University of Nevada, Reno
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UNR Economics Working Paper Series
Working Paper No. 06-0018

Explaining the Variation in Tax Structures in the MENA Region

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December, 2006

Abstract

This paper examines the tax structures of the Middle East and North Africa (MENA) countries by focusing on the quality of governance and demographic changes as two influential factors in region's economies. The objective of is to determine whether these factors can explain the variation in the tax structures of these countries. Results from regressions on the MENA countries and the ones based on a larger sample of 61 countries show that these factors affected the level of taxation, measured by the tax ratio, more strongly than they affected the tax composition. While the quality of governance seems to have affected the tax structures in the MENA countries more than in other comparable Non-OECD countries, demographics seems to have played a bigger role in determining the tax structures in other Non-OECD countries. However, neither of these factors explained changes in the income tax share satisfactorily. One key result is that the increase in the quality of governance has decreased the reliance on domestic taxes on goods and services. The paper provides a discussion on the policy implications of these results.

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1. Introduction

Developing countries have experienced major changes in their tax systems in the last four decades. These changes have been largely attributed to forces that include changes in major economic variables, government policies, demographic and other socio-economic trends and domestic and international political environment. However, there has also been a substantial variation in these forces across different countries that have widely different tax structures. It is indeed shown that the tax structures of developing countries vary extensively (Tanzi, 1992; Zee, 1996 and Tanzi and Zee, 2000). As recently mentioned in the literature, it is surprising to see so few studies that examine tax structure changes across countries (Volkerink and DeHaan, 1999; Tanzi and Davoodi, 2000; Kenny and Winer, 2001). To set the stage for an analysis of tax policy in developing countries, Tanzi and Zee (2000) listed four major challenges to efficient tax systems in developing countries. The first is the difficulty in income tax base calculations due to irregular earnings. The second difficulty is the absence of "well-educated and well-trained" staff in tax administration. The third is the "informal structure of the economy" and difficulties in policy analysis due to lack of data or problems with existing data. The final challenge noted, is uneven income distribution in developing countries, which prevents enactment of progressive taxes. Tanzi and Zee concluded "tax policy is often the art of the possible rather than the pursuit of the optimal."

This paper examines the relationship between tax structures, and governance and demographics as two forces that are strongly related to the abovementioned challenges to developing country tax systems. The objective of this study is to determine whether these two forces can explain the variation in the tax structures of countries, particularly in the Middle East

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and North Africa (MENA), over a period of two decades. To date, these links have been left mainly unexamined. For example, Tanzi and Davoodi (2000) noted that previous studies focused on the effect of corruption on overall taxation levels but not on tax composition.

There are good reasons for a curiosity in the MENA countries as a group for analysis and comparison. First, the MENA countries differ considerably from both OECD and other Non-OECD countries in their economic and demographic structures, trade orientation and quality of governance and they differ among themselves as well. The MENA region includes countries that have unique characteristics such as economic dependency on sizeable oil reserves, poor governance and astounding growth in the working-age population[1] mainly due to high population growth in the region. A study by Abed (1998) gives a comprehensive overview of the trade liberalization experience of Southern Mediterranean Region (SMR) countries through EU's Association Agreements. While Abed discussed various tax reform proposals needed to counteract revenue losses from tariff reductions, he did not provide an empirical estimation of the effect of trade liberalization on the tax structures.[2] In a recent study, Tosun (2004a) did not a find a major impact of trade openness on the tax structures of MENA countries, pointing to other forces that might have been dominant for these countries. Thus, a broader examination of the tax structures of MENA countries would be a natural extension of previous research in this area, making it possible to examine the roles of demographic changes and quality of governance in determining the tax structures.

The paper is structured as follows. The next section reviews recent trends in governance, demographics and tax structures in the MENA, OECD and other Non-OECD countries. Section 3 provides the theoretical underpinnings that guide the empirical analysis. Section 4 describes

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[1] Dhonte, Bhattacharya and Yousef (2000) call this a "demographic explosion".
[2] Eltony (2002) examined the tax structures and tax efforts of only Arab countries.

the variables in the empirical analysis, the empirical specification and the data. Section 5 presents the empirical results and provides interpretations. The final section provides concluding remarks and discusses policy implications of the results.

2. Trends in the MENA Countries

Quality of Governance

Governance is a term that is widely used in various circles including the academia and the popular media. To understand the concept of good governance, it is imperative to define governance first. Governance is defined in the 2002 Arab Human Development Report as "the exercise of economic, political and administrative authority to manage a country's affairs at all levels" (UNDP and Arab Fund for Economic and Social Development, 2002: 105). Referring to the UNDP, the same report lists participation, rule of law, transparency, responsiveness, equity, accountability and strategic vision as characteristics of good governance. In turn, good governance is defined as "a set of societal institutions that fully represent the people, interlinked by a solid network of institutional regulation and accountability (with ultimate accountability to the people), whose purpose is to achieve the welfare of all members of society" (UNDP and Arab Fund for Economic and Social Development, 2002: 106). The next question is to find a good measure of governance that can be used to compare countries over long time periods. Such a measure is necessary for statistical comparisons as well as for rigorous econometric analysis. One measure that meets the criteria is the quality of governance indicators that are produced by Stephen Knack and the IRIS Center in the University of Maryland, which are based on the International Country Risk Guide (ICRG) data released by the PRS Group.

This dataset (from now on the IRIS data) includes the following variables - corruption in government, rule of law (law and order tradition), bureaucratic quality, ethnic tensions,

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repudiation of contracts by government and risk of appropriation - and covers 130 countries over the period 1982 through 1997. Table 1 shows these variables and the IRIS data averaged for the MENA, OECD and other Non-OECD countries for the periods 1982-84, 1988-90, 1995-97, 1982-89 and 1990-97. The additional variable called "quality of governance" is the average of corruption in government, rule of law and bureaucratic quality[3] and has been recently used as a measure of governance quality (Knack, 2001). Components of the quality of governance in the IRIS data, particularly corruption in government," were used in many other studies including Tanzi and Davoodi (2000), Mauro (1996) and Knack and Keefer (1995).

Table 1 shows that the MENA countries have performed poorly in almost all governance indicators compared to both OECD countries and other Non-OECD countries. However, these countries also exhibited significant improvement in these indicators from 1982 to 1997. The improvement in governance in the MENA countries is particularly noteworthy for the 1990-1997 period, which is a trend that is not seen at the same magnitude in other comparison countries. This confirms the uniqueness of the MENA countries in terms of the quality of governance.

Governance and Taxation

The relationship between governance and taxes has been a topic of interest in the Middle Eastern and North African civilizations for centuries. The famous vizier of the Seljuk Turks, Nizam al-Mulk (1018-1092)[4], wrote in his Siyasat-nama[5] (about good governance and taxation) that "the ruler should not oppress his subjects by levying illegal taxes" and it is the ruler's "duty to see that the governors of the provinces, the tax collectors and the soldiers do not take recourse

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[3] There is high positive correlation between these three measures. The correlation coefficients between these variables are as follows: corruption-bureaucratic quality (0.84), corruption-rule of law (0.77), rule of law-bureaucratic quality (0.78).

