

Tax Revenue Trends in Asia and Latin America: A Comparative Analysis

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Abstract

We take stock of and compare tax revenue trends in Asia and Latin America. The tax revenues to GDP ratios increased significantly in both regions in the 2000s, although they remain visibly below European levels. Our analysis portrays a complex picture of the tax collection challenges facing developing countries. Overall, there remains sizable heterogeneity in the revenue performance of developing countries, and across regions. While progress has been made, the gap between the advanced economies and developing countries suggests ample room for future fiscal developments, and for more disaggregated studies of the tax mobilization challenges facing developing countries in the aftermath of the global financial crisis.

JEL Codes

H20

Keywords

Tax, tax revenues, tax administration, Asia, Latin America

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1 Introduction

Governments play a central role in the economic growth and development of developing countries. More specifically, they often provide key services such as education and health care, and invest in vital infrastructure such as roads and power plants. Such public services and infrastructure build up a country's stock of human and physical, which are indispensable for growth and development. Public services and infrastructure require a lot of resources. Since most governments depend primarily on tax revenues for fiscal resources, tax revenues enable governments to undertake growth- and development-conducive fiscal spending. Or, equivalently, inadequate tax revenues are a major constraint to the government's capacity to foster growth and development. Therefore, tax revenue mobilization is a top-priority strategic challenge for developing regions such as Asia and Latin America.

In addition to the basic need for tax revenues to finance growth- and development-promoting fiscal expenditures, a number of sizable fiscal demands loom on the horizon. In particular, many developing countries of Asia and Latin America have joined advanced economies in the demographic transition toward older populations. Some countries, most notably China, have experienced sudden and rapid transitions, giving rise to concerns about getting old rich before getting rich. Population aging tends to increase government spending on pensions, health care, and other programs geared toward the elderly. Financing those programs will require tax revenues. Furthermore, there are other future fiscal demands, including environmental protection. In China, for example, there is a growing demand from the general public for a cleaner environment, and widespread expectations of greater government involvement in cleaning up the environment.

The deceleration of growth since the global financial crisis adversely affects tax revenue collection and thus raises further concerns about the fiscal health of developing countries. At a fundamental level, the limited institutional capacity, in particular tax administration capacity, constrains the tax revenue mobilization of developing countries in Asia, Latin America, and elsewhere. For example, weaker enforcement and widespread corruption leads to large leakages and erodes the tax base. Furthermore, the successful integration of developing countries into the global economy, associated with expanded trade and financial integration, reduced tax revenues from relatively easy to collect taxes which were widely used by developing countries – import tariffs, inflation tax, financial repression taxes, and the like [see Aizenman and Jinjarak (2009)].

Consequently, many developing countries faced the twin challenges of lower revenues from traditional tax sources and growing fiscal demands. In response, they embarked on fiscal reforms, increasing the share of new revenue sources – higher personal and corporate income taxes, sales taxes, value added taxes, and other taxes. These fiscal reforms are necessary and welcome but require large investments in improving tax administration and collection. But such investments are often challenging and difficult in countries that are characterized by high enforcement costs due to large informal sectors and other structural factors.

Against this background, we take stock of the recent patterns of tax revenue mobilization in Asia, Latin America and other regions, subject to data availability. Asia and Latin America are at broadly similar income and development levels, so a comparison of the two regions is especially significant and interesting. While the tax ratios in Asia and Latin America were significantly lower than in Europe in the 2000s, about 14%, 17% and 20%, respectively, tax revenues rose visibly in both Asia and

Latin America during that time. The deepening of tax collection in Asia and Latin America is in line with earlier studies. For example, using pre-global financial crisis (GFC) data, Aizenman and Jinjarak (2009) found a positive association between trade and financial openness and 'hard to collect' taxes, and a negative association with easy to collect taxes.

According to the public finance literature, understanding tax systems requires an understanding of their interaction with the quality of institutions and economic structure [see, for example, Auerbach et al. (2013)]. To illustrate, if a large share of the GDP is produced by a few commodity exporters, for example oil firms in oil dependent economies, tax collection can be centralized. At the same time, in any economy, the quality of institutions matters in enforcing tax payment and minimizing the leakages of taxes. For a given quality of institutions, tax collection is more challenging in countries with a large informal sector and an agricultural sector dominated by small farms.⁵ In this paper we add some controls to account for institutional quality and structural factors - government effectiveness (as a proxy for the quality of institutions), trade openness, urban population, and manufacturing value added (as a proxy for economic structure).

The rest of the paper is organized as follows. Section 2 provides a review of the relevant literature. Section 3 portrays the patterns of tax revenues in Asia, Latin America, and elsewhere in recent years. Section 4 empirically analyzes the

⁵ A recent illustration of these considerations may be Brazil: "where the state collects a hefty 36% of GDP in taxes and offers mediocre public services in return, tax-dodging is a national sport. The latest scam unearthed by police, treasury and finance-ministry sleuths sets a record. On March 26th they revealed that over the past ten years the government had been cheated of at least 5.7 billion reais (\$1.8 billion) in back taxes and fines from firms, and perhaps as much as 19 billion reais. That would be enough to pay three-quarters of the bill for last year's football World Cup. It is nearly twice the suspicious payments in a separate corruption scheme involving Petrobras, a state-controlled oil company." *Corruption in Brazil Taxmen on the take* Apr 4th 2015 , The Economist

determinants of the tax/GDP for both the whole sample of countries as well as the Asian and

2 Literature Review

More inclusive growth that benefits broader segments of the population rather than just the privileged elite has become a strategic objective of developing countries around the world, especially in largely middle-income Asia and Latin America. For example, according to ADB (2012) and Kanbur, Rhee and Zhuang (2014), while Asia has reduced poverty at unprecedented scale and speed, partly as a result of its sustained rapid growth, it now faces the problem of widening inequality in countries that collectively account for over 80% of the region's population. Consequently, there has been growing popular demand for Asian governments to leverage fiscal policy to tackle inequality [see ADB (2014)]. Relative to Asia, Latin America has much more experience in using fiscal policy to promote equity. In particular, successful cash transfer programs such as Brazil's Bolsa Familia or Mexico's Oportunidades and Progresa have helped to mitigate inequality [see Lee and Park (2014)]. Equity-promoting fiscal programs in Asia, Latin America and elsewhere – for example, public spending on education, health care, and subsidies and transfers – require plenty of fiscal resources and hence effective tax revenue mobilization.

As noted earlier, we can expect population aging to impose significant fiscal burdens on the governments of developing countries. Older populations will increase the demand for public spending on pensions, health care, and other programs that benefit the elderly. Therefore, even in developing Asia, which has more fiscal space than Latin America and other parts of the world [ADB (2014)], fiscal space today is no guarantee of fiscal space for tomorrow. For example, Lee and Mason (2014) find that Asian governments spent 2.4% of GDP on health care in 2010, but that figure is

projected to rise sharply to 7.3% by 2050. Similarly, public spending on social security and welfare is projected to escalate from 2.5% in 2010 to 6.7% in 2015. Since Latin America is also undergoing demographic transition, we can expect demographic pressures to tighten fiscal space there as well [see Lee and Park (2014)]. In both regions, population aging and other future fiscal demands such as environmental protection will render tax revenue mobilization a top priority in the coming years.

While Latin America has more experience than Asia in using fiscal policy to reduce inequalities, another group of countries – the advanced economies – have even more experience with inclusive fiscal policy. In fact, in the advanced economies, redistribution of income via progressive taxation and pro-poor public spending has long been one of the main objectives of fiscal policy. [see Heshmati, Kim, and Park (2014)] A number of studies confirm that fiscal policy had a significant pro-equity impact in advanced economies. Bastagli *et al.* (2012) found that, on average, 25 OECD countries experienced a 15% decrease in the Gini index of inequality due to taxes and transfers in 1985-2005. Seven countries saw their Gini index fall by over 20% while five others achieved around 10% decrease through the successful implementation of fiscal measures. Similarly, Joumard *et al.* (2012) found that taxes and transfers reduced disposable income gaps in OECD countries.

More broadly, the emergence of the redistributive state or welfare state in rich countries is closely related to a well-known stylized fact. The relative size of the government tends to increase as countries grow richer due to growing demand for the government to provide key services such as education and health care. For example, Mitchell (2007) documents a rise in the tax revenues to GDP ratio from 10% to 25% over time for a group of 18 OECD countries during the course of the 20th century. The tax revenue expansion was made possible by a progressive strengthening of tax

administration capacity, and hence collection and enforcement. The expansion of tax revenues was accompanied by a change in the structure of tax revenues in OECD. A common pattern has been the sharp decline in the share of trade tax in total tax revenues, and their replacement by income tax at first and subsequently by value added tax (VAT), sales taxes, and other indirect taxes.

We can expect the developing countries to follow in the footsteps of the developed countries as they grow richer and their citizens' demand for public services grow. This is especially true for largely middle-income Asia and Latin America. Their embrace of globalization – i.e. trade and financial integration – will reduce the relative importance of trade tax, inflation tax, and financial repression, and increase that of income taxes, VAT, and sales tax. Extensive structural change in the developing world will impinge on tax revenue mobilization. For example, urbanization and the decline of the informal sector will widen the tax net, and the emergence of large firms in urban areas will facilitate collection. Another conducive factor is financial sector development, which gives rise to transparent accounting procedures [Tanzi (1987, 1992), Burgess and Stern (1993)]. These developments put to the fore the key role of administrative capabilities and effectiveness in inducing tax compliance, which, in turn, is shaped by political economy factors [Cukierman, Edwards, and Tabellini (1992), Slemrod and Yitzhaki (2002)].

