Fiscal Capacity and Economic Performance*

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23 September 2009

Abstract

Weak fiscal states that lack the capacity to raise sufficient tax resources cannot provide adequate amounts of basic public goods that improve worker productivity. We perform an econometric analysis of fiscal capacity and economic performance that uses data for 112 sample countries from 1975 to 2004. Our findings indicate that there is a significant relationship between fiscal strength and worker productivity. The cross-sectional results show that a 10 percentage point increase in fiscal capacity leads to a 21 to 44 percent increase in GDP per worker for the average income sample country. We supplement our cross-sectional investigation with a panel analysis to address the problem of omitted variable bias and an instrumental variable analysis to address the problem of reverse causation. Both sets of tests reinforce the cross-sectional findings. In total, our results suggest that fiscal weakness impedes economic development.

PRELIMINARY VERSION

*We thank Tiago Cavalcanti, Peter Lindert, Gérard Roland, Jean-Laurent Rosenthal, Mauro Sylos Labini, Guillermo Tolosa, and seminar participants at IMT Lucca.

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1 Introduction

The level of direct taxation (i.e., income, social security, payroll, and property taxes) is a key indicator of the fiscal capacity of the state. If fiscal capacity is small, then the state is unable to raise enough in resources. In turn, it cannot provide sufficient amounts of basic, "common-interest" public goods (e.g., police force, legal system, transportation infrastructure) that improve worker productivity.

One distinguishing characteristic of weak fiscal states is the political conflict between state actors and non-state elites. The case of Guatemala, where conservative oligarchs oppose structural tax reforms, illustrates. From 2001 to 2003, the Guatemalan Supreme Court received more than 50 appeals from powerful interest groups to eliminate, clarify, or reduce taxes. As the courts overturned key taxes, the tax-to-GDP ratio fell further from the 12 percent target established under the 1996 Peace Accords (IMF Staff Report, 2005). State revenues, which rely heavily on indirect taxes, continue to sum to less than 10 percent of GDP (by contrast, tax-to-GDP ratios in rich countries are typically 25 to 30 percent; see figure 3 ahead). This political equilibrium, where elites successfully resist fiscal predominance by the state, contributes to the lack of basic government services. For instance, since police, prosecutors, and court officials are underfunded, the Guatemalan judicial system functions poorly: Guatemala has long had one of the world's highest murder rates (The Economist, 2006).

Weak fiscal states are not particular to Latin America, however. There is a close relationship between small fiscal capacity and lack of economic development in Africa.[1] Traditional economic groups such as bosses, chiefs, clan leaders, landlords, and rich peasants oppose fiscal control by central governments. In turn, states underinvest in basic public goods such as legal systems and transportation infrastructure. In contrast, the successful development experiences of East Asian nations such as South Korea and Taiwan took place under strong fiscal states (see Wade, 1990).

If fiscal capacity does in fact influence performance, then we will be able to gauge its effect through measures of taxation and development. Figure 1 illustrates a strong positive relationship between fiscal strength and worker productivity. It plots the share of revenues from direct taxes, our benchmark measure of fiscal capacity, against GDP per worker for 112 sample countries (both variables are averaged over the period 1975 to 2004; Section 3 describes the data). The share of direct taxation in total taxation is

[1] See Migdal (1988), Herbst (2000), Bates (2001), Acemoglu *et al.* (2004), and Acemoglu (2005).

roughly 35 to 50 percentage points higher in advanced economies.[2] Figure 2 displays the share of direct taxes as five-year averages from 1975 to 2004 for two sets of sample countries: the G7 and the seven poorest.[3] The share of direct taxation is persistently larger for the G7 countries (roughly 75 to 90 percent) than for the poorest (roughly 25 to 40 percent). Finally, figure 3 displays total tax revenues to GDP from 1975 to 1999 for the same two sets of sample countries.[4] As for direct tax shares, total tax revenues are persistently larger for the G7 countries (roughly 25 to 30 percent) than for the poorest (roughly 10 to 15 percent). In combination with figure 2, this evidence confirms the strong links between direct taxation and fiscal capacity: if direct taxes are low, then so are total taxes. Overall, figures 1 to 3 suggest that central governments in rich countries have large fiscal capacities and play important economic roles.

To further explore such patterns, this paper performs an econometric analysis of fiscal capacity and economic performance. All tests make use of economic and political data for 112 sample countries from 1975 to 2004. The econometric analysis has three parts. The first exploits the cross-sectional variation in the data. We find that greater fiscal strength significantly improves worker productivity: a 10 percentage point increase in fiscal capacity leads to a 21 to 44 percent increase in GDP per worker for the average income sample country.

The cross-sectional analysis controls for a variety of factors beyond fiscal capacity that may also influence worker productivity. However, fiscal capacity may still be correlated with unobserved characteristics particular to certain countries or years. To account for the possibility of omitted variable bias, the second part performs a panel analysis, which allows us to remove the country and yearly means from all observations via fixed effects. The results of this analysis reinforce the cross-sectional ones.

In addition to omitted variables, there is also the possibility of feedback effects from output per worker to fiscal capacity. To control for reverse causation, the third part employs instrumental variables. In particular, we exploit links between historical conflicts and current fiscal capacity. We argue that past external wars encouraged fiscal innovation, and that past internal conflicts destroyed fiscal infrastructure. The results of the IV analysis also indicate that greater fiscal capacity significantly improves

[2]Excluding the outlier country Myanmar (MYA) does not alter this correlation. Moreover, the use of data for GDP per capita rather than per worker also reveals a strong increasing relationship.

[3]The G7 countries are Canada, France, Germany, Italy, Japan, United Kingdom, and the United States. The seven poorest sample countries are Bhutan, Burkina Faso, Burundi, Chad, the Democratic Republic of the Congo, Myanmar, and Tanzania.

[4]Data for total tax revenues are not available for most of these countries from 2000 onwards.

worker productivity.

The rest of the paper proceeds as follows. Section 2 describes the theoretical rationale and related literature. Section 3 sets up and performs the cross-sectional analysis. Section 4 does the same for the panel and IV tests. Section 5 concludes.

2 Capacity and Performance

□ **Theory:** We summarize our analysis of the relationship between fiscal capacity and economic performance as follows:

Output per Worker
↑
Basic Public Goods
↑
Fiscal Capacity
↑
Political Conflict.

We start with political conflict between state actors and non-state elites. If the state achieves tax predominance over non-state elites, then fiscal capacity - as characterized by the share of direct taxes - rises. In turn, the state is able to provide sufficient amounts of basic, "common-interest" public goods: a competent police force, an effective legal system, proper transportation infrastructure. Adequate provision of public services improves worker performance and promotes economic development.[5] However, if the state cannot achieve tax predominance over non-state elites, then fiscal capacity remains small, and the state underprovides basic public goods. Insufficient security, courts, and/or transportation networks impede worker productivity. Thus, economic development levels remain low.

Since adequate data on police, legal systems, and physical infrastructure were unavailable, the econometric analysis tests the relationship between fiscal capacity and worker productivity directly.[6] We are aware that our characterization may omit other politico-economic factors that influence economic performance, such as fiscal federal-

[5]There is a close relationship between output per worker and national wealth; see Hall and Jones (1999).