[4] Of Persian descent, his name translates as "the order of the state". His name at birth was Abn Ali al-Hasan bin Ali ibn Ishâq al-Tusi.

[5] This book was translated to English by Hubert Darke as "The Book of Government or Rules for Kings" (see Nizam al-Mulk, 1978).

to illegal taxation and oppressive extortion" (Khan, 1989). The famous fourteenth century Arab philosopher and statesman Ibn Khaldun, whose writings on history and economics, including the theory of taxation, later echoed in the writings of the classical economists, highlighted the importance of tax administration in the chapter of his *Muqaddimah* on dynasties, royal authority and government ranks. Referring to the political power of the ministry of financial operations and taxation, Ibn Khaldun asserts "the person who holds the office of tax collections has a good part of the royal authority for himself" (Ibn Khaldun, 1967: 198-201).

Governance is still a critical issue for today's MENA countries. According to the Middle East and North Africa regional report by Leenders and Sfakianasis (2003) published in Transparency International's 2003 edition of the Global Corruption Report[6], corruption in the MENA countries thrives "in virtually all domains of economic, administrative and political activity" (Leenders and Sfakianasis, 2003: 205). The report describes this as "endemic corruption" and notes that polls on business people throughout the region show taxes and corruption as two important challenges to business environment in the MENA countries.

As a prelude to the empirical analysis in the following sections, Figures 1 through 8 provide scatter plots of the sample period (1982-97) averages that show the simple relationship between quality of governance and the level and structure of taxes in the MENA countries. Figure 1 shows a negative relationship between tax ratio (ratio of taxes to GDP) and quality of governance. Similar negative relationships are seen in Figures 6 and 8 for the share of domestic taxes on goods and services and the share of other taxes. All other tax shares in Figures 2 through 5 and Figure 7 show a positive relationship with the quality of governance. These figures also show the wide variation in both these tax shares and quality of governance for the MENA countries.

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[6] The 2003 Global Corruption Report can be accessed at http://www.globalcorruptionreport.org/gcr2003.htm.

Demography

As the 2003 Arab Human Development Report shows, Arab countries exhibit unique demographic characteristics. Despite significant decreases, they have higher fertility and population growth rates than other countries and regions. It is also noted that they have a significantly younger age structure. The report concludes that this can present a "demographic gift or a demographic curse" depending on whether the high population growth and fertility can be transformed into human wealth through capital investments and technological progress. Similarly, in a recent study, Dhonte, Bhattacharya and Yousef (2000) argue that the expected "explosion" in working-age population in the Middle East present challenges as well as opportunities for these countries. The authors argue that the opportunities can flourish given the right institutional developments in the region. International Monetary Fund's (IMF) September 2004 issue of the World Economic Outlook provides further hope that working-age population increase in the Middle East could have a significant positive impact on growth in real GDP per capita between 2000 and 2050. The report shows that this contrasts significantly with expected slow GDP per capita growth in countries with aging populations.

While these recent reports tell us about the uniqueness of demographic trends in the Middle East or Arab countries and their significance in terms of economic performance, it would be useful to look at selected population statistics for the MENA countries as a whole. Table 2 shows comparative statistics on population growth, labor force, 15-64 and 0-14 age groups and urban population for the MENA, OECD and other Non-OECD countries.[7] The MENA countries have consistently had the highest population growth rates and the highest share of population in

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[7] Another important indicator, the unemployment rate, is not shown due to lack of data in the World Development Indicators.

the 0-14 age group compared to other country groups throughout the 1982-97 period. However,

there has also been a considerable decrease in the population growth rate in the MENA countries

between 1982 and 1997. In addition, the share of population in the 15-64 age group and the

share of labor force in total population have been below the corresponding shares in other

country groups throughout the 1982-97 period. The share of urban population in total population

falls between the shares for OECD countries and other Non-OECD countries.

Tax Revenues

There have been considerable changes in the tax structures of both MENA and other

countries. Table 3 shows the tax structure changes for a selection of 61 countries between 1982-

84 and 1995-97.[8] Description of tax classifications are provided in a footnote to Table 3.

Comparing first the differences in tax composition in 1995-97 across countries, OECD

countries rely significantly less on international trade taxes and more on income taxes compared

to all other groups. Also, OECD countries draw more tax revenue from social security

contributions compared to other countries. There is considerably greater reliance on trade taxes

in MENA countries compared to all other countries. Next, Table 3 shows that OECD, MENA

and other Non-OECD countries all decreased their reliance on international trade taxes between

1982-84 and 1995-97. Another trend is greater reliance over time on domestic taxes on goods

and services in these groups, particularly in OECD countries and other Non-OECD countries.

While taxes on income, profits and capital gains, domestic taxes on goods and services and taxes

on international trade and transactions are the three major tax revenue sources for the MENA and

other Non-OECD countries, OECD countries differ by relying significantly more on social

security contributions than on international trade taxes. It should be noted that Table 3 does not

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[8] See Appendix Table 1 for a list of sample countries classified into different regional or economic groups.

show the variability in tax structures within each country group. The variability in tax structures in the MENA countries can be better seen in Figures 1 through 8.

3. Tax Structures: Theoretical Considerations

Tax structures could be analyzed in a number of theoretical models. Optimal taxation literature points to ways to make tax systems "better" in terms of economic efficiency and equity (Ramsey, 1927; Diamond and Mirrlees, 1971; Diamond, 1975; Stern, 1987). Slemrod, (1990) distinguishes between optimal taxation and optimal tax systems and argues that the administration of taxes or the "technology of raising taxes" is a critical element in tax systems.

The mechanisms behind the choice of tax instruments by governments have been formally addressed in the recent literature on the positive theory of tax structure[9]. One approach is to derive a politically optimal tax structure. Hettich and Winer (1984), and recently Kenny and Winer (2001) used a probabilistic voting model to explain the general nature of tax systems. In the probabilistic voting model, the objective of each political group or party is to maximize the expected votes to win an election. It is different from the median voter model in the way that there is an uncertainty involved regarding voters' behavior. Voters derive benefit from the public good while incurring income and welfare losses from taxation. The cost and benefit of taxation determine the probability that each voter will vote for the incumbent. A politically optimal tax structure dictates that marginal political cost of increasing a tax rate should be equal to its marginal political benefit for all activities and voters. Using such a framework as a basis for empirical work, Kenny and Winer (2001) argued that all taxes are subject to increasing marginal political cost. They found that as the scale or size of total revenues increases, countries rely more on taxes with large bases.

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[9] Hettich and Winer (1999) provide an extensive survey of political economy models of taxation.

Since governance is about political and administrative authority, the relationship between governance and tax structures can be addressed within the political economy models of tax structures. However, some recent studies examined the direct link between components of governance, particularly corruption, and taxation. The consensus from the literature on corruption and taxation is that total tax revenue is lower in countries that suffer from high corruption. Tanzi and Davoodi (2000) and Friedman, Johnson, Kaufmann and Zoido-Lobaton (2000) argue that the tax revenue officially received by the government fall below the total taxes paid by taxpayers in highly corrupt economies, leading to a lower tax ratio (ratio of tax revenue to GDP). Barreto and Alm (2003) found, within a theoretical endogenous growth framework, that "optimal size of government is smaller in an economy with corruption than in one without corruption." Since quality of governance is associated with low corruption[10], a positive relationship is expected between quality of governance and the tax ratio.

