# Does Trade Liberalization Affect the Composition of Government Spending in Developing Nations ?

Michael O. Moore
George Washington University

Maurizio Zanardi
ECARES, Université Libre de Bruxelles

**ECARES working paper 2010-013**

ECARES
ULB - CP 114
50, F.D. Roosevelt Ave., B-1050 Brussels BELGIUM
www.ecares.org

# Does Trade Liberalization Affect the Composition of Government Spending in Developing Nations?

Michael O. Moore
Institute for International Economic Policy and Department of Economics
George Washington University

Maurizio Zanardi
ECARES, Université Libre de Bruxelles

March 2010

**Abstract**

Many skeptics of trade liberalization in the developing world argue that lowering trade taxes can cause significant fiscal pressures in countries particularly reliant on these taxes and result in a reallocation of resources away from important development goals. This research evaluates whether there is evidence that central governments systematically change the composition of spending priorities in the wake of lowered trade tax revenues as a share of total government revenues. We find very little evidence for this concern in a sample of 51 developing countries for the 1990 through 2005 period.

*Keywords:* Government expenditure, tariff revenue, trade liberalization
*JEL Codes:* H7, F13

The authors would like to thank Ron Davies for comments on a previous version of the paper. All remaining errors are our own.
* *Corresponding author:* Maurizio Zanardi: ECARES, Université Libre de Bruxelles, Avenue F. D. Roosevelt 50, CP 114, 1050 Brussels, Belgium; mzanardi@ulb.ac.be This author is also member of ECORE, the association between CORE and ECARES.

Opponents and proponents of trade liberalization long have argued about the economic impact of open trade including the impact on job losses in import-competing sectors, wage pressures, productivity and growth. While skepticism remains, there nonetheless has been a remarkable degree of liberalization over the last three decades, especially in countries that traditionally have had high trade barriers.

Whatever one's view of the economic globalization's impact, a very real issue for policymakers in many developing countries is the impact that trade liberalization may have on the public finance position of a government. In particular, many poorer countries have long relied on trade taxes as a major source of revenue for central government spending. If trade liberalization reduces tariff and export tax revenues, then governments must either find other sources of revenue (e.g. increasing sales or income taxes) or readjust public expenditure patterns. The latter could be a reduction across the board with little change in the shares across categories or a substitution away from one group of sectors to others.

There is particular concern in some quarters that reduced trade tax revenues would result in lower public investment in critical areas (e.g. education, health, and infrastructure) thereby undercutting longer term growth and generating domestic social problems. Some observers argue that vulnerable groups in societies with less political power might see their share of resources drop. In addition, increased exposure to international competition could also mean that adjustment costs rise as import-competing firms reduce output and lay off workers. These disruptions can increase the demands on a social safety net just as government financial resources may be falling. Critics also have pointed to this problem as a loss of economic sovereignty and have used this as a

reason to push back against calls for more trade liberalization. Increased global economic integration, the argument goes, reduces the ability of governments to choose domestic policies they believe are in their national interests.

The possibility of fiscal pressures arising out of trade liberalization is a frequently voiced concern of governments resisting reductions in trade barriers, especially in the developing world. A typical version of this was given by the Saint Kitts and Nevis representative at the Cancun WTO ministerial conference in 2003:

> Another matter of great concern to small economies and the Caribbean is the threat of tariff reductions and the effect on government revenue. Import taxes account for as much as 50 per cent of government revenue in some Caribbean countries. It is therefore critical that high tariff revenue dependent countries be exempted from further tariff reduction to provide them with the flexibility to take the decisions consistent with their development needs. (Saint Kitts and Nevis, 2003)

A Jamaican 2004 Trade Policy Review made a similar argument:

> The benefits of trade liberalization can be outweighed in situations where governments are dependent on these duties as a key component of government revenue. A drastic reduction of government revenue from customs-related duties and charges could have a negative effect on the fiscal balance. (Jamaica, 2004)

We will examine one aspect of this issue in this paper using data from 1990 to 2005 for 51 developing countries. In particular, we will explore whether there is any evidence that trade tax revenues as a share of total revenues can explain central government spending patterns. We do not examine whether trade liberalization is a good or bad policy nor whether increased globalization in general results in lower spending levels in particular categories. Nor do we examine whether trade liberalization has resulted in a reduction in overall government revenues. Instead, we take trade tax revenue as a share

of total revenue as a given and examine whether governments have changed the pattern of spending shares in a systematic way given those revenue levels. In other words, we are looking to see if there is a "substitution" effect away from certain sectors of government spending and towards other sectors as the share of resources from trade taxes change.

The primary source of data for this study is the International Monetary Fund's Government Financial Statistics (GFS), which is a compilation of the public finance position of dozens of countries across the globe for the fiscal year of each country, obtained through detailed questionnaires sent to each government. The database includes information on the sources and uses of revenue, in principal for national and sub-national levels of government. However, we will only examine spending patterns for central government activities, which is the level of government that typically collects trade tax revenue. This is both a practical decision (since data at the sub-national level is often missing) and substantive (since we are interested in particular in how central government revenue pressures from trade tax changes affects spending at the national level). While the data has been collected for some decades, changes in procedures mean that recent data is only comparable from 1990 forward.[1]

Table 1 provides a context for the issue we are addressing. We show a subset of developing countries' experience with trade taxes (i.e. tariffs plus export taxes) as a share of total central government revenues. The table includes countries from Latin America (Argentina, Chile, and Mexico), Asia (India, Indonesia, Korea, and Thailand), and two island nations (Mauritius and Seychelles). These countries represent a wide variety of

[1] For more detail about the GFS, please see the Government Financial Statistics Manual available at http://www.imf.org/external/pubs/ft/gfs/manual/index.htm.

experiences, including significant as well as minimal trade liberalization, steady economic growth and economic crisis, small and large economies, and geographic variation.

We see that this set of countries began the period with an important reliance on trade taxes, with an average of 21.7 percent of total revenues in 1990 with a high of 48 percent for the Seychelles. There is also a marked reduction in this reliance across these countries over time. For example, the share fell around 70 percent in Argentina (1990 to 2001), Korea (1990 to 2005), and the Seychelles (1990 to 2002) and about one-third in Mexico (1990 to 2000). These countries, therefore, have all faced important reductions in revenues from trade taxes, which raise the possibility of a realignment of expenditure priorities. Although we do not focus on developed countries, it is instructive to compare these figures with the experience of industrialized countries. For example, revenue for trade taxes in the U.S. fell from 2.7 percent to 2 percent from 1990 to 2003 and from 4 percent to 1.7 percent in Canada. Thus, although there are non-trivial percentage changes in the reliance on trade taxes, the low levels in developed countries throughout the period suggest that government expenditures are not significantly affected by changes in trade tax revenues, at least in recent years.[2]

Table 1 also includes the sum of social protection, health, and education spending for the countries as a share of total central government spending. We include these categories because they are likely candidates for those parts of government spending that critics of trade liberalization fear would be squeezed as a result of a drop in trade tax

[2] Similar patterns can be discerned in Australia (from 4.5 percent in 1990 to 2.8 in 1998) and in Switzerland (3.0 percent in 1991 and 2.0 in 2005). Relevant statistics for EU member states are unavailable since customs duties are collected at the EU level rather than at the national level.

revenues, i.e., governments might substitute away from these sectors since they support more vulnerable and politically less influential constituents. These also are sectors where one might expect higher spending shares if governments were supplementing efforts to deal with the adjustment costs associated with a stronger presence by international competitors subsequent to trade liberalization.[3]

The patterns are much less consistent than in the first columns with some countries experiencing a decrease (Korea, Seychelles, and Argentina) while others seeing an increase in this broad measure of social spending (e.g. Mexico and Mauritius). At the very least, these data suggest that there may not be a simple relationship between a reduced share of trade tax revenues and falling social spending as some have feared.

We will see below that more detailed descriptive statistics as well as formal econometric results for the 51 developing countries also do not support the argument that central government spending patterns generally can be explained by variations in shares of trade tax revenues except in isolated spending categories for specific country groups. These results suggest that developing country governments have not changed the composition of how they allocate resources as a consequence of lower import and export tax revenues. This indicates that the governments have not reduced the share of social spending, even if the trade liberalization might lower the overall level of fiscal resources. In other words, at least one of the worries often expressed about trade liberalization, i.e. that the vulnerable will bear a disproportionate amount of the burden from fiscal

[3] An alternative expectation would arise out of an application of the Stolper-Samuelson theorem. Since developing countries are likely to be unskilled labor abundant, trade liberalization would result in higher real wages to those workers, perhaps obviating the need for some social spending. Researchers have found, however, that many developing countries have not experienced a reduction in the wage premium for higher skilled workers. See for example Attansio et al. (2004) and Cragg and Epelbaum (1996).

pressures, finds little support in this study. However, another way to interpret this result is that these governments may not have been able to increase the share of spending in these categories, presuming that needs for social spending had risen. The key to distinguishing between these two interpretations is what the government's optimal composition of spending might be subsequent to a trade liberalization reform. In order to be able to disentangle these effects empirically, a structural model of government spending is needed, which is outside the scope of this paper but that would be an interesting direction for future research.

This paper is organized as follows. After a brief literature review in section 1, we turn to a more detailed discussion of relevant descriptive statistics for our sample of developing nations in section 2. Section 3 includes a discussion of the econometric methodology and results while robustness checks are reported in section 4. We offer some concluding remarks in section 5.

## 1. Relevant literature

This work analyzes one component of the broad question of how globalization affects domestic economic policies. This vast literature, which includes the impact of international economic integration on monetary policy, tax policy, and environmental policy, just to name a few, is far too vast to summarize here.

Our work should be seen in the context of the potential constraints on fiscal policy when trade is liberalized. This constraint is composed of a series of possible cause and effect relationships. The first (Link 1) is that globalization, including reductions in trade tax rates (through international negotiations such as GATT rounds, unilateral

liberalization, or those conducted as part of an IMF program), might reduce revenues to the central government. The central government subsequently might be forced to raise domestic revenues in other ways to make up for the shortfall (Link 2a) or reduce and adjust spending plans (Link 2b).[4]

The link between trade tax rate reduction and overall tax revenue is a complicated one. First, the tax rate on trade could be so high as to trigger a "Laffer-curve" type effect so that reduction might actually increase trade tax revenues. Second, it is possible that trade liberalization could spur economic growth that could result in higher overall revenues. Third, governments might readjust the tax burden onto domestic sources so that the fiscal position might not deteriorate or even improve.

Although the issue is crucial for developing countries and it is a complicated one because of the various channels, there is surprisingly little research on the specific link between trade liberalization and tax revenues.

Khattry and Rao (2002) examine one version of Link 1 by evaluating the relationship between a broad measure of openness to the international economy and tax revenues in a panel of 80 countries over the period 1970 through 1998. They find that increased "openness" (defined here as the ratio of trade taxes to the volume of total trade) is related both to reduced trade tax revenues and falling overall tax revenues as shares of GDP. They argue that the "reduced state capacity" associated with lowered trade taxes and the subsequent reduction in general tax revenues have undercut the ability of developing

[4] Another related research question concerns the relationship between trade openness and governments' size. Rodrik (1998) argues that the higher income risks associated with an open economy can lead to higher levels of government spending to mitigate those risks. However, globalization may also lead to the shrinking of governments' size to ensure higher competitiveness in the international market (i.e., efficiency hypothesis). We do not address this issue since we take governments' size as given and investigate possible changes it its composition. See Schultze and Ursprung (1999) for a survey of the broad issues surrounding international economic integration and the functions of national governments.

countries to use fiscal policies to deal with important development problems. However, they do not explore the effects of the dropping revenues on particular spending categories.

Baunsgaard and Keen (2005) focus on the relationship between declining trade revenue and increased revenues from other sources but focus specifically on whether countries replace falling trade tax revenues with revenue from other sources (i.e. they examine Link 2a). Their study utilizes data on over one hundred countries for the 1975 to 2000 period and in their analysis they distinguish countries based on their GDP per capita.[5] The authors find evidence that high income countries generally have been able to find ways to make up for any loss of trade tax revenues through other sources. Developing countries, on the other hand, have had much more difficulty in doing so. This problem is particularly acute for low-income countries where they estimate that governments were able to replace only about 30 cents on the dollar of lost trade tax funds.[6] These results suggest that concerns about fiscal pressures arising out of trade liberalization episodes reflect realities, at least for poorer countries. This in turn may create problems for poor countries' efforts using government spending to achieve development goals or to compensate losers from trade liberalization. However, the authors do not examine whether such a change in the composition of public spending is evident in the data.

Dreher et al. (2008) focus on a combination of Link 1 and Link 2b. They examine

[5] They augment GFS data with other information provided to the IMF as part of its general monitoring programs under Article IV of the IMF's charter.

[6] Emran and Stigliz (2005) examine the issue of replacing trade taxes with domestic income taxes. They argue that the large informal sectors in many low income countries means that increased VAT taxes on the formal sector could actually reduce national welfare relative to retaining trade taxes.

how disaggregated categories of government spending have been affected by increased globalization measured in a variety of ways.[7] They find very little evidence that government spending has been constrained by increased globalization. In particular, they find that four different measures of globalization have very little explanatory power in predicting the spending structure in a broad sample of 60 countries from 1971-2001 as well as a more detailed (in terms of expenditure categories) but smaller (i.e. only ten countries) OCED sample from 1990 through 2001. These results suggest that international economic integration may have relatively little impact on how governments spend their funds, i.e. independence of fiscal action generally remains robust.

We contribute to the literature by focusing specifically on Link 2b, i.e., we focus exclusively on how the share of trade tax revenues in total revenue affects the composition of central government spending across nine separate functional categories. Baunsgaard and Keen (2005) have provided evidence that there may be a fiscal shock, especially in the poorest countries, when trade taxes are lowered. We are interested however in whether this fiscal shock constrains how central governments allocate resources across alternative uses. For example, do governments substitute away from social spending as the budget constraint becomes tighter and towards defense? Evidence of such a substitution might suggest a further deterioration in the government's pursuit of development goals. The absence of such evidence would suggest a continued ability of governments to allocate resources (albeit potentially smaller) subsequent to trade liberalization. Alternatively, do governments shift resources towards social spending in

[7] The globalization measures include: 1) exports plus imports as a share of GDP; 2) inward and outward FDI share of GDP; 3) restrictions on capital accounts; and 4) the Swiss Economic Institute's index of globalization.

order to reinforce a safety net to deal with the consequences of reallocation of resources subsequent to trade liberalization?

These questions mean that our work is similar to Dreher et al. (2008) although we look directly at trade taxes and not broadly defined globalization measures. Moreover, we are able to focus on 51 developing countries, which we argue are more at risk when faced with trade-related fiscal shocks, over a longer sample period.

## 2. Overview of Trade Revenue and Spending Patterns

The basis of this study is information on the disaggregated level of central government spending as reported in the IMF's GFS database. As reported in the GFS, the categories for the functional classifications of central government spending used as the dependent variables in the analysis include the following nine sectors: social protection (e.g. unemployment, old age pensions, disability), health, education, economic affairs (e.g. economic and labor affairs, infrastructure, communications), general public services (e.g. executive and legislative branch costs, foreign aid), defense, public order (e.g. police, fire, prisons, and law courts), housing and community amenities (e.g. housing development, water supply), and recreation.[8] The data used in the analysis are developed using a cash-accrual basis, i.e. flows reflect the year in which a change in the economic value occurs.[9]

Table 2 displays basic information about trade tax revenues and spending patterns for

[8] In principle, the GFS data also report environmental spending. However, we do not include it in our analysis because of missing data in many countries.

[9] One downside to this data is that there is spotty availability of information for many of the countries covered by the GFS in principle. Consequently, it is important to note that the results of this study do not necessarily apply to all developing countries but only to those actually used in the econometric study.

a subset of spending categories across country groups and across two time periods (1990 through 1996 and 1997 through 2005), as well as the entire sample period 1990-2005. These tables make clear that there have been substantial differences across countries.[10]

In the upper panel of Table 2, we see that African countries are particularly reliant on trade tax revenue, with an average of 22.4 percent share of total revenue for the entire period, which is almost twice as high as for the entire group of countries in the sample. This reliance did fall from 25.1 percent in 1990-1996 to 17.8 percent for 1997-2005 but still exceeds the level for any of the other country subsamples in Table 2 for the earlier period. For example, Latin American countries reliance on trade taxes fell over time from 11.8 percent for the 1990-1996 period to only 8.9 percent in the 1997-2005 period. The level of reliance on trade tax revenues patterns for Asian countries largely mirrors those of Latin America though the change over time was not as great. These data are consistent with the broad patterns of trade liberalization across these three continents: most Asian and Latin American countries have tried to become more integrated in the world economy over the last three decades while African nations have lagged behind.

Table 2 also includes information based on countries' income level, as defined by the World Bank. We see a clear increase in the reliance on trade taxes as countries' average income level decreases. All income groups experienced a reduction in the percentage of revenues derived from trade taxes. However, this drop was greatest for lower-middle income countries (from 15.3 to 8.9 percent or a decrease of 42 percent) and the smallest

[10] Note that these data are for all developing countries reporting information in the GFS and are not identical to the data used in the formal econometric work. (See Appendix 1 for the list of countries included in the descriptive statistics and in the econometric analysis.) The broad patterns are quite similar in the two samples however and detailed statistics for the observations included in the regressions are reported with the estimation results.

for low-income countries (from 19.8 to 14.4 percent or a decrease of 27 percent). This also reflects the pattern that the poorest countries in the world have liberalized the least.