[6]The best data that we found on the number of police, prosecutors, and judges were from the Eighth United Nations Survey of Crime Trends and Operations of Criminal Justice Systems (2005) for the years 2001 to 2002. However, the amount of sample countries was nearly always less than 30.

ism, preferences for government size, ethnic and linguistic fractionalization, tax evasion, administrative inefficiency, and economic informality. There may also be feedback effects. For instance, poor countries may lack the resources to build effective fiscal capacities. Sections 3 and 4 of the econometric analysis address both types of problems.

□ **Literature:** Our paper is related to several literatures. The first is the body of work that emphasizes government expropriation.[7] This view suggests that institutionalized fiscal constraints such as parliamentary control over state budgets protect property rights and encourage investment by limiting the ability of executives to overtax. In essence, we focus on the flip side of the coin: governments that lack the fiscal capacity to tax enough cannot provide basic public goods which improve productivity.

The paper is also related to the historical literature on state formation and long-run economic growth.[8] While standard economic theory assumes that governments are "born" with sufficient tax authority, economic historians study the evolution of fiscal capacity over time. Warfare, which encouraged fiscal innovations by states in order to raise greater revenues, plays a central role in such accounts. Our work uses the insights of economic history to test for the presence of similar effects in modern data.

Finally, the paper is related to recent works on "weak" states and economic development.[9] The closest antecedents are the set of papers by Besley and Persson (2009a,b), which focus on the relationships between state capacities and economic growth. In the theoretical framework that Besley and Persson put forth, governments choose (under uncertainty) investment levels in state capacity over time.[10] Instead, our work considers cases where states lack the predominance to overcome non-state elites and make capacity investments, even if they may find them worthwhile. For instance, though the process of growth in fiscal capacity in Europe took centuries, it was dramatically unfinished through the 1700s. Structural improvements typically occurred from 1789 onwards. However, they required a bloody revolution in France and, in many other

[7]For theory, see Brennan and Buchanan (1980), North (1981), Levi (1988), and McGuire and Olson (1996). For empirics, see De Long and Shleifer (1993), Knack and Keefer (1995), and Acemoglu *et al.* (2001, 2002, 2005).

[8]This literature focuses on Western Europe. See Brewer (1989), Tilly (1990), Hoffman and Rosenthal (1997a,b), Epstein (2000), O'Brien (2005), and Dincecco (2009).

[9]Acemoglu *et al.* (2004) and Acemoglu (2005) were among the first works in the current economics literature to identify problems of divided authority within polities and propose formal models to evaluate their effects.

[10]Besley and Persson identify two complementary aspects of state capacity: fiscal capacity and legal capacity. For tractability, we concentrate on the former. However, future work should also address the role of legal capacity.

places, "exogenous" imposition by way of French conquest, as traditional economic groups (e.g., nobles, clergy, and residents of certain towns or regions) resisted state control.[11]

The dramatic example of Old Regime governments, which remained stuck in "weak" fiscal equilibria for centuries, highlights the difficulties of overcoming even well-known institutional deficiencies. A historical case from Rosenthal (1992) illustrates further. New drainage and irrigation projects would have benefited agricultural productivity in Old Regime France. Property rights litigation, however, obstructed such plans. Reform was difficult, since the sale of judicial offices was a cheap way for the French state to raise funds. Altering the compensation of judges would have disrupted such sales. To expand the kingdom, moreover, the crown had granted judicial privileges to powerful local interest groups. Streamlining the court system and designating a supreme judicial arbitrator was thus unlikely. Finally, judges, bureaucrats, and even the king himself had incentives to support repeated legal appeals as a way to extract revenues.

For present-day economies, figure 2 shows a strong persistence in fiscal capacity levels over the 30 years under consideration. The evidence for our Guatemalan example also reveals persistence in outcomes. A 1952 book by Adler, Schlesikgerer, and Olson argues that overall taxation in Guatemala was not only too low, but that the state relied too heavily on indirect taxes; the same sorts of fiscal capacity problems that Guatemala faces to this day.[12]

3 Cross-Sectional Analysis

□ **Set-up:** A lack of tax resources means that fiscally weak governments cannot provide basic public goods that improve output per worker. Hence, we should observe a significant positive relationship between greater fiscal capacity and worker productivity. To test this hypothesis, we estimate the following benchmark model:

$$\log(Y_i/L_i) = \alpha + \beta F_i + \boldsymbol{\gamma}'\mathbf{X_i} + \epsilon_i, \tag{1}$$

[11] See Hoffman and Rosenthal (1997a), Epstein (2000), Acemoglu *et al.* (2008), and Dincecco (2009).

[12] From p. 20: "It is only too obvious, however, that the fiscal system, on the receipts side as well as on the expenditures side, is not yet adapted to cope with the additional tasks which the government is committed to undertake. The government has been reluctant to increase the overall level of taxes because it did not wish to curtail the level of consumption of the low- and middle-income groups which bear the largest share of the tax burden. It has failed, on the other hand, to gain access to the savings of the relatively small group of the well-to-do."

where Y_i/L_i is output per worker in country i, F_i is fiscal capacity, and $\mathbf{X_i}$ is a set of controls. We now describe these variables; the data appendix provides further details about sources and construction methods.

Our goal is to characterize cross-country differences in the relative levels of worker productivity at similar points in time. Hence, we measure productivity Y_i/L_i in terms of real GDP per worker from the Penn World Tables of Heston *et al.* (2006). As an alternative, we also use the measure of total factor productivity from Hall and Jones (1999).

Our measures of fiscal capacity F_i use tax data for 112 sample countries from the Government Financial Statistics (GFS) database of the IMF for the years 1975 to 2004.[13] The benchmark variable is the share of total tax revenues from direct taxes (i.e., income, social security, payroll, and property taxes). As an alternative measure of (high) fiscal capacity, we employ the share of total tax revenues from income taxes alone. Though the cross-sectional results are similar for a second alternative, one minus the share of total tax revenues from trade taxes, this measure is very imprecise. For instance, we do not wish to consider a state that collects the greater part of its tax revenues from indirect taxes (besides trade taxes) to have a large fiscal capacity, because this arrangement suggests that the state in question does not possess a big enough administrative bureaucracy to enforce sufficient levels of tax compliance.[14] The same logic holds for "catch-all" measures such as total tax revenues as a share of per capita GDP (we add a control for government size in the regressions; see ahead).

The cross-sectional analysis includes a standard set of control variables $\mathbf{X_i}$ that follow Hall and Jones (1999) and Persson and Tabellini (2003). To account for government size, we measure central government spending inclusive of social security as a percentage of GDP from the GFS/IMF database. Though we focused on central government spending rather than general government spending (that incorporated local and regional government spending) due to data availability and comparability, we always included a dummy variable for federal political structures according to Adserà *et al.* (2001) and the CIA World Factbook (2009). To control for trade openness, we measure the sum of exports and imports as a percentage of GDP from the Penn

[13] 16 countries with populations of around 500,000 or less in 2007 were dropped from the sample. They were the Bahamas, Barbados, Djibouti, Dominica, Iceland, Luxembourg, Macau, the Maldives, Malta, the Netherlands Antilles, Seychelles, St. Kitts and Nevis, St. Lucia, Suriname, Tonga, and Vanuatu.

