotemberg, and Lawrence H. Summers. 1986. "A Tax-Based Test for Nominal Rigidities." *American Economic Review* 76 (4): 659–75.

Reckon LLP. 2009. *Study to Quantify and Analyze the VAT Gap in the EU-25 Member States.* London: Reckon LLP.

Ring, Raymond J., Jr. 1989. "Proportion of Consumers' and Producers' Goods in the General Sales Tax." *National Tax Journal* 42:167–79.

Uslaner, Eric M. 2006. "The Civil State: Trust, Polarization, and the Quality of State Government." In *Public Opinion in State Politics*, edited by Jeffrey E. Cohen, 142–62. Stanford, CA: Stanford University Press.