These falls in trade tax revenues clearly might cause some changes in spending patterns especially if, as Baunsgaard and Keen (2005) have argued, the drop in trade tax revenue was not matched by increases from other sources. We focus our discussion on four categories of expenditures about which globalization's skeptics might be particularly concerned: social protection, education, health, and economic affairs.[11] We see in the lower four remaining panels of Table 2 that there are marked differences across country groups in central government fiscal expenditures.

For example, Latin America has by far the highest percentage of spending in social protection and health of the three continents displayed for the period as a whole and also for the two subsamples. Alone among these three, Latin America is the only one where social spending's share of total expenditures fell between the two periods (but only by 2 percent). Average spending on economic affairs, a very broad category that includes items such as labor, agriculture, mining, transport, and communications fell by 18 percent in Latin America across the two time periods. On the other hand, education spending rose by 21.8 percent in our sample of Latin American countries. In short, Latin American countries reliance on trade tax revenues fell substantially over the 16 years of the sample and there is some evidence of reallocation of spending during this same period, though there is little evidence of broad expenditure retrenchment for these sectors as a whole. In fact, the total share of these four sectors remained essentially unchanged at 65 percent of central government spending.

[11] Tables for all nine spending categories can be found in Table A.1.in the appendix.

African countries in the sample allocated a much larger share of their spending to education, social protection, and health in the latter period (39.9 percent) compared to the 1990-1996 period (27.4 percent); the broader category of economic spending in Africa fell from 17.8 to 15.3 percent during this same timeframe. On the surface, these results are suggestive that Africa, with less trade liberalization and less fiscal pressure from trade tax revenue decreases, may have been able to devote more resources to fiscal categories supportive of human development.

Our sample of Asian countries show a different pattern, with lower trade tax revenues (falling by 12.2 percent) as in Latin America but markedly different spending patterns. We see that social protection spending as a share of total central government expenditures increased by 16.7 percent while education spending decreased by 19 percent, health spending marginally decreased, and general economic spending falling by 18.3 percent. Moreover, the total share of spending in these four sectors fell from 50.5 to 43.2 percent of total central government expenditures.

We also see in these panels of Table 2 that there is very different reliance on trade tax revenues across countries based on income categories. However, there has been a broad reduction in trade taxes as share of total revenues across low (fall of 27 percent), lower-middle (fall of 42 percent), and upper-middle income (fall of 40 percent) countries between the two time sub-periods. On the other hand, there has been very little change in the share of the four spending categories as a whole, with the total more or less around 60 percent for all three income groups. However, these aggregate numbers do not reflect some important changes in individual categories. For example, lower-middle income countries experienced an increase in social spending's share of total central government

expenditure from 17 to 27.8 percent while education spending fell by 22 percent (from 13.7 to 10.7 percent). Upper-middle income countries spent 16.2 percent more on health in the 1997-2005 period compared to 1990-1996.

In sum, we see clear evidence that these groupings of countries in our sample have experienced a decrease, sometimes sharp, in the share of total revenue that central governments obtain from trade taxes. These figures mirror those displayed for individual countries in Table 1. However, we see less specific evidence that there has been a systematic reduction in these "sensitive" spending sectors that might come under pressure with a financial squeeze, at least for these broad categories of countries. There is also little evidence that trade liberalization episodes have resulted in a greater share of spending to deal with dislocation from increased international competition. For example, Latin American governments, typically implementing significant trade liberalization in this period, do not seem to be moving the share of government spending towards categories that would provide a strengthened safety net. We will now turn to a more detailed econometric study of individual countries in the dataset while controlling for other factors that can help explain government spending patterns.

## 3. Econometric Methodology and Results

We do not presume to develop a formal theoretical model for the determination of government spending and we simply posit a reduced form relationship. However, we make the reasonable assumption that past shares of government spending in a particular category are not independent of the previous year's share. Thus, the basic econometric approach is very straightforward. We assume that in country *i* the government spending

share (out of total central spending) in each category *j* (out of the nine categories for which data is available) in year *t* can be expressed as a linear function of relevant covariates:

$$G_{i,j,t} = a_i + d \cdot G_{i,j,t-1} + X_{i,t-1} \cdot b + e_{i,j,t} \qquad (1)$$

where $G_{i,j,t-1}$ is the lagged value of the dependent variable, $X_{t-1}$ is a matrix of (one year lagged) explanatory variables with associated slope coefficients $b$, $a_i$ is a country fixed effect (reflecting unobservables) and $e_{i,j,t}$ is a disturbance term. Because of the lagged dependent variable, the coefficients on the explanatory variables represent the short-run adjustment of government spending while $b/(1-d)$ is the long run effect. Also note that the use of spending shares implies that the sum over expenditure components of the coefficients on each regressor must sum to zero since the positive (negative) impact of one variable must be compensated by an opposite effect on other expenditure shares.

The specification in (1) can be run separately for each of the nine categories of expenditure shares discussed in the previous section. However, the possibility of correlation of the disturbance terms across spending categories suggests the use of seemingly-unrelated-regression (SUR) estimation techniques, which are more efficient than OLS estimators.[12]

The only econometric complications are the lagged dependent variable together with countries' fixed effects, especially because the time dimension of our panel is not particularly long. To deal with the possible bias, we will consider specifications without the countries' fixed effects but we will also use the system GMM estimator suggested by

[12] The inclusion of the lagged dependent variable makes the list of regressors different for the various expenditure shares, thus allowing a SUR estimation.

Arellano and Bover (1995) and Blundell and Bond (1998).[13]

Our focus is on the impact of trade taxes on these government expenditure categories. We turn once again to the GFS for these data (see Table 3 for detailed variable definitions and sources). In particular, "Trade tax revenue" is the trade tax revenues (including for example import tariffs, export taxes, profits of exports or import monopolies) divided by total revenues of the central government. In the econometric analysis, a positive coefficient on "Trade tax revenue" would indicate that a drop in trade tax revenue share would result in a diminished share of that particular sector in overall central government spending.

We will also control for a number of other factors. In the basic specification, we include, as noted above, the lagged dependent variable for each spending category, which measure the persistence of spending. In addition, we include "GDP per capita" (in constant 2005 US$) to control for the possibility that the level of economic development could affect spending in the various categories. We follow Dreher et al. (2008) and include total government expenditures as a share of GDP ("Expenditure share") to account for the possibility that the level of total government spending in an economy might influence the share of spending. Two more regressors control for macroeconomic conditions: annual growth in GDP ("Growth") and inflation ("Inflation", measured by annual changes in the GDP deflator). A country's age population distribution also might influence spending in many of these categories. Consequently, we include the "Age dependency ratio," which is ratio of the population younger than 15 and older than 65 years to the population between 15 and 64 (i.e., the working population). Finally, the

[13] The use of the system (instead of difference) GMM estimator is justified because of the likely persistence of the expenditure shares.

basic specification also includes country fixed effects to account for unobserved country-level heterogeneity.

Table 4 includes the basic set of SUR regressions for all countries in the data set. Note that the SUR estimator requires a balanced panel across spending shares that reduces the total number of observations to 439 for a total of 51 countries. The R-squared for all of the individual equations is high and the country fixed effects are jointly different from zero at a one percent level in all instances.[14]

The first four columns of this and the other regression tables include the results for the "sensitive" sectors discussed above: social protection, health, education, and economic affairs. The coefficient on trade tax revenues is not significantly different from zero in any of these four sectors. This evidence is not supportive of the hypothesis that fiscal pressures from trade liberalization have caused a retrenchment in spending in these categories nor do governments move resources into those sectors. We do find evidence that housing and recreation expenditures may be reduced with dropping trade tax revenues. However, the point estimates suggest that these are fairly small effects at the margin.

The other results in Table 4 correspond to our expectation that the lagged value of the dependent variable is an important predictor of later spending in that category. We find that the coefficient on "Age dependency ratio" is the one most frequently statistically significant. Among the other regressors, the shares of expenditure on housing and recreation are positively and significantly related, as expected, to the overall level of total expenditure. The macro control do not show much explanatory power while GDP per

[14] See Appendix 1 for a list of the countries included in the sample.

capita is negatively related to expenditure on social protection, public order and recreation.

We also tested the long run restriction that the sum (across expenditure categories) of the coefficients of each of the regressors (with the exception of the lagged dependent variable) should add up to zero. Such restrictions are never rejected.[15]

Tables 5, 6, and 7 include the results when the full sample is split into low-, lower middle-, and upper-middle-income countries, respectively. The results are broadly similar to those of Table 4. Most notably, we see little evidence that the level of trade tax revenue affects the level of spending in these fiscal expenditure categories across country subsamples. We find only four instances where the coefficient on "Trade tax revenue" is significantly different from zero at least at the 5 percent level in the twenty-seven separate equations.

We focus in particular on the results for low-income countries. Recall that Baunsgaard and Keen (2005) and Khattry and Rao (2002) both reported evidence that low-income countries have had difficulties in finding revenue substitutes for falling trade tax revenues. The results of Table 5 suggest however that the trade tax revenue share generally does not explain the spending share in the expenditure categories (with recreation spending as the sole exception). This does not mean that falling trade tax revenues might not result in reduced spending in any of these particular categories. However, on average these governments seem to share the burden equally across sectors, which may be suboptimal if they would have liked to increase spending in those categories that may cushion the adjustment costs due to trade liberalization.

[15] Analogous tests for short-run restrictions would also pass in all but one case (for GDP per capita).

We also divided the sample by region (Latin America, Africa, and Asia) but report only the results for Latin America as displayed in Table 8. We chose Latin America because, as discussed above, this was the group of countries with the largest decrease in trade tax revenues of the three. In addition, trade liberalization and the pressures on social spending are particularly sensitive politically in Latin America.

As in the other tables, we see little evidence in Table 8 that the level of trade tax revenue as a share of total revenue has important explanatory power across the various spending categories. Most notably, its coefficient is not significantly different from zero for regressions involving expenditure shares of social protection, health or economic affairs. In fact, the only instance where it is significant is for education but the coefficient estimate is negative, meaning that on average as trade tax revenue has fallen in Latin America, education's share of overall central government spending has actually risen.

In results not reported here[16], we also find no evidence that trade revenue reductions are important in explaining spending shares for Africa and Asia. The one exception is for defense spending in Africa where the coefficient estimate is negative. But there is no instance where we see the positive and significant coefficient estimate in any of the individual estimations.

## 4. Robustness Checks

We have undertaken two types of robustness checks. On a methodological front, we want to mitigate the possibility of a bias due to the inclusion of the lagged dependent

[16] Results for Africa and Asia can be found in Tables A.2 and A.3 in the appendix.

variable with countries fixed effect in a panel with a short time dimension. To this end we have re-estimated the specification in Table 4: i) without countries fixed effect; and ii) employing the system GMM estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998). In another set of robustness checks, we have added various regressors to the basic specification. Neither set of sensitivity test alters the basic conclusion reached in the previous section that tariff revenue shares generally do not affect central government expenditure shares across a variety of categories. The results are reported in the appendix (Tables A.2-A.9).

The exclusion of the countries fixed effects does not lead to any major qualitative change for the effect of tariff revenue on expenditure shares, which remains mostly insignificant. However, the estimates of the coefficients on the lagged dependent variables are much higher because of its positive correlation with the error. As a matter of fact, the true parameter should thus lie in the range between the estimates found in Table 4 and those without the countries fixed effects. When using the GMM system estimator, we do find point estimates that do fall in these intervals and the conclusions on the role of trade tax revenues are unchanged.[17]

To investigate whether the results in Table 4 are robust to inclusion of additional regressors, we considered the role of total government revenue, foreign financial aid, democratic institutions, and conflicts. In the first case, we added total government revenue (as a share of GDP) since only better funded governments may engage in

[17] The tests for first and second-order autocorrelation do not reject the specifications. The Sargan test of overidentifying restrictions rejects the null hypothesis of joint validity of the instruments for all expenditure categories while the Hansen test do not. The former is robust to a large number of instruments but not to heteroskedasticity while it is the opposite for the latter. For these reasons, we prefer to discuss these results only in the robustness section.

spending in non-necessities (e.g., education, especially for poor countries). As for the financial controls, we added foreign aid and IBRD and IDA credits, all expressed as a share of GDP. These additional financial resources might affect the patterns of government spending by relaxing a government budget constraint but perhaps with conditionality that might affect spending patterns. We controlled for the level of democracy by employing the Polity index, which ranks countries on a scale ranging from −10 to +10 scale, where 10 represents the highest score for a democratic institutions. Its inclusion reflects the possibility that a nation with more responsive government to its citizens' needs might have a different expenditure share pattern than less democratic nations. Finally, we considered whether a country is involved in inter- or intra-state conflicts. All things equal, a government facing such conflicts might alter its spending patterns to deal with the associated military and security exigencies. The inclusion of each of these regressors reduces the number of observations (e.g. including the aid variables reduces the sample from 439 to 341) so that we do not include them in all specifications.[18]

The results show that the coefficient for total revenue is rarely significant but, more importantly, its inclusion does not affect our qualitative results in any systematic way. The only changes concerning the coefficient estimates for the share of tariff revenue are for spending on public services and defense in the sample of low-income countries, which become significant (negative and positive, respectively).

The foreign financial aid variables generally provide little explanatory power (though the coefficient for aid is negative and significant for education and the coefficient for

[18] See Table 3 for description and sources of all extra regressors.

IBRD/IDA is positive and significant for defense expenditures). The coefficients on tariff revenue are once again positive for housing and recreation; the negative coefficients for tariff revenue for defense and social protection spending are now significantly different from zero at 10 and 5 percent, respectively and retain their negative values. More democratic countries do spend more for public services but less on education and economic affairs but there is no statistically significant role of trade taxes except for social spending. As expected, intra-state conflicts lead to a larger share of government expenditures for defense purposes to the detriment of spending on economic affairs and housing.[19] Most importantly for our work, we see little impact for trade revenue shares (with the exception of recreation expenditure shares) for this specification.

## 5. Conclusions

Many developing country governments traditionally have relied extensively on import and export taxes as means to finance government operations. These governments face the possibility that trade liberalization will result in lower overall revenues, especially if domestic capacity of raising funds through other means cannot be found. This in turn can lead to a reduction of spending in areas that these governments and societies might find important.

These concerns are not merely academic. Trade negotiators, such as the ones quoted above from Jamaica and St. Kitts and Nevis, have explicitly referred to the spending constraints arising out of trade liberalization as a justification for resisting calls for reduced barriers. Assessing these concerns is therefore important in understanding both

[19] Interstate conflicts surprisingly do not provide significant explanatory power for defense spending.

the effects of trade liberalization more generally but also whether poorer countries might have legitimate fears about the fiscal pressures they might be under if they reduce this traditional means of financing central government spending.

Researchers (e.g. Baunsgaard and Keen (2005) and Khattry and Rao (2002)) have found evidence for one important part of this fear. In particular, their work suggests that developing countries, especially those with the lowest average income, may have a particularly hard time in finding alternative sources for falling trade tax revenues.

In this paper, we take this line of reasoning one step forward and ask how the share of government funds derived from import and export taxes affects the spending shares of central government funding. If lower trade tax revenue shifts resources away from, for example, spending on health and education, then trade liberalization unmatched by increases in other funds could be even more problematic. If instead, shares of government spending categories are unaffected by lower trade tax revenues, then the problem is less acute. In a sense, we start with the premise that there might be an "income" effect from lower overall revenues associated with trade liberalization but we ask whether there is a "substitution" effect that moves spending away from sensitive areas as a consequence of the fiscal pressures.

We find very little evidence indeed that such a substitution effect is taking place, at least in the sample of countries for which data is available from the IMF's Government Financial Statistics database. Simple descriptive statistics show that there has been a broad reduction in the reliance of trade tax revenues across the developing world since 1990 through 2005. But there is little systematic evidence that this decrease has caused a shift in the composition of spending across central government spending categories,

especially at the expense of items such as health, education, and social protection. This is true both for subsamples of countries based on average income as well as across Latin America, Asia, and Africa.

The results of formal econometric analysis are consistent with these general observations. We use seemingly unrelated regression techniques to simultaneously analyze nine spending categories, using trade revenue shares along with other covariates likely to be helpful in explaining expenditure patterns. We also use GMM methods to deal with the possibility of bias because of a lagged dependent variable. We find virtually no evidence that these trade revenue shares affect spending categories as a percentage of the whole. This is true whether we consider all of the developing countries simultaneously or whether we divide the sample into average income categories or regional groupings. These results are also largely robust to a variety of alternative specifications, including generalized methods of moments techniques and with the inclusion of different sets of explanatory variables.

The evidence presented here, in short, suggests that developing countries in the past have not altered the *pattern* of spending as a consequence of falling revenues from import and export taxes. This of course does not undercut the fears of government officials, consistent with findings of researchers, that poorer developing countries might face a reduction in overall fiscal resources if trade liberalization occurs. But our results do suggest that governments in this sample of countries have not moved resources out of one sector and into others as a consequence of these pressures. Of course, it is possible that governments might have preferred to increase the share of spending in these categories to deal with the social dislocation resulting from resource reallocation associated with trade

liberalization. If this is true, then our results suggest that these governments have not been able to pursue a different composition of spending when faced with the fiscal pressures and reduced trade tax revenues. Only further research can determine which interpretation is correct since it depends on determining what the optimal composition of spending might be for these governments.