3 Pattern of Tax Revenue Trends in Asia, Latin America, and Other Regions

In this section, we take a look at recent tax revenue trends in Asia, Latin America, and other parts of the world. Tax statistics are drawn from two data sources: (i) Government Finance Statistics 2013 publication provides a cross section of disaggregated tax/GDP for year 2012; (ii) World Development Indicators database provides panel data of total tax/GDP for years 1993-2012. In addition, we draw a

number of economic and demographic control variables from the panel data of the World Development Indicators.

Our empirical analysis centers on tax/GDP, which is a policy outcome, and its determinants. We consider “time to prepare tax” as a proxy of tax collection and administration across countries. We note that while this variable is informative, it is not a replacement for measures of tax evasion and avoidance (see Slemrod and Yitzhaki, 2002, for a thorough discussion of these variables).

Table 1.1 shows average tax/GDP during 1993-2012 by country and region. Table 1.2 shows VAT and sales taxes rates across countries in 2015. A cross section of disaggregated tax/GDP for year 2012 is shown in Figure 1. The blue-color bars denote Asia, while red-color bars denote Latin America. Figure 1.1 shows that tax/GDP is 20 percent or below for the majority of countries in Asia and Latin America. Income tax/GDP is equal to less than 10 percent, below the level of OECD countries (Figure 1.2). The pattern is mixed for goods and services tax/GDP (Figure 1.3) and property tax/GDP (Figure 1.4). Trade tax/GDP is below 3 percent for most countries (Figure 1.5). Social contribution/GDP is clearly higher in OECD countries than elsewhere (Figure 1.6). A number of Latin American countries depend on grants and other non-standard sources of government revenue (Figures 1.7 and 1.8).

Figure 2 shows the composition of revenue collection, as share of GDP, for Asia vis-à-vis Latin America, 2012. Tax revenues include income, goods, property, and trade taxes. Income taxes include taxes on income, profits, capital gains, on individual and corporations. Goods taxes include general taxes on goods and services, and excises. Trade taxes include taxes on international trade and transactions. Social contributions include social security contributions and other social contributions. Grants include revenues from foreign governments and international

organizations. The comparison suggests that the relative share of goods taxes is higher in Latin America is higher than Asia.

Figure 3.1 shows panel data of total tax/GDP for 1993-2012 for each 5-year period. The average tax/GDP in Europe is 20 percent, higher than the rest of the world, which is 10-15 percent. For Asia and Latin America, tax/GDP is trending higher, and averaging to 14.8 percent and 17.9 percent, respectively, during the past five years. On the other hand, North America and Sub-Saharan Africa witnessed declining tax/GDP over the past decade.

Figure 3.2 shows a proxy for complexity of the tax system, average time to prepare and pay taxes, across regions. Over the past decade, tax preparation time declined in all regions. During 2008-2012, North America had the shortest time of tax preparation (155.4 hours), followed by Middle East (205.7 hours) and Europe (244.9 hours). On the other hand, tax preparation time is the longest in Latin America (383.0 hours), followed by Sub-Saharan Africa (316.6 hours) and Asia (245.4 hours).

Institutional quality varies significantly across the regions, and the differences persist over time. Figure 3.3 shows a summary index of government effectiveness, where a higher number indicates stronger government effectiveness. Government is most effective in North America, followed by Europe. On the other hand, Latin America, Asia, Middle East, and Sub-Saharan Africa have relatively much weaker institutional quality throughout the past two decades.

4 Determinants of Tax/GDP: Empirical Analysis

In this section, we report and discuss the results of our regressions that explain the tax/GDP ratio with a number of economic and demographic variables, along with institutional quality or government effectiveness.

Denoting i for country and t for period ($t=1, 2, 3$), we estimate the following equation:

$$\begin{aligned}(\text{Tax/GDP})_{it} = & a_0 + b_1(\text{Initial capita GDP})_{i0} + b_2(\text{GDP growth})_{it-1} \\ & + b_3(\text{Population growth})_{it-1} + b_4(\text{Urban population})_{it-1} \\ & + b_5(\text{Manufacturing value added})_{it-1} + b_6(\text{Openness})_{it-1} \\ & + b_7(\text{GINI index})_{it-1} + b_8(\text{Average time to prepare tax})_{it} \\ & + b_9(\text{Government effectiveness})_{it-1} \\ & + U_{it}\end{aligned}$$

where a_0 is a constant term, b 's are coefficients to be estimated, and u_{it} is an error term.

The sample period is 1993-2012. We use average 5-year panel observations: 1993-1997 ($t=0$); 1998-2002 ($t=1$); 2003-2007 ($t=2$); 2008-2012 ($t=3$). The initial capita GDP is of the 1993-1997 period ($t=0$). For the average time to prepare tax, since the data series start from 2005 and there is small year-to-year variation in each country, we use the 2005-2012 average as a control. The regression is estimated on 5-year average observations, $t=1, 2, 3$ (panel data of 3 periods per country), using ordinary least squares (OLS) estimator.

The above econometric specification is a simple one, but can provide us with useful first-order information about the determinants of tax revenue collection. Nevertheless, we take note of relevant empirical challenges, including tax composition-economic growth feedback (Acosta-Ormaechea and Yoo, 2012), non-rate tax system aspects (Robinson and Slemrod, 2012), and measurement of informal sector and threat of financial disintermediation (Gordon and Lee, 2009).

Table 2 reports our baseline regression estimates. Using the whole sample of observations, we find that initial capita GDP, openness, GINI index of inequality, and

government effectiveness are all positively associated with the level of Tax/GDP, while manufacturing value added and population growth are negatively related. With North America as a base region and controlling for other variables controlled, we find evidence of regional effects. Our econometric specification is able to explain about half of variation in the data. Our regression results suggest that there is no significant relationship between tax/GDP and a number of other variables such as higher GDP growth, larger urban population, and faster time to prepare tax.

Table 3 shows the estimates for the Asian and Latin American sub-samples. Compared to the whole-sample results, there are notable differences. More openness, lower population growth, and higher government effectiveness are associated with higher tax/GDP in Asia. On the other hand, for Latin America, lower manufacturing value added, more openness, and lower population growth are associated with higher tax/GDP. While the sub-sample regressions are able to explain more than half the variation for Latin America and almost one third for Asia, they indicate that there is no one-size-fits-all econometric specification for explaining tax/GDP collection across Asia and Latin America.

Figure 4 shows the economic significance of the coefficient estimates. The figure reports economic significance of the variables that explain tax/GDP (%). Each bar in the figure is a product of coefficient estimate of column (1) in Table 2 and the corresponding variable's sample standard deviation. The figure indicates that openness, initial GDP per capita, GINI index of inequality, and population growth are the most economically significant variable; one standard deviation increase is associated with more than 2 percent increase in tax/GDP. In order of their economic significance, a one standard deviation increase in the GINI index is positively associated with Tax/GDP collection by 2.2 percent, initial GDP per capita 2.1 percent,

population growth -2.1 percent, and openness 2.0 percent. A standard deviation increase in government effectiveness, our variable of interest and a proxy for institutional quality, is associated with 1.7 percent increase in Tax/GDP, a non-trivial relationship.

To perform a robustness check on the government effectiveness and regional influences, we add controls for share of commodity exports – i.e. ores and metals, fuels, and food – and its interaction with government effectiveness, along with interaction terms for government effectiveness and regional dummy variables. Table 4 reports the results of this exercise. In most developing countries, the exports of commodities are controlled by a state monopoly taxing exports, such as an export board, or by a large foreign multinational that is taxed by the state. This may explain some of the big values of the regional dummies in Africa and Latin America. The results suggest that the significant effect of government effectiveness on tax/GDP could partly reflect the government's control of commodity export income.

Due to data constraints, we are able to capture only a partial picture of cross-regional differences. For example, in the case of Asia, Araki and Claus (2014) find that tax collection and administration performance is influenced by institutional arrangements of tax revenue bodies, the budget and expenditure process, as well as tax audits, dispute settlement, and review systems, which vary across countries. Regional differences also depend on the political economy and its interaction with fiscal capacity. In the presence of inequality, for instance, income tax capacity is influenced by income inequality – i.e. GINI index – and the relative political power of the low-income and high-income groups (Besley and Persson, 2013). In addition, tax revenues may react to economic growth in Latin America differently than in Asia, when

there is a trade-off between growth and volatility of tax revenues (for the case of Latin America, see Fricke and Sussmuth, 2014).

5 Concluding Observations

In both Asia and Latin America, two largely middle-income regions of the developing world, the share of tax revenues in GDP has risen in recent years, for a number of reasons. Above all, as countries grow richer, the government tends to expand in response to the citizens' demand for more and better public services. Further contributing to the growth of the state in the two regions are structural changes such as population aging – which induces more public spending on health care, for instance – and widening inequality – which brings about equity-promoting expenditures such as transfers to poor households. Given the heterogeneity of both Asia and Latin America, it is difficult to make sweeping comparative generalizations. Nevertheless, Latin America collects more tax revenues than Asia, and the goods and services tax plays a bigger role. Our empirical analysis of the determinants of tax revenue performance reveals both differences and similarities between the two regions. More openness and low population growth boosts revenues in both regions, but higher government effectiveness and lower manufacturing value added does so only in Asia and Latin America, respectively.

Overall, our analysis yields a highly complex and nuanced picture of the tax revenue mobilization challenges facing developing countries at a time when many of them, especially in Asia and Latin America, face large and growing demands for fiscal spending. The tax revenue mobilization performance of developing countries is characterized by a great deal of heterogeneity. While progress has been made, the revenue gap between the OECD countries and developing countries suggests room for expanding revenues in developing countries, even though a large part of the gap

reflects the larger size of the government in richer countries. Our study also validates the key importance of government effectiveness and the quality of institutions. Adding more disaggregated controls for various dimensions of institutional quality and economic structure, which can help explain the sizable effect of continental dummies in some of our regressions, would be a valuable future research agenda.