[14] Advanced European economies that assess value-added taxes on goods and services do not fall into this category because they also rely heavily on income taxes that require extensive infrastructures for tax collection; see Hines and Summers (2009).

World Tables of Heston *et al.* (2006).[15] We wish to account for geography and colonial history as well. To capture geography, we use continental dummies for Africa, East and Southeast Asia (excluding Japan, which is part of the OECD), and Latin America. We also include an indicator variable for OECD countries (for all members before 1993, excluding Turkey). Hence, non-OECD countries in Europe, the Middle East, and Asia comprise the default group. To capture colonial history, we use a set of dummy variables for legal origins (see La Porta *et al.*, 1998). Countries are divided into those with English, German, Scandinavian, or Socialist legal origins; the default group consists of countries with French legal origins.[16] To account for ethnic and linguistic fractionalization, we include the measure from Alesina *et al.* (2002), which takes higher values for more fractionalized countries. Finally, controls for corruption and government effectiveness account for factors such as tax evasion, inefficient bureaucracy, and informal sector activity. The former variable is from the Corruption Perceptions Index of Transparency International (2009) and the latter is from Kaufmann *et al.* (2008).[17]

Table 1 displays the summary statistics of the economic and political variables for 112 sample countries from 1975 to 2004. Mean GDP per worker is $17,670 (std dev: $15,470). Mean total factor productivity is 52 percent relative to that of the United States (std dev: 31 percent; these data are only available for 89 sample countries for the year 1988). On average, direct taxes comprise 45 percent of total taxes (std dev: 18 percent) and income taxes 27 percent (std dev: 15 percent). Mean government size is 22 percent of GDP (std dev: 9 percent); 14 percent of sample governments have federal political structures (std dev: 34 percent). Average trade openness is 75 percent (std dev: 49 percent). 26 percent of sample countries are found in Africa; 6 percent in East Asia; and 19 percent in Latin America. 18 percent are OECD countries. Non-OECD countries in Europe, the Middle East, and Asia are the remainder (31 percent). 23 percent of sample countries have English legal origins; 4 percent German or Scandinavian ones; and 20 percent Socialist ones. Countries with French legal origins are the remainder (49 percent). Lastly, the mean measure of ethnic and linguistic fractionalization is 0.32 (std dev: 0.29; these data are only available for 102 sample countries for

[15]In addition, we experimented with demographic measures of population shares between 15 and 64 years old and at least 65 years old from the World Development Indicators of the World Bank (2009); the cross-sectional results were similar.

[16]The inclusion of a control for latitude that measured a country's distance from the equator did not alter the cross-sectional results in any significant way.

[17]As an alternative, we employed the corruption control from Kaufmann *et al.* (2008), which was only available for 46 sample countries. Again, the cross-sectional results were similar.

the year 2001); that of the Corruption Perceptions Index is 4.32 (std dev: 2.20; these data are only available for 101 sample countries); and that of government effectiveness is 0.87 (std dev: 0.97; these data are only available for 46 sample countries).

□ **Evidence:** Does fiscal capacity affect worker productivity? Table 2 presents the findings of the cross-sectional analysis. In the first column, we report the results of the most parsimonious regression. Fiscal capacity has a positive, highly significant impact: a 10 percentage point increase in the share of direct taxes leads to a 44 percent increase in output per worker for the average income sample country. Trade openness is also positive and highly significant. Though larger government is associated with significantly lower worker productivity, this result (unlike the one for trade openness) is not robust to other specifications. The same may be said for the dummy variable for federal political structures.

In columns 2 and 3, we add the controls for geography and colonial history, respectively. The economic impact of greater fiscal capacity remains highly significant. With the additional variables, the estimated effect of a 10 percentage point increase in the share of direct taxes now leads to a 21 to 22 percent increase in output per worker for the average income sample country. In the full specification (column 3), OECD countries display significantly higher levels of GDP per worker than the default group (i.e., non-OECD countries in Europe, the Middle East, and Asia), and African countries display significantly lower levels. Similarly, countries with Scandinavian legal origins exhibit significantly higher levels of worker productivity than the default group (i.e., French legal origins).

In column 4, we add the control for ethnic and linguistic fractionalization, and the number of sample countries falls from 112 to 102. The economic impact of greater fiscal capacity remains remarkably stable. In column 5, we add the control for corruption, and the number of sample countries falls to 91. However, the estimated effect of a 10 percentage point in the share of direct taxes still leads to a 21 percent increase in output per worker for the average income sample country. In column 6, we add the control for government effectiveness, and the number of sample countries falls even further to 46. The economic impact of greater fiscal capacity also decreases, but remains significant at the 10 percent level. Neither fractionalization, government effectiveness, nor corruption display significant effects in these specifications.

In the remaining three columns, we perform additional robustness checks. In column 7, we restrict the cross-sectional data averages to the 1990s. In column 8, we

employ the share of total tax revenues from income taxes as an alternative measure of (high) fiscal capacity. In both cases, the economic impact of greater fiscal capacity is positive and highly significant. Finally, in column 9, we use total factor productivity as an alternative measure of our dependent variable. Though the number of sample observations falls to 89 countries, the economic effect of fiscal capacity remains positive and highly significant. Now the estimated effect of a 10 percentage point increase in the share of direct taxes leads to a 5 percentage point increase in total factor productivity (relative to the United States) for the average productivity sample country.

In summary, the cross-sectional results conforms to prior expectations. The positive effect of greater fiscal capacity on output per worker is substantial and robust to the specification. To further examine our hypothesis, we now subject the data to tests that control for two forms of simultaneity: omitted variable bias and reverse causation.

4 Robustness Analysis

□ **Panel Data:** The cross-sectional analysis controls for a variety of factors beyond fiscal capacity that may also influence worker productivity. However, fiscal capacity may still be correlated with unobserved characteristics particular to certain countries or years. To account for the possibility of omitted variable bias, we now perform a panel analysis, which allows us to capture time-invariant but country-specific unobserved determinants of output per worker through country fixed effects. Likewise, fixed effects by year enables us to control for country-invariant but time-specific unobserved factors.