## References


Attanasio, Orazion, Pinelopi Goldberg, and Nina Pavcnik (2004). "Trade Reforms and Wage Inequality in Colombia" Journal of Development Economics, 74(2), pp. 331-66.

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

Baunsgaard, Thomas and Michael Keen (2005). "Tax Revenue and (or?) Trade Liberalization" International Monetary Fund Working Papers: 05/112.

Blundell, Richard and Steven Bond (1998). "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models" Journal of Econometrics, 87(1), pp. 115-43.

Correlates of War project, Available at http://www.correlatesofwar.org/.

Cragg, Micahel and Mario Epelbaum (1996). "Why Has Wage Dispersion Grown in Mexico? Is It the Incidence of Reforms or the Growing Demand for Skills?" Journal of Development Economics, 51(1), pp. 99-116.

Dreher, Axel, Jan-Egbert Sturm, and Heinrich Ursprung (2008). "The Impact of Globalization on the Composition of Government Expenditures: Evidence from Panel Data" Public Choice, 134(3-4), pp. 263-92.

Emran, Shahe and Joseph Stiglitz (2005). "On selective indirect tax reform in developing countries," Journal of Public Economics, 89(4), pp. 599-623.

Jamaica (2004). Jamaica Trade Policy Review (WT/TPR/G/139).

Khattry, Barsha and Mohan Rao (2002). "Fiscal Faux Pas? An Analysis of the Revenue Implications of Trade Liberalization," World Development, 30(8), pp. 1431-44.

Monty, G. Marshall and Keith Jaggers (2002). Polity IV Data Set. [Computer file; version p4v2004] College Park, MD: Center for International Development and Conflict Management, University of Maryland.

Rodrik, Dani (1998). "Why Do More Open Economies Have Bigger Governments," Journal of Political Economy, 106 (5), pp. 997-1032.

Schulze, Gunther and Heinrich Ursprung (1999). "Globalisation of the Economy and the Nation State" World Economy, 22(3), pp. 295-352.

Saint Kitts and Nevis (2003). Statement by Mr Horatio Versailles of Permanent

Secretary, Ministry of International Trade and CARICOM Affairs (WT/MIN(03)/ST/123).

Uppsala Conflict Data Program (UCDP/PRIO), Available at http://www.prio.no/CSCW/Datasets/Armed-Conflict/UCDP-PRIO/.

Table 1: Percentage of Tariff Revenue and Percentage of Social Protection, Health, and Education Spending

| | **Argentina** | | **Chile** | | **Mexico** | | **India** | | **Indonesia** | | **Korea** | | **Thailand** | | **Seychelles** | | **Mauritius** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (a) | (b) | (a) | (b) | (a) | (b) | (a) | (b) | (a) | (b) | (a) | (b) | (a) | (b) | (a) | (b) |
| **1990** | 14 | 58 | 12 | 57 | 6 | 29 | 29 | 4 | 6 | 11 | 12 | 30 | 22 | 30 | 48 | 34 | 46 | 36 |
| **1991** | 8 | 56 | 10 | 57 | 8 | 41 | 26 | 4 | 5 | 13 | 9 | 27 | 19 | 31 | 46 | 35 | 46 | 38 |
| **1992** | 8 | 57 | 10 | 59 | 8 | 47 | 24 | 4 | 5 | 12 | 7 | 27 | 17 | 33 | 46 | 34 | 40 | 38 |
| **1993** | 8 | 59 | 10 | 59 | 7 | 52 | 22 | 4 | 5 | 13 | 6 | 32 | 18 | 32 | 40 | 32 | 41 | 41 |
| **1994** | 7 | 62 | 9 | 60 | 6 | 54 | 22 | 4 | 6 | 18 | 6 | 31 | 17 | 33 | 42 | 33 | 41 | 42 |
| **1995** | 5 | 62 | 9 | 61 | 4 | 47 | 24 | 4 | 4 | 18 | 7 | 30 | 16 | 33 | 43 | 30 | 34 | 44 |
| **1996** | 7 | 62 | 9 | 62 | 4 | 47 | 25 | 3 | 3 | 19 | 6 | 30 | 15 | 33 | 38 | 29 | 33 | 43 |
| **1997** | 8 | 60 | 8 | 62 | 4 | 44 | 22 | 4 | 3 | 16 | 6 | 32 | 12 | 32 | 41 | 28 | 30 | 45 |
| **1998** | 7 | 59 | 8 | 63 | 4 | 52 | 21 | 4 | 4 | 14 | 4 | 32 | 9 | 29 | 43 | 34 | 30 | 46 |
| **1999** | 6 | 57 | 7 | 65 | 4 | 51 | 21 | 4 | 3 | 14 | 4 | 32 | 9 | 27 | 24 | 30 | 26 | 45 |
| **2000** | 5 | 57 | 6 | 67 | 4 | 50 | 19 | 4 | | | 4 | 34 | 11 | 37 | 22 | 47 | 27 | 46 |
| **2001** | 4 | 55 | 5 | 67 | | | 16 | 4 | 3 | 14 | 4 | 32 | 10 | 39 | 19 | 39 | 25 | 45 |
| **2002** | | | 4 | 67 | | | 15 | 4 | 3 | 12 | 4 | 34 | 10 | 32 | 16 | 31 | 21 | 46 |
| **2003** | | | | | | | 15 | 4 | 3 | 13 | 4 | 28 | | | | | 20 | 44 |
| **2004** | | | | | | | 15 | 4 | 3 | 11 | 4 | 25 | | | | | 20 | 46 |
| **2005** | | | | | | | 14 | 5 | | | 3 | 27 | | | | | 20 | 49 |

Source: Government Financial Statistics.

Notes: Tariff revenue as a share of total central government revenues displayed in column (a). Sum of the three expenditure categories as a share of total central government expenditures displayed in column (b).

Table 2: Shares of Trade Tax and Selected Expenditure Categories

| **Trade tax share** | **1990-2005** | **1990-1996** | **1997-2005** |
|---|---|---|---|
| All countries | 11.7 | 15.1 | 9.1 |
| Latin America | 10.3 | 11.8 | 8.9 |
| Africa | 22.4 | 25.1 | 17.8 |
| Asia | 12.1 | 13.1 | 11.5 |
| Low income | 16.8 | 19.8 | 14.4 |
| Lower middle income | 11.8 | 15.3 | 8.9 |
| Upper middle income | 7.8 | 10.5 | 6.3 |
| | | | |
| **Social protection** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 20.4 | 17.2 | 22.6 |
| Latin America | 28.4 | 28.6 | 28.0 |
| Africa | 10.7 | 7.5 | 16.8 |
| Asia | 4.4 | 4.2 | 4.9 |
| Low income | 2.7 | 3.1 | 2.5 |
| Lower middle income | 23.3 | 17.0 | 27.8 |
| Upper middle income | 27.1 | 29.0 | 25.7 |
| | | | |
| **Education** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 11.6 | 12.5 | 11.0 |
| Latin America | 14.7 | 13.3 | 16.2 |
| Africa | 15.3 | 14.7 | 16.7 |
| Asia | 12.2 | 13.7 | 11.1 |
| Low income | 10.9 | 11.4 | 10.7 |
| Lower middle income | 12 | 13.7 | 10.7 |
| Upper middle income | 11.5 | 11.2 | 11.7 |
| | | | |
| **Health** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 7.4 | 6.9 | 7.7 |
| Latin America | 9.3 | 9.5 | 9.3 |
| Africa | 5.6 | 5.2 | 6.4 |
| Asia | 4.1 | 4.2 | 4.0 |
| Low income | 4.7 | 4.5 | 4.9 |
| Lower middle income | 8.2 | 7.9 | 8.3 |
| Upper middle income | 8.1 | 7.4 | 8.6 |
| | | | |
| **Economic affairs** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 16.9 | 19.2 | 15.1 |
| Latin America | 13.1 | 14.2 | 11.6 |
| Africa | 17.1 | 17.8 | 15.3 |
| Asia | 25.6 | 28.4 | 23.2 |
| Low income | 24.5 | 26.8 | 22.1 |
| Lower middle income | 16.3 | 18.9 | 14.3 |
| Upper middle income | 12.5 | 13.1 | 12.1 |

Source: Government Financial Statistics

Notes: Trade tax revenue as a share of total central government revenues. Others as share of total central government expenditure. See Appendix 1 for country group membership.

Table 3: Data Description

| | Description | Source |
|---|---|---|
| **Dependent Variables*** | | IMF Government Financial Statistics |
| Social protection | Social protection expenditure | IMF Government Financial Statistics |
| Health | Health expenditure | IMF Government Financial Statistics |
| Education | Education expenditure | IMF Government Financial Statistics |
| Economic affairs | Economic affairs expenditure | IMF Government Financial Statistics |
| Public services | General public services expenditure | IMF Government Financial Statistics |
| Defense | Defense expenditure | IMF Government Financial Statistics |
| Public order | Public order and safety expenditure | IMF Government Financial Statistics |
| Housing | Housing and community amenities expenditure | IMF Government Financial Statistics |
| Recreation | Recreation, culture, and religion expenditure | IMF Government Financial Statistics |
| | | |
| **Explanatory Variables** | | |
| Trade tax revenue | Trade tax revenue (% of total central government revenue) | IMF Government Financial Statistics |
| Total expenditures (% GDP) | Total central government expenditures as a share of GDP | World Development Indicators |
| GDP per capita | GDP per capita, PPP (constant 2005 international $) | World Development Indicators |
| Inflation | Annual change in GDP deflator | World Development Indicators |
| Growth | Annual growth rate of GDP | World Development Indicators |
| Age dependency ratio | (population younger than 15 and older than 65) / population between 15 and 64 | World Development Indicators |
| Total government revenue (%GDP) | Total central government revenue as a share of GDP | World Development Indicators |
| AID (% GNI) | Aid (% of GNI) | World Development Indicators |
| IBRD and IDA credit (% GDP) | IBRD loans and IDA credits (% GDP) | World Development Indicators |
| Polity | Index ranging from −10 (autocracy) to +10 (democracy) | Monty and Jaggers (2002) |
| Inter-state conflicts | Dummy variable equal to 1 for inter-state conflicts (of hostility level > 2) | Correlates of War project |
| Intra-state conflicts | Number of concurrently active intra-state conflicts | UCDP/PRIO Armed Conflict dataset |

Notes: * All dependent variables refer to central governments expenditures and are calculated as percentage shares of total central government expenditures.

Table 4: All Countries

| Explanatory variable (mean/standard deviation) | Social protection (0.22 / 0.16) | Health (0.08 / 0.05) | Education (0.11 / 0.59) | Economic affairs (0.17 / 0.10) | Public services (0.24 / 0.13) | Defense (0.08 / 0.07) | Public order (0.05 / 0.03) | Housing (0.03 / 0.04) | Recreation (0.02 / 0.02) |
|---|---|---|---|---|---|---|---|---|---|
| Lagged dependent variable | 0.461*** (0.022) | 0.522*** (0.031) | 0.573*** (0.026) | 0.512*** (0.018) | 0.530*** (0.018) | 0.517*** (0.027) | 0.422*** (0.034) | 0.599*** (0.028) | 0.460*** (0.042) |
| Trade tax revenue (0.10 / 0.09) | -0.035 (0.034) | 0.014 (0.022) | -0.001 (0.020) | -0.005 (0.042) | -0.031 (0.061) | 0.008 (0.027) | -0.004 (0.013) | 0.059*** (0.021) | 0.022*** (0.008) |
| Total expenditures (% GDP) (27 / 10) | 0.0001 (0.0004) | -0.0001 (0.0002) | -0.0001 (0.0002) | 0.0002 (0.0004) | -0.0001 (0.001) | -0.001** (0.0003) | -0.00002 (0.0001) | 0.0005** (0.0002) | 0.0004*** (0.0001) |
| GDP per capita (0.08 / 0.06) | -0.351*** (0.101) | 0.040 (0.063) | 0.084 (0.058) | 0.191 (0.125) | 0.134 (0.180) | -0.013 (0.080) | -0.149*** (0.038) | -0.028 (0.062) | -0.057** (0.023) |
| Inflation (0.12 / 1.3) | 0.0004 (0.001) | -0.00003 (0.001) | 0.00005 (0.001) | 0.001 (0.001) | 0.0002 (0.002) | -0.001 (0.001) | 0.0003 (0.0004) | -0.001* (0.001) | 0.0002 (0.0002) |
| Growth (0.04 / 0.05) | -0.015 (0.027) | 0.018 (0.017) | 0.023 (0.016) | 0.044 (0.033) | -0.122** (0.048) | 0.018 (0.021) | 0.018* (0.010) | -0.0002 (0.017) | 0.028*** (0.006) |
| Age dependency ratio (0.59 / 0.15) | -0.129*** (0.028) | -0.002 (0.017) | 0.079*** (0.016) | 0.080** (0.035) | -0.025 (0.050) | 0.045** (0.022) | -0.038*** (0.011) | -0.018 (0.017) | -0.016*** (0.006) |
| Country Fixed Effects (Prob. > F) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) |
| R-squared | 0.98 | 0.91 | 0.95 | 0.91 | 0.90 | 0.93 | 0.93 | 0.85 | 0.91 |
| Observations | 439 | 439 | 439 | 439 | 439 | 439 | 439 | 439 | 439 |

Notes: SUR regressions result. Standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob. > F reports the probability of the joint test that all fixed effects are zero; all variables are lagged by one year. Countries with fewer than 3 observations excluded.

Table 5: Low-Income Countries

| Explanatory variable (mean/standard deviation): | Social protection (0.28 / 0.03) | Health (0.05 / 0.03) | Education (0.11 / 0.60) | Economic affairs (0.23 / 0.13) | Public services (0.36 / 0.18) | Defense (0.13 / 0.10) | Public order (0.03 / 0.3) | Housing (0.05 / 0.06) | Recreation (0.01 / 0.02) |
|---|---|---|---|---|---|---|---|---|---|
| Lagged dependent variable | 0.558*** (0.078) | 0.284*** (0.090) | 0.513*** (0.065) | 0.501*** (0.040) | 0.547*** (0.041) | 0.408*** (0.062) | 0.410*** (0.084) | 0.532*** (0.062) | 0.548*** (0.078) |
| Tariff revenue (0.14 / 0.10) | 0.043 (0.066) | 0.004 (0.039) | -0.036 (0.070) | -0.080 (0.159) | -0.225 (0.242) | 0.159 (0.120) | 0.078** (0.038) | 0.012 (0.107) | 0.085*** (0.023) |
| Total expenditures (% GDP) (23 / 13) | -0.00001 (0.0004) | -0.0001 (0.0002) | -0.0005 (0.0004) | 0.001 (0.001) | -0.003* (0.002) | -0.001 (0.0001) | -0.002 (0.013) | 0.001** (0.0006) | 0.0004*** (0.0002) |
| GDP per capita (0.02 / 0.01) | 1.089 (1.398) | 0.523 (0.821) | -1.305 (1.427) | -7.963** (3.284) | 10.7666** (4.333) | -0.669 (2.456) | -0.166 (0.739) | 0.816 (2.2898) | 0.545 (0.473) |
| Inflation (0.36 / 2.90) | -0.0003 (0.001) | 0.0001 (0.0005) | 0.0003 (0.001) | 0.002 (0.002) | 0.001 (0.003) | -0.003* (0.002) | -0.001 (0.001) | -0.001 (0.001) | -0.0003 (0.0003) |
| Growth (0.05 / 0.05) | 0.027 (0.048) | -0.015 (0.026) | 0.038 (0.048) | 0.393*** (0.112) | -0.552*** (0.169) | 0.129 (0.082) | 0.019 (0.027) | -0.122* (0.074) | 0.045*** (0.016) |
| Age dependency ratio (0.74 / 0.13) | 0.044 (0.067) | 0.052 (0.039) | -0.006 (0.069) | -0.185 (0.158) | 0.198 (0.246) | 0.146 (0.097) | -0.057 (0.038) | -0.099 (0.109) | -0.006 (0.023) |
| Country Fixed Effects (Prob. > F) | Y (0.02) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.02) | Y (0.00) |
| R-squared | 0.75 | 0.93 | 0.93 | 0.92 | 0.90 | 0.92 | 0.91 | 0.83 | 0.93 |
| Observations | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |

Notes: SUR regressions result. Standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob. > F reports the probability of the joint test that all fixed effects are zero; all variables are lagged by one year. Countries with fewer than 3 observations excluded.