The VAT is especially important because it can help broaden the tax base into a more comprehensive and less distortionary structure. According to Keen (2013), in both Asia and Latin America, the average central rate of the VAT increased by about 2% from 1993 to 2012, reaching about 11% and 14%, respectively. Yet the average VAT revenue to GDP rose by 2 % GDP points in Latin America, while it fell by about 1% in Asia. This remarkable gap in de facto VAT collection can probably be explained by divergent trends in the variation of the actual VAT rates across different economic sectors and VAT enforcement. But without more disaggregated data, we are simply unable to make clear inferences from the divergent trends between these two regions.⁶ Quantifying and understanding the importance of these factors in accounting for the heterogeneous tax revenue performance across different countries and regions remains an important future research agenda.

⁶ First, as the public debt/GDP of the Americas and Caribbean exceeds that of Asia/Pacific, the pressure on depending the VAT tax collection in the Americas and Caribbean may be greater than in Asia/Pacific. Second, the VAT collection efficiency, defined by the ratio of VAT revenue to aggregate consumption divided by the standard VAT rate, is affected by the economic and the political structure, as well as by the development and institutional patterns of countries. Aizenman and Jinjark (2008) found that a one standard deviation increase in urbanization, trade openness, and the share of agriculture is associated with a rise of the VAT collection efficiency by about 13%, 4%, and -5%, respectively. A one standard deviation increase in GDP/Capita is associated with a rise of the tax efficiency by about 8%. A one standard deviation increase in durability of political regime, and in the ease and fluidity of political participation, is associated with a rise of the VAT collection efficiency by about 3% and 4%, respectively. Qualitatively identical results apply for an alternative measure of VAT collection efficiency, defined by the ratio of VAT revenue to GDP divided by the standard VAT.

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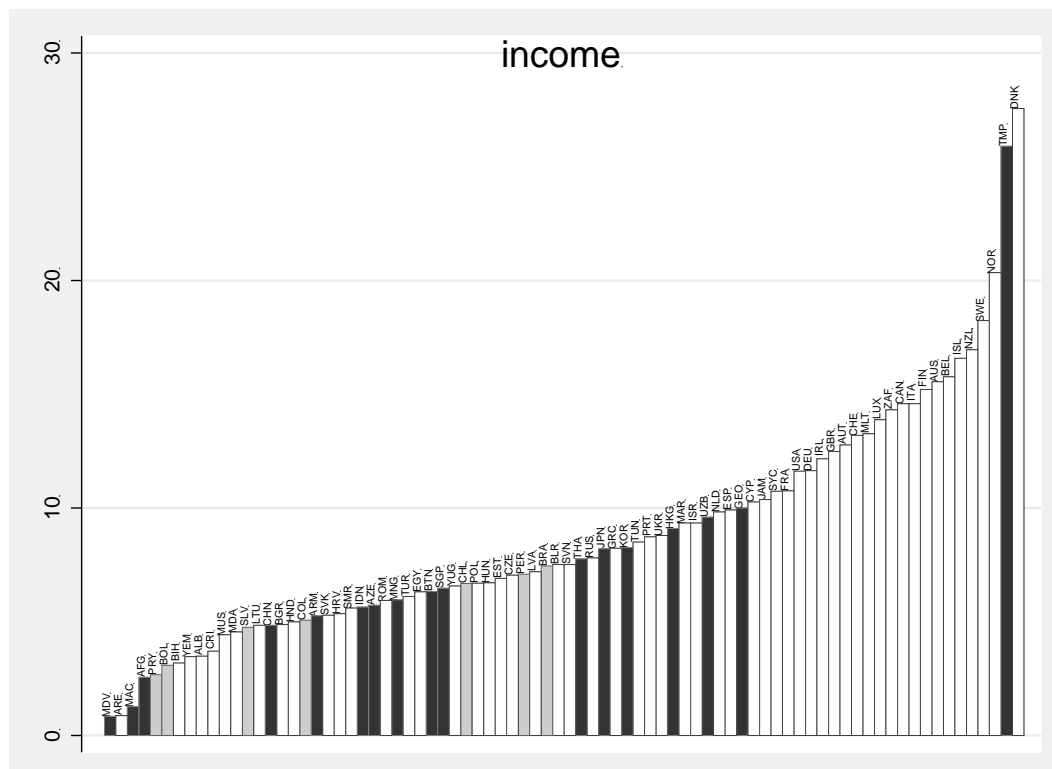
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Figure 1.2: Tax Revenue as % of GDP – Income Taxes, 2012.

Income taxes include taxes on income, profits, capital gains, on individual and corporations.

Source: Government Finance Statistics.

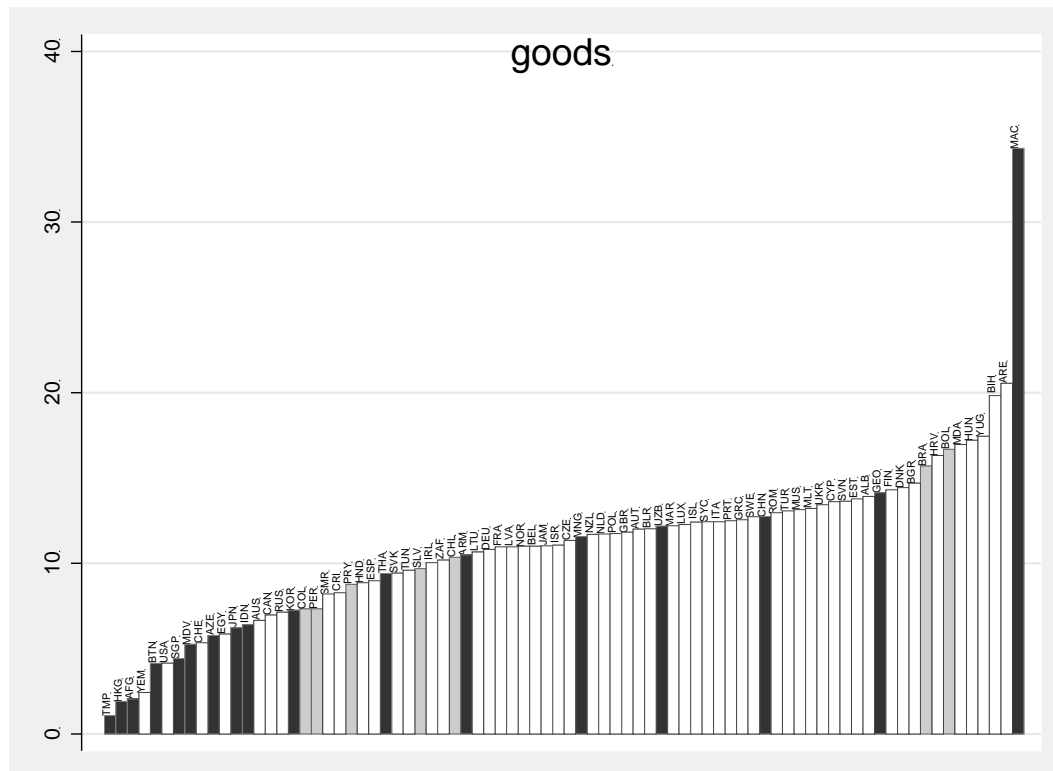


Note: AFG:Afghanistan, ALB:Albania, ARE:United Arab Emirates, ARM:Armenia, AUS:Australia, AUT:Austria, AZE:Azerbaijan, BEL:Belgium, BGR:Bulgaria, BIH:Bosnia and Herzegovina, BLR:Belarus, BOL:Bolivia, BRA:Brazil, BTN:Bhutan, CAN:Canada, CHE:Switzerland, CHL:Chile, CHN:China, COL:Colombia, CRI:Costa Rica, CYP:Cyprus, CZE:Czech Republic, DEU:Germany, DNK:Denmark, EGY:Egypt, ESP:Spain, EST:Estonia, FIN:Finland, FRA:France, GBR:United Kingdom, GEO:Georgia, GRC:Greece, HKG:Hong Kong SAR, China, HND:Honduras, HRV:Croatia, HUN:Hungary, IDN:Indonesia, IRL:Ireland, ISL:Iceland, ISR:Israel, ITA:Italy, JAM:Jamaica, JPN:Japan, KOR:Korea, LTU:Lithuania, LUX:Luxembourg, LVA:Latvia, MAC:Macao SAR, China, MAR:Morocco, MDA:Moldova, MDV:Maldives, MLT:Malta, MNG:Mongolia, MUS:Mauritius, NLD:Netherlands, NOR:Norway, NZL:New Zealand, PER:Peru, POL:Poland, PRT:Portugal, PRY:Paraguay, ROM:Romania, RUS:Russia, SGP:Singapore, SLV:El Salvador, SMR:San Marino, SVK:Slovak Republic, SVN:Slovenia, SWE:Sweden, SYC:Seychelles, THA:Thailand, TMP:Timor-Leste, TUN:Tunisia, TUR:Turkey, UKR:Ukraine, USA:United States, UZB:Uzbekistan, YEM:Yemen, YUG:Serbia, ZAF:South Africa.

Figure 1.3: Tax Revenue as % of GDP – Goods Taxes, 2012.

Goods taxes include general taxes on goods and services, and excises.