We estimate the following dynamic panel model:

$$\log(Y_{it}/L_{it}) = \alpha + \lambda[\log(Y_{it-1}/L_{it-1})] + \beta F_{it} + \boldsymbol{\gamma}'\mathbf{X_{it}} + u_t + \epsilon_{it}, \tag{2}$$

where Y_{it}/L_{it} is output per worker in country i in year t, F_{it} is fiscal capacity, and $\mathbf{X_{it}}$ is a set of controls to be described. To allow for persistence in worker productivity from one year to the next, we add the lagged dependent variable Y_{it-1}/L_{it-1} to the right-hand side of the regression. As described, we include a set of country-specific indicator variables (country fixed effects) v_i to remove the country means from all observations and year-specific indicator variables (yearly fixed effects) u_t to remove the annual means. Finally, since our panel is unbalanced, we take five-year averages from 1975 to 2004 to smooth out data gaps.[18]

[18]The panel results remain significant if we use yearly data, with or without restricting the set of sample

The panel analysis makes use of a modified set of controls $\mathbf{X_{it}}$. We account for government size and trade openness, which vary across country and time, as described in section 3. However, we omit time-invariant variables such as federalism, geography, and colonial history, because the country fixed effects subsume their impacts on worker productivity. Due to a lack of sufficient time series data, we also omit the variables for total factor productivity, ethnic and linguistic fractionalization, government effectiveness, and corruption.

Table 3 presents the findings of the panel analysis. In the first column, we report the results of the regression which excludes the lagged dependent variable. The estimated effect of greater fiscal capacity is positive and highly significant: a 10 percentage point increase in the share of direct taxes leads to a 9 percent increase in output per worker for the average income sample country. Government size and trade openness, however, do not display significant effects over time.

Since worker productivity levels may persist, the specification in column 2 adds the lagged dependent variable to the regression. The estimated effect of greater fiscal capacity remains highly significant. Yet the magnitude falls: a 10 percentage point increase in the share of direct taxes now leads to a 5 percent increase in output per worker for the average income sample country. One reason may be because the estimated effect of the lagged dependent variable, also highly significant, captures an important part of the impact of greater past fiscal capacity in terms of higher past worker productivity.

In column 3, we employ the share of total tax revenues from income taxes as an alternative measure of (high) fiscal capacity. Again, the estimated effect of greater fiscal capacity is positive and highly significant: a 10 percentage point increase in the share of direct taxes leads to a 8 percent increase in output per worker for the average income sample country. The specification in column 4 adds the lagged dependent variable to this regression. Though the estimated effect of greater fiscal capacity remains qualitatively similar, it is not precisely estimated. As in column 2, the highly significant effect of the lagged dependent variable may capture a sizeable portion of the impact of greater past fiscal capacity in terms of higher past worker productivity.

In summary, the results of the panel analysis, which account for the potential problem of omitted variable bias, reinforce the cross-sectional ones. Overall, the positive

countries to those with at least ten consecutive observations and/or including the price of oil in U.S. dollars (distinguishing between oil exporters and importers) instead of yearly fixed effects.

effect of greater fiscal capacity on worker productivity remains highly significant and robust to the specification.

□ **Instrumental Variables:** In addition to omitted variables, there is also the possibility of feedback effects from worker productivity to fiscal capacity. To control for reverse causation, the cross-sectional analysis accounts for country characteristics such as geography and colonial history. However, the use of additional controls may not be sufficient to properly estimate the effect of fiscal capacity on output per worker. To address this problem, we now employ instrumental variables that isolate exogenous variation in fiscal capacities. Our IVs measure the past incidence of external and internal conflicts. As discussed in section 2, the historical literature on state formation emphasizes the relationship between external wars and fiscal innovations. Besley and Persson (2009a,b) also find strong positive links between past external conflicts and current fiscal capacities. In a similar manner, there is reason to think that past internal conflicts had a destructive impact on fiscal infrastructure. Our exclusion restriction says that historical conflicts do not influence current levels of worker productivity, except through their effects on fiscal structures. Though we believe that this restriction holds true, particularly as we move further back in time, we test the validity of our instruments through overidentifying restrictions.

The first stage of our 2SLS model is:

$$F_i = \alpha + \boldsymbol{\gamma}'\mathbf{X_i} + \boldsymbol{\theta}'\mathbf{Z_i} + \epsilon_i, \tag{3}$$

where F_i is fiscal capacity in country i, $\mathbf{X_i}$ is the set of controls found in column 1 of table 2, and $\mathbf{Z_i}$ is a set of instruments.

We now describe the instruments for historical conflicts $\mathbf{Z_i}$ that we created; the data appendix provides further details about sources and construction methods. Our initial measure for external conflict is the share of years from 1816 (or the year of independence if later) to 1975 that a sample country was involved in external military conflicts from the Correlates of War (COW) Database of Sarkees (2000). Likewise, we compute internal conflict as the share of years from 1816 (or the year of independence if later) to 1975 that a sample country was involved in domestic military conflicts (also from the COW Database).

Though the dummy variable approach is useful as a first pass, it does not account for size differences between wars. Presumably, a large-scale external conflict like the Crimean War (1853-1856), which according to the COW Database led to 264,200 total

battle-related deaths, would have had a greater effect on fiscal capacity than a small external conflict like the Spanish-American War (1898), which led to 3,685 battle-related deaths. To better capture war magnitudes, we computed a second set of instruments (again from the COW Database) for the number of total battle-related deaths sustained by state armed forces in external (internal) conflicts to 1975 for each sample country. For robustness, we also restricted the cut-off years to 1938 (just before the start of World War II) and to 1913 (just before the start of World War I).[19]

The COW Database is an accessible, clear source of historical conflicts. However, its coverage skews heavily towards Western Europe, particularly as we move further back in history. To broaden our sample of past wars, we also compiled data on total casualties for all external conflicts from 1816 to 1913 in Western and Eastern Europe, North and Sub-Saharan Africa, the Middle East and Central Asia, the British Indian Empire, East and Southeast Asia and Oceania, the United States and Canada (including Indian Wars), the Caribbean, and South America from the statistical reference of Clodfelter (2002).[20] In some cases, we accounted for modern states by way of historical predecessors; the data appendix provides the details.

Table 4 displays the summary statistics for the conflict instruments. Sample countries participated in external conflicts in 7 percent of the years from 1816 (or the year of independence if later) to 1975 (std dev: 0.10); there were internal conflicts in 5 percent of these years (std dev: 0.10). Over this period, external conflicts led to an average of 251,924 total battle-related deaths (std dev: 678,0914) per sample country and internal conflicts to an average of 30,649 (std dev: 111,904). Mean battle-related deaths fall as we move backwards in time: the 1938 figure for external (internal) conflicts is 99,280 (13,535) per sample country and the 1913 figure is 19,413 (12,562). According to the Clodfelter data, which measures total casualties, the 1913 figure was higher, at 37,762 (std dev: 127,590). Germany (5,343,613) experienced the most external battle-related deaths to 1975; Russia (2,15,022) to 1938; and Turkey (battle-related deaths, COW: 356,400) or France (casualties, Clodfelter: 948,464) to 1913. Similarly, Spain (734,900) experienced the most internal battle-related deaths to 1975; and Mexico (583,600 and 564,900, respectively) to 1938 and to 1913.

Table 5 presents the findings of the 2SLS analysis. In the first column, we report

[19] As further alternatives, we employed the years 1946 (just after the end of World War II) and 1919 (just after the end of World War I) as cut-offs; the 2SLS results were similar.