Table 6: Lower-Middle Income Countries

| Explanatory variable (mean/standard deviation): | Social protection (0.25 / 0.13) | Health (0.08 / 0.05) | Education (0.12 / 0.06) | Economic affairs (0.16 / 0.09) | Public services (0.21 / 0.10) | Defense (0.07 / 0.06) | Public order (0.06 / 0.02) | Housing (0.03 / 0.03) | Recreation (0.01 / 0.01) |
|---|---|---|---|---|---|---|---|---|---|
| Lagged dependent variable | 0.601*** (0.036) | 0.576*** (0.043) | 0.618*** (0.039) | 0.543** (0.030) | 0.567*** (0.030) | 0.616*** (0.039) | 0.319*** (0.047) | 0.743*** (0.051) | 0.422*** (0.054) |
| Tariff revenue (0.11 / 0.10) | 0.006 (0.050) | 0.061* (0.033) | 0.024 (0.026) | 0.052 (0.053) | -0.109 (0.074) | -0.005 (0.032) | -0.009 (0.017) | 0.018 (0.017) | 0.011** (0.006) |
| Total expenditures (% GDP) (26 / 8.8) | -0.0001 (0.0007) | -0.0001 (0.0005) | 0.0004 (0.0004) | 0.00002 (0.0008 | 0.0003 (0.001) | -0.0004 (0.0005) | -0.00005 (0.0002) | -0.0001 (0.0002) | -0.0001 (0.0001) |
| GDP per capita (0.07 / 0.04) | -0.177 (0.271) | 0.227 (0.182) | 0.362** (0.147) | 0.115 (0.295) | -0.226 (0.410) | -0.194 (0.176) | -0.148 (0.094) | -0.142 (0.092) | 0.024 (0.032) |
| Inflation (0.05 / 0.33) | -0.007 (0.006) | -0.002 (0.004) | 0.001 (0.003) | 0.007 (0.007) | -0.008 (0.010) | 0.004 (0.004) | 0.009*** (0.002) | -0.002 (0.002) | -0.00004 (0.0008) |
| Growth (0.04 / 0.05) | -0.080* (0.050) | 0.067** (0.032) | 0.067*** (0.025) | -0.054 (0.051 | -0.058 (0.071) | -0.004 (0.030) | 0.056** (0.017) | 0.021 (0.016) | 0.006 (0.005) |
| Age dependency ratio (0.58 / 0.14) | -0.144*** (0.041) | -0.017 (0.027) | 0.101*** (0.024) | 0.057 (0.044 | 0.039 (0.060) | -0.018 (0.026) | -0.034** (0.014) | 0.010 (0.013) | -0.004 (0.005) |
| Country Fixed Effects (Prob. > F) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.09) | Y (0.00) |
| R-squared | 0.96 | 0.90 | 0.95 | 0.91 | 0.85 | 0.92 | 0.87 | 0.92 | 0.90 |
| Observations | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 | 225 |

Notes: SUR regressions result. Standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob. > F reports the probability of the joint test that all fixed effects are zero; all variables are lagged by one year. Countries with fewer than 3 observations excluded.

Table 7: Upper-Middle Income Countries

| Explanatory variable (mean/standard deviation): | Social protection (0.29 / 0.15) | Health (0.09 / 0.05) | Education (0.12 / 0.06) | Economic affairs (0.13 / 0.06) | Public services (0.23 / 0.11) | Defense (0.05 / 0.04) | Public order (0.06 / 0.04) | Housing (0.02 / 0.03) | Recreation (0.02 / 0.02) |
|---|---|---|---|---|---|---|---|---|---|
| Lagged dependent variable | 0.331*** (0.033) | 0.377*** (0.057) | 0.442*** (0.046) | 0.374*** (0.038) | 0.427*** (0.034) | 0.463*** (0.059) | 0.554*** (0.057) | 0.557*** (0.054) | 0.370*** (0.077) |
| Tariff revenue (0.05 / 0.04) | -0.051 (0.068) | 0.080** (0.037) | 0.014 (0.032) | -0.005 (0.072) | 0.003 (0.101) | 0.050* (0.027) | -0.014 (0.023) | 0.102*** (0.038) | 0.020 (0.023) |
| Total expenditures (% GDP) (30 / 9.6) | 0.001 (0.001) | 0.00002 (0.0004) | 0.0002 (0.0004) | -0.002*** (0.001) | 0.001 (0.001) | 0.0004 (0.0003) | 0.0001 (0.0003) | 0.0002 (0.0004) | 0.0004* (0.0002) |
| GDP per capita (0.01 / 0.07) | -0.521*** (0.144) | -0.028 (0.078) | -0.018 (0.068) | 0.298** (0.151) | 0.311 (0.211) | 0.001 (0.056) | -0.201*** (0.050) | 0.063 (0.080) | -0.094** (0.048) |
| Inflation (0.08 / 0.29) | 0.011 (0.011) | 0.007 (0.006) | -0.007 (0.005) | 0.006 (0.011) | -0.012 (0.016) | -0.001 (0.004) | 0.001 (0.004) | 0.001 (0.006) | 0.001 (0.003) |
| Growth (0.04 / 0.06) | 0.051 (0.044) | -0.008 (0.024) | -0.038* (0.021) | 0.046 (0.046) | -0.090 (0.064) | 0.019 (0.017) | -0.005 (0.015) | 0.016 (0.024) | 0.038*** (0.014) |
| Age dependency ratio (0.50 / 0.08) | -0.184* (0.107) | -0.016 (0.058) | -0.041 (0.051) | 0.118 (0.111) | 0.147 (0.157) | 0.018 (0.042) | -0.121*** (0.037) | 0.039 (0.060) | -0.030 (0.033) |
| Country Fixed Effects (Prob. > F) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.08) | Y (0.00) |
| R-squared | 0.98 | 0.93 | 0.97 | 0.83 | 0.91 | 0.96 | 0.97 | 0.77 | 0.91 |
| Observations | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 | 129 |

Notes: SUR regressions result. Standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob. > F reports the probability of the joint test that all fixed effects are zero; all variables are lagged by one year. Countries with fewer than 3 observations excluded.

Table 8: Latin American Countries

| Explanatory variable (mean/standard deviation): | Social protection (0.29 / 0.18) | Health (0.09 / 0.06) | Education (0.15 / 0.07) | Economic affairs (0.13 / 0.08) | Public services (0.22 / 0.12) | Defense (0.05 / 0.03) | Public order (0.05 / 0.02) | Housing (0.04 / 0.04) | Recreation (0.01 / 0.004) |
|---|---|---|---|---|---|---|---|---|---|
| Lagged dependent variable | 0.233***<br>0.037) | 0.233**<br>(0.096) | 0.281***<br>(0.071) | 0.226***<br>(0.064) | 0.425**<br>(0.055) | 0.192**<br>(0.079) | 0.419***<br>(0.081) | 0.981***<br>(0.095) | -0.062<br>(0.121) |
| Tariff revenue<br>(0.10 / 0.11) | 0.030<br>(0.164) | 0.094<br>(0.084) | -0.186**<br>(0.088) | -0.077<br>(0.161) | -0.203<br>(0.224) | 0.059<br>(0.045) | -0.002<br>(0.054) | -0.010<br>(0.094) | 0.021<br>(0.013) |
| Total expenditures (% GDP)<br>(21 / 5.8) | 0.0043***<br>(0.0013) | 0.00013<br>(0.0027) | 0.0013*<br>(0.0006) | -0.003**<br>(0.0013) | -0.0043**<br>(0.0043) | -0.0006<br>(0.0038) | -0.0002<br>(0.0004) | -0.00009<br>(0.0007) | 0.00021**<br>(0.00011) |
| GDP per capita<br>(0.07 / 0.03) | 0.161<br>(0.390) | -0.006<br>(0.199) | 0.661***<br>(0.218) | -0.557<br>(0.381) | 0.240<br>(0.532) | -0.349***<br>(0.112) | -0.020<br>(0.129) | -0.351*<br>(0.211) | -0.006<br>(0.032) |
| Inflation<br>(0.12 / 0.56) | 0.00003<br>(0.0052) | 0.0027<br>(0.0027) | -0.003<br>(0.003) | 0.006<br>(0.005) | -0.011<br>(0.007) | 0.0027*<br>(0.0015) | 0.0091***<br>(0.0017) | -0.003<br>(0.003) | -0.0002<br>(0.0004) |
| Growth<br>(0.04 / 0.04) | 0.099*<br>(0.055) | -0.035<br>(0.028) | -0.025<br>(0.029) | 0.022<br>(0.054) | -0.141*<br>(0.075) | 0.027*<br>(0.015) | 0.048**<br>(0.019) | 0.045<br>(0.030) | 0.0012<br>(0.0043) |
| Age dependency ratio<br>(0.66 / 0.09) | 0.174<br>(0.184) | -0.255***<br>(0.095) | 0.089<br>(0.098) | 0.598***<br>(0.184) | 0.393<br>(0.253) | -0.019<br>(0.051) | -0.088<br>(0.062) | -0.033<br>(0.103) | 0.008<br>(0.015) |
| Country Fixed Effects (Prob. > F) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) | Y (0.00) |
| R-squared | 0.99 | 0.97 | 0.98 | 0.95 | 0.95 | 0.96 | 0.92 | 0.93 | 0.87 |
| Observations | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |

Notes: SUR regressions result. Standard errors in parenthesis; ***, **, and * denote significance at 1, 5, and 10 percent, respectively; Prob. > F reports the probability of the joint test that all fixed effects are zero; all variables are lagged by one year. Countries with fewer than 3 observations excluded.

Appendix 1: List of countries

| Low income | Lower middle income | Upper middle income |
|---|---|---|
| **Africa** | **Africa** | **Africa** |
| Burundi* | Mauritius* | |
| Dem. Rep. of Congo* | Morocco* | |
| Egypt* | Tunisia* | |
| Lesotho | | |
| Madagascar | | |
| **Asia** | **Asia** | **Asia** |
| Bangladesh | Malaysia* | South Korea* |
| Bhutan* | Thailand* | |
| India* | | |
| Indonesia* | | |
| Nepal* | | |
| Pakistan* | | |
| **Latin America** | **Latin America** | **Latin America** |
| | Argentina* | Brazil* |
| | Bolivia* | Mexico* |
| | Chile* | Uruguay* |
| | Costa Rica* | Venezuela* |
| | Dominican Republic* | |
| | El Salvador | |
| | Nicaragua* | |
| | Panama* | |
| **Others** | **Others** | **Others** |
| Maldives* | Albania | Bahrain* |
| Myanmar* | Azerbaijan* | Belarus* |
| | Bulgaria* | Estonia* |
| | Cameroon | Hungary* |
| | Croatia* | Latvia* |
| | Czech Republic* | Lithuania* |
| | Georgia* | Macao* |
| | Iran* | Malta* |
| | Kazakhstan* | Netherlands Antilles |
| | Lebanon | Russian Federation |
| | Moldova* | Seychelles |
| | Mongolia* | Slovenia* |
| | Poland* | Trinidad and Tobago* |
| | Romania* | |
| | Slovak Republic* | |
| | Syria* | |
| | Tajikistan | |
| | Turkey | |
| | Ukraine* | |
| | Vanuatu | |
| | Zimbabwe | |

Notes: a * indicates that the country is included in the econometric analysis.

Table A.1: Shares of Trade Tax (Remaining Expenditure Categories)

| **Public services** | **1990-2005** | **1990-1996** | **1997-2005** |
|---|---|---|---|
| All countries | 16.9 | 19.2 | 15.1 |
| Latin America | 13.1 | 14.2 | 11.6 |
| Africa | 17.1 | 17.8 | 15.3 |
| Asia | 25.6 | 28.4 | 23.2 |
| Low income | 24.5 | 26.8 | 22.1 |
| Lower middle income | 16.3 | 18.9 | 14.3 |
| Upper middle income | 12.5 | 13.1 | 12.1 |
| | | | |
| **Defense** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 7.9 | 9.0 | 7.2 |
| Latin America | 5.0 | 5.3 | 4.7 |
| Africa | 7.5 | 8.4 | 5.3 |
| Asia | 10.1 | 10.7 | 9.9 |
| Low income | 11.8 | 10.8 | 12.5 |
| Lower middle income | 7.7 | 9.8 | 6.3 |
| Upper middle income | 5.5 | 6.1 | 5.2 |
| | | | |
| **Public order** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 5.4 | 4.6 | 5.9 |
| Latin America | 5.0 | 4.9 | 5.3 |
| Africa | 5.8 | 5.2 | 7.0 |
| Asia | 4.4 | 4.0 | 4.6 |
| Low income | 2.9 | 2.4 | 3.2 |
| Lower middle income | 6.0 | 5.5 | 6.5 |
| Upper middle income | 6.0 | 4.9 | 6.6 |
| | | | |
| **Housing** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 3.1 | 3.5 | 2.9 |
| Latin America | 4.0 | 3.8 | 4.1 |
| Africa | 3.5 | 3.3 | 4.1 |
| Asia | 4.9 | 5.5 | 4.4 |
| Low income | 4.7 | 4.6 | 4.9 |
| Lower middle income | 3.0 | 3.5 | 2.6 |
| Upper middle income | 2.2 | 2.5 | 2.1 |
| | | | |
| **Recreation** | **1990-2005** | **1990-1996** | **1997-2005** |
| All countries | 1.5 | 1.2 | 1.6 |
| Latin America | 0.6 | 0.5 | 0.7 |
| Africa | 2.0 | 2.0 | 2.1 |
| Asia | 0.8 | 0.7 | 0.8 |
| Low income | 1.2 | 1.4 | 0.8 |
| Lower middle income | 1.3 | 1.0 | 1.5 |
| Upper middle income | 2.0 | 1.5 | 2.3 |

Source: Government Financial Statistics

Notes: All expenditure categories as share of total central government expenditure. See Appendix 1 for country group membership.

For Tables A.2-A.9:

```
Lagged Y = lagged dependent variable
Trade tax re = trade tax revenue
GDP capita = GDP per capita
Total expend = Total expenditure (% of GDP)
Age dependen = Age dependency ratio
```

Table A.2: African Countries

```
Seemingly unrelated regression
------------------------------------------------------------------------------
Equation          Obs  Parms        RMSE    "R-sq"       chi2        P
------------------------------------------------------------------------------
Pub services       50     12    .0415619    0.8820     389.59   0.0000
Defense            50     12    .0128594    0.9371     760.13   0.0000
Pub order          50     12    .0076012    0.9202     579.53   0.0000
Econ affairs       50     12    .0215538    0.9373     801.69   0.0000
Housing            50     12    .0058961    0.9269     643.73   0.0000
Health             50     12    .0030853    0.9866    3687.00   0.0000
Recreation         50     12    .0031016    0.9759    2028.37   0.0000
Education          50     12     .006925    0.9797    2468.68   0.0000
Soc protect        50     12    .0169176    0.9490     957.79   0.0000
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Pub services |
    Lagged Y |   .3079425   .0841001     3.66   0.000     .1431093    .4727756
Trade tax re |   .4821629   .2304184     2.09   0.036     .0305511    .9337747
  GDP capita |   1.933354    1.67901     1.15   0.250    -1.357445    5.224154
Total expend |   .0050494   .0036725     1.37   0.169    -.0021485    .0122473
   Inflation |  -.0002506   .0028039    -0.09   0.929    -.0057463     .005245
      Growth |  -.6477915   .2274064    -2.85   0.004      -1.0935   -.2020831
Age dependen |   -.215851    .193166    -1.12   0.264    -.5944494    .1627473
       _cons |   .1937427   .1954008     0.99   0.321    -.1892358    .5767212
-------------+----------------------------------------------------------------
Defense      |
    Lagged Y |   -.251197   .0555244    -4.52   0.000    -.3600229   -.1423711
Trade tax re |  -.1629133    .070658    -2.31   0.021    -.3014004   -.0244262
  GDP capita |  -.9263448   .5191952    -1.78   0.074    -1.943949    .0912592
Total expend |  -.0031087   .0011286    -2.75   0.006    -.0053207   -.0008967
   Inflation |  -.0037534   .0008916    -4.21   0.000    -.0055009   -.0020058
      Growth |  -.0131752   .0735057    -0.18   0.858    -.1572437    .1308933
Age dependen |   .1527059   .0599485     2.55   0.011      .035209    .2702029
       _cons |   .1525867   .0604682     2.52   0.012     .0340713    .2711022
-------------+----------------------------------------------------------------
Pub order    |
    Lagged Y |   .4472633   .1615625     2.77   0.006     .1306066    .7639201
Trade tax re |   .0125916   .0418621     0.30   0.764    -.0694566    .0946398
  GDP capita |  -.0521456   .3309719    -0.16   0.875    -.7008386    .5965474
Total expend |   .0000835   .0006631     0.13   0.900    -.0012161    .0013831
   Inflation |  -.0000737   .0005056    -0.15   0.884    -.0010646    .0009172
      Growth |  -.0263988   .0417552    -0.63   0.527    -.1082375    .0554398
Age dependen |  -.0095715   .0370598    -0.26   0.796    -.0822074    .0630643
       _cons |   .0294469   .0422249     0.70   0.486    -.0533124    .1122061
-------------+----------------------------------------------------------------
Econ affairs |
    Lagged Y |   .4948468   .0514856     9.61   0.000      .393937    .5957567
Trade tax re |  -.0431251   .1226659    -0.35   0.725    -.2835459    .1972957
  GDP capita |  -.5055407   .8961479    -0.56   0.573    -2.261958    1.250877
Total expend |   -.004765   .0019053    -2.50   0.012    -.0084993   -.0010308
```