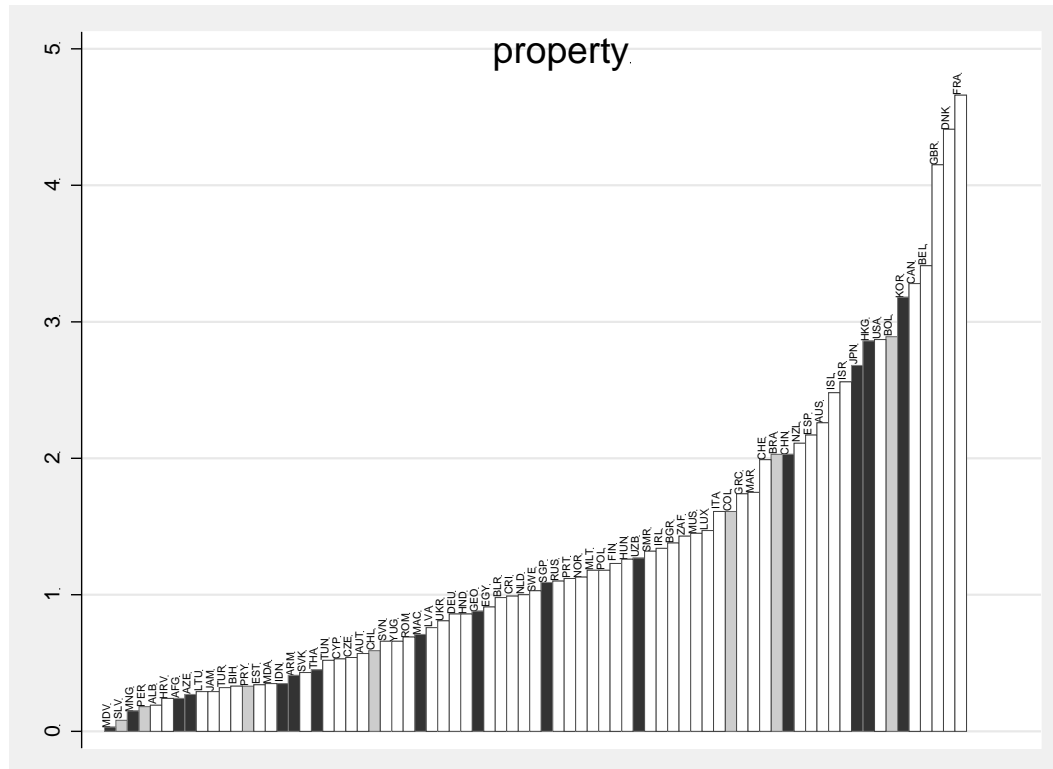
Source: Government Finance Statistics.



Note: AFG:Afghanistan, ALB:Albania, ARE:United Arab Emirates, ARM:Armenia, AUS:Australia, AUT:Austria, AZE:Azerbaijan, BEL:Belgium, BGR:Bulgaria, BIH:Bosnia and Herzegovina, BLR:Belarus, BOL:Bolivia, BRA:Brazil, BTN:Bhutan, CAN:Canada, CHE:Switzerland, CHL:Chile, CHN:China, COL:Colombia, CRI:Costa Rica, CYP:Cyprus, CZE:Czech Republic, DEU:Germany, DNK:Denmark, EGY:Egypt, ESP:Spain, EST:Estonia, FIN:Finland, FRA:France, GBR:United Kingdom, GEO:Georgia, GRC:Greece, HKG:Hong Kong SAR, China, HND:Honduras, HRV:Croatia, HUN:Hungary, IDN:Indonesia, IRL:Ireland, ISL:Iceland, ISR:Israel, ITA:Italy, JAM:Jamaica, JPN:Japan, KOR:Korea, LTU:Lithuania, LUX:Luxembourg, LVA:Latvia, MAC:Macao SAR, China, MAR:Morocco, MDA:Moldova, MDV:Maldives, MLT:Malta, MNG:Mongolia, MUS:Mauritius, NLD:Netherlands, NOR:Norway, NZL:New Zealand, PER:Peru, POL:Poland, PRT:Portugal, PRY:Paraguay, ROM:Romania, RUS:Russia, SGP:Singapore, SLV:El Salvador, SMR:San Marino, SVK:Slovak Republic, SVN:Slovenia, SWE:Sweden, SYC:Seychelles, THA:Thailand, TMP:Timor-Leste, TUN:Tunisia, TUR:Turkey, UKR:Ukraine, USA:United States, UZB:Uzbekistan, YEM:Yemen, YUG:Serbia, ZAF:South Africa.

Figure 1.4: Tax Revenue as % of GDP – Property Taxes, 2012.

Source: Government Finance Statistics.

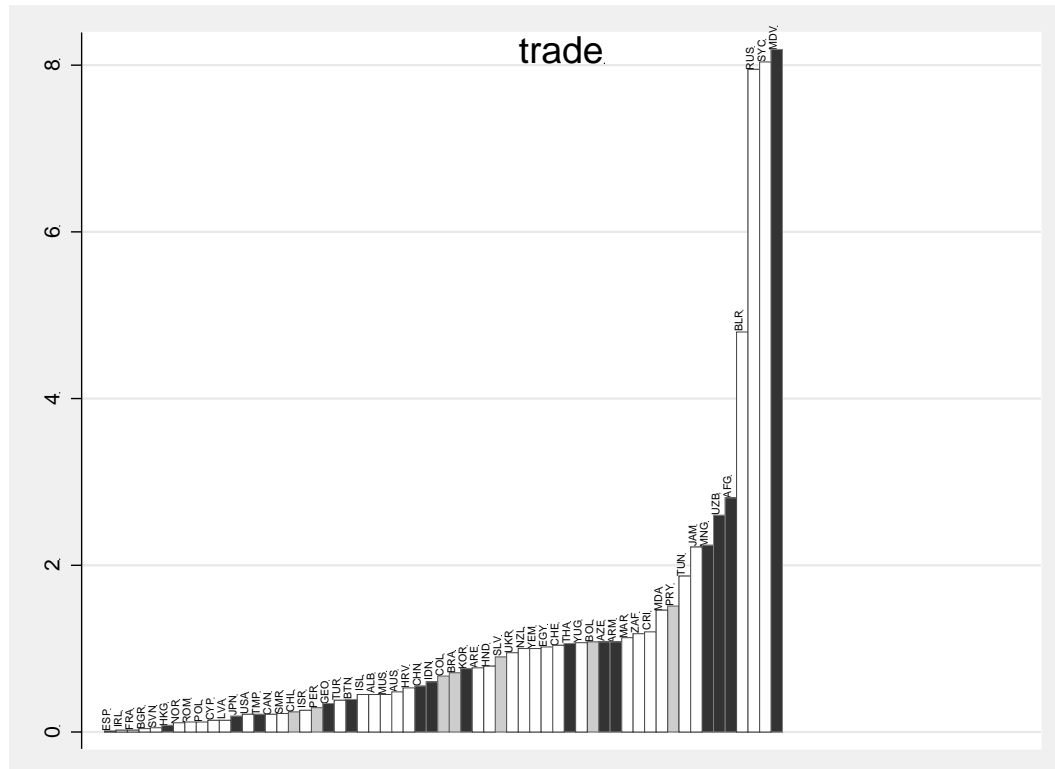


Note: AFG:Afghanistan, ALB:Albania, ARE:United Arab Emirates, ARM:Armenia, AUS:Australia, AUT:Austria, AZE:Azerbaijan, BEL:Belgium, BGR:Bulgaria, BIH:Bosnia and Herzegovina, BLR:Belarus, BOL:Bolivia, BRA:Brazil, BTN:Bhutan, CAN:Canada, CHE:Switzerland, CHL:Chile, CHN:China, COL:Colombia, CRI:Costa Rica, CYP:Cyprus, CZE:Czech Republic, DEU:Germany, DNK:Denmark, EGY:Egypt, ESP:Spain, EST:Estonia, FIN:Finland, FRA:France, GBR:United Kingdom, GEO:Georgia, GRC:Greece, HKG:Hong Kong SAR, China, HND:Honduras, HRV:Croatia, HUN:Hungary, IDN:Indonesia, IRL:Ireland, ISL:Iceland, ISR:Israel, ITA:Italy, JAM:Jamaica, JPN:Japan, KOR:Korea, LTU:Lithuania, LUX:Luxembourg, LVA:Latvia, MAC:Macao SAR, China, MAR:Morocco, MDA:Moldova, MDV:Maldives, MLT:Malta, MNG:Mongolia, MUS:Mauritius, NLD:Netherlands, NOR:Norway, NZL:New Zealand, PER:Peru, POL:Poland, PRT:Portugal, PRY:Paraguay, ROM:Romania, RUS:Russia, SGP:Singapore, SLV:El Salvador, SMR:San Marino, SVK:Slovak Republic, SVN:Slovenia, SWE:Sweden, SYC:Seychelles, THA:Thailand, TMP:Timor-Leste, TUN:Tunisia, TUR:Turkey, UKR:Ukraine, USA:United States, UZB:Uzbekistan, YEM:Yemen, YUG:Serbia, ZAF:South Africa.

Figure 1.5: Government Revenue as % of GDP – Trade Taxes, 2012.

Trade taxes include taxes on international trade and transactions.

Source: Government Finance Statistics.