[20] In military usage, "casualty" refers to all persons lost to active military service, including those killed in action or by disease, disabled by physical or mental injuries, captured, deserted, or missing.

the results of the regression which uses the past incidences of external and internal wars to 1975 as instruments. The estimated effect of greater fiscal capacity is not only positive and highly significant, but larger than the OLS estimates in table 3: now a 10 percentage point increase in the share of direct taxes leads to a 95 percent increase in output per worker for the average income sample country. Moreover, the F-test indicates that the instruments are strongly correlated with current fiscal capacity, our variable of interest. As for the cross-sectional analysis, trade openness also has a positive and highly significant effect on worker productivity.

Recall that the dummy variable approach represents our first pass. Column 1 shows that the Hansen's J χ^2 overidentifying test rejects the validity of the two instruments, which may not be exogenous to the dependent variable (i.e., output per worker). Hence, in column 2, we replace the dummy variables for past external and internal conflicts with total battle-related deaths. Now we can longer reject the overidentifying restrictions, which suggests that the new instruments are valid. Moreover, the F-test indicates that the instruments are strongly correlated with current fiscal capacity. Though the estimated effect of greater fiscal capacity falls from column 1, it remains positive and highly significant, and is still larger than the OLS estimates. A 10 percentage point increase in the share of direct taxes leads to a 64 percent increase in output per worker for the average income sample country.

In columns 3 and 4, we report the results which employ the instruments that measure the numbers of total battle-related deaths from external (internal) conflicts to 1938 and to 1913, respectively. Again, the Hansen's J χ^2 tests indicate that we cannot reject the overidentifying restriction that the instruments are exogenous to the dependent variable. Similarly, the F-tests suggest that the instruments are significantly correlated with current fiscal capacity, though these relationships weaken as we move further back in time. The economic effect of greater fiscal capacity remains positive and highly significant.

In columns 5 and 6, we replace the pre-World War I data for total battle-related deaths from the COW Database with the data for total casualties from Clodfelter. We first employ the Clodfelter instrument by itself, and then supplement it with the COW instrument for internal battle-related deaths to 1913. In both cases, the F-tests indicate that the instruments are strongly correlated with current fiscal capacity. Since the specification in column 5 is not overidentified, we are unable to perform the Hansen's J χ^2 test. However, the results of this test for the specification in column 6

suggest that we cannot reject the overidentifying restriction that the instruments are exogenous to the dependent variable. Once more, greater fiscal capacity displays a positive, highly significant effect on worker productivity.

In the remaining two columns, we experiment with a new instrument: the historical incidence of political inclusiveness, which we compute as averages of the variable *polity2* from the Polity IV Database of Jaggers and Marshall (2008) from 1800 (or the year of independence if later) to 1975 for each sample country. The raw scale for this IV runs from -10 to 10, where larger values indicate greater democracy. Table 4 indicates that the mean value of past political inclusiveness is -1.92 (std dev: 5.56). As for historical warfare, there is reason to think that past democracy influenced fiscal capacity. In a standard median-voter model, for instance, the equilibrium amount of public goods rises as the franchise is extended to middle-class and lower-class citizens (see Persson and Tabellini, 2000). Moreover, it is not obvious how past suffrage reforms would systematically affect current productivity levels, though we test for the validity of our new instrument through overidentifying restrictions.

In column 7, we pair our IV for past democracy with the Clodfelter instrument for total casualties from external conflicts prior to World War I. The estimated effect of greater fiscal capacity is the strongest yet: now a 10 percentage point increase in the share of direct taxes leads to a 112 percent increase in output per worker for the average income sample country. In column 8, we pair the IV for past democracy with the COW instruments for total battle-related deaths for external and internal conflicts to 1975. Again, the economic effect of greater fiscal capacity is positive and highly significant. In both specifications, the F-tests indicate that the instruments are strongly correlated with current fiscal capacity. Moreover, the Hansen's J χ^2 tests suggest that we cannot reject the overidentifying restrictions for the validity of our instruments.

In total, the results of the 2SLS analysis, which account for the potential problem of reverse causation, reinforce the cross-sectional ones. As for the panel tests, the positive effect of greater fiscal capacity on worker productivity remains highly significant and robust to the specification.

5 Conclusion

This paper examines state fiscal capacity and economic performance. Our cross-sectional results indicate that there is a significant relationship between fiscal strength

and worker productivity. A 10 percentage point increase in fiscal capacity leads to a 21 to 44 percent increase in GDP per worker for the average income sample country. Panel and IV analyses reinforce these findings.

Our results suggest that small fiscal capacity impedes economic development. If the state cannot achieve predominance over non-state elites, then it cannot raise enough resources to provide basic public goods that improve worker productivity. The findings lend support to theories (e.g., Acemoglu, 2005, Besley and Persson, 2009a,b) that emphasize the key role that fiscal capacity plays in long-run growth. In light of these results, future work on other aspects of state capacity, such as legal capacity, should also prove fruitful.

Data Appendix

GDP per Worker: Real gross domestic product per worker in constant dollars (chain index) expressed in international prices, base year 2000. For the regressions, we use the variable (named RGDPWOK) in logs. Source: Penn World Tables of Heston *et al.* (2006), Version 6.2.

TFP: Total factor productivity relative to that of the United States in 1988. Source: Hall and Jones (1999).

Share of Direct Taxes: The share of total tax revenues from direct taxes. This measure is computed as the sum of income taxes, social security taxes, payroll taxes, and property taxes divided by total tax revenues. Source: Government Financial Statistics database of the IMF.

Share of Income Taxes: The share of total tax revenues from income taxes. This measure is computed as income taxes divided by total tax revenues. Source: Government Financial Statistics database of the IMF.

Central Government Size: The government share of real gross domestic product in constant prices, base year 2000. This variable is named CG.
Source: Penn World Tables of Heston *et al.* (2006), Version 6.2.

Federal Indicator: This dummy equals one for sample countries with federal political structures. Sources: Adserà *et al.* (2001) and the CIA World Factbook (2009).

Trade Openness: The sum of exports and imports as a percentage of GDP in constant prices, base year 2000. This variable is named OPENK.
Source: Penn World Tables of Heston *et al.* (2006), Version 6.2.

Continental and OECD Indicators: The dummy for Africa equals one for sample countries located in Africa. The dummy for Latin America equals one for sample countries located in Latin America (i.e., Central and South America plus Mexico). The dummy for East Asia equals one for sample countries located in East or Southeast Asia (Japan is counted as an OECD country instead). The dummy for the OECD equals one for sample countries that were OECD members prior to 1993 (Turkey is not counted as an OECD country). Non-OECD countries in Europe, the Middle East, and Asia comprise the default group. Source: CIA World Factbook (2009).

Legal Origins Indicators: The dummy for English legal origins equals one for sample countries with English legal origins. Similar classifications are used for countries with German, Scandinavian, or Socialist origins. Countries with French legal origins

comprise the default group. Source: La Porta *et al.* (1998).

Ethnic Fractionalization: One minus the Herfindahl index of ethnolinguistic group shares. The measure takes higher values for more fractionalized countries. Source: Alesina *et al.* (2002).

Government Effectiveness: This variable (named GOVEF) combines perceptions of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies into a single grouping. The measure ranges from -2.5 to 2.5, with higher values corresponding to better governance outcomes. Source: Kaufmann *et al.* (2008).