| | | | | | | |
|---|---|---|---|---|---|---|
| Inflation | .0000851 | .0014298 | 0.06 | 0.953 | -.0027172 | .0028875 |
| Growth | .2874315 | .1235506 | 2.33 | 0.020 | .0452769 | .5295862 |
| Age dependen | .0545076 | .1031123 | 0.53 | 0.597 | -.1475889 | .2566041 |
| _cons | .1840476 | .1015124 | 1.81 | 0.070 | -.014913 | .3830082 |
| Housing | | | | | | |
| Lagged Y | .617028 | .0926743 | 6.66 | 0.000 | .4353896 | .7986663 |
| Trade tax re | .0189417 | .0323099 | 0.59 | 0.558 | -.0443846 | .082268 |
| GDP capita | -.4879352 | .2414727 | -2.02 | 0.043 | -.961213 | -.0146574 |
| Total expend | .0011104 | .0005137 | 2.16 | 0.031 | .0001035 | .0021174 |
| Inflation | -.0007852 | .0004089 | -1.92 | 0.055 | -.0015866 | .0000163 |
| Growth | .0029075 | .032515 | 0.09 | 0.929 | -.0608207 | .0666357 |
| Age dependen | -.0269226 | .0281939 | -0.95 | 0.340 | -.0821816 | .0283364 |
| _cons | .0155234 | .0279734 | 0.55 | 0.579 | -.0393034 | .0703502 |
| Health | | | | | | |
| Lagged Y | .5825383 | .1232041 | 4.73 | 0.000 | .3410628 | .8240138 |
| Trade tax re | .0085955 | .01687 | 0.51 | 0.610 | -.0244691 | .0416602 |
| GDP capita | .0876632 | .1279659 | 0.69 | 0.493 | -.1631454 | .3384717 |
| Total expend | .0008486 | .0002869 | 2.96 | 0.003 | .0002862 | .001411 |
| Inflation | .0002767 | .000207 | 1.34 | 0.181 | -.000129 | .0006825 |
| Growth | .0130478 | .0169466 | 0.77 | 0.441 | -.020167 | .0462625 |
| Age dependen | .0269066 | .0162366 | 1.66 | 0.097 | -.0049165 | .0587298 |
| _cons | -.043545 | .0145435 | -2.99 | 0.003 | -.0720498 | -.0150402 |
| Recreation | | | | | | |
| Lagged Y | .0832737 | .1230475 | 0.68 | 0.499 | -.157895 | .3244424 |
| Trade tax re | .0241017 | .0168207 | 1.43 | 0.152 | -.0088663 | .0570698 |
| GDP capita | -.0594387 | .1268429 | -0.47 | 0.639 | -.3080463 | .1891688 |
| Total expend | .0002296 | .0002718 | 0.84 | 0.398 | -.0003033 | .0007624 |
| Inflation | .0000487 | .0002066 | 0.24 | 0.814 | -.0003564 | .0004537 |
| Growth | .0195921 | .017082 | 1.15 | 0.251 | -.0138879 | .0530721 |
| Age dependen | -.0214654 | .0143939 | -1.49 | 0.136 | -.0496769 | .0067462 |
| _cons | .0735919 | .018482 | 3.98 | 0.000 | .0373679 | .109816 |
| Education | | | | | | |
| Lagged Y | .5414712 | .1150145 | 4.71 | 0.000 | .3160469 | .7668954 |
| Trade tax re | .0572922 | .0373177 | 1.54 | 0.125 | -.0158491 | .1304334 |
| GDP capita | -.0500192 | .2772648 | -0.18 | 0.857 | -.5934483 | .4934099 |
| Total expend | .0010171 | .0006684 | 1.52 | 0.128 | -.0002929 | .0023271 |
| Inflation | -3.31e-06 | .0004669 | -0.01 | 0.994 | -.0009183 | .0009117 |
| Growth | .0149858 | .0391278 | 0.38 | 0.702 | -.0617033 | .091675 |
| Age dependen | -.1168184 | .0350684 | -3.33 | 0.001 | -.1855511 | -.0480857 |
| _cons | .1101527 | .0488995 | 2.25 | 0.024 | .0143115 | .2059939 |
| Soc protect | | | | | | |
| Lagged Y | .4359953 | .1036916 | 4.20 | 0.000 | .2327636 | .6392271 |
| Trade tax re | -.1214571 | .0907495 | -1.34 | 0.181 | -.2993228 | .0564085 |
| GDP capita | .1277066 | .6844033 | 0.19 | 0.852 | -1.213699 | 1.469112 |
| Total expend | .0028925 | .0014491 | 2.00 | 0.046 | .0000523 | .0057328 |
| Inflation | .0018645 | .0011076 | 1.68 | 0.092 | -.0003064 | .0040354 |
| Growth | .0249415 | .0918187 | 0.27 | 0.786 | -.1550198 | .2049027 |
| Age dependen | -.0494635 | .0785019 | -0.63 | 0.529 | -.2033244 | .1043973 |
| _cons | -.0210666 | .0799125 | -0.26 | 0.792 | -.1776923 | .135559 |

Country fixed effects included but not reported to save on space.

Table A.3: Asian Countries

```
Seemingly unrelated regression
------------------------------------------------------------------------------
Equation           Obs  Parms        RMSE    "R-sq"       chi2        P
------------------------------------------------------------------------------
Pub services        71     14     .048137    0.9389    1302.90   0.0000
Defense             71     14    .0084818    0.9797    3627.52   0.0000
Pub order           71     14    .0067294    0.9318     981.75   0.0000
Econ affairs        71     14    .0368495    0.9101     819.79   0.0000
Housing             71     14    .0206917    0.7589     307.84   0.0000
Health              71     14    .0071407    0.9530    1448.88   0.0000
Recreation          71     14    .0024436    0.8864     581.00   0.0000
Education           71     14    .0104347    0.9773    3100.67   0.0000
Soc protect         71     14    .0119599    0.9310     992.15   0.0000
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Pub services |
    Lagged Y |   .6423693   .0396172    16.21   0.000     .5647209    .7200176
Trade tax re |  -.2763385   .3731307    -0.74   0.459    -1.007661    .4549843
  GDP capita |   .0754549   .7937218     0.10   0.924    -1.480211    1.631121
Total expend |   .0010446   .0024613     0.42   0.671    -.0037796    .0058687
   Inflation |    .170339   .9614825     0.18   0.859    -1.714132     2.05481
      Growth |  -.0701581   .2283231    -0.31   0.759    -.5176631     .377347
Age dependen |  -.3388651   .1460636    -2.32   0.020    -.6251445   -.0525857
       _cons |   .3430185   .1637259     2.10   0.036     .0221217    .6639153
-------------+----------------------------------------------------------------
Defense      |
    Lagged Y |    .725194   .0452812    16.02   0.000     .6364445    .8139435
Trade tax re |   .0632784   .0660597     0.96   0.338    -.0661962    .1927529
  GDP capita |  -.2379037   .1450511    -1.64   0.101    -.5221986    .0463912
Total expend |  -.0001695   .0004471    -0.38   0.705    -.0010458    .0007068
   Inflation |  -.1549579   .1690579    -0.92   0.359    -.4863053    .1763896
      Growth |   .0639915   .0403323     1.59   0.113    -.0150583    .1430413
Age dependen |   .0003282   .0257519     0.01   0.990    -.0501445    .0508009
       _cons |     .00863   .0296254     0.29   0.771    -.0494347    .0666947
-------------+----------------------------------------------------------------
Pub order    |
    Lagged Y |    .496984   .0854751     5.81   0.000     .3294559    .6645122
Trade tax re |  -.0108355   .0534536    -0.20   0.839    -.1156027    .0939316
  GDP capita |  -.1904016   .1127331    -1.69   0.091    -.4113544    .0305513
Total expend |  -.0000412   .0003842    -0.11   0.915    -.0007943    .0007118
   Inflation |   .1242322   .1359278     0.91   0.361    -.1421813    .3906458
      Growth |   .0394022   .0323006     1.22   0.223    -.0239058    .1027103
Age dependen |  -.0168173   .0207792    -0.81   0.418    -.0575438    .0239092
       _cons |   .0441673   .0267853     1.65   0.099    -.0083308    .0966655
-------------+----------------------------------------------------------------
Econ affairs |
    Lagged Y |   .5748658   .0484531    11.86   0.000     .4798994    .6698321
Trade tax re |   .2459696   .2882884     0.85   0.394    -.3190653    .8110046
  GDP capita |   .7885086   .6144178     1.28   0.199    -.4157282    1.992745
Total expend |  -.0039466   .0019383    -2.04   0.042    -.0077456   -.0001477
   Inflation |  -1.099637   .7462914    -1.47   0.141    -2.562342    .3630668
      Growth |  -.3210088   .1766103    -1.82   0.069    -.6671586    .0251409
Age dependen |   .3685197   .1160723     3.17   0.001     .1410222    .5960172
       _cons |   .0245892   .1270741     0.19   0.847    -.2244714    .2736499
-------------+----------------------------------------------------------------
Housing      |
    Lagged Y |   .6654301   .0525055    12.67   0.000     .5625213     .768339
Trade tax re |   .0637634   .1625509     0.39   0.695    -.2548306    .3823574
```

```
  GDP capita |   .4999636   .3479273     1.44   0.151    -.1819614    1.181889
Total expend |   .0003263   .0010784     0.30   0.762    -.0017872    .0024398
   Inflation |   .4653791   .4208834     1.11   0.269    -.3595372    1.290295
      Growth |   .0462588    .099329     0.47   0.641    -.1484224    .2409399
Age dependen |   .0206172   .0633895     0.33   0.745    -.1036238    .1448583
       _cons |    -.04088     .07095    -0.58   0.564    -.1799395    .0981795
-------------+----------------------------------------------------------------
Health       |
    Lagged Y |   .2996459   .0871265     3.44   0.001     .1288811    .4704106
Trade tax re |  -.0554532   .0559711    -0.99   0.322    -.1651546    .0542482
  GDP capita |  -.1553732   .1195401    -1.30   0.194    -.3896674     .078921
Total expend |   .0011467   .0003769     3.04   0.002     .0004079    .0018854
   Inflation |   .2685555    .144531     1.86   0.063      -.01472     .551831
      Growth |   .0835201   .0343337     2.43   0.015     .0162273    .1508129
Age dependen |   .0043153   .0219762     0.20   0.844    -.0387574    .0473879
       _cons |   .0147282    .027286     0.54   0.589    -.0387514    .0682078
-------------+----------------------------------------------------------------
Recreation   |
    Lagged Y |   .6154959   .0719331     8.56   0.000     .4745096    .7564823
Trade tax re |   .0181488   .0192332     0.94   0.345    -.0195476    .0558453
  GDP capita |   .0202968   .0423412     0.48   0.632    -.0626903     .103284
Total expend |   .0000471   .0001336     0.35   0.725    -.0002149     .000309
   Inflation |  -.0155951   .0494494    -0.32   0.752    -.1125141    .0813239
      Growth |   .0051917   .0117716     0.44   0.659    -.0178801    .0282635
Age dependen |   .0048419   .0075025     0.65   0.519    -.0098626    .0195464
       _cons |    -.00086   .0085902    -0.10   0.920    -.0176964    .0159764
-------------+----------------------------------------------------------------
Education    |
    Lagged Y |   .6369171   .0695113     9.16   0.000     .5006774    .7731567
Trade tax re |  -.0859181   .0820156    -1.05   0.295    -.2466656    .0748295
  GDP capita |  -.5247358    .182915    -2.87   0.004    -.8832426   -.1662289
Total expend |   .0013172    .000561     2.35   0.019     .0002177    .0024166
   Inflation |   .4080198    .211278     1.93   0.053    -.0060773     .822117
      Growth |   .1913273   .0506405     3.78   0.000     .0920737    .2905808
Age dependen |  -.0192494   .0332438    -0.58   0.563     -.084406    .0459072
       _cons |   .0121414   .0423763     0.29   0.774    -.0709145    .0951973
-------------+----------------------------------------------------------------
Soc protect  |
    Lagged Y |   .6283031   .0722608     8.69   0.000     .4866745    .7699317
Trade tax re |   -.102756   .0964862    -1.06   0.287    -.2918655    .0863535
  GDP capita |  -.2974032   .2047533    -1.45   0.146    -.6987122    .1039058
Total expend |   .0001573   .0006232     0.25   0.801    -.0010642    .0013788
   Inflation |  -.0221381   .2420532    -0.09   0.927    -.4965536    .4522774
      Growth |   .0070963   .0573984     0.12   0.902    -.1054026    .1195952
Age dependen |  -.0171831   .0368563    -0.47   0.641    -.0894201     .055054
       _cons |    .017107   .0413903     0.41   0.679    -.0640166    .0982305
------------------------------------------------------------------------------
Country fixed effects included but not reported to save on space.
```

Table A.4: All Countries without Country Fixed Effects

```
Seemingly unrelated regression
------------------------------------------------------------------------------
Equation          Obs  Parms        RMSE    "R-sq"       chi2        P
------------------------------------------------------------------------------
Pub services      439      7    .0466622    0.8777    9677.84   0.0000
Defense           439      7    .0213467    0.9080    6536.21   0.0000
Pub order         439      7    .0107812    0.8947    4562.28   0.0000
Econ affairs      439      7    .0338008    0.8841    6905.41   0.0000
Housing           439      7    .0163777    0.8072    2398.69   0.0000
Health            439      7    .0169349    0.8877    4455.85   0.0000
Recreation        439      7    .0060453    0.8786    3404.22   0.0000
Education         439      7     .015706    0.9306    8063.77   0.0000
Soc protect       439      7    .0312109    0.9607   14374.25   0.0000
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Pub services |
    Lagged Y |    .922488   .0095745    96.35   0.000     .9037223    .9412537
Trade tax re |  -.0258031    .026397    -0.98   0.328    -.0775403    .0259341
  GDP capita |  -.0116109    .045014    -0.26   0.796    -.0998368     .076615
Total expend |  -.0001347   .0002364    -0.57   0.569    -.0005979    .0003286
   Inflation |  -.0045651   .0017657    -2.59   0.010    -.0080258   -.0011043
      Growth |  -.0538858   .0452513    -1.19   0.234    -.1425767     .034805
Age dependen |   .0084097    .018929     0.44   0.657    -.0286905    .0455099
       _cons |   .0237611   .0155288     1.53   0.126    -.0066747     .054197
-------------+----------------------------------------------------------------
Defense      |
    Lagged Y |   .9219815   .0122307    75.38   0.000     .8980096    .9459533
Trade tax re |  -.0084469   .0120626    -0.70   0.484    -.0320892    .0151953
  GDP capita |  -.0118306   .0205411    -0.58   0.565    -.0520904    .0284292
Total expend |  -.0001678   .0001102    -1.52   0.128    -.0003837    .0000482
   Inflation |  -.0004977    .000806    -0.62   0.537    -.0020773     .001082
      Growth |   .0201251   .0206838     0.97   0.331    -.0204144    .0606645
Age dependen |   .0057262   .0087273     0.66   0.512     -.011379    .0228313
       _cons |   .0062566   .0070583     0.89   0.375    -.0075774    .0200905
-------------+----------------------------------------------------------------
Pub order    |
    Lagged Y |   .9272913   .0150702    61.53   0.000     .8977542    .9568283
Trade tax re |   .0010512   .0061084     0.17   0.863    -.0109211    .0130235
  GDP capita |   -.006846   .0106998    -0.64   0.522    -.0278172    .0141252
Total expend |   6.26e-06   .0000548     0.11   0.909    -.0001012    .0001138
   Inflation |   .0000389   .0004071     0.10   0.924     -.000759    .0008367
      Growth |  -.0182675   .0104744    -1.74   0.081    -.0387969     .002262
Age dependen |  -.0060872   .0044222    -1.38   0.169    -.0147547    .0025802
       _cons |   .0094013   .0037094     2.53   0.011      .002131    .0166716
-------------+----------------------------------------------------------------
Econ affairs |
    Lagged Y |   .9196536   .0117238    78.44   0.000     .8966753    .9426319
Trade tax re |   -.016316   .0191398    -0.85   0.394    -.0538294    .0211973
  GDP capita |  -.0113923   .0325665    -0.35   0.726    -.0752215     .052437
Total expend |  -.0002291   .0001712    -1.34   0.181    -.0005646    .0001064
   Inflation |   .0069746   .0012768     5.46   0.000      .004472    .0094771
      Growth |    .067791   .0328104     2.07   0.039     .0034839    .1320981
Age dependen |   .0225254    .013924     1.62   0.106    -.0047651    .0498159
       _cons |    .002902   .0111236     0.26   0.794    -.0188997    .0247038
-------------+----------------------------------------------------------------
Housing      |
    Lagged Y |   .8956654   .0214862    41.69   0.000     .8535532    .9377776
Trade tax re |   .0234868   .0103212     2.28   0.023     .0032576     .043716
```

```
  GDP capita |   .0122392   .0158447     0.77   0.440    -.0188157    .0432942
Total expend |   .0000257   .0000835     0.31   0.758     -.000138    .0001895
   Inflation |  -.0012246   .0006201    -1.97   0.048      -.00244   -9.11e-06
      Growth |   .0040441   .0159875     0.25   0.800    -.0272908     .035379
Age dependen |   .0039552   .0066583     0.59   0.552    -.0090947    .0170051
       _cons |  -.0024898   .0054054    -0.46   0.645    -.0130841    .0081046
-------------+----------------------------------------------------------------
Health       |
    Lagged Y |   .9176113   .0154327    59.46   0.000     .8873638    .9478587
Trade tax re |   .0001253   .0095904     0.01   0.990    -.0186716    .0189221
  GDP capita |  -.0016781    .016598    -0.10   0.919    -.0342096    .0308535
Total expend |   .0001657    .000089     1.86   0.063    -8.74e-06    .0003402
   Inflation |   -.000041   .0006378    -0.06   0.949    -.0012911    .0012092
      Growth |  -.0020739   .0163998    -0.13   0.899     -.034217    .0300691
Age dependen |   -.007371   .0068615    -1.07   0.283    -.0208193    .0060774
       _cons |   .0074444   .0055602     1.34   0.181    -.0034534    .0183421
-------------+----------------------------------------------------------------
Recreation   |
    Lagged Y |   .9340763   .0168735    55.36   0.000     .9010048    .9671478
Trade tax re |   .0029756   .0034259     0.87   0.385     -.003739    .0096903
  GDP capita |  -.0012605   .0059594    -0.21   0.832    -.0129407    .0104196
Total expend |   .0000704   .0000306     2.30   0.021     .0000105    .0001303
   Inflation |   .0002565   .0002282     1.12   0.261    -.0001907    .0007037
      Growth |   .0122337   .0058789     2.08   0.037     .0007113    .0237561
Age dependen |  -.0007497   .0024512    -0.31   0.760    -.0055539    .0040545
       _cons |  -.0009657   .0019899    -0.49   0.627    -.0048658    .0029344
-------------+----------------------------------------------------------------
Education    |
    Lagged Y |   .9486635   .0115222    82.33   0.000     .9260804    .9712466
Trade tax re |   .0211704   .0090926     2.33   0.020     .0033491    .0389916
  GDP capita |   .0289693   .0157308     1.84   0.066    -.0018625    .0598011
Total expend |   .0000267   .0000797     0.33   0.738    -.0001296    .0001829
   Inflation |  -.0005606   .0005993    -0.94   0.350    -.0017352    .0006141
      Growth |    .015222   .0152541     1.00   0.318    -.0146755    .0451195
Age dependen |   .0122964    .006503     1.89   0.059    -.0004492     .025042
       _cons |  -.0071464   .0051594    -1.39   0.166    -.0172586    .0029657
-------------+----------------------------------------------------------------
Soc protect  |
    Lagged Y |   .9257615   .0090853   101.90   0.000     .9079546    .9435685
Trade tax re |   .0092446   .0179389     0.52   0.606     -.025915    .0444043
  GDP capita |  -.0202833   .0298777    -0.68   0.497    -.0788425    .0382759
Total expend |    .000297    .000159     1.87   0.062    -.0000146    .0006086
   Inflation |  -.0003053   .0011659    -0.26   0.793    -.0025904    .0019799
      Growth |  -.0421637   .0300075    -1.41   0.160    -.1009774    .0166499
Age dependen |  -.0399328   .0131759    -3.03   0.002    -.0657571   -.0141085
       _cons |   .0346102   .0110253     3.14   0.002     .0130011    .0562194
------------------------------------------------------------------------------
```