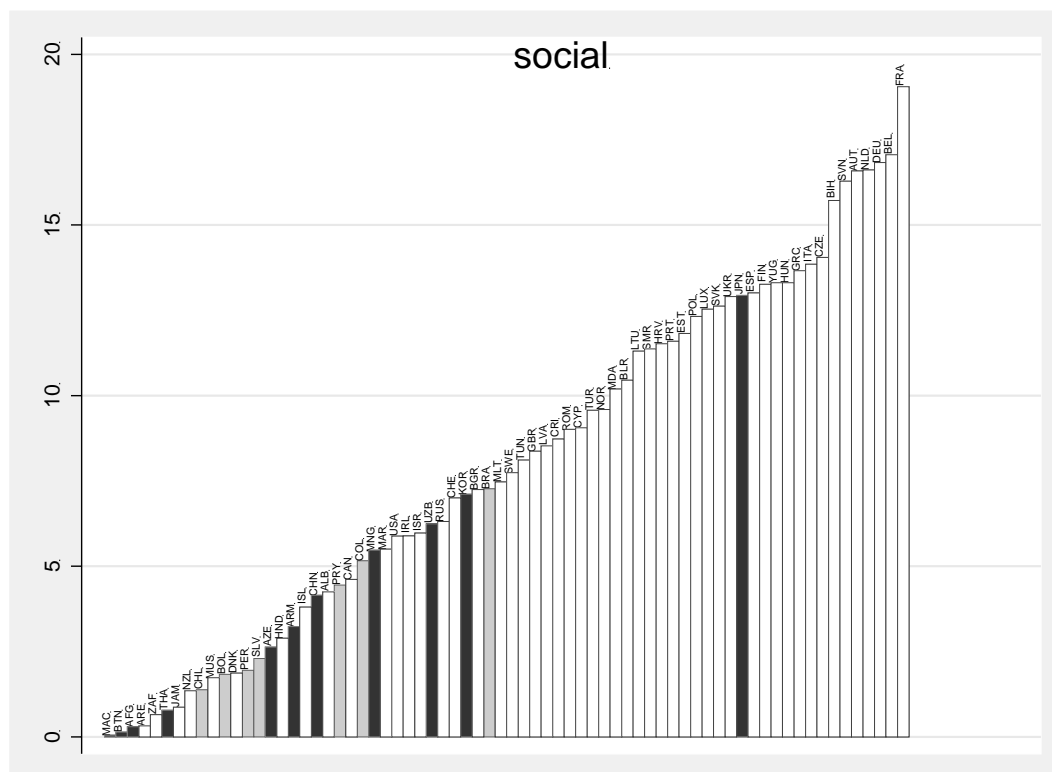


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Figure 1.6: Government Revenue as % of GDP – Social Contribution, 2012.

Social contributions include social security contributions and other social contributions.

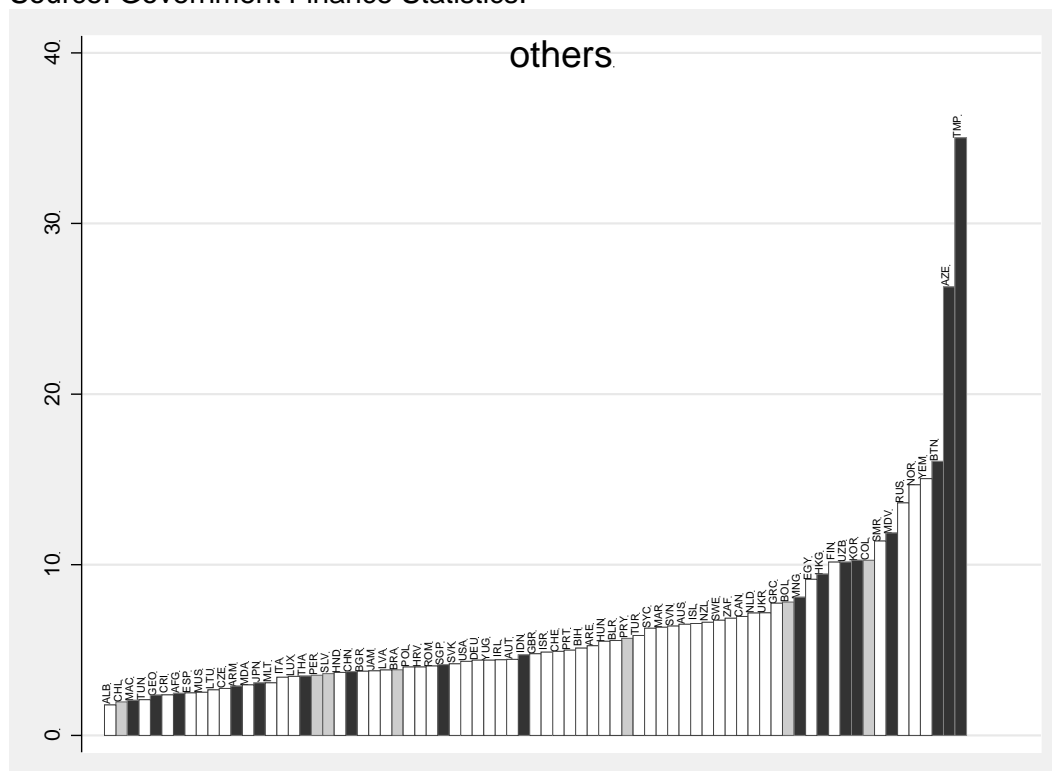
Source: Government Finance Statistics.



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Figure 1.8: Government Revenue as % of GDP – Others, 2012.

Source: Government Finance Statistics.



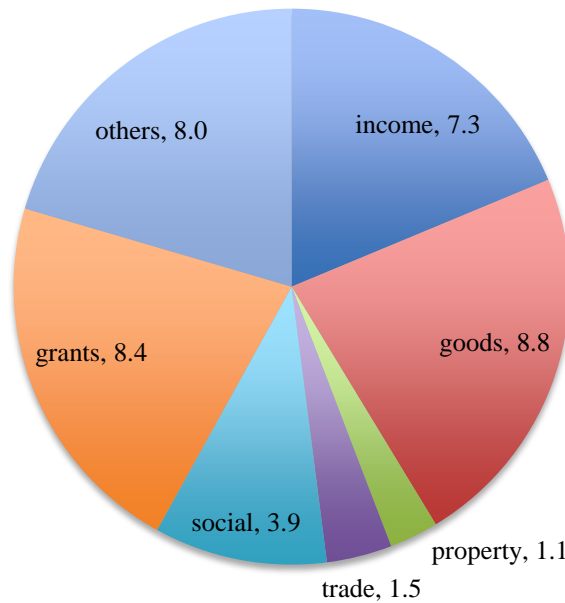
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Figure 2: Composition of Revenue Collection (% of GDP), Asia v. Latin America, 2012. Tax revenues include income, goods, property, and trade taxes. Income taxes include taxes on income, profits, capital gains, on individual and corporations. Goods taxes include general taxes on goods and services, and excises. Trade taxes include taxes on international trade and transactions. Social contributions include social security contributions and other social contributions. Grants include revenues from foreign governments and international organizations.

Source: Government Finance Statistics.

2.1 Asia

(average total tax and other revenue collection = 38.9% of GDP)



2.2 Latin America

(average total tax and other revenue collection = 29.0% of GDP)

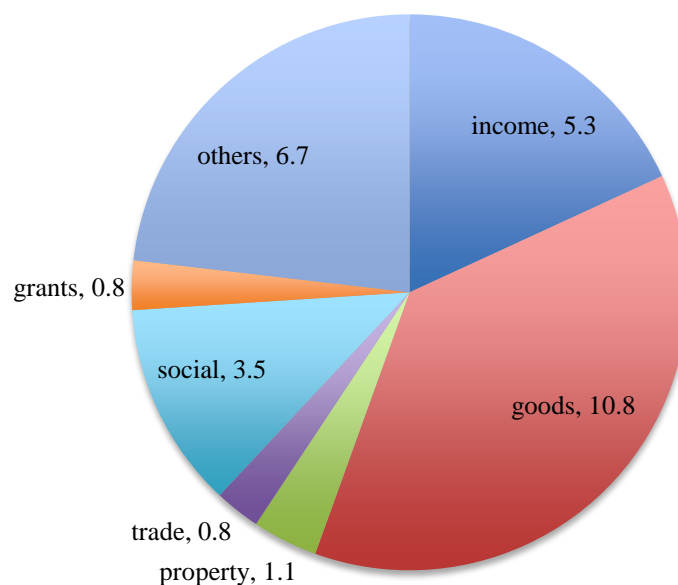


Figure 3.1: Average Tax Revenue as % of GDP.

Source: World Development Indicators.

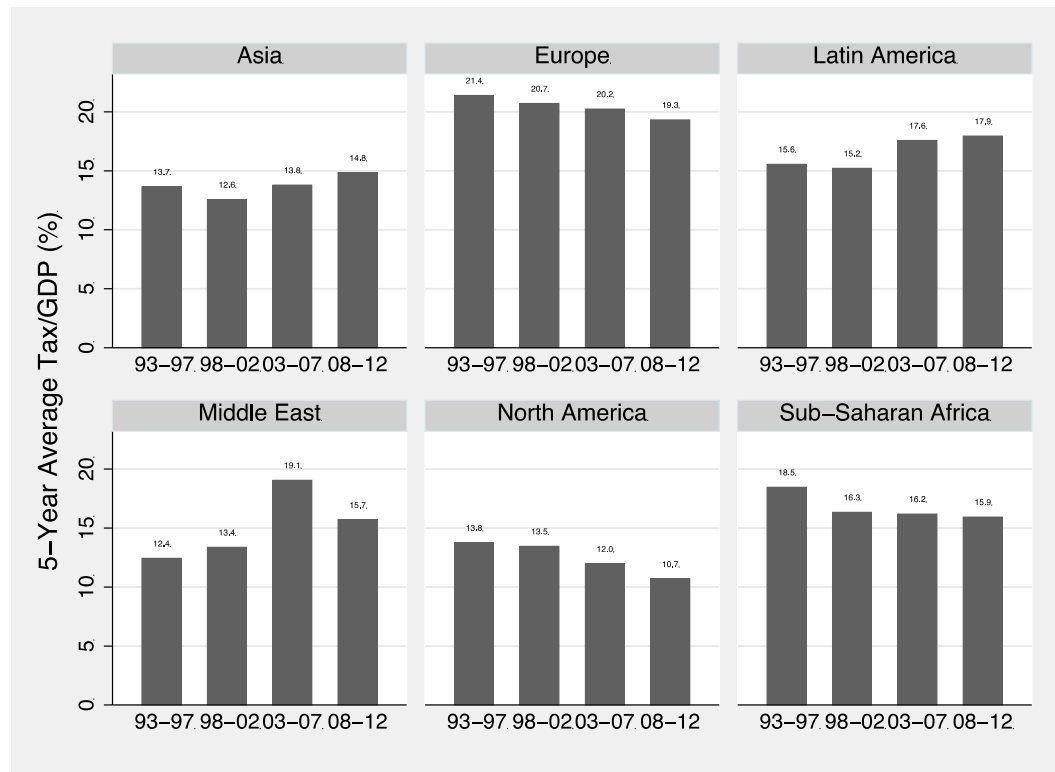


Figure 3.2: Average Time to Prepare and Pay Taxes (Hours).