Tanzi and Davoodi (2000) pointed out that similar analyses and consensus could not be found for the effect of corruption on tax composition. However, they made plausible arguments and raised interesting questions on this issue. For example, referring to recent surveys, they asserted that corruption might be more prevalent in customs. They asked whether corruption reduces taxes from customs more than other taxes. They also argued that revenue from value added taxes (VAT) might be more resistant to corruption. Their results showed that corruption reduces the ratio of tax revenue to GDP, individual income taxes and VAT, sales and turnover taxes. Contrary to the surveys mentioned above, they find no relationship between international trade taxes and corruption. While these results are useful for comparison, Tanzi and Davoodi did

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[10] The coefficient of correlation between quality of governance and corruption in government in the MENA countries is 0.93. Note again that, according to the IRIS dataset, higher values of the corruption indicator means lower corruption in government.

not use tax shares (ratio of each tax to total tax revenue) in their tax structure analysis; they also focused only on corruption rather than examining the more general concept of governance.

Barreto and Alm (2003) differ from other studies by addressing directly the theoretical link between corruption and optimal tax structure. In their endogenous growth model, there are two agents, a public agent that captures the corruption income and pays only the consumption tax and a private agent that pays both the income and the consumption tax. They show that the public agent prefers a tax structure with higher income tax and a lower consumption tax while the reverse is true for the private agent. In the presence of corruption, maximization of a utilitarian social welfare function that derives their optimal tax result produces an optimal tax structure that weighs more heavily on consumption taxes than income taxes. It would be interesting to see in the following sections whether such relationship holds for the MENA countries.

The relationship between demographics and the tax structures is less clear. For one thing, there is only scant literature that addresses this issue. Among the few studies on the relationship between demographic change and total tax revenues, Hondroyiannis and Papapetrou (2000) show, using time series data for Greece for the period 1960-95, that low fertility rates and high old-age dependency ratio (ratio of elderly to working young) have led to a decrease in total tax revenues. Hence they found evidence of a positive link between population growth and tax revenues. Another study by Goudswaard and Van de Kar (1994) confirms this relationship for Netherlands. In their simulation study, tax revenue rises with population growth until 2010 and falls after 2030 when the population starts its decline. Links between demographic changes and

the composition of taxes can not be clearly determined from the theory, which is certainly an area that needs further study.[11]

4. Empirical Analysis

4.1 Empirical Strategy

While the focus of this paper is the MENA countries, comparison with other regions and countries would give a more accurate picture of where MENA countries stand in terms of governance, demographics and tax structures. Hence, the empirical analysis is conducted in two stages. In the first stage, the effect of governance and demography on tax structures is shown only for a sample of 12 MENA countries. In the second stage, a larger sample that includes both MENA countries and OECD and other Non-OECD countries is used to show the differences between these country groups.

4.2 Dependent Variables

The empirical analysis uses tax ratio (ratio of tax revenue to GDP) and seven major components of total tax revenue. Accordingly, total tax revenue (T) is defined as

$$T = PCT + SST + PAYT + PROPT + GST + IT + OT, \qquad (1)$$

where, PCT is personal and corporate taxes on income, profits and capital gains, SST is social security contributions from both the employees and the employers, $PAYT$ is payroll taxes, $PROPT$ is property taxes, GST is domestic taxes on goods and services taxes, IT is international trade taxes and OT is all other taxes. Accordingly, tax shares are defined as the ratio of each tax on the right hand side of (1) to total tax revenue on the left hand side of (1). This implies that

$$\frac{PCT}{T} + \frac{SST}{T} + \frac{PAYT}{T} + \frac{PROPT}{T} + \frac{GST}{T} + \frac{IT}{T} + \frac{OT}{T} = 1. \qquad (2)$$

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[11] In a series of simulations for the developed and developing regions, Tosun (2004b) shows that a decrease in the population growth rate in the developed region could lead to a decline in the income tax rate. Simulations with international migration show that the flow of young workers to the developed region could offset this decline. Thus, Tosun (2004b) found a positive link between the population growth rate and the income tax rate in a stylized model.

Tax structure changes can be examined by using each of the seven tax shares in (2) as dependent variables in regressions that form a seemingly unrelated system (Kenny and Winer, 2001). In this seemingly unrelated system, the value of the coefficients of the explanatory variables would also sum to 0. The regression analysis uses tax ratio (T/GDP) and seven tax shares in (2) as dependent variables.

4.3 Explanatory Variables and Other Control Variables

The key explanatory variables are *Governance* and *Demography*. *Governance* is the quality of governance indicator, which is the average of corruption in government, rule of law and bureaucratic quality from the IRIS data. *Demography* represents a set of various demographic variables shown earlier in Table 2 – population growth rate, share of labor force in total population, share of population in 15-64 age group, share of population in 0-14 age group and share of urban population in total population. Based on the arguments in section 3, an increase in the quality of governance is expected to increase the tax ratio and decrease the reliance on domestic taxes on goods and services. Population growth rate, greater share of labor force and share of population in 15-64 group are expected to increase the tax ratio since such demographic changes would increase the base of most taxes. The share of population in the 0-14 age group is not expected to have a positive effect on the tax ration since the contribution of this economically inactive group to tax revenue is expected to be small. However, the effect of these changes on the tax shares is not clear. Nevertheless, there may be a positive relationship between, for example, share of labor force and payroll, social security and income taxes. As for the share of urban population, Kenny and Winer (2001) argue that "land is more valuable in urban and densely populated areas and thus offers a larger tax base." (Kenny and Winer, 2001: 26). Their results show that population density has a positive and significant effect on the

property tax share. Hence, a similar relationship may be observed between the share of urban

population and property taxes.

The remaining control variables include *Openness*, which is defined as the ratio of the

sum of exports and imports to the gross domestic product.[12] A liberalized trade structure is

expected to trigger a shift from international trade taxes to other taxes in the tax structure,

particularly domestic taxes on goods and services.[13] *GDP growth* controls for the general

economic performance of low, lower-middle, upper-middle, and high-income countries. In

addition, GDP growth directly affects tax bases.[14] While there is no consensus on which tax

base is more or less affected by GDP growth, the proposition that different tax bases will be

affected differently, as economic growth occurs, can be a strong one. Groves and Kahn (1952)

and Holcombe and Sobel (1997) provide two examples of the income elasticity comparisons for

different taxes. Both studies, using data from the United States, show considerable dispersion in

income elasticities of various taxes. Holcombe and Sobel (1997) also distinguish between long-

run and short-run elasticity estimates and show that there is greater variability in short-run

estimates. Tosun and Abizadeh (2003) show that growth in GDP per capita has had a significant

impact on the tax structures of OECD countries. The authors argue that the greatest impact was

indeed on personal income taxes and goods and services taxes. Finally, *year dummies* are used

to capture the effect of any time specific events.