Table A.5: All Countries, GMM estimation

```
Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =    381.83                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
Pub services |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .7755154   .0746259    10.39   0.000     .6292513    .9217795
Trade tax re |  -.0396316   .0343727    -1.15   0.249    -.1070009    .0277377
  GDP capita |  -.0660298   .0944092    -0.70   0.484    -.2510684    .1190087
Total expend |  -.0006174   .0003142    -1.97   0.049    -.0012332   -1.70e-06
   Inflation |  -.0027675   .0010895    -2.54   0.011    -.0049028   -.0006322
      Growth |  -.0430083   .0515365    -0.83   0.404    -.1440181    .0580015
Age dependen |   .0181818   .0285997     0.64   0.525    -.0378727    .0742362
       _cons |   .0708694   .0349753     2.03   0.043      .002319    .1394197
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -4.17  Pr > z =  0.000
Arellano-Bond test for AR(2) in first differences: z =   1.01  Pr > z =  0.314
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   = 115.42  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  47.04  Prob > chi2 =  0.797
  (Robust, but can be weakened by many instruments.)


Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =    600.93                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
     Defense |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .8327499   .0831541    10.01   0.000     .6697708     .995729
Trade tax re |  -.0083141   .0169564    -0.49   0.624    -.0415481    .0249199
  GDP capita |  -.0175255   .0336422    -0.52   0.602     -.083463    .0484119
Total expend |  -.0002674   .0001635    -1.64   0.102    -.0005879     .000053
   Inflation |   .0002811   .0004173     0.67   0.501    -.0005368    .0010989
      Growth |   .0312624   .0397627     0.79   0.432    -.0466711    .1091959
Age dependen |   .0142072   .0168352     0.84   0.399    -.0187892    .0472035
       _cons |   .0105477   .0120983     0.87   0.383    -.0131645    .0342599
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -2.06  Pr > z =  0.040
Arellano-Bond test for AR(2) in first differences: z =  -1.12  Pr > z =  0.263
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   = 238.07  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  46.90  Prob > chi2 =  0.802
  (Robust, but can be weakened by many instruments.)

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
```

```
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =    428.18                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
   Pub order |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .8483531   .0957798     8.86   0.000     .6606282    1.036078
Trade tax re |   .0006057   .0085117     0.07   0.943    -.0160769    .0172884
  GDP capita |   .0044074   .0145809     0.30   0.762    -.0241707    .0329855
Total expend |  -4.10e-06    .000104    -0.04   0.969    -.0002079    .0001997
   Inflation |  -.0001239    .000177    -0.70   0.484    -.0004707     .000223
      Growth |  -.0051433   .0164733    -0.31   0.755    -.0374303    .0271437
Age dependen |  -.0124792   .0091185    -1.37   0.171    -.0303511    .0053927
       _cons |    .015888   .0112442     1.41   0.158    -.0061502    .0379262
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -2.42  Pr > z =  0.016
Arellano-Bond test for AR(2) in first differences: z =   1.04  Pr > z =  0.297
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   = 107.38  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  44.08  Prob > chi2 =  0.876
  (Robust, but can be weakened by many instruments.)

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =    904.37                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
Econ affairs |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .8474709   .0402669    21.05   0.000     .7685492    .9263926
Trade tax re |   .0050276   .0226353     0.22   0.824    -.0393368     .049392
  GDP capita |  -.0016544   .0424076    -0.04   0.969    -.0847718    .0814631
Total expend |  -.0004184   .0002782    -1.50   0.133    -.0009636    .0001268
   Inflation |   .0042469   .0004393     9.67   0.000     .0033859    .0051079
      Growth |   .0200806   .0401981     0.50   0.617    -.0587063    .0988675
Age dependen |    .037213   .0304508     1.22   0.222    -.0224695    .0968955
       _cons |   .0100438   .0206398     0.49   0.627    -.0304095    .0504971
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -3.68  Pr > z =  0.000
Arellano-Bond test for AR(2) in first differences: z =  -0.72  Pr > z =  0.469
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   =  80.34  Prob > chi2 =  0.018
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  43.54  Prob > chi2 =  0.888
  (Robust, but can be weakened by many instruments.)

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =   3180.83                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
     Housing |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .9037596   .0328235    27.53   0.000     .8394268    .9680925
Trade tax re |   .0224305   .0202807     1.11   0.269    -.0173189    .0621799
```

```
  GDP capita |    .010483   .0130752     0.80   0.423    -.0151439    .0361099
Total expend |    .000026   .0001406     0.19   0.853    -.0002496    .0003017
   Inflation |  -.0015595   .0002324    -6.71   0.000    -.0020149    -.001104
      Growth |  -.0018909   .0216644    -0.09   0.930    -.0443523    .0405706
Age dependen |   .0041043   .0057497     0.71   0.475    -.0071648    .0153734
       _cons |  -.0024277   .0068747    -0.35   0.724    -.0159019    .0110465
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -2.54  Pr > z =  0.011
Arellano-Bond test for AR(2) in first differences: z =  -0.61  Pr > z =  0.539
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   = 163.89  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  45.30  Prob > chi2 =  0.846
  (Robust, but can be weakened by many instruments.)

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =   1142.86                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
      Health |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .8750508    .061392    14.25   0.000     .7547247     .995377
Trade tax re |   .0033647   .0091004     0.37   0.712    -.0144719    .0212012
  GDP capita |   .0038588    .014282     0.27   0.787    -.0241335     .031851
Total expend |   .0003022   .0001437     2.10   0.035     .0000207    .0005838
   Inflation |   .0000129   .0001815     0.07   0.943    -.0003429    .0003686
      Growth |  -.0108303   .0148269    -0.73   0.465    -.0398905      .01823
Age dependen |  -.0078025   .0070879    -1.10   0.271    -.0216946    .0060896
       _cons |   .0064964    .007154     0.91   0.364    -.0075252     .020518
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -2.21  Pr > z =  0.027
Arellano-Bond test for AR(2) in first differences: z =   1.28  Pr > z =  0.202
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   = 105.96  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  45.24  Prob > chi2 =  0.848
  (Robust, but can be weakened by many instruments.)

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =    984.66                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
  Recreation |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .8460986   .0296606    28.53   0.000     .7879649    .9042323
Trade tax re |   .0025901   .0034613     0.75   0.454     -.004194    .0093741
  GDP capita |    .006303   .0079719     0.79   0.429    -.0093217    .0219276
Total expend |   .0000679   .0000437     1.55   0.120    -.0000178    .0001536
   Inflation |   .0002529   .0000635     3.99   0.000     .0001285    .0003773
      Growth |   .0187532   .0106979     1.75   0.080    -.0022143    .0397206
Age dependen |  -.0007536   .0022065    -0.34   0.733    -.0050783    .0035711
       _cons |   -.000454   .0013877    -0.33   0.744    -.0031738    .0022658
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -1.49  Pr > z =  0.137
Arellano-Bond test for AR(2) in first differences: z =   0.43  Pr > z =  0.670
```

```
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   = 301.53  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  45.32  Prob > chi2 =  0.846
  (Robust, but can be weakened by many instruments.)

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =   1625.77                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
   Education |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .8535791   .0549575    15.53   0.000     .7458644    .9612937
Trade tax re |   .0363731   .0158461     2.30   0.022     .0053153    .0674309
  GDP capita |   .0622093   .0239808     2.59   0.009     .0152078    .1092107
Total expend |   .0000498   .0001106     0.45   0.652    -.0001669    .0002665
   Inflation |  -.0006738   .0003962    -1.70   0.089    -.0014503    .0001028
      Growth |   .0120849   .0270131     0.45   0.655    -.0408597    .0650295
Age dependen |   .0226737   .0108629     2.09   0.037     .0013827    .0439646
       _cons |  -.0067683   .0071073    -0.95   0.341    -.0206984    .0071618
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -3.44  Pr > z =  0.001
Arellano-Bond test for AR(2) in first differences: z =   1.61  Pr > z =  0.107
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   =  67.92  Prob > chi2 =  0.132
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  43.23  Prob > chi2 =  0.894
  (Robust, but can be weakened by many instruments.)

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: cty                             Number of obs      =       439
Time variable : year                            Number of groups   =        51
Number of instruments = 64                      Obs per group: min =         3
Wald chi2(6)  =   6165.56                                      avg =      8.61
Prob > chi2   =     0.000                                      max =        16
------------------------------------------------------------------------------
             |              Corrected
Soc protect  |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Lagged Y |   .9060537   .0738813    12.26   0.000     .7612491    1.050858
Trade tax re |   .0060752    .026248     0.23   0.817    -.0453699    .0575202
  GDP capita |  -.0186947   .0465318    -0.40   0.688    -.1098954    .0725061
Total expend |    .000518   .0004688     1.11   0.269    -.0004007    .0014368
   Inflation |   .0001849   .0004967     0.37   0.710    -.0007886    .0011584
      Growth |  -.0415053    .039127    -1.06   0.289    -.1181928    .0351822
Age dependen |  -.0486025   .0337437    -1.44   0.150    -.1147388    .0175339
       _cons |   .0378058   .0312167     1.21   0.226    -.0233778    .0989893
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -3.20  Pr > z =  0.001
Arellano-Bond test for AR(2) in first differences: z =  -1.42  Pr > z =  0.155
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(56)   = 112.48  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(56)   =  44.45  Prob > chi2 =  0.867
  (Robust, but can be weakened by many instruments.)
```

Table A.6: All Countries, with Total Government Revenue (Total rev)

```
Seemingly unrelated regression
------------------------------------------------------------------------------
Equation           Obs  Parms        RMSE    "R-sq"       chi2        P
------------------------------------------------------------------------------
Pub services       439     58    .0418763    0.9015    4734.27   0.0000
Defense            439     58     .017151    0.9406    7180.74   0.0000
Pub order          439     58     .008872    0.9287    5763.38   0.0000
Econ affairs       439     58    .0294764    0.9119    5070.49   0.0000
Housing            439     58     .014572    0.8474    2588.41   0.0000
Health             439     58     .014817    0.9140    4787.31   0.0000
Recreation         439     58    .0051382    0.9123    4572.58   0.0000
Education          439     58    .0136672    0.9474    8140.17   0.0000
Soc protect        439     58    .0236786    0.9774   19268.01   0.0000
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Pub services |
    Lagged Y |   .5278294   .0175856    30.01   0.000     .4933622    .5622966
Trade tax re |  -.0622202   .0608958    -1.02   0.307    -.1815737    .0571333
  GDP capita |   .0963087   .1777894     0.54   0.588    -.2521521    .4447695
Total expend |  -.0002427   .0006486    -0.37   0.708     -.001514    .0010287
   Inflation |  -.0066803    .002489    -2.68   0.007    -.0115586    -.001802
      Growth |  -.1111137   .0476471    -2.33   0.020    -.2045003   -.0177271
Age dependen |  -.0190473     .04901    -0.39   0.698    -.1151052    .0770107
   Total rev |  -360.6915    90.3464    -3.99   0.000    -537.7672   -183.6158
       _cons |   .0849834   .0556606     1.53   0.127    -.0241093    .1940761
-------------+----------------------------------------------------------------
Defense      |
    Lagged Y |   .5436196   .0256946    21.16   0.000     .4932592      .59398
Trade tax re |   .0337722   .0250366     1.35   0.177    -.0152986     .082843
  GDP capita |   .0246355   .0729408     0.34   0.736    -.1183258    .1675968
Total expend |  -.0004969   .0002678    -1.86   0.064    -.0010218     .000028
   Inflation |   .0050223   .0010372     4.84   0.000     .0029894    .0070551
      Growth |   .0082844   .0195256     0.42   0.671    -.0299851    .0465539
Age dependen |   .0390215   .0200893     1.94   0.052    -.0003528    .0783957
   Total rev |   330.8171   37.10652     8.92   0.000     258.0897    403.5446
       _cons |   .0022931   .0229081     0.10   0.920    -.0426059    .0471921
-------------+----------------------------------------------------------------
Pub order    |
    Lagged Y |   .4182478   .0339754    12.31   0.000     .3516573    .4848383
Trade tax re |  -.0034344   .0129979    -0.26   0.792    -.0289099     .022041
  GDP capita |  -.1481551   .0381591    -3.88   0.000    -.2229457   -.0733646
Total expend |  -.0000162   .0001385    -0.12   0.907    -.0002877    .0002553
   Inflation |   .0005171   .0005313     0.97   0.330    -.0005242    .0015583
      Growth |   .0175586   .0103618     1.69   0.090    -.0027502    .0378673
Age dependen |  -.0388603   .0106987    -3.63   0.000    -.0598294   -.0178912
   Total rev |   10.40294   19.18854     0.54   0.588     -27.2059    48.01178
       _cons |   .0666254   .0122867     5.42   0.000     .0425439    .0907069
-------------+----------------------------------------------------------------
Econ affairs |
    Lagged Y |    .512443   .0191346    26.78   0.000     .4749399    .5499461
Trade tax re |   .0028629   .0427575     0.07   0.947    -.0809403    .0866661
  GDP capita |   .2000701   .1248882     1.60   0.109    -.0447063    .4448465
Total expend |  -.0001736   .0004555    -0.38   0.703    -.0010663    .0007191
   Inflation |   .0030788    .001754     1.76   0.079     -.000359    .0065165
      Growth |   .0415049   .0334389     1.24   0.215    -.0240342     .107044
Age dependen |   .0784574   .0346352     2.27   0.023     .0105737     .146341
   Total rev |   89.37373   64.67806     1.38   0.167    -37.39294    216.1404
       _cons |   -.006021    .039031    -0.15   0.877    -.0825204    .0704785
```