Corruption: This variable uses the Corruption Perceptions Index, which measures perceptions of abuses of power by public officials on a 0-10 scale, where lower values denote greater corruption. Source: Transparency International (2009).

External Conflict: The first type of external conflict variable computes the share of years from 1816 (or the year of independence if later) to 1975 (or 1938 or 1913) that a sample country was involved in external military conflicts. A country was at war externally in a given year if the dummy variable *interstatewar* or *extrastate war* equaled one. Source: Correlates of War Database of Sarkees (2000), Version 3.0.

The second type of external conflict variable computes the number of total battle-related deaths sustained by state armed forces in external conflicts from 1816 (or the year of independence if later) to 1975 (or 1938 or 1913) for each sample country. Source: Correlates of War Database of Sarkees (2000), Version 3.0.

The third external conflict variable computes the number of total casualties sustained by state armed forces in external conflicts listed as wars, wars of independence, conquests, or campaigns from 1816 to 1913 for each sample country. In military usage, "casualty" refers to all persons lost to active military service, including those killed in action or by disease, disabled by physical or mental injuries, captured, deserted, or missing. Data limitations mean that our figures may refer to soldiers killed or wounded in battle as well as deaths by disease rather than to casualties per se. Further back in time, such reports are more common. In those cases, we employed total military deaths. When such tolls were not provided, deaths from major land and sea battles as well as major sieges were summed to compute totals. In some cases, we accounted for modern states by way of historical predecessors. These were as follows. *Western*

and Eastern Europe: The Habsburg Empire was counted for Austria and Hungary before 1867. Casualty figures were divided evenly between the two states. From 1867 onwards, the division of casualty figures was based on the relevant summary descriptions. Prussia was counted for Germany before 1871. Sardinia was counted for Italy before 1861. *North and Sub-Saharan Africa*: The Dahomey Kingdom was counted for Benin. The Belgian Congo was counted for the Democratic Republic of the Congo. The Boer Colony and the Zulu Empire were counted for South Africa. The Ndebele Kingdom was counted for Zimbabwe. *The Middle East and Central Asia*: Persia was counted for Iran. *British Indian Empire*: The Maratha Empire was counted for India. Sepoys were Indian soldiers that served in the British armed forces. Hence, they were counted for the United Kingdom.[21] *East and Southeast Asia and Oceania*: Ceylon was counted for Sri Lanka. Burma was counted for Myanmar. Bali, Java, and Sumatra were counted for Indonesia. Siam was counted for Thailand. *The United States and Canada*: Texas was counted for the United States. Source: Clodfelter (2002).

Internal Conflict: The first type of internal conflict variable computes the share of years from 1816 (or the year of independence if later) to 1975 (or 1938 or 1913) that a sample country was involved in internal military conflicts. A country was at war internally in a given year if the dummy variable *intrastatewar* equaled one. Source: Correlates of War Database of Sarkees (2000), Version 3.0.

The second type of internal conflict variable computes the number of total battle-related deaths sustained by state armed forces in external conflicts from 1816 (or the year of independence if later) to 1975 (or 1938 or 1913) for each sample country. Source: Correlates of War Database of Sarkees (2000), Version 3.0.

Political Inclusiveness: The variable for political inclusiveness computes the average of the variable *polity2* from 1800 (or the year of independence if later) to 1975 for each sample country. The raw scale for this IV runs from -10 to 10, where larger values indicate greater democracy. Germany is Germany, 1868-1945, and West Germany, 1945-1975. Korea is Korea, 1800-1910, and South Korea, 1948-1975. Russia is Russia, 1800-1922, and the USSR, 1923-1975. Yemen is North Yemen, 1918-1975. Data were taken from the USSR from 1922-1975 to calculate this variable for Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Tajikstan, and Ukraine. Pre-1941 data were taken from Estonia (start year: 1917), Latvia (1920), and Lithuania (1918) and post-1940

[21] In general, casualty figures for native soldiers in the armed forces of European colonists were counted for the European state for which they served.

data from the USSR to calculate this variable for those three countries. Data were taken from Czechoslovakia from 1918-1975 to calculate this variable for the Czech Republic and the Slovak Republic. Data were taken from Yugoslavia from 1921-1975 to calculate this variable for Croatia and Slovenia. Finally, since Namibia gained independence from South Africa in 1990, it was assigned the South African value. Source: Polity IV Database of Jaggers and Marshall (2008).

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Table 1: Summary Statistics, 1975-2004

	No of Countries	Mean	Std Dev	Min	Max
GDP per Worker	112	17,670	15,470	366	70,115
Total Factor Productivity	89	0.52	0.31	0.08	1.21
Direct Tax Share	112	0.45	0.18	0.12	0.94
Income Tax Share	111	0.27	0.15	0.05	0.72
Government Size	112	22.43	9.01	5.00	56.45
Federal	112	0.14	0.34	0	1
Trade Openness	112	74.82	48.81	10.64	287.96
Africa	112	0.26	0.44	0	1
East and Southeast Asia	112	0.06	0.24	0	1
Latin America	112	0.19	0.39	0	1
OECD	112	0.18	0.38	0	1
English Legal Origins	112	0.23	0.42	0	1
German Legal Origins	112	0.04	0.21	0	1
Scandinavian Legal Origins	112	0.04	0.19	0	1
Socialist Legal Origins	112	0.20	0.40	0	1
French Legal Origins	112	0.49	0.50	0	1
Fractionalization	102	0.32	0.29	0	1
Corruption Perceptions Index	101	4.32	2.20	1.65	9.64
Government Effectiveness	46	0.87	0.97	-0.85	2.19

Sources: See data appendix.

Table 2: Capacity and Performance: Cross-Sectional Results

	(1)	(2)	(3)	(4)	(5)
	log Y/L	log Y/L	log Y/L	log Y/L	log Y/L
Direct Tax Share	3.665***	2.084***	2.246***	2.425***	2.066***
	(8.88)	(4.05)	(3.83)	(3.66)	(3.57)
Income Tax Share					
Govt Size	-0.020***	-0.019**	-0.018*	-0.017*	-0.012
	(2.49)	(1.99)	(1.80)	(1.75)	(0.39)
Federal	0.328**	0.155	0.200	0.251	0.135
	(2.41)	(1.27)	(1.34)	(1.48)	(0.80)
Trade Openness	0.005***	0.005***	0.002***	0.005***	0.004**
	(3.37)	(3.24)	(3.17)	(3.08)	(2.29)
Fractionalization				-0.168	-0.065
				(0.55)	(0.22)
Corruption					0.238
					(4.58)
Govt Effectiveness					
Continents	No	Yes	Yes	Yes	Yes
Legal Origins	No	No	Yes	Yes	Yes
Sample	1975-2004	1975-2004	1975-2004	1975-2004	1975-2004
Observations	112	112	112	102	91
Adjusted R^2	0.468	0.614	0.607	0.653	0.721

*significant at 10%; **significant at 5%; ***significant at 1%.

Notes: Robust standard errors; t-statistics in parentheses.