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[12] While this measure of openness is widely used in the literature, it is argued to be imperfect particularly in the
context of the MENA region. For instance, liberalizing producer goods does not have the same meaning and impact
as liberalizing consumer goods. However, the ratio of the sum of exports and imports to the gross domestic product
appears to be the only common openness indicator available particularly for panel data analysis.
[13] Keen and Ligthart (2002) argued that replacement of import duties and export taxes with domestic consumption
taxes improves welfare and increases revenues. However, while Tosun (2004a) found evidence of this for the Non-
OECD countries in general, he did not find such relationship in the MENA countries.
[14] GDP growth was chosen to GDP itself due to strong evidence of multicollinearity between GDP and other
explanatory variables in the regression.

4.4 Empirical Specification

As also argued by Kenny and Winer (2001), a way to efficiently estimate the seemingly unrelated system in (2) is to include exactly the same set of explanatory variables described in the previous section in each regression.[15] Fixed-effects and random-effects procedures are the two typical approaches for estimating panel data. A fixed effects model has the advantage of removing the bias from the estimation caused by a possible correlation between the explanatory variables and time-invariant country specific effects. This approach in a sense uses countries as controls for themselves. Another important characteristic of the fixed effects model is that it produces consistent estimates even when the random effects model is valid. The dependent variable as defined in section 4.2 is either the tax ratio (T/GDP) or the share of each tax in total tax revenues as defined in equation (2). The following specification is used to run regressions for the MENA countries:

$$Tax_{it}^{j} = \alpha + \beta_1 Governance_{it} + \gamma Demography_{it} + \eta Z_{it} + f_i + \phi_t + \varepsilon_{it}, \qquad (3)$$

where "Tax_{it}^{j}" is the tax j (either the tax ratio of the share of the specific tax) in country i at time t. *Governance* is the quality of governance indicator as described earlier and *Demography* is a vector of demographic variables as listed before. f_i represents the unobservable country specific, time-invariant effects, ϕ_t represents unobservable time specific effects[16], and ε_{it} represents time-variant unsystematic effects and is i.i.d. Z_{it} includes all remaining control variables that are described in the previous section. In equation (3) the coefficients of interest are β_1 and the coefficient vector γ.

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[15] A combined seemingly unrelated regression (SUR) model would be preferred to running separate regression equations when explanatory variables differ between these equations. SUR would then be relevant because the errors associated with the dependent variables may be correlated. However, when same set of explanatory variables is used, SUR gives the same results in terms of coefficients and standard errors as separate regressions.

[16] The year 1982 is excluded to avoid the dummy variable trap.

In the second stage of the empirical analysis, sample is raised to 61 countries that include MENA, OECD and other Non-OECD countries. While the same set of explanatory variables as in equation (3) are used, interaction terms are added to these new regressions to identify the differences in results between the country groups. For these regressions, the specification in equation (3) is changed to:

$$
\begin{aligned}
Tax_{it}^{j} = \alpha &+ \beta_1 Governance_{it} + \beta_2 Governance_{it} * MENA + \beta_3 Governance_{it} * Ot.Non-OECD \\
&+ \gamma_1 Demography_{it} + \gamma_2 Demography_{it} * MENA + \gamma_3 Demography_{it} * Ot.Non-OECD \quad (4)\\
&+ \delta_1 Ot.Non-OECD + \eta Z_{it} + f_i + \phi_t + \varepsilon_{it},
\end{aligned}
$$

where *MENA* is a dummy variable that takes the value 1 if the country is a MENA country in a given year and 0 otherwise and *Ot.Non-OECD* is a dummy variable that takes the value 1 if the country is a Non-OECD country other than MENA and 0 otherwise. Dummy variable and corresponding interaction terms for the OECD countries are omitted to avoid perfect multicollinearity. The specifications in (3) and (4) will be used in two different sets of regressions in section 5.

4.5 Data Sources

Data for the regression analysis comes from three main sources: the IRIS data created from the International Country Risk Guide (ICRG, 2004), Government Finance Statistics CD-ROM (IMF, 2003) and World Development Indicators CD-ROM (World Bank, 2003). The period for analysis is 1982-1997, due to data availability. The pre-1982 data is not available for many countries and for many data series. As shown in Appendix Table 1, there are 61 countries in the sample of which, 26 are OECD countries. Out of 35 Non-OECD countries, 12 are MENA countries. Descriptive statistics for the variables used in regression specifications (3) and (4) are presented in Table 4 and Table 5, respectively.

5. Empirical Results

Using econometric specifications in equations (3) and (4), fixed effects estimation with panel data is used in all regressions. As a start, a simple *F*-test is used for the joint significance of the dummies that form the fixed effects. In all regressions, the null hypothesis, which says that fixed-effect dummies are "not significant", is resoundingly rejected.[17] In addition to this, a Hausman specification test[18] for random effects is conducted to check the robustness of the fixed effects specification. In a random effects model, the assumption is that individual country effects f_i in equations (3) and (4) and all other regressors shown in the same equations are uncorrelated. However, if they are correlated then the coefficient estimates of the regressors in a random effects model will be inconsistent and systematically different from those for a fixed effects model, and the fixed effects model is strictly a better choice.[19] In Hausman specification test, the null hypothesis says that coefficient estimates of the fixed effects and random effects models are not systematically different from each other. Hausman specification tests show that fixed effects specification is clearly more appropriate for some of the regressions. However, the tests were inconclusive in others. To further check whether the fixed-effects estimation is indeed appropriate, Breusch-Pagan Lagrange multiplier test for random effects is used. Random effects model is rejected in all regressions. Therefore, the fixed effects estimation is used for comparison of results.

MENA Country Regressions

The results for the first set of regressions for only the MENA countries are shown in Table 6. The results for the level of taxes in column (1) are as expected. Quality of governance,

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[17] See Baltagi (1995: 12) for the specifics of this test.

[18] See Hausman (1978) for the original description of this test.

[19] Fixed effects regression produces unbiased and consistent estimates even when the random effects model is valid. However, the fixed effects estimator is not as efficient as the random effects estimator.

population growth and the share of population in the 15-64 age group all have positive and statistically significant effects on the tax ratio. These effects are in line with the arguments and expectations set forth in sections 3 and 4.3. It is particularly noteworthy to see a large positive effect from the quality of governance indicator. However, the share of population in the 0-14 age group has a large negative and statistically significant effect on the tax ratio. As argued before, this is the economically inactive group that may be limiting the purchasing power of households without contributing much to tax revenue. This is an important result for the MENA countries since the 0-14 age group is the fastest growing age group in these countries. Nevertheless, it is a relief to see that the positive effect of the working age population in the 15-64 age group balances this negative effect.

The results for the tax shares shown in columns (2)-(8) are not as strong as the ones for the tax ratio. Quality of governance has a significant and negative effect on only the payroll tax share and the property tax share which are two fairly insignificant revenue sources for the MENA countries. The results for the income tax, goods and services tax and trade tax are not only significant but also contrary to our expectations based on previous empirical and theoretical studies. For example, an optimal tax mix as shown by Barreto and Alm (2003) should lead to greater reliance on income taxes (or lesser reliance on goods and services taxes) with an increase in the quality of governance. The signs of the coefficients of the quality of governance variable in the income tax share and goods and services tax share regressions are showing an opposite relationship. As in Tanzi and Davoodi (2000), there is no significant relationship between the quality of governance and the trade tax share. On the other hand, we see expected positive relationships between the share of labor force and the payroll tax share and the social security tax share. In addition, similar to their effect on the tax ratio, the share of population in the 15-64 age

group and the share of population in the 0-14 age group have, respectively, significant positive and significant negative effects on the goods and services tax share.