| | | | | | | |
|---|---|---|---|---|---|---|
| Housing | | | | | | |
| Lagged Y | .6007501 | .0279982 | 21.46 | 0.000 | .5458747 | .6556255 |
| Trade tax re | .0563635 | .0213143 | 2.64 | 0.008 | .0145883 | .0981388 |
| GDP capita | -.0305401 | .0621987 | -0.49 | 0.623 | -.1524473 | .0913672 |
| Total expend | .0005277 | .0002308 | 2.29 | 0.022 | .0000755 | .00098 |
| Inflation | -.00174 | .0008713 | -2.00 | 0.046 | -.0034478 | -.0000322 |
| Growth | .0009424 | .0166703 | 0.06 | 0.955 | -.0317308 | .0336156 |
| Age dependen | -.0174689 | .0171403 | -1.02 | 0.308 | -.0510632 | .0161254 |
| Total rev | -25.88056 | 31.45278 | -0.82 | 0.411 | -87.52687 | 35.76575 |
| _cons | .0090235 | .0194458 | 0.46 | 0.643 | -.0290895 | .0471366 |
| Health | | | | | | |
| Lagged Y | .5196236 | .0306646 | 16.95 | 0.000 | .4595221 | .5797252 |
| Trade tax re | .0126824 | .0216868 | 0.58 | 0.559 | -.0298229 | .0551877 |
| GDP capita | .0387214 | .0633166 | 0.61 | 0.541 | -.0853769 | .1628197 |
| Total expend | -.0000776 | .000231 | -0.34 | 0.737 | -.0005303 | .0003751 |
| Inflation | -.0002705 | .000886 | -0.31 | 0.760 | -.002007 | .0014661 |
| Growth | .0184526 | .0169845 | 1.09 | 0.277 | -.0148363 | .0517416 |
| Age dependen | -.0014833 | .0174584 | -0.08 | 0.932 | -.0357011 | .0327344 |
| Total rev | -13.28576 | 32.00849 | -0.42 | 0.678 | -76.02125 | 49.44973 |
| _cons | .0505727 | .0199949 | 2.53 | 0.011 | .0113834 | .0897621 |
| Recreation | | | | | | |
| Lagged Y | .4598792 | .041322 | 11.13 | 0.000 | .3788897 | .5408688 |
| Trade tax re | .0217092 | .0077839 | 2.79 | 0.005 | .0064529 | .0369654 |
| GDP capita | -.0570039 | .0229032 | -2.49 | 0.013 | -.1018934 | -.0121144 |
| Total expend | .0003765 | .0000809 | 4.65 | 0.000 | .0002179 | .0005351 |
| Inflation | .0001985 | .0003074 | 0.65 | 0.518 | -.0004039 | .000801 |
| Growth | .0278742 | .0059036 | 4.72 | 0.000 | .0163034 | .0394451 |
| Age dependen | -.01579 | .0060766 | -2.60 | 0.009 | -.0276999 | -.0038801 |
| Total rev | .7913251 | 11.12028 | 0.07 | 0.943 | -21.00403 | 22.58668 |
| _cons | .0089785 | .0069054 | 1.30 | 0.194 | -.0045557 | .0225128 |
| Education | | | | | | |
| Lagged Y | .5737993 | .0255818 | 22.43 | 0.000 | .5236599 | .6239386 |
| Trade tax re | -.0028383 | .0199879 | -0.14 | 0.887 | -.042014 | .0363373 |
| GDP capita | .0822602 | .0583949 | 1.41 | 0.159 | -.0321917 | .1967121 |
| Total expend | -.000103 | .0002136 | -0.48 | 0.630 | -.0005215 | .0003156 |
| Inflation | -.0002588 | .0008165 | -0.32 | 0.751 | -.0018592 | .0013415 |
| Growth | .0238058 | .0156238 | 1.52 | 0.128 | -.0068162 | .0544279 |
| Age dependen | .0791002 | .0164071 | 4.82 | 0.000 | .0469429 | .1112575 |
| Total rev | -17.13132 | 29.49632 | -0.58 | 0.561 | -74.94305 | 40.68041 |
| _cons | .0058632 | .0183263 | 0.32 | 0.749 | -.0300557 | .041782 |
| Soc protect | | | | | | |
| Lagged Y | .4610458 | .0217464 | 21.20 | 0.000 | .4184236 | .503668 |
| Trade tax re | -.0337602 | .0347505 | -0.97 | 0.331 | -.10187 | .0343495 |
| GDP capita | -.3490429 | .1011715 | -3.45 | 0.001 | -.5473354 | -.1507503 |
| Total expend | .0001283 | .0003705 | 0.35 | 0.729 | -.0005978 | .0008544 |
| Inflation | .0006156 | .0014154 | 0.43 | 0.664 | -.0021585 | .0033897 |
| Growth | -.0153222 | .0270718 | -0.57 | 0.571 | -.068382 | .0377375 |
| Age dependen | -.1290529 | .0282954 | -4.56 | 0.000 | -.184511 | -.0735949 |
| Total rev | 14.1313 | 51.14825 | 0.28 | 0.782 | -86.11743 | 114.38 |
| _cons | .3052471 | .0340274 | 8.97 | 0.000 | .2385547 | .3719395 |

Country fixed effects included but not reported to save on space.

Table A.7: All Countries, with Financial Controls

```
Seemingly unrelated regression
------------------------------------------------------------------------------
Equation           Obs  Parms        RMSE    "R-sq"       chi2        P
------------------------------------------------------------------------------
Pub services       341     50    .0439876    0.9015    3656.37   0.0000
Defense            341     50    .0177653    0.9054    3348.70   0.0000
Pub order          341     50    .0090906    0.8883    2729.52   0.0000
Econ affairs       341     50    .0303521    0.9151    4089.44   0.0000
Housing            341     50    .0146663    0.8635    2246.55   0.0000
Health             341     50    .0152221    0.8944    2974.22   0.0000
Recreation         341     50     .003947    0.9051    3257.01   0.0000
Education          341     50    .0130837    0.9591    8140.20   0.0000
Soc protect        341     50    .0246777    0.9765   14340.93   0.0000
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Pub services |
    Lagged Y |   .5209706   .0204522    25.47   0.000     .4808851    .5610561
Trade tax re |   .0429045   .0759957     0.56   0.572    -.1060443    .1918534
  GDP capita |   .0615012   .4068503     0.15   0.880    -.7359106    .8589131
Total expend |  -.0005339   .0007486    -0.71   0.476    -.0020011    .0009333
   Inflation |  -.0004128   .0020249    -0.20   0.838    -.0043815    .0035559
      Growth |  -.1647713   .0590082    -2.79   0.005    -.2804252   -.0491174
Age dependen |  -.0218939   .0609842    -0.36   0.720    -.1414208    .0976329
  Aid (%GNI) |   .0001882   .0009835     0.19   0.848    -.0017394    .0021158
  IBRD + IDA |  -.0036205   .0014301    -2.53   0.011    -.0064233   -.0008176
       _cons |   .1776018   .0806408     2.20   0.028     .0195486     .335655
-------------+----------------------------------------------------------------
Defense      |
    Lagged Y |   .4824781   .0321523    15.01   0.000     .4194608    .5454955
Trade tax re |   -.055917   .0311832    -1.79   0.073     -.117035    .0052009
  GDP capita |  -.0697228   .1671654    -0.42   0.677    -.3973609    .2579153
Total expend |  -.0007576   .0003097    -2.45   0.014    -.0013647   -.0001506
   Inflation |  -.0008668   .0008381    -1.03   0.301    -.0025095    .0007758
      Growth |   .0514497   .0241522     2.13   0.033     .0041123    .0987872
Age dependen |   .0507046   .0249657     2.03   0.042     .0017726    .0996366
  Aid (%GNI) |  -.0004269    .000403    -1.06   0.290    -.0012168     .000363
  IBRD + IDA |   .0015745   .0005939     2.65   0.008     .0004105    .0027385
       _cons |   .0363754   .0329766     1.10   0.270    -.0282576    .1010084
-------------+----------------------------------------------------------------
Pub order    |
    Lagged Y |   .3240501    .040864     7.93   0.000     .2439581    .4041421
Trade tax re |   .0069767   .0160048     0.44   0.663    -.0243922    .0383456
  GDP capita |  -.0687948   .0853811    -0.81   0.420    -.2361386    .0985491
Total expend |   -.000019   .0001575    -0.12   0.904    -.0003276    .0002896
   Inflation |   .0001113   .0004244     0.26   0.793    -.0007205    .0009431
      Growth |   .0317728   .0125821     2.53   0.012     .0071122    .0564333
Age dependen |  -.0447088   .0131481    -3.40   0.001    -.0704786   -.0189391
  Aid (%GNI) |   .0002923    .000207     1.41   0.158    -.0001134     .000698
  IBRD + IDA |   .0003776   .0003002     1.26   0.208    -.0002108     .000966
       _cons |   .0365522   .0225769     1.62   0.105    -.0076976     .080802
-------------+----------------------------------------------------------------
Econ affairs |
    Lagged Y |   .4912795   .0212436    23.13   0.000     .4496427    .5329162
Trade tax re |   .0068217   .0523129     0.13   0.896    -.0957097    .1093531
  GDP capita |   .1816152   .2804949     0.65   0.517    -.3681447    .7313751
Total expend |   .0004658   .0005165     0.90   0.367    -.0005465    .0014782
   Inflation |   .0010393   .0013968     0.74   0.457    -.0016983    .0037769
      Growth |   .0641619   .0406618     1.58   0.115    -.0155338    .1438576
Age dependen |    .096866   .0425955     2.27   0.023     .0133804    .1803516
```

| | | | | | | |
|---|---|---|---|---|---|---|
| Aid (%GNI) | .0009539 | .0006778 | 1.41 | 0.159 | -.0003745 | .0022824 |
| IBRD + IDA | .0011106 | .000986 | 1.13 | 0.260 | -.0008219 | .0030432 |
| _cons | -.1051413 | .0736537 | -1.43 | 0.153 | -.2494998 | .0392173 |
| Housing | | | | | | |
| Lagged Y | .6064141 | .0326323 | 18.58 | 0.000 | .542456 | .6703722 |
| Trade tax re | .0499179 | .0256155 | 1.95 | 0.051 | -.0002876 | .1001233 |
| GDP capita | -.1716848 | .1373772 | -1.25 | 0.211 | -.4409391 | .0975696 |
| Total expend | .0007071 | .000257 | 2.75 | 0.006 | .0002033 | .0012109 |
| Inflation | -.0012683 | .0006824 | -1.86 | 0.063 | -.0026058 | .0000691 |
| Growth | .0028855 | .01992 | 0.14 | 0.885 | -.0361569 | .041928 |
| Age dependen | -.0302857 | .0205704 | -1.47 | 0.141 | -.070603 | .0100317 |
| Aid (%GNI) | .0003315 | .0003319 | 1.00 | 0.318 | -.000319 | .000982 |
| IBRD + IDA | -.0000681 | .0004839 | -0.14 | 0.888 | -.0010166 | .0008804 |
| _cons | -.0044737 | .0361866 | -0.12 | 0.902 | -.0753982 | .0664507 |
| Health | | | | | | |
| Lagged Y | .5533693 | .0364603 | 15.18 | 0.000 | .4819084 | .6248303 |
| Trade tax re | .0288915 | .0266521 | 1.08 | 0.278 | -.0233457 | .0811287 |
| GDP capita | .1240838 | .1435008 | 0.86 | 0.387 | -.1571727 | .4053402 |
| Total expend | -.0000834 | .0002629 | -0.32 | 0.751 | -.0005987 | .0004319 |
| Inflation | -.0000644 | .0007092 | -0.09 | 0.928 | -.0014544 | .0013257 |
| Growth | .0365662 | .0207776 | 1.76 | 0.078 | -.0041572 | .0772897 |
| Age dependen | -.0043522 | .0214292 | -0.20 | 0.839 | -.0463527 | .0376482 |
| Aid (%GNI) | -.0002484 | .0003459 | -0.72 | 0.473 | -.0009262 | .0004295 |
| IBRD + IDA | .0000634 | .0005038 | 0.13 | 0.900 | -.0009241 | .0010509 |
| _cons | .0325998 | .0282702 | 1.15 | 0.249 | -.0228087 | .0880084 |
| Recreation | | | | | | |
| Lagged Y | .4761631 | .0461858 | 10.31 | 0.000 | .3856405 | .5666857 |
| Trade tax re | .0204585 | .0069148 | 2.96 | 0.003 | .0069057 | .0340113 |
| GDP capita | .0100889 | .0369402 | 0.27 | 0.785 | -.0623126 | .0824904 |
| Total expend | .0003471 | .0000697 | 4.98 | 0.000 | .0002106 | .0004837 |
| Inflation | .0001517 | .0001838 | 0.82 | 0.409 | -.0002087 | .000512 |
| Growth | .0181698 | .005373 | 3.38 | 0.001 | .0076388 | .0287007 |
| Age dependen | -.0133943 | .005601 | -2.39 | 0.017 | -.0243721 | -.0024165 |
| Aid (%GNI) | .00006 | .0000903 | 0.66 | 0.506 | -.000117 | .0002371 |
| IBRD + IDA | .0001173 | .0001301 | 0.90 | 0.367 | -.0001377 | .0003723 |
| _cons | .0080129 | .0045892 | 1.75 | 0.081 | -.0009818 | .0170075 |
| Education | | | | | | |
| Lagged Y | .5496928 | .0304083 | 18.08 | 0.000 | .4900937 | .6092919 |
| Trade tax re | .0131373 | .0229216 | 0.57 | 0.567 | -.0317883 | .0580629 |
| GDP capita | .3066574 | .1226672 | 2.50 | 0.012 | .0662341 | .5470806 |
| Total expend | -.0001889 | .0002278 | -0.83 | 0.407 | -.0006353 | .0002575 |
| Inflation | .0001329 | .0006095 | 0.22 | 0.827 | -.0010616 | .0013274 |
| Growth | .0051772 | .0178003 | 0.29 | 0.771 | -.0297108 | .0400652 |
| Age dependen | .0839193 | .0186197 | 4.51 | 0.000 | .0474254 | .1204132 |
| Aid (%GNI) | -.0007708 | .0002981 | -2.59 | 0.010 | -.0013552 | -.0001865 |
| IBRD + IDA | -.0005882 | .0004327 | -1.36 | 0.174 | -.0014364 | .0002599 |
| _cons | .0415203 | .0325946 | 1.27 | 0.203 | -.0223639 | .1054046 |
| Soc protect | | | | | | |
| Lagged Y | .4374776 | .0251401 | 17.40 | 0.000 | .388204 | .4867512 |
| Trade tax re | -.0854791 | .0435814 | -1.96 | 0.050 | -.170897 | -.0000612 |
| GDP capita | -.5854332 | .2316409 | -2.53 | 0.011 | -1.039441 | -.1314253 |
| Total expend | -.0001947 | .0004289 | -0.45 | 0.650 | -.0010353 | .000646 |
| Inflation | .0006486 | .0011497 | 0.56 | 0.573 | -.0016047 | .0029019 |
| Growth | -.0377202 | .033611 | -1.12 | 0.262 | -.1035966 | .0281562 |
| Age dependen | -.1541996 | .0353299 | -4.36 | 0.000 | -.2234449 | -.0849543 |
| Aid (%GNI) | .0000936 | .0005603 | 0.17 | 0.867 | -.0010045 | .0011917 |
| IBRD + IDA | .0007755 | .0008152 | 0.95 | 0.341 | -.0008222 | .0023733 |
| _cons | .329021 | .0311384 | 10.57 | 0.000 | .2679908 | .3900511 |

Country fixed effects included but not reported to save on space.