Table 2 Continued: Cross-Sectional Results

	(6)	(7)	(8)	(9)
	log Y/L	log Y/L	log Y/L	TFP
Direct Tax Share	1.046*	3.085***		0.455***
	(1.91)	(4.92)		(2.97)
Income Tax Share			1.241**	
			(2.26)	
Govt Size	-0.001	-0.009	-0.021**	-0.004
	(0.11)	(0.70)	(2.07)	(1.14)
Federal	0.101	0.013	0.294*	0.098*
	(0.58)	(0.08)	(1.81)	(1.89)
Trade Openness	0.001	0.006***	0.007***	0.001
	(0.61)	(3.54)	(3.16)	(0.79)
Fractionalization	-0.504			
	(1.39)			
Corruption	0.052			
	(0.58)			
Govt Effectiveness	0.296			
	(1.29)			
Continents	Yes	Yes	Yes	Yes
Legal Origins	Yes	Yes	Yes	Yes
Sample	1975-2004	1990-2000	1975-2004	1975-2004
Observations	46	96	111	89
Adjusted R^2	0.764	0.577	0.543	0.660

*significant at 10%; **significant at 5%; ***significant at 1%.

Notes: Robust standard errors; t-statistics in parentheses.

Table 3: Capacity and Performance: Panel Results

	(1)	(2)	(3)	(4)
	log Y/L	log Y/L	log Y/L	log Y/L
Lagged log Y/L		0.580***		0.615***
		(7.25)		(7.43)
Direct Tax Share	0.866***	0.465***		
	(4.34)	(2.97)		
Income Tax Share			0.803***	0.192
			(4.20)	(0.85)
Government Size	0.002	-0.001	-0.001	-0.002
	(0.47)	(0.30)	(0.18)	(1.08)
Trade Openness	0.001	0.001	0.001	0.001
	(1.52)	(1.28)	(1.61)	(1.24)
No of Countries	111	108	110	107
Observations	454	369	452	368
Within R^2	0.289	0.625	0.276	0.595

*significant at 10%; **significant at 5%; ***significant at 1%.

Notes: Robust standard errors; t-statistics in parentheses.

All regressions include fixed effects by country and time.

Table 4: Summary Statistics for Instrumental Variables

	Mean	Std Dev	Min	Max
COW Ext Conflict to 1975 (Dummy)	0.07	0.10	0	0.61
COW Ext Conflict to 1975 (Battle Deaths)	251,924	678,914	0	5,343,613
COW Ext Conflict to 1938 (Battle Deaths)	99,280	343,878	0	2,115,022
COW Ext Conflict to 1913 (Battle Deaths)	19,431	64,363	0	356,400
Clodfelter Ext Conflict to 1913 (Casualties)	37,762	127,590	0	948,464
COW Int Conflict to 1975 (Dummy)	0.05	0.10	0	0.67
COW Int Conflict to 1975 (Battle Deaths)	30,649	111,904	0	734,900
COW Int Conflict to 1938 (Battle Deaths)	13,535	66,382	0	583,900
COW Int Conflict to 1913 (Battle Deaths)	12,562	64,592	0	564,900
Polity IV Democracy to 1975	-1.92	5.56	-10	10

Sources: See data appendix.

Notes: There are data for 112 countries.

Table 5: Capacity and Performance: 2SLS Results

	(1)	(2)	(3)	(4)
	log Y/L	log Y/L	log Y/L	log Y/L
Share of Direct Taxes	6.700***	4.922***	4.915***	5.247***
	(6.82)	(6.63)	(5.80)	(4.30)
Government Size	-0.009	-0.015*	-0.015*	-0.014
	(0.95)	(1.88)	(1.80)	(1.50)
Federal	-0.098	0.152	0.153	0.106
	(0.36)	(0.79)	(0.46)	(0.46)
Trade Openness	0.003**	0.004***	0.004***	0.004***
	(2.01)	(2.94)	(2.95)	(2.77)
Instruments used:				
COW Ext Conflict to 1975 (Dummy)	Yes	No	No	No
COW Int Conflict to 1975 (Dummy)	Yes	No	No	No
COW Ext Conflict to 1975 (Battle Deaths)	No	Yes	No	No
COW Int Conflict to 1975 (Battle Deaths)	No	Yes	No	No
COW Ext Conflict to 1938 (Battle Deaths)	No	No	Yes	No
COW Int Conflict to 1938 (Battle Deaths)	No	No	Yes	No
COW Ext Conflict to 1913 (Battle Deaths)	No	No	No	Yes
COW Int Conflict to 1913 (Battle Deaths)	No	No	No	Yes
Hansen's J χ^2 overidentifying test	4.405**	0.034	1.499	2.433
F-test of excluded instruments	13.42***	4.86***	3.35**	2.44*
No of observations	112	112	112	112
Centered R^2	0.262	0.448	0.449	0.426

*significant at 10%; **significant at 5%; ***significant at 1%.

Notes: Robust standard errors; t-statistics in parentheses.