Regressions for all 61 Countries

Regression results in Table 7 bring out the significance of governance and demographics for the tax structure in the MENA countries relative to other country groups. Starting with the results for the tax ratio in column (1), as the coefficient of *Governance*MENA* shows, the quality of governance has a particularly strong positive and significant effect on the tax ratio in the MENA countries relative to OECD and other Non-OECD countries. This, together with the result in Table 6, shows the significance of governance for the level of taxation in the MENA countries. The share of population in both the 15-64 and 0-14 age groups have significant positive effects on the tax ratio in the MENA countries. This contrasts with the negative and significant effect for the 0-14 age group shown in Table 6. Hence, this economically inactive age group is still an asset for revenue generation in the MENA countries compared to other country groups.

The results in Table 7 for the tax shares in columns (2)-(8) are more encouraging compared to results in Table 6. The quality of governance has a positive and significant effect on the social security tax and other tax shares and a negative and significant effect on payroll tax, property tax and goods and services tax shares. The estimated negative effect for the goods and services tax, which is a major tax revenue source for the MENA countries, is in line with the optimal tax mix result of Barreto and Alm (2003). According to their theory, with a decrease in corruption, which would mean greater quality of governance in our empirical analysis, optimal mix of taxes shifts a way from consumption to income taxes. While, the negative and significant effect for the goods and services tax confirms this, the effect on the income tax share is not

significant and has the opposite sign. Table 7 shows that the quality of governance may have played a bigger role in determining the tax structures of the MENA countries compared to other Non-OECD countries. The demographic variables have significant effects only on payroll tax, property tax, the goods and services tax and other tax shares for the MENA countries. There is again a positive and significant effect of the share of labor force on the payroll tax share for the MENA group. The share of urban population has positive and significant effects on payroll and property tax shares in the MENA countries. This is similar to the finding in Kenny and Winer (2001) that population density has a positive and significant effect on the property tax share. Overall, results in Table 7 show that demographic variables seem to have a more significant effect on the tax structure of the MENA countries when compared to the results in Table 6. However, Table 7 also shows that demographics may have played a bigger role in the tax structures of other Non-OECD countries compared to the MENA countries.

6. Concluding Remarks

This paper examined the tax structures of the MENA countries by focusing on the quality of governance and demographic changes as two influential factors in region's economies. Results from regressions on the MENA countries and the ones based on a larger sample of 61 countries show that these factors affected the level of taxation, measured by the tax ratio, more strongly than they affected the tax composition. While the quality of governance seems to have affected the tax structures in MENA countries more than in other comparable Non-OECD countries, demographics seems to have played a bigger role in determining the tax structures in other Non-OECD countries. However, neither of these factors explained changes in the income tax share satisfactorily. One key result is that the increase in the quality of governance has decreased the reliance on domestic taxes on goods and services. There are three important policy

implications of these results. First, increasing the quality of governance has paid off in terms of revenue generation in the MENA countries. Considering that MENA countries have fallen behind other comparable countries in quality of governance in the past two decades, improvement in governance is expected to bring more tax revenue in the future. Second, failure to find a significant relationship between quality of governance and income tax share or demographic variables and income tax share may be worrisome since income tax is a major revenue source for almost all countries in the sample and that theory suggests a greater reliance on this tax in the optimal tax mix with lower corruption or higher quality of governance. More research is needed to shed light on the forces that affect income taxes. Finally, population growth and increases in the share of young population, particularly the working-age group (15-64) have impacted positively on the level of taxation. However, there are mixed results on the impact of the youngest age group (0-14). The tremendous growth in this age group in the MENA countries can create opportunities for economic growth, hence be a demographic gift, if it is matched with improvements in the quality of governance. Otherwise, as the results suggest, it may very well be a demographic curse.

References

Abed, George T. 1998. "Trade Liberalization and Tax Reform in the Southern Mediterranean
        Region," *IMF Working Paper* WP/98/49.

Baltagi, Badi. 1995. *Econometric Analysis of Panel Data*, New York: John Wiley & Sons.

Barreto, Raul A. and James Alm. 2003. "Corruption, Optimal Taxation, and Growth," *Public
        Finance Review* 31 (3): 207-240.

Dhonte, P., R. Bhattacharya and T. Yousef. 2000. "Demographic Transition in the Middle East:
        Implications for Growth, Employment, and Housing," *IMF Working Paper* 41, March.

Diamond, P. and J. Mirrlees. 1971. "Optimal Taxation and Public Production II:
        Tax Rules," *American Economic Review*, 61 (3): 261-278. http://www.jstor.org

Diamond, P. 1975. "A Many-Person Ramsey Tax Rule," *Journal of Public
        Economics*, 4: 335-342.

Eltony, M. Nagy. 2002. "Measuring Tax Effort in Arab Countries," Conference Paper,
        Economic Research Forum, Ninth Annual Conference, American University in Sharja,
        the United Arab Emirates, 26-28th October, 2002.

Friedman, Eric, Simon Johnson, Daniel Kaufmann and Pablo Zoido-Lobaton. 2000. "Dodging
        the Grabbing Hand: the Determinants of Unofficial Activity in 69 Countries," *Journal of
        Public Economics* 76 (3): 459-493.

Goudswaard, Kees and Hans Van de Kar. 1994. "The Impact of Demographic Change on Tax
        Revenue,"*Atlantic Economic Journal* 22 (3): 52-60.

Groves, H.M. and C.H. Kahn. 1952. "The Stability of State and Local Tax Yields," *American
        Economic Review* 42 (1): 87-102.

Hausman, J.A. 1978. "Specification Tests in Econometrics," *Econometrica* 46: 1251-1271.

Hettich, W. and S.L. Winer. 1999. *Democratic Choice and Taxation.* Cambridge, UK:
        University Press.

Hettich, W. and S.L. Winer. 1984. "A Positive Model of Tax Structure." *Journal of Public
        Economics,* Vol. 24: 67-87.

Holcombe, R.G. and R.S. Sobel. 1997. *Growth and Variability in State Tax Revenue: An
        Anatomy of State Fiscal Crises*, Chapter 5, Westport, CT: Greenwood Press.

Hondroyiannis, George and Evangelia Papapetrou. 2000. "Do Demographic Changes Affect
        Fiscal Developments," *Public Finance Review* 28 (5): 468-488.

International Monetary Fund. 2004. *World Economic Outlook, September 2004: The Global
        Demographic Transition*, Washington, D.C.: IMF.

International Monetary Fund. 2003. *Government Finance Statistics CD-ROM.* Washington
        D.C.: IMF.

Keen, M. and J.E. Ligthart. 2002. "Coordinating Tariff Reduction and Domestic Tax Reform."
        Journal of International Economics, Vol. 56: 489-507.

Kenny, L.W. and S.L. Winer, (2001), "Tax Systems in the World: An Empirical Investigation
        into the Importance of Tax Bases, Collection Costs, and Political Regime," working
        paper, Ottawa, Canada: Carleton University, Department of Economics.