Source: World Development Indicators.

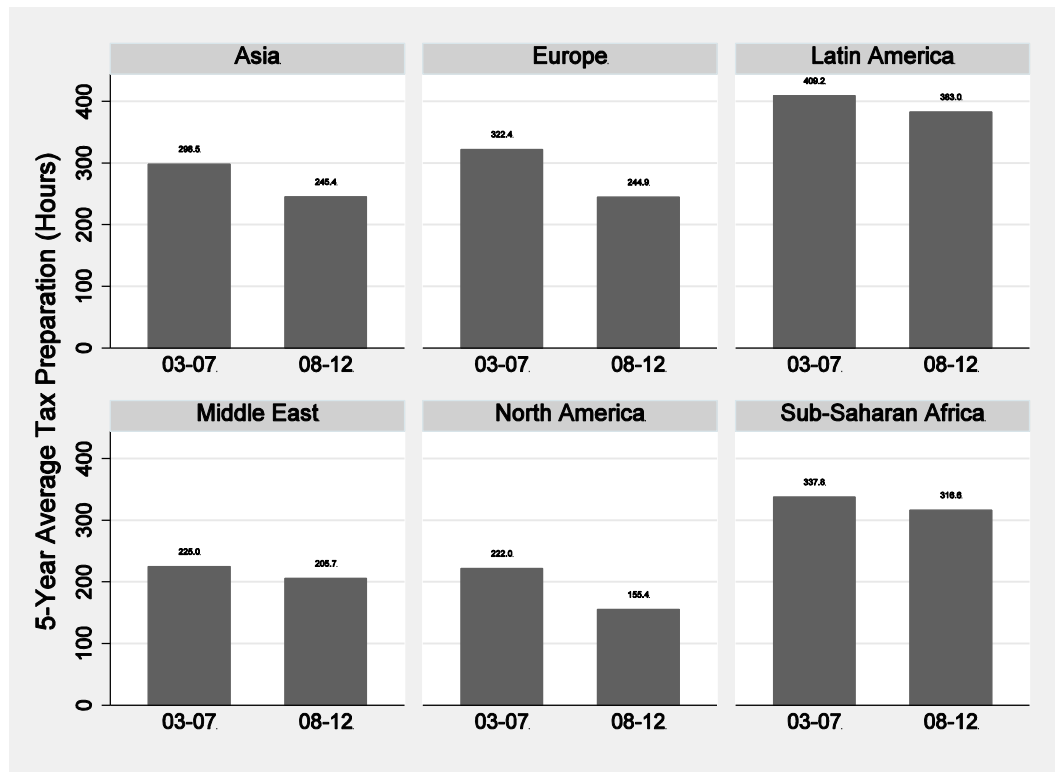


Figure 3.3: Average Government Effectiveness Scores.

Source: Worldwide Governance Indicators (WGI)

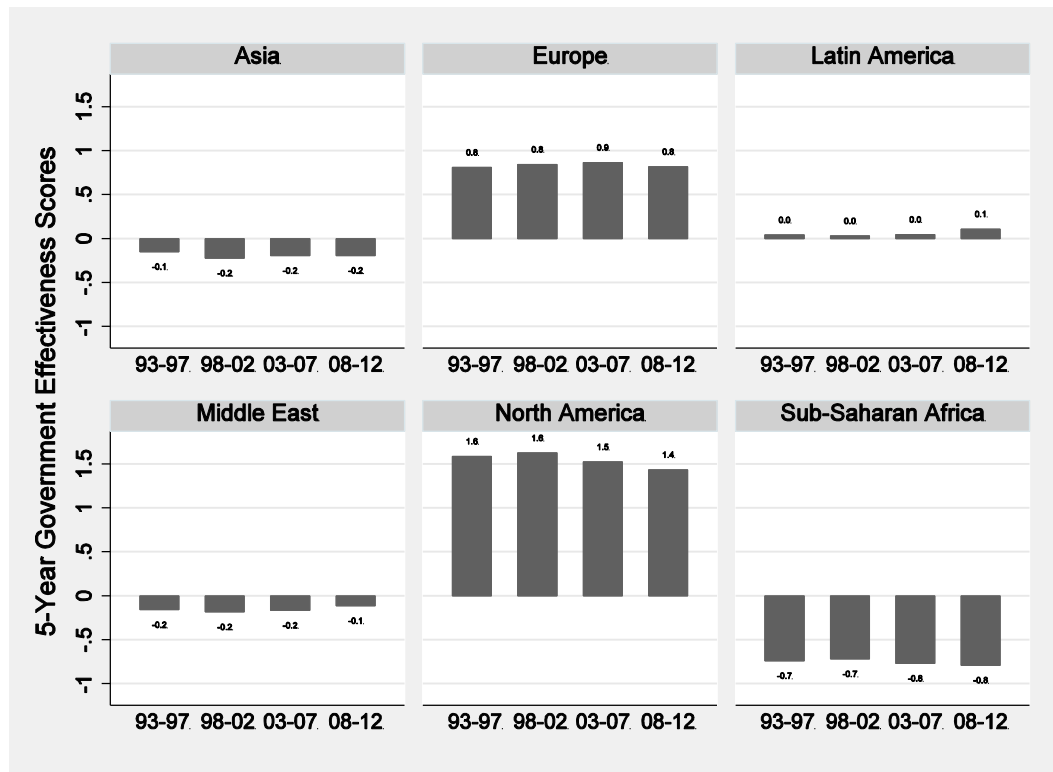


Figure 4: Economic Significance.

This figure reports economic significance of explanatory variables on Tax/GDP (%). Each bar is a product of coefficient estimate of column (1) in Table 2 and standard deviation of variable.

Source: Authors' calculation.

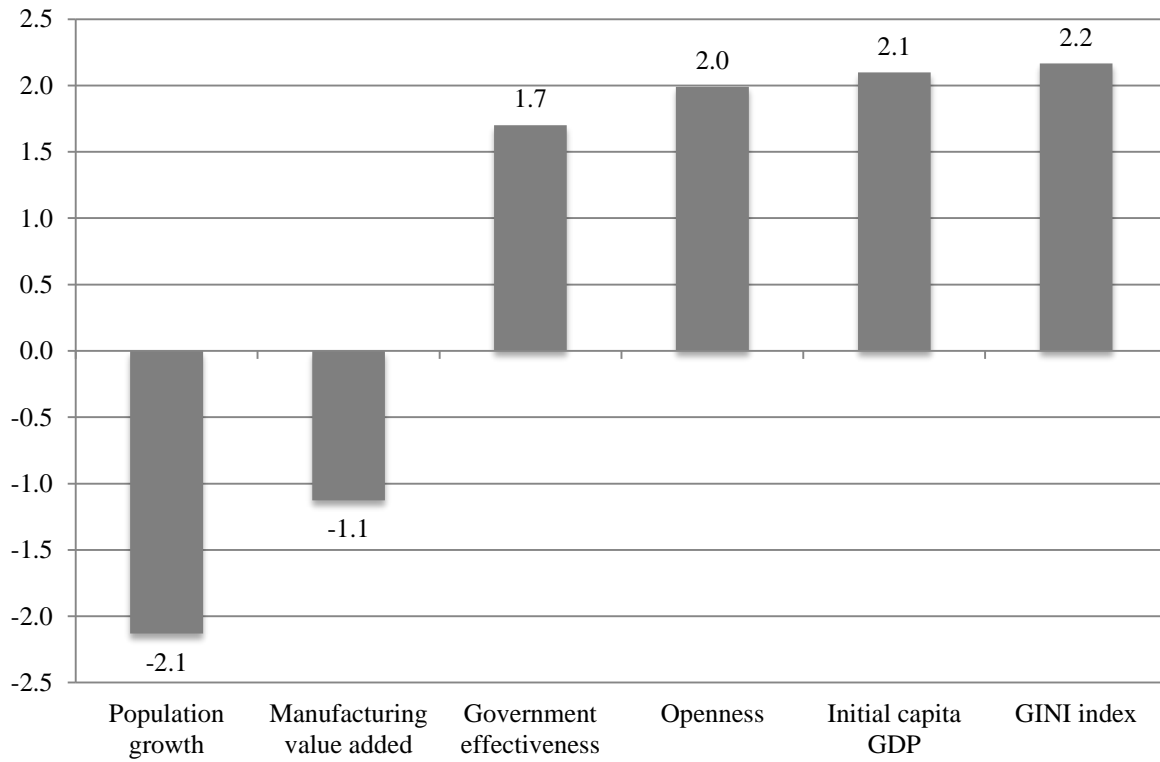


Table 1.1: Average Tax/GDP (%), 1993-2012, by Country and Region in the Sample.
Source: World Development Indicators.