Table A.8: All Countries, with Democracy Control

```
Seemingly unrelated regression
------------------------------------------------------------------------------
Equation           Obs  Parms        RMSE    "R-sq"       chi2        P
------------------------------------------------------------------------------
Pub services       394     54    .0431154    0.9037    4357.31   0.0000
Defense            394     54    .0191676    0.9263    5117.37   0.0000
Pub order          394     54    .0085571    0.9152    4286.90   0.0000
Econ affairs       394     54      .02767    0.9087    4443.45   0.0000
Housing            394     54    .0126325    0.8481    2321.67   0.0000
Health             394     54    .0149439    0.9179    4503.89   0.0000
Recreation         394     54    .0031895    0.9319    5392.17   0.0000
Education          394     54     .013416    0.9524    8060.04   0.0000
Soc protect        394     54    .0243814    0.9755   15937.25   0.0000
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Pub services |
    Lagged Y |    .530129   .0185116    28.64   0.000      .493847    .5664111
Trade tax re |    -.05535   .0708707    -0.78   0.435    -.1942539     .083554
  GDP capita |   .1433343   .2466055     0.58   0.561    -.3400037    .6266723
Total expend |   .0003685     .00089     0.41   0.679    -.0013759    .0021129
   Inflation |  -.0000437   .0019722    -0.02   0.982    -.0039091    .0038218
      Growth |  -.0914275   .0539977    -1.69   0.090    -.1972611     .014406
Age dependen |   .0119216   .0583348     0.20   0.838    -.1024125    .1262558
      Polity |   .0035731   .0010883     3.28   0.001     .0014401    .0057062
       _cons |   .1580629   .0430034     3.68   0.000     .0737778    .2423481
-------------+----------------------------------------------------------------
Defense      |
    Lagged Y |   .5202078   .0277226    18.76   0.000     .4658726     .574543
Trade tax re |   .0189441   .0318203     0.60   0.552    -.0434225    .0813108
  GDP capita |    -.05432   .1106257    -0.49   0.623    -.2711424    .1625024
Total expend |  -.0003329   .0003981    -0.84   0.403    -.0011132    .0004473
   Inflation |  -.0010373    .000888    -1.17   0.243    -.0027777    .0007031
      Growth |   .0240715   .0241756     1.00   0.319    -.0233118    .0714548
Age dependen |   .0255218   .0261233     0.98   0.329    -.0256789    .0767225
      Polity |   .0002024   .0004869     0.42   0.678    -.0007518    .0011567
       _cons |   .0168032   .0276132     0.61   0.543    -.0373176     .070924
-------------+----------------------------------------------------------------
Pub order    |
    Lagged Y |   .4162252   .0371245    11.21   0.000     .3434626    .4889879
Trade tax re |  -.0006473   .0142665    -0.05   0.964    -.0286092    .0273146
  GDP capita |  -.1055328   .0494764    -2.13   0.033    -.2025049   -.0085608
Total expend |   -.000202    .000179    -1.13   0.259    -.0005529    .0001488
   Inflation |   .0002479   .0003945     0.63   0.530    -.0005254    .0010211
      Growth |   .0195257    .011033     1.77   0.077    -.0020986    .0411499
Age dependen |  -.0309109   .0119819    -2.58   0.010     -.054395   -.0074268
      Polity |   .0001425   .0002179     0.65   0.513    -.0002845    .0005696
       _cons |    .055804   .0130044     4.29   0.000     .0303158    .0812921
-------------+----------------------------------------------------------------
Econ affairs |
    Lagged Y |   .5257992   .0192008    27.38   0.000     .4881662    .5634321
Trade tax re |   .0342415   .0450933     0.76   0.448    -.0541397    .1226228
  GDP capita |    .066272   .1569457     0.42   0.673    -.2413359    .3738799
Total expend |  -.0007871   .0005655    -1.39   0.164    -.0018956    .0003213
   Inflation |   .0011402   .0012555     0.91   0.364    -.0013206     .003601
      Growth |   .0038723   .0343634     0.11   0.910    -.0634787    .0712233
Age dependen |   .0341556   .0372758     0.92   0.360    -.0389037     .107215
      Polity |  -.0024938   .0006937    -3.60   0.000    -.0038533   -.0011342
       _cons |   .0048184   .0271276     0.18   0.859    -.0483507    .0579875
```

| | | | | | | |
|---|---|---|---|---|---|---|
| Housing | | | | | | |
| Lagged Y | .6316676 | .0305074 | 20.71 | 0.000 | .5718743 | .6914609 |
| Trade tax re | .0186464 | .0209324 | 0.89 | 0.373 | -.0223804 | .0596732 |
| GDP capita | -.016791 | .0730683 | -0.23 | 0.818 | -.1600022 | .1264202 |
| Total expend | .0000174 | .0002627 | 0.07 | 0.947 | -.0004974 | .0005322 |
| Inflation | -.0010835 | .0005816 | -1.86 | 0.062 | -.0022235 | .0000565 |
| Growth | .013566 | .016001 | 0.85 | 0.397 | -.0177955 | .0449274 |
| Age dependen | .0165616 | .0172571 | 0.96 | 0.337 | -.0172617 | .050385 |
| Polity | -.0006249 | .0003239 | -1.93 | 0.054 | -.0012597 | 9.95e-06 |
| _cons | -.0024307 | .0183579 | -0.13 | 0.895 | -.0384116 | .0335502 |
| Health | | | | | | |
| Lagged Y | .5084286 | .0327991 | 15.50 | 0.000 | .4441435 | .5727137 |
| Trade tax re | .0330586 | .0247387 | 1.34 | 0.181 | -.0154283 | .0815456 |
| GDP capita | .0856186 | .0863124 | 0.99 | 0.321 | -.0835506 | .2547878 |
| Total expend | -.0001182 | .0003105 | -0.38 | 0.703 | -.0007269 | .0004904 |
| Inflation | -.000181 | .0006873 | -0.26 | 0.792 | -.0015281 | .0011661 |
| Growth | .0325936 | .018954 | 1.72 | 0.086 | -.0045555 | .0697427 |
| Age dependen | -.0112543 | .0204039 | -0.55 | 0.581 | -.0512452 | .0287367 |
| Polity | .0004804 | .0003809 | 1.26 | 0.207 | -.0002661 | .0012269 |
| _cons | .0259529 | .0202765 | 1.28 | 0.201 | -.0137883 | .0656941 |
| Recreation | | | | | | |
| Lagged Y | .4648031 | .0393777 | 11.80 | 0.000 | .3876242 | .5419821 |
| Trade tax re | .017579 | .0053658 | 3.28 | 0.001 | .0070623 | .0280957 |
| GDP capita | .0165434 | .0184407 | 0.90 | 0.370 | -.0195998 | .0526865 |
| Total expend | .0000949 | .0000664 | 1.43 | 0.153 | -.0000351 | .000225 |
| Inflation | .0001079 | .0001475 | 0.73 | 0.465 | -.0001812 | .000397 |
| Growth | .0071257 | .0040339 | 1.77 | 0.077 | -.0007806 | .0150319 |
| Age dependen | -.0021405 | .0043778 | -0.49 | 0.625 | -.0107208 | .0064398 |
| Polity | -.0000528 | .0000812 | -0.65 | 0.516 | -.000212 | .0001064 |
| _cons | .004401 | .0032683 | 1.35 | 0.178 | -.0020048 | .0108067 |
| Education | | | | | | |
| Lagged Y | .5718705 | .0281909 | 20.29 | 0.000 | .5166175 | .6271236 |
| Trade tax re | .0047864 | .0222205 | 0.22 | 0.829 | -.038765 | .0483379 |
| GDP capita | .127714 | .0774738 | 1.65 | 0.099 | -.0241319 | .2795598 |
| Total expend | .0002054 | .0002801 | 0.73 | 0.463 | -.0003436 | .0007544 |
| Inflation | .0001555 | .0006157 | 0.25 | 0.801 | -.0010512 | .0013623 |
| Growth | .0314314 | .0169037 | 1.86 | 0.063 | -.0016992 | .0645621 |
| Age dependen | .0776178 | .0191643 | 4.05 | 0.000 | .0400566 | .1151791 |
| Polity | -.0007168 | .0003407 | -2.10 | 0.035 | -.0013847 | -.000049 |
| _cons | -.0783462 | .0196629 | -3.98 | 0.000 | -.1168847 | -.0398077 |
| Soc protect | | | | | | |
| Lagged Y | .45716 | .0230091 | 19.87 | 0.000 | .4120629 | .502257 |
| Trade tax re | -.0517443 | .0405409 | -1.28 | 0.202 | -.131203 | .0277144 |
| GDP capita | -.4433391 | .1406027 | -3.15 | 0.002 | -.7189153 | -.1677628 |
| Total expend | .0006853 | .0005086 | 1.35 | 0.178 | -.0003115 | .0016821 |
| Inflation | .0006143 | .0011206 | 0.55 | 0.584 | -.0015821 | .0028106 |
| Growth | -.0210203 | .030786 | -0.68 | 0.495 | -.0813597 | .0393191 |
| Age dependen | -.1500516 | .0336118 | -4.46 | 0.000 | -.2159296 | -.0841737 |
| Polity | .000247 | .0006197 | 0.40 | 0.690 | -.0009675 | .0014615 |
| _cons | .2687088 | .0379201 | 7.09 | 0.000 | .1943868 | .3430309 |

Country fixed effects included but not reported to save on space.

Table A.9: All Countries, with Conflicts Controls

```
Seemingly unrelated regression
------------------------------------------------------------------------------
Equation           Obs  Parms        RMSE    "R-sq"       chi2        P
------------------------------------------------------------------------------
Pub services       344     58    .0403933    0.9008    3403.97   0.0000
Defense            344     58    .0172028    0.9431    5796.07   0.0000
Pub order          344     58    .0082819    0.9125    3599.03   0.0000
Econ affairs       344     58    .0291031    0.9226    4480.82   0.0000
Housing            344     58    .0123061    0.8803    2593.65   0.0000
Health             344     58    .0128203    0.9378    5230.25   0.0000
Recreation         344     58    .0030242    0.9430    5700.92   0.0000
Education          344     58    .0130063    0.9532    7104.67   0.0000
Soc protect        344     58    .0233027    0.9791   16259.62   0.0000
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Pub services |
    Lagged Y |   .4157401   .0221525    18.77   0.000      .372322    .4591581
Trade tax re |   .0172391   .0736517     0.23   0.815    -.1271155    .1615937
  GDP capita |   .5161103     .35639     1.45   0.148    -.1824014    1.214622
Total expend |   .0009748   .0008535     1.14   0.253    -.0006981    .0026476
   Inflation |   .0008709   .0018859     0.46   0.644    -.0028253    .0045672
      Growth |  -.0482732   .0538652    -0.90   0.370     -.153847    .0573006
Age dependen |  -.1398565   .0757047    -1.85   0.065    -.2882351    .0085221
Intersta con |  -.0007105   .0040798    -0.17   0.862    -.0087068    .0072857
Intrasta con |   .0060617   .0074811     0.81   0.418     -.008601    .0207244
       _cons |   .0266821   .0858708     0.31   0.756    -.1416215    .1949858
-------------+----------------------------------------------------------------
Defense      |
    Lagged Y |   .3959254   .0283684    13.96   0.000     .3403244    .4515264
Trade tax re |  -.0159575   .0314088    -0.51   0.611    -.0775176    .0456026
  GDP capita |   -.269743    .152719    -1.77   0.077    -.5690668    .0295808
Total expend |  -.0008617   .0003641    -2.37   0.018    -.0015754    -.000148
   Inflation |   -.001317   .0008083    -1.63   0.103    -.0029013    .0002673
      Growth |   .0222869   .0229667     0.97   0.332    -.0227271    .0673009
Age dependen |   .0710835   .0322627     2.20   0.028     .0078498    .1343172
Intersta con |   .0020036   .0017392     1.15   0.249    -.0014053    .0054124
Intrasta con |   .0146003   .0031897     4.58   0.000     .0083485     .020852
       _cons |   .0589174   .0368543     1.60   0.110    -.0133157    .1311504
-------------+----------------------------------------------------------------
Pub order    |
    Lagged Y |    .265282   .0447687     5.93   0.000     .1775369    .3530271
Trade tax re |  -.0069249    .015167    -0.46   0.648    -.0366518     .022802
  GDP capita |  -.1332199   .0733722    -1.82   0.069    -.2770268     .010587
Total expend |  -.0002699   .0001773    -1.52   0.128    -.0006175    .0000777
   Inflation |   .0002836   .0003865     0.73   0.463    -.0004738    .0010411
      Growth |   .0130132   .0112603     1.16   0.248    -.0090567     .035083
Age dependen |  -.0507951   .0160078    -3.17   0.002    -.0821698   -.0194204
Intersta con |   .0003355   .0008402     0.40   0.690    -.0013113    .0019823
Intrasta con |   .0011659   .0015413     0.76   0.449    -.0018551    .0041868
       _cons |   .0854989   .0183063     4.67   0.000     .0496192    .1213786
-------------+----------------------------------------------------------------
Econ affairs |
    Lagged Y |   .4314893   .0207516    20.79   0.000     .3908169    .4721616
Trade tax re |  -.0880543   .0523972    -1.68   0.093    -.1907509    .0146423
  GDP capita |  -.3874749   .2537247    -1.53   0.127    -.8847662    .1098163
Total expend |  -.0011924    .000605    -1.97   0.049    -.0023782   -6.66e-06
   Inflation |   .0011388    .001335     0.85   0.394    -.0014779    .0037554
      Growth |  -.0173083   .0382152    -0.45   0.651    -.0922086    .0575921
```

| | | | | | | |
|---|---|---|---|---|---|---|
| Age dependen | .1940608 | .0539993 | 3.59 | 0.000 | .0882241 | .2998975 |
| Intersta con | -.0000254 | .0028939 | -0.01 | 0.993 | -.0056974 | .0056466 |
| Intrasta con | -.0110482 | .00531 | -2.08 | 0.037 | -.0214556 | -.0006409 |
| _cons | .1007374 | .0610398 | 1.65 | 0.099 | -.0188983 | .2203731 |
| Housing | | | | | | |
| Lagged Y | .5285428 | .0319713 | 16.53 | 0.000 | .4658802 | .5912054 |
| Trade tax re | .0223116 | .0224497 | 0.99 | 0.320 | -.0216889 | .0663122 |
| GDP capita | -.2350419 | .1087559 | -2.16 | 0.031 | -.4481995 | -.0218842 |
| Total expend | -.0000641 | .0002601 | -0.25 | 0.805 | -.0005738 | .0004457 |
| Inflation | -.0012276 | .0005731 | -2.14 | 0.032 | -.0023508 | -.0001043 |
| Growth | .0027093 | .0164667 | 0.16 | 0.869 | -.0295649 | .0349835 |
| Age dependen | -.0013449 | .0230836 | -0.06 | 0.954 | -.0465878 | .043898 |
| Intersta con | .0004893 | .0012452 | 0.39 | 0.694 | -.0019512 | .0029298 |
| Intrasta con | -.0078264 | .0022877 | -3.42 | 0.001 | -.0123101 | -.0033426 |
| _cons | .0713885 | .0263521 | 2.71 | 0.007 | .0197392 | .1230377 |
| Health | | | | | | |
| Lagged Y | .4299583 | .0393984 | 10.91 | 0.000 | .3527389 | .5071776 |
| Trade tax re | .0254868 | .0234127 | 1.09 | 0.276 | -.0204012 | .0713748 |
| GDP capita | .1588422 | .1136021 | 1.40 | 0.162 | -.0638139 | .3814982 |
| Total expend | .0002315 | .0002712 | 0.85 | 0.393 | -.0003001 | .0007631 |
| Inflation | -.0000509 | .0005975 | -0.09 | 0.932 | -.0012219 | .00112 |
| Growth | .0182841 | .0171534 | 1.07 | 0.286 | -.0153359 | .051904 |
| Age dependen | .0034647 | .0240784 | 0.14 | 0.886 | -.0437281 | .0506575 |
| Intersta con | .001321 | .0012978 | 1.02 | 0.309 | -.0012227 | .0038647 |
| Intrasta con | -.0001021 | .0023923 | -0.04 | 0.966 | -.0047909 | .0045867 |
| _cons | .0209196 | .0274269 | 0.76 | 0.446 | -.0328361 | .0746754 |
| Recreation | | | | | | |
| Lagged Y | .4548687 | .0417015 | 10.91 | 0.000 | .3731352 | .5366022 |
| Trade tax re | .0203009 | .005599 | 3.63 | 0.000 | .0093271 | .0312747 |
| GDP capita | -.017451 | .026767 | -0.65 | 0.514 | -.0699134 | .0350114 |
| Total expend | .0001431 | .000064 | 2.23 | 0.025 | .0000176 | .0002686 |
| Inflation | .0001145 | .0001416 | 0.81 | 0.419 | -.000163 | .000392 |
| Growth | .0100183 | .0040466 | 2.48 | 0.013 | .0020871 | .0179495 |
| Age dependen | -.0116964 | .0057108 | -2.05 | 0.041 | -.0228894 | -.0005033 |
| Intersta con | -.0002884 | .000306 | -0.94 | 0.346 | -.0008882 | .0003114 |
| Intrasta con | -.000235 | .0005661 | -0.42 | 0.678 | -.0013445 | .0008746 |
| _cons | .010739 | .0065913 | 1.63 | 0.103 | -.0021798 | .0236577 |
| Education | | | | | | |
| Lagged Y | .4583352 | .0328147 | 13.97 | 0.000 | .3940197 | .5226508 |
| Trade tax re | .0412425 | .0237575 | 1.74 | 0.083 | -.0053214 | .0878065 |
| GDP capita | .2272612 | .1157227 | 1.96 | 0.050 | .0004488 | .4540736 |
| Total expend | .0003931 | .0002748 | 1.43 | 0.153 | -.0001456 | .0009317 |
| Inflation | -.0000326 | .0006052 | -0.05 | 0.957 | -.0012187 | .0011535 |
| Growth | .0360725 | .0173664 | 2.08 | 0.038 | .002035 | .0701099 |
| Age dependen | .07724 | .0245473 | 3.15 | 0.002 | .0291282 | .1253517 |
| Intersta con | -.001503 | .0013145 | -1.14 | 0.253 | -.0040795 | .0010734 |
| Intrasta con | -.0010444 | .0024227 | -0.43 | 0.666 | -.0057927 | .003704 |
| _cons | -.0291563 | .027679 | -1.05 | 0.292 | -.0834061 | .0250936 |
| Soc protect | | | | | | |
| Lagged Y | .3348737 | .025532 | 13.12 | 0.000 | .2848319 | .3849155 |
| Trade tax re | .0150147 | .042564 | 0.35 | 0.724 | -.0684091 | .0984386 |
| GDP capita | .0793766 | .206499 | 0.38 | 0.701 | -.3253539 | .4841072 |
| Total expend | .000329 | .0004965 | 0.66 | 0.508 | -.0006441 | .0013022 |
| Inflation | .0000694 | .0010852 | 0.06 | 0.949 | -.0020576 | .0021963 |
| Growth | -.0258492 | .0311538 | -0.83 | 0.407 | -.0869094 | .035211 |
| Intersta con | -.0027524 | .002357 | -1.17 | 0.243 | -.007372 | .0018672 |
| Intrasta con | -.0019249 | .0043235 | -0.45 | 0.656 | -.0103988 | .006549 |
| _cons | .2946875 | .0509225 | 5.79 | 0.000 | .1948812 | .3944937 |

Country fixed effects included but not reported to save on space.