Khaldun, Ibn. 1967. *The Muqaddimah: An Introduction to History*, translated from the Arabic
        by Franz Rosenthal, Princeton, NJ: Princeton University Press.

Khan, M.S. 1989. "The Saljuq Vizier Nizam al-Mulk and His Siyasat Nama," presented manuscript in the "Uluslararasi Osmanli Oncesi Turk Kulturu Kongresi", Istanbul, Turkey, 4-8 September, 1989.

Knack, Stephen and Philip Keefer. 1995. "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures," *Economics and Politics* 7 (3): 207-227.

Knack, Stephen. 2001. "Aid Dependence and the Quality of Governance," *Southern Economic Journal* 68 (2):

Leenders, Reinoud and John Sfakianasis. 2003. "Middle East and North Africa," in *Global Corruption Report 2003*, Transparency International: 203-214. http://www.globalcorruptionreport.org/gcr2003.htm

Mauro, Paolo. 1996. "The Effects of Corruption on Growth, Investment and Government Expenditure," *IMF Working Paper* WP/96/98.

Nizam al-Mulk. 1978. *The Book of Government or Rules for Kings: the Siyar al-muluk or Siyasat-nama of Nizam al-Mulk*, translated from the Persian by Hubert Darke, Boston: Routledge and K. Paul.

Ramsey, Frank P. 1927. "A Contribution to the Theory of Taxation," *Economic Journal*, March.

Slemrod, J. 1990. "Optimal Taxation and Optimal Tax Systems," *Journal of Economic Perspectives*, 4 (1): 157-178.

Stern, Nicholas. 1987. "The Theory of Optimal Commodity and Income Taxation: An Introduction," in D. Newbery and N. Stern, eds., *The Theory of Taxation in Developing Countries*, Oxford: Oxford University Press: pp.22-59.

Tanzi, Vito. 1992. "Structural Factors and Tax Revenue in Developing Countries: A Decade of Evidence." In Ian Goldin and L. Alan Winters (eds.), *Open Economies: Structural Adjustment and Agriculture.* New York: Cambridge University Press, pp. 267-89.

Tanzi, Vito and Hamid R. Davoodi. 2000. "Corruption, Growth and Public Finances," *IMF Working Paper* WP/00/182.

Tanzi, Vito and Howell H. Zee. 2000. "Tax Policy for Emerging Markets: Developing Countries," *National Tax Journal*, 53(2): 299-322.

Tosun, Mehmet S. 2004a. "Middle East and North Africa Region's Tax Structure and Trade Liberalization," manuscript, November.

Tosun, Mehmet S. 2004b. "Global Aging and Fiscal Policy with International Labor Mobility: A Political Economy Perspective," *IMF Working Paper*, forthcoming.

Tosun, Mehmet S. and Sohrab Abizadeh. 2003. "Economic Growth and Tax Components: An Analysis of Tax Changes in OECD," *West Virginia Public Finance Program Working Paper No.6*, June.

United Nations and Arab Fund for Economic and Social Development. 2002. *Arab Human Development Report 2002: Creating Opportunities for Future Generations* New York, NY: United Nations Development Programme.

Volkerink, Bjorn and Jakob De Haan. 1999. "Political and Institutional Determinants of the Tax Mix: An Empirical Investigation For OECD Countries," *SOM Research Report*, 99E05, University of Groningen, Groningen.

World Bank. 2003. *World Development Indicators*, Washington, D.C.: World Bank, CD-ROM.

Zee, Howell H. 1996. "Empirics of Crosscountry Tax Revenue Comparisons," *World Development*, 24(10): 1659-71.

Table 1. Changes in the Indicators of the Quality of Governance in the MENA and other Countries (1982-1997)

MENA	1982-84	1988-90	1995-97	1982-89	1990-97
Quality of governance[a,b]	2.12	2.68	3.70	2.49	3.32
Corruption in government[b]	2.26	2.83	3.11	2.52	3.04
Rule of law (law and order tradition)[b]	1.98	2.28	4.70	2.32	3.80
Bureaucratic quality[b]	2.11	2.92	3.28	2.63	3.14
Ethnic tensions[c]	2.83	2.95	5.08	2.90	4.26
Repudiation of government contracts[c]	4.35	4.68	8.59	4.50	7.48
Expropriation risk[c]	4.23	5.29	9.44	4.86	8.23
Other Non-OECD	**1982-84**	**1988-90**	**1995-97**	**1982-89**	**1990-97**
Quality of governance[a,b]	2.97	2.98	3.73	3.01	3.43
Corruption in government[b]	3.20	3.11	3.37	3.17	3.33
Rule of law (law and order tradition)[b]	2.81	2.66	4.27	2.79	3.57
Bureaucratic quality[b]	2.91	3.17	3.54	3.06	3.38
Ethnic tensions[c]	3.49	3.19	4.49	3.34	3.96
Repudiation of government contracts[c]	5.54	5.79	8.31	5.55	7.51
Expropriation risk[c]	5.91	6.45	9.27	6.04	8.27
OECD	**1982-84**	**1988-90**	**1995-97**	**1982-89**	**1990-97**
Quality of governance[a,b]	5.46	5.32	5.49	5.37	5.49
Corruption in government[b]	5.40	5.23	5.03	5.31	5.21
Rule of law (law and order tradition)[b]	5.50	5.35	5.86	5.39	5.70
Bureaucratic quality[b]	5.49	5.37	5.59	5.40	5.56
Ethnic tensions[c]	5.17	5.09	5.17	5.07	5.22
Repudiation of government contracts[c]	8.51	9.30	9.64	8.79	9.51
Expropriation risk[c]	8.66	9.74	9.95	9.06	9.89

Source: Stephen Knack and the IRIS Center, University of Maryland, based on 2003 International Country Risk Guide (ICRG) data by the PRS Group.

[a] Quality of governance is the average of corruption in government, rule of law and bureaucratic quality.

[b] These indicators range between 0 and 6, higher values indicating improvements in those variables.

[c] These indicators range between 0 and 10, higher values indicating improvements in those variables.

Table 2. Demographic Changes in MENA and other Countries (1982-97)

MENA	1982-84	1988-90	1995-97	1982-89	1990-97
Annual population growth rate (%)	3.43	2.46	2.84	3.31	2.67
Share of labor force in total population (%)	34.52	35.02	35.75	34.73	35.45
Share of age 15-64 in total population (%)	55.14	56.23	57.63	55.76	57.39
Share of age 0-14 in total population (%)	41.36	40.97	38.86	41.17	40.03
Share of urban population in total population (%)	53.56	58.04	62.31	55.46	60.89
Other Non-OECD	1982-84	1988-90	1995-97	1982-89	1990-97
Annual population growth rate (%)	2.09	2.24	1.87	2.15	1.97
Share of labor force in total population (%)	40.86	42.02	43.62	41.34	42.89
Share of age 15-64 in total population (%)	56.91	58.56	60.05	57.62	59.44
Share of age 0-14 in total population (%)	38.27	36.69	34.43	37.66	35.30
Share of urban population in total population (%)	49.08	52.61	55.39	50.54	54.88
OECD	1982-84	1988-90	1995-97	1982-89	1990-97
Annual population growth rate (%)	0.50	0.71	0.58	0.56	0.64
Share of labor force in total population (%)	46.03	47.58	48.68	46.68	48.34
Share of age 15-64 in total population (%)	65.30	66.49	66.51	65.93	66.48
Share of age 0-14 in total population (%)	22.20	20.46	19.40	21.44	19.73
Share of urban population in total population (%)	73.18	74.84	76.96	73.87	76.23

Source: World Development Indicators, World Bank CD-ROM (2003).