Country	code	Tax/GDP region	Country	code	Tax/GDP region
Afghanistan	AFG	7.4 Asia	Argentina	ARG	11.4 Latin America
Armenia	ARM	15.9 Asia	Antigua and Barb	BATG	17.4 Latin America
Australia	AUS	23.2 Asia	Bahamas, The	BHS	14.2 Latin America
Azerbaijan	AZE	14.3 Asia	Belize	BLZ	20.4 Latin America
Bangladesh	BGD	7.8 Asia	Bolivia	BOL	15.2 Latin America
Bhutan	BTN	8.0 Asia	Brazil	BRA	14.4 Latin America
China	CHN	10.0 Asia	Barbados	BRB	25.7 Latin America
Fiji	FJI	21.9 Asia	Chile	CHL	17.6 Latin America
Georgia	GEO	14.1 Asia	Colombia	COL	12.8 Latin America
Hong Kong S.A.R.	HKG	11.9 Asia	Costa Rica	CRI	14.1 Latin America
Indonesia	IDN	13.4 Asia	Dominica	DMA	21.7 Latin America
India	IND	9.4 Asia	Dominican Republic	DOM	13.6 Latin America
Japan	JPN	9.9 Asia	Ecuador	ECU	22.2 Latin America
Kazakhstan	KAZ	10.1 Asia	Grenada	GRD	19.6 Latin America
Kyrgyz Republic	KGZ	14.5 Asia	Guatemala	GTM	10.2 Latin America
Cambodia	KHM	9.2 Asia	Honduras	HND	14.9 Latin America
Kiribati	KIR	16.2 Asia	Jamaica	JAM	26.2 Latin America
Korea, Rep.	KOR	13.8 Asia	St. Kitts and Nevis	KN	19.8 Latin America
Lao PDR	LAO	12.6 Asia	St. Lucia	LCA	22.9 Latin America
Sri Lanka	LKA	14.5 Asia	Mexico	MEX	9.0 Latin America
Macao SAR, China	MAC	23.3 Asia	Nicaragua	NIC	12.2 Latin America
Maldives	MDV	13.0 Asia	Panama	PAN	11.3 Latin America
Myanmar	MMR	3.3 Asia	Peru	PER	14.4 Latin America
Mongolia	MNG	16.1 Asia	Paraguay	PRY	11.3 Latin America
Malaysia	MYS	15.8 Asia	El Salvador	SLV	12.9 Latin America
Nepal	NPL	9.6 Asia	Suriname	SUR	19.7 Latin America
New Zealand	NZL	29.9 Asia	Trinidad and Tobago	TT	24.7 Latin America
Pakistan	PAK	10.9 Asia	Uruguay	URY	17.7 Latin America
Philippines	PHL	13.7 Asia	St. Vincent and the Grenadines	VC	22.6 Latin America
Papua New Guinea	PG	21.3 Asia	Venezuela, Republic of	VE	13.4 Latin America
Singapore	SGP	13.9 Asia	United Arab Emirates	ARE	0.3 Middle East
Thailand	THA	16.3 Asia	Bahrain	BHR	1.2 Middle East
Tajikistan	TJK	8.6 Asia	Algeria	DZA	38.4 Middle East
Vanuatu	VUT	17.6 Asia	Egypt, Arab Republic of	EGY	15.4 Middle East
Samoa	WSM	0.0 Asia	Iran, Islamic Republic of	IR	7.2 Middle East
Albania	ALB	13.9 Europe	Israel	ISR	24.8 Middle East
Austria	AUT	19.2 Europe	Jordan	JOR	19.4 Middle East
Belgium	BEL	25.2 Europe	Kuwait	KWT	1.1 Middle East
Bulgaria	BGR	18.8 Europe	Lebanon	LBN	15.2 Middle East
Bosnia and Herzegovina	BIH	20.5 Europe	Morocco	MAR	22.9 Middle East
Belarus	BLR	19.2 Europe	Malta	MLT	44.3 Middle East
Switzerland	CHE	9.5 Europe	Oman	OMN	4.0 Middle East
Cyprus	CYP	42.8 Europe	Qatar	QAT	19.6 Middle East
Czech Republic	CZE	14.5 Europe	Syrian Arab Republic	SYR	16.7 Middle East
Germany	DEU	10.8 Europe	Tunisia	TUN	19.7 Middle East
Denmark	DNK	31.5 Europe	West Bank and Gaza	WB	4.9 Middle East
Spain	ESP	12.8 Europe	Yemen, Republic of	YEM	9.8 Middle East
Estonia	EST	16.7 Europe	Angola	AGO	26.3 Sub-Saharan Africa
Finland	FIN	21.1 Europe	Burundi	BDI	14.3 Sub-Saharan Africa
France	FRA	21.1 Europe	Benin	BEN	16.0 Sub-Saharan Africa
United Kingdom	GBR	25.9 Europe	Burkina Faso	BFA	12.5 Sub-Saharan Africa
Greece	GRC	19.9 Europe	Botswana	BWA	23.2 Sub-Saharan Africa
Croatia	HRV	20.9 Europe	Central Africa	CAF	8.7 Sub-Saharan Africa
Hungary	HUN	21.7 Europe	Cote d'Ivoire	CIV	14.3 Sub-Saharan Africa
Ireland	IRL	24.9 Europe	Cameroon	CMR	9.3 Sub-Saharan Africa
Iceland	ISL	23.9 Europe	Congo, Republic of	CG	7.3 Sub-Saharan Africa
Italy	ITA	22.1 Europe	Cabo Verde	CPV	20.1 Sub-Saharan Africa
Lithuania	LTU	15.7 Europe	Ethiopia	ETH	8.7 Sub-Saharan Africa
Luxembourg	LUX	24.9 Europe	Ghana	GHA	15.9 Sub-Saharan Africa
Latvia	LVA	14.5 Europe	Guinea	GIN	10.8 Sub-Saharan Africa
Moldova	MDA	16.9 Europe	Gambia, The	GMB	9.1 Sub-Saharan Africa
Macedonia, Former Yugoslav Republic of	MKD	18.1 Europe	Equatorial Guinea	GNQ	13.4 Sub-Saharan Africa
Netherlands	NLD	21.0 Europe	Kenya	KEN	16.3 Sub-Saharan Africa
Norway	NOR	27.7 Europe	Liberia	LBR	17.3 Sub-Saharan Africa
Poland	POL	16.8 Europe	Lesotho	LSO	45.4 Sub-Saharan Africa
Portugal	PRT	20.1 Europe	Madagascar	MDG	10.3 Sub-Saharan Africa
Romania	ROM	14.4 Europe	Mali	MLI	14.5 Sub-Saharan Africa
Russian Federation	RUS	14.7 Europe	Mozambique	MOZ	18.5 Sub-Saharan Africa
San Marino	SMR	22.2 Europe	Mauritius	MUS	18.7 Sub-Saharan Africa
Serbia	SRB	21.3 Europe	Namibia	NAM	26.1 Sub-Saharan Africa
Slovak Republic	SVK	13.7 Europe	Niger	NER	10.7 Sub-Saharan Africa
Slovenia	SVN	19.4 Europe	Nigeria	NGA	2.8 Sub-Saharan Africa
Sweden	SWE	20.9 Europe	Rwanda	RWA	12.8 Sub-Saharan Africa
Turkey	TUR	19.7 Europe	Sudan	SDN	6.3 Sub-Saharan Africa
Ukraine	UKR	15.5 Europe	Senegal	SEN	18.7 Sub-Saharan Africa
Canada	CAN	13.4 North America	Sierra Leone	SLE	9.1 Sub-Saharan Africa
United States	USA	10.2 North America	Sao Tome and Principe	STP	13.9 Sub-Saharan Africa
			Seychelles	SYC	27.7 Sub-Saharan Africa
			Togo	TGO	15.4 Sub-Saharan Africa
			Tanzania	TZA	12.0 Sub-Saharan Africa
			Uganda	UGA	11.3 Sub-Saharan Africa
			South Africa	ZAF	25.0 Sub-Saharan Africa
			Congo, Democratic Republic of the	ZAR	5.1 Sub-Saharan Africa
			Zambia	ZMB	15.2 Sub-Saharan Africa
			Zimbabwe	ZWE	22.9 Sub-Saharan Africa

Table 1.2: VAT and Sales Tax Rates.
Source: Ernst & Young 2015 Worldwide Tax Guide.