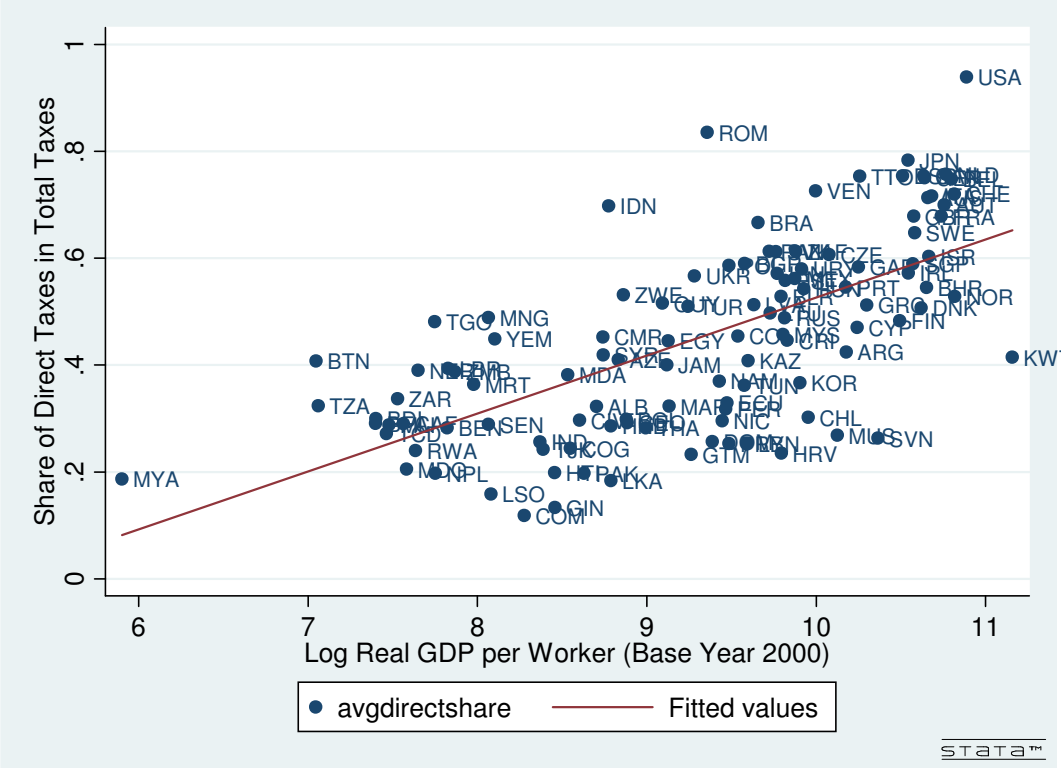
Table 5 Continued: 2SLS Results

	(5)	(6)	(7)	(8)
	log Y/L	log Y/L	log Y/L	log Y/L
Share of Direct Taxes	5.301***	4.619***	7.494***	6.553***
	(6.82)	(4.62)	(5.37)	(6.19)
Government Size	-0.014	-0.016*	-0.007	-0.010
	(1.52)	(1.89)	(0.55)	(0.98)
Federal	0.098	0.194	-0.209	-0.077
	(0.40)	(0.98)	(0.61)	(0.28)
Trade Openness	0.004***	0.004***	0.003	0.004**
	(2.72)	(3.08)	(1.64)	(2.04)
Instruments used:				
Clodfelter Ext Conflict to 1913 (Casualties)	Yes	Yes	Yes	No
COW Int Conflict to 1913 (Battle Deaths)	No	Yes	No	No
Polity IV Democracy to 1975	No	No	Yes	Yes
COW Ext Conflict to 1975 (Battle Deaths)	No	No	No	Yes
COW Int Conflict to 1975 (Battle Deaths)	No	No	No	Yes
Hansen's J χ^2 overidentifying test		1.381	2.474	3.889
F-test of excluded instruments	5.05**	3.59**	7.32***	6.01***
No of observations	112	112	112	112
Centered R^2	0.421	0.465	0.129	0.283

*significant at 10%; **significant at 5%; ***significant at 1%.

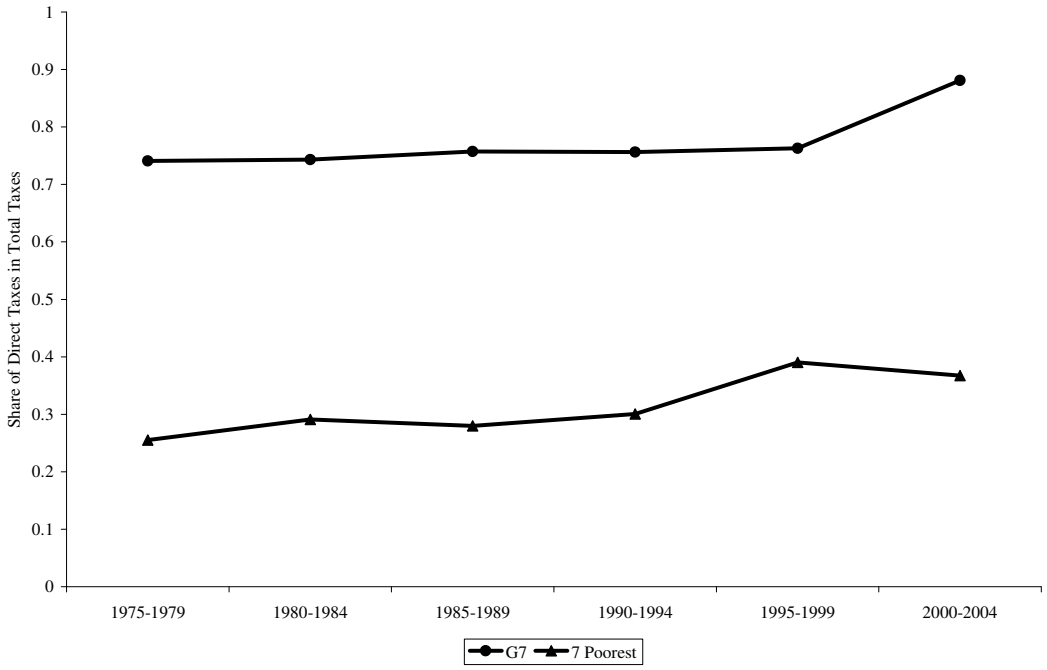
Notes: Robust standard errors; t-statistics in parentheses.

Figure 1: Fiscal Capacity and Worker Productivity: Cross-sectional Averages, 1975-2004



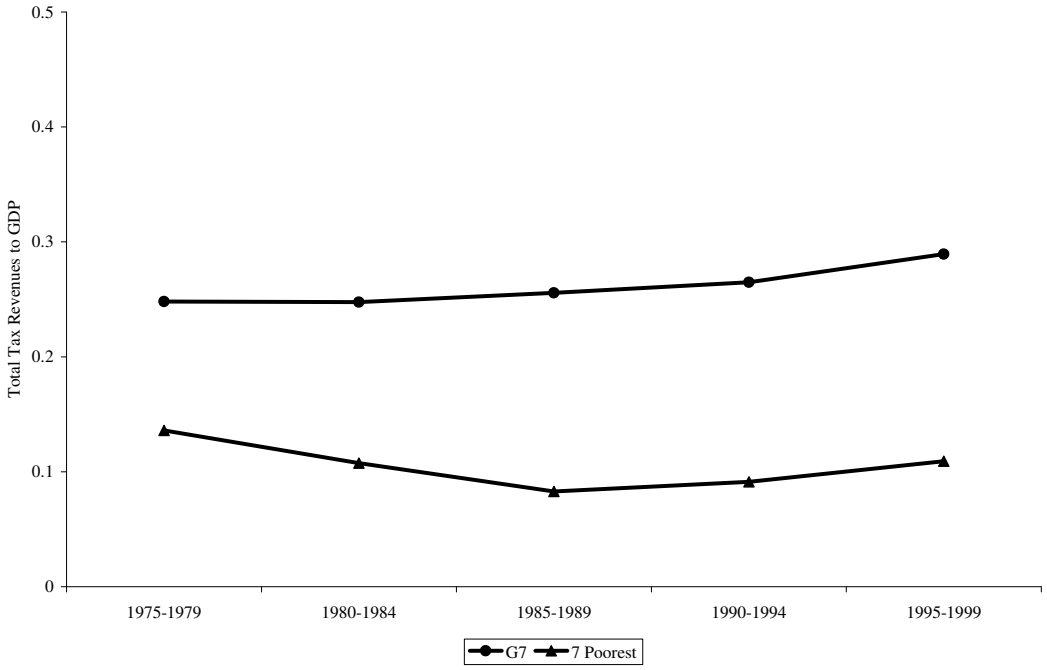
Sources: IMF Government Financial Statistics (tax data); Penn World Tables (GDP per worker data).

Figure 2: Share of Revenues from Direct Taxes for Richest and Poorest Sample Countries: Five-Year Averages, 1975-2004



Source: IMF Government Financial Statistics.

Figure 3: Total Tax Revenues to GDP for Richest and Poorest Sample Countries: Five-Year Averages, 1975-1999



Source: IMF Government Financial Statistics.