Table 3. Changes in Tax Composition (1982-97)
Shares in Total Tax Revenues[a]

MENA	1982-84	1988-90	1995-97	1982-89	1990-97
Taxes on Income, Profits and Capital Gains	0.30	0.27	0.29	0.27	0.29
Social Security Contributions	0.09	0.09	0.07	0.09	0.08
Payroll Tax	0.01	0.01	0.01	0.01	0.01
Taxes on Property	0.03	0.02	0.02	0.02	0.02
Domestic Taxes on Goods and Services	0.20	0.29	0.30	0.29	0.29
Taxes on International Trade and Transactions	0.34	0.29	0.27	0.28	0.27
Other Taxes	0.03	0.03	0.04	0.03	0.03

Other Non-OECD	1982-84	1988-90	1995-97	1982-89	1990-97
Taxes on Income, Profits and Capital Gains	0.35	0.33	0.33	0.35	0.33
Social Security Contributions	0.08	0.10	0.10	0.09	0.10
Payroll Tax	0.01	0.01	0.00	0.01	0.00
Taxes on Property	0.02	0.02	0.02	0.02	0.02
Domestic Taxes on Goods and Services	0.33	0.34	0.37	0.33	0.35
Taxes on International Trade and Transactions	0.19	0.18	0.15	0.19	0.16
Other Taxes	0.02	0.02	0.03	0.02	0.03

OECD	1982-84	1988-90	1995-97	1982-89	1990-97
Taxes on Income, Profits and Capital Gains	0.37	0.37	0.36	0.37	0.36
Social Security Contributions	0.26	0.25	0.26	0.26	0.26
Payroll Tax	0.01	0.01	0.01	0.01	0.01
Taxes on Property	0.02	0.03	0.02	0.02	0.03
Domestic Taxes on Goods and Services	0.30	0.31	0.33	0.31	0.32
Taxes on International Trade and Transactions	0.03	0.02	0.01	0.03	0.01
Other Taxes	0.01	0.01	0.01	0.01	0.01

Source: Government Finance Statistics CD-ROM (IMF), 2003.

[a] Tax shares may not sum to 1 due to rounding. The tax classifications are adopted from IMF's Government Finance Statistics. *Taxes on income, profits and capital gains* comprise individual income and corporate income taxes; *social security contributions* include contributions to the social security programs by employees, employers and self-employed or nonemployed; *property taxes* include recurrent taxes on immovable property and net wealth, estate, inheritance and gift taxes, taxes on financial and capital transactions and all other recurrent and nonrecurrent taxes on property; d*omestic taxes on goods and services* include general sales, turnover, or value-added taxes and excise taxes; *international trade taxes* include customs and other import duties, taxes on exports, and taxes on the profits of export or import monopolies; and *other taxes* include all other unclassified taxes.

Table 4.   Descriptive Statistics for Regressions on 12 MENA Countries

Variable	Number of Observations	Mean	Standard Error	Minimum	Maximum
Tax ratio (% ratio of total tax revenue to GDP)	172	12.99	7.92	0	28
Personal and corporate taxes on income, profits and capital gains (% share)	175	28.34	20.52	0	92
Social security contributions (% share)	175	8.37	10.35	0	37
Payroll tax (% share)	175	1.30	1.93	0	8
Property taxes (% share)	174	2.37	2.32	0	20
Domestic taxes on goods and services in total tax revenues (% share)	175	27.79	23.03	0	97
International trade taxes (% share)	175	28.64	17.79	0	79
Other taxes (% share)	174	3.18	4.14	0	17
Quality of governance	180	2.91	0.81	1	5
GDP growth (%)	180	0.98	6.31	-22	30
Openness (% ratio of sum of exports and imports to GDP)	177	80.76	43.70	9	226
Population growth rate (%)	192	2.99	3.78	-44	12
Share of labor force in total population (%)	192	35.09	6.97	24	53
Share of population age 15-64 in total population (%)	192	56.58	7.06	45	90
Share of population age 0-14 in total population (%)	192	40.60	6.16	27	55
Share of urban population in total population (%)	192	58.18	21.39	20	96

Source: Author's calculations.

Table 5. Descriptive Statistics for Regressions on all 61 Countries

Variable	Number of Observations	Mean	Standard Error	Minimum	Maximum
Tax ratio (% ratio of total tax revenue to GDP)	933	21.64	9.70	0	51
Personal and corporate taxes on income, profits and capital gains (% share)	934	33.65	17.60	0	92
Social security contributions (% share)	934	15.92	16.90	0	59
Payroll tax (% share)	933	0.79	1.64	0	8
Property taxes (% share)	931	2.25	2.40	0	20
Domestic taxes on goods and services in total tax revenues (% share)	931	32.26	15.55	0	97
International trade taxes (% share)	931	13.26	14.79	0	79
Other taxes (% share)	931	1.89	2.97	0	18
Other-Non-OECD (dummy variable)	976	0.40	0.49	0	1
Quality of governance	954	4.05	1.45	1	6
Quality of governance * MENA	954	0.55	1.19	0	5
Quality of governance * Other-Non-OECD	954	1.30	1.71	0	6
GDP growth (%)	964	1.84	4.39	-22	30
Openness (% ratio of sum of exports and imports to GDP)	961	73.10	54.90	9	407
Population growth rate (%)	976	1.67	2.03	-44	12
Population growth * MENA	976	0.59	2.05	-44	12
Population growth * Other-Non-OECD	976	0.83	1.17	-3	6
Share of labor force in total population (%)	976	42.87	7.00	24	60
Share of labor * MENA	976	6.90	14.29	0	53
Share of labor * Other-Non-OECD	976	17.01	20.90	0	60
Share of population age 15-64 in total population (%)	976	61.18	6.59	45	90
Share of population age 15-64 * MENA	976	11.13	22.72	0	90
Share of population age 15-64 * Other-Non-OECD	976	23.61	28.95	0	74
Share of population age 0-14 in total population (%)	976	31.02	10.56	15	55
Share of population age 0-14 * MENA	976	7.99	16.38	0	55
Share of population age 0-14 * Other-Non-OECD	976	14.75	18.58	0	50
Share of urban population in total population (%)	976	62.58	23.23	11	100
Share of urban population * MENA	976	11.44	25.00	0	96
Share of urban population * Other-Non-OECD	976	21.15	30.61	0	100

Source: Author's calculations.