Country	Standard rate	Other rates	Country	Standard rate	Other rates
Albania	20%	0%	Latvia	21%	12%, 0%
Argentina	21%	10.5%, 0%	Lebanon	10%	0%
Armenia	20%	0%	Lithuania	21%	9%, 5%, 0%
Aruba	1.50%	NA	Luxembourg	17%	14%, 8%, 3%
Australia	10%	0%	Macedonia	18%	5%, 0%
Austria	20%	12%, 10%	Madagascar	20%	0%
Azerbaijan	18%	0%	Malaysia	6%	0%
Bahamas	7.50%	0%	Malta	18%	7%, 5%
Barbados	17.50%	7.5%, 0%	Mauritius	15%	0%
Belarus	20%	10%, 0%	Mexico	16%	0%
Belgium	21%	12%, 6%, 0%	Moldova	20%	8%, 0%
	Nominal: 13%		Mongolia	10%	0%
Bolivia	Effective: 14.94%	0%	Morocco	20%	14%, 10%, 7%
	Goods: 8%			Goods: 5%	
Bonaire, Sint Eustatius and Saba	Services: 6%	18%, 10%, 7%, 5%, 0%	Myanmar	Services: 5%–100%	NA
Botswana	12%	0%	Namibia	15%	0%
	IPI: 0%–365%		Netherlands	21%	6%, 0%
	ICMS: 0%–35%		New Zealand	15%	0%
	ISS: 0%–5%		Nicaragua	15%	0%
	PIS-PASEP: 0.65%,		Nigeria	5%	0%
	1.65%		Norway	25%	15%, 8%, 0%
Brazil	COFINS: 3%, 7.65%	NA		Goods: 17%	
Bulgaria	20%	9%, 0%	Pakistan	Services: 16%, 3, 5%, 4%, 2%, 1%, 0%	
	GST: 5%		Panama	7%	15%, 10%
Canada	HST: 9.975%–15%	0%	Papua New Guinea	10%	0%
Chile	19%	15%–50%	Paraguay	10%	5%
China	17%	13%, 11%, 6%, 3%	Peru	18%	0%
Colombia	16%	5%, 0%	Philippines	12%	0%
Costa Rica	13%	10%, 5%, 0%	Poland	23%	8%, 5%, 0%
Croatia	25%	13%, 5%	Portugal	23%	13%, 6%
Curacao	6%	9%, 7%	Puerto Rico	7%	0%
Cyprus	19%	9%, 5%, 0%	Romania	24%	9%, 5%
Czech Republic	21%	15%, 10%, 0%	Russian Federation	18%	10%, 0%
Denmark	25%	0%	Rwanda	18%	0%
Dominican Republic	18%	13%, 0%	Saint Lucia	15%	9.5%, 0%
Ecuador	12%	0%	Serbia	20%	10%, 0%
Egypt	10%	1.2%–45%	Seychelles	15%	0%
El Salvador	13%	0%	Singapore	7%	0%
Estonia	20%	9%, 0%	Sint Maarten	5%	NA
European Union	NA	NA	Slovak Republic	20%	10%, 0%
Finland	24%	14%, 10%, 0%	Slovenia	22%	9.5%, 0%
France	20%	10%, 5.5%, 2.1%	South Africa	14%	0%
Georgia	18%	0.54%	Spain	21%	10%, 4%
Germany	19%	7%		Goods: 10%	
Ghana	15%	17.5%, 0%	Suriname	Services: 8%	25%, 0%
Greece	23%	13%, 6.5%	Sweden	25%	12%, 6%
Guatemala	12%	0%	Switzerland	8%	3.5%, 2.8%, 0%
Honduras	15%	18%		VAT: 5%	
Hungary	27%	18%, 5%	Taiwan	GBRT: 0.1%–25%	NA
Iceland	24%	11%, 0%	Tanzania	18%	10%, 0%
India	12.5%–15%	10%, 5%–5.5%, 1%, 0%	Thailand	7%	0%
Indonesia	10%	0%	Trinidad and Tobago	15%	0%
Ireland	23%	13.5%, 9%	Tunisia	18%	12%, 6%
Isle of Man	20%	5%, 0%	Turkey	18%	8%, 1%
Israel	18%	0%	Uganda	18%	0%
Italy	22%	10%, 4%	Ukraine	20%	7%, 0%
Japan	8%	NA	United Kingdom	20%	5%, 0%
Jersey	5%	0%	United States	0%–7%	NA
Jordan	16%	4%, 0%	Uruguay	22%	10%, 0%
Kazakhstan	12%	0%	Venezuela	12%	8%–16.5%
Kenya	16%	0%	Vietnam	10%	5%, 0%
Korea	10%	0%	Zambia	16%	0%
Kosovo	16%	NA	Zimbabwe	15%	0%

Table 2: Baseline Estimation Results.

This table reports OLS estimation, using the whole sample of observations. The dependent variable is Tax/GDP (%). The sample period is 1993-2012. We use average 5-year panel observations: 1993-1997 (t=0); 1998-2002 (t=1); 2003-2007 (t=2); 2008-2012 (t=3). The Initial capita GDP is of the 1993-1997 period (t=0). For the Average time to prepare tax, as the series start from 2005 and there is small year-to-year variation in each country, we use the 2005-2012 average as a control. Higher Government effectiveness indicates stronger performance. The regression is estimated on 5-year average observations, t=1, 2, 3 (panel data of 3 periods per country), using the ordinary least squares estimator. Standard errors are in parentheses (***, **, * signifies 1, 5, 10 level). Source: Authors' calculation.

Dependent Variable: Tax/GDP	(1)	(2)	(3)	(4)	(5)
Initial capita GDP	.22 (.10)**	.17 (.07)**	.30 (.05)***		.14 (.07)**
GDP growth	.12 (.21)				
Manufacturing value added	-0.16 (.08)*	-0.15 (.06)**	-0.14 (.06)**		-0.23 (.06)***
Openness	.04 (.02)***	.05 (.01)***	.05 (.01)***		.06 (.01)***
Population growth	-1.61 (.69)**	-1.41 (.48)***	-1.58 (.48)***		-1.16 (.40)***
GINI index	.29 (.08)***	.23 (.06)***	.26 (.06)***		.16 (.04)***
Urban population	-0.00 (.04)				
Average time to prepare tax	-0.13 (1.40)				
Government effectiveness	1.21 (.90)	1.71 (.66)**		3.36 (.44)***	1.73 (.70)**
Asia dummy variable	8.53	8.23	7.93	7.46	

Europe dummy variable	(3.15)*** 11.50	(2.54)*** 10.69	(2.57)*** 10.66	(3.05)** 10.87	
Latin America dummy variable	(2.94)*** 6.47	(2.40)*** 7.08	(2.43)*** 6.36	(2.96)*** 10.87	
Middle East dummy variable	(3.37)* 13.29	(2.66)*** 12.40	(2.68)** 12.42	(3.07)*** 9.50	
Africa dummy variable	(3.64)*** 10.85	(2.82)*** 11.87	(2.85)*** 11.12	(3.15)*** 12.30	
R-sq.	(3.41)*** .42	(2.73)*** .44	(2.75)*** .43	(3.15)*** .21	.33
Observations	154	232	232	397	232

Table 3: Regression Results of Sub-Samples of Asia and Latin America.

This table reports OLS estimation, using Asia and Latin America sub-samples. The dependent variable is Tax/GDP (%). The sample period is 1993-2012. We use average 5-year panel observations: 1993-1997 (t=0); 1998-2002 (t=1); 2003-2007 (t=2); 2008-2012 (t=3). The Initial capita GDP is of the 1993-1997 period (t=0). Higher Government effectiveness indicates stronger performance. The regression is estimated on 5-year average observations, t=1, 2, 3 (panel data of 3 periods per country), using the ordinary least squares estimator. Standard errors are in parentheses (***, **, * signifies 1, 5, 10 level).

Source: Authors' calculation.

Dependent Variable: Tax/GDP	(1) Asia	(2) Latin America
Initial capita GDP	-.07 (.13)	.22 (.35)
Manufacturing value added	-.11 (.08)	-.36 (.13)***
Openness	.04 (.02)**	.07 (.02)***
Population growth	-1.59 (.75)**	-2.07 (.98)**
GINI index	-.05 (.11)	.11 (.12)
Government effectiveness	2.88 (1.28)**	.84 (1.11)
R-sq.	.28	.50
Observations	51	37

Table 4: Robustness.

This table reports OLS estimation, using the whole sample of observations. The dependent variable is Tax/GDP (%). The sample period is 1993-2012. We use average 5-year panel observations: 1993-1997 (t=0); 1998-2002 (t=1); 2003-2007 (t=2); 2008-2012 (t=3). The Initial capita GDP is of the 1993-1997 period (t=0). Higher Government effectiveness indicates stronger performance. Share of commodities in exports covers ores and metals, fuels, and food in merchandise exports. The regression is estimated on 5-year average observations, t=1, 2, 3 (panel data of 3 periods per country), using the ordinary least squares estimator. Standard errors are in parentheses (***, **, * signifies 1, 5, 10 level).

Source: Authors' calculation.

Dependent Variable: Tax/GDP	(1)	(2)	(3)
Initial capita GDP	.10 (.07)	.16 (.07)**	.22 (.08)***
Manufacturing value added	-.22 (.07)***	-.20 (.07)***	-.12 (.07)*
Openness	.06 (.01)***	.06 (.01)***	.05 (.01)***
Population growth	-1.22 (.41)***	-1.15 (.40)***	-1.21 (.51)**
GINI index	.15 (.04)***	.15 (.04)***	.17 (.06)***
Government effectiveness	2.16 (.76)***	.01 (1.00)	9.95 (16.22)
Share of commodities in exports	-.00 (.02)	-.00 (.02)	-.00 (.02)
Government eff.*Exp. of commodities		.05 (.01)***	.05 (.01)***
Asia dummy variable			25.75 (28.30)
Europe dummy variable			28.83 (28.30)
Latin America dummy variable			25.54 (28.25)
Middle East dummy variable			31.17 (28.34)
Africa dummy variable			32.05 (28.27)
Government eff.*Asia dummy			-11.38

				(16.29)
Government eff.*Europe dummy				-10.91
				(16.29)
Government eff.*Latin America dummy				-12.56
				(16.25)
Government eff.*Middle East dummy				-8.96
				(16.48)
Government eff.*Africa dummy				-7.08
				(16.31)
R-sq.	.33	.36		.52
Observations	220	220		220