Table 6. Fixed Effects Regressions for Tax Ratio and Tax Shares (12 MENA Countries)

	(1) Tax Ratio (Tax/GDP)	(2) Income Tax Share	(3) Social Sec. Tax Share	(4) Payroll Tax Share	(5) Property Tax Share	(6) G&S Tax Share	(7) Trade Tax Share	(8) Other Tax Share
Quality of Governance	0.982** (0.476)	-0.353 (1.317)	-0.040 (0.862)	-1.615*** (0.222)	-0.434* (0.225)	0.564 (1.211)	2.565 (1.770)	-0.645 (0.464)
GDP growth (%)	0.004 (0.027)	-0.212*** (0.078)	-0.029 (0.051)	-0.009 (0.013)	-0.018 (0.013)	0.033 (0.072)	0.231** (0.105)	0.008 (0.028)
Openness	0.043** (0.017)	0.069 (0.045)	-0.002 (0.030)	-0.025*** (0.008)	-0.019** (0.008)	0.063 (0.042)	-0.058 (0.061)	-0.026* (0.016)
Population Growth (%)	0.257* (0.145)	-0.055 (0.426)	-0.319 (0.279)	0.089 (0.072)	-0.049 (0.073)	0.452 (0.392)	0.011 (0.573)	-0.134 (0.150)
Labor Force (% of pop.)	-0.043 (0.320)	0.220 (0.945)	1.672*** (0.618)	0.568*** (0.159)	-0.404** (0.161)	-0.988 (0.869)	-2.047 (1.270)	0.956*** (0.332)
Pop. 15-64 (% of pop.)	0.281** (0.123)	0.107 (0.362)	-0.240 (0.237)	-0.074 (0.061)	-0.033 (0.062)	0.765** (0.333)	0.056 (0.486)	-0.581*** (0.127)
Pop. 0-14 (% of pop.)	-0.353*** (0.135)	0.269 (0.398)	0.339 (0.260)	0.067 (0.067)	-0.045 (0.068)	-1.215*** (0.366)	0.144 (0.534)	0.440*** (0.139)
Urban Pop. (% of pop.)	0.067 (0.067)	-0.088 (0.197)	0.321** (0.129)	0.035 (0.033)	0.010 (0.034)	0.155 (0.181)	-0.260 (0.264)	-0.167** (0.069)
Constant	10.928 (12.991)	16.557 (38.357)	-58.649** (25.092)	-13.789** (6.452)	20.480*** (6.531)	61.583* (35.265)	89.336* (51.540)	-14.954 (13.455)
Observations	157	160	160	160	159	160	160	159
R-squared	0.96	0.93	0.92	0.83	0.83	0.96	0.87	0.86

* significant at 10%; ** significant at 5%; *** significant at 1%
Dependent variables are shown in column headings. Standard errors in parentheses.
Country and year dummy variables are not shown in the table.

Table 7. Fixed Effects Regressions for Tax Ratio and Tax Shares (All 61 Countries)

	(1) Tax Ratio (Tax/GDP)	(2) Income Tax Share	(3) Social Sec. Tax Share	(4) Payroll Tax Share	(5) Property Tax Share	(6) G&S Tax Share	(7) Trade Tax Share	(8) Other Tax Share
Other Non-OECD	-89.638*** (32.396)	89.574 (71.979)	59.007 (58.926)	-29.383*** (10.258)	-3.324 (15.278)	56.874 (77.311)	-176.496** (69.781)	12.610 (21.709)
Quality of Governance	-1.740*** (0.407)	1.126 (0.903)	-4.994*** (0.740)	0.044 (0.129)	0.584*** (0.192)	2.995*** (0.970)	0.620 (0.876)	-0.324 (0.273)
Governance* MENA	2.168*** (0.546)	-0.566 (1.213)	3.890*** (0.993)	-0.958*** (0.173)	-0.854*** (0.257)	-3.531*** (1.302)	1.072 (1.175)	0.935** (0.366)
Governance* Ot. Non-OECD	2.077*** (0.458)	-0.305 (1.017)	5.074*** (0.833)	-0.005 (0.145)	-0.233 (0.216)	-3.368*** (1.093)	-1.090 (0.986)	0.035 (0.307)
GDP growth (%)	0.004 (0.019)	-0.045 (0.042)	-0.045 (0.034)	-0.005 (0.006)	-0.014 (0.009)	-0.023 (0.045)	0.151*** (0.041)	-0.022* (0.013)
Openness	0.041*** (0.008)	0.059*** (0.017)	0.007 (0.014)	-0.004* (0.002)	-0.002 (0.004)	-0.013 (0.018)	-0.031* (0.017)	-0.018*** (0.005)
Population Growth(%)	0.065 (0.408)	0.123 (0.907)	-1.265* (0.743)	0.324** (0.129)	0.266 (0.193)	-1.092 (0.974)	1.479* (0.879)	0.209 (0.274)
Pop.Growth* MENA	0.219 (0.437)	-0.240 (0.971)	1.051 (0.795)	-0.281** (0.138)	-0.328 (0.206)	1.605 (1.043)	-1.428 (0.941)	-0.423 (0.293)
Pop.Growth* Ot. Non-OECD	-0.739 (0.457)	-0.882 (1.014)	1.532* (0.830)	-0.596*** (0.145)	-0.815*** (0.215)	2.309** (1.089)	-2.307** (0.983)	0.778** (0.306)
Labor Force (% of pop.)	0.604*** (0.181)	-0.282 (0.402)	0.706** (0.329)	0.051 (0.057)	0.297*** (0.085)	0.160 (0.432)	-0.873** (0.390)	-0.073 (0.122)
Labor Force* MENA	-0.761** (0.383)	0.301 (0.851)	0.659 (0.697)	0.722*** (0.121)	-0.634*** (0.181)	-1.591* (0.914)	-0.745 (0.825)	1.241*** (0.257)
Labor Force* Ot. Non-OECD	-0.167 (0.277)	0.432 (0.615)	-0.111 (0.504)	0.052 (0.088)	-0.344*** (0.131)	0.405 (0.662)	-0.766 (0.597)	0.144 (0.186)

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Table 7. cont'd

	(1) Tax Ratio (Tax/GDP)	(2) Income Tax Share	(3) Social Sec. Tax Share	(4) Payroll Tax Share	(5) Property Tax Share	(6) G&S Tax Share	(7) Trade Tax Share	(8) Other Tax Share
Pop. 15-64 (% of pop.)	-1.037*** (0.238)	0.401 (0.529)	-0.021 (0.433)	-0.118 (0.075)	-0.129 (0.112)	0.318 (0.569)	-0.899* (0.514)	0.446*** (0.160)
Pop. 15-64* MENA	1.307*** (0.270)	-0.452 (0.599)	-0.141 (0.490)	0.012 (0.085)	0.087 (0.127)	0.546 (0.644)	0.971* (0.581)	-1.005*** (0.181)
Pop. 15-64* Ot. Non-OECD	1.040*** (0.294)	-0.871 (0.653)	-0.756 (0.534)	0.203** (0.093)	0.231* (0.139)	-0.552 (0.701)	2.253*** (0.632)	-0.495** (0.197)
Pop. 0-14 (% of pop.)	-0.964*** (0.214)	-0.606 (0.476)	0.602 (0.390)	-0.104 (0.068)	0.122 (0.101)	-0.065 (0.511)	-0.302 (0.462)	0.390*** (0.144)
Pop. 0-14 * MENA	0.592** (0.260)	0.652 (0.578)	-0.268 (0.473)	0.248*** (0.082)	-0.148 (0.123)	-1.211* (0.620)	0.535 (0.560)	0.140 (0.174)
Pop. 0-14 * Ot. Non-OECD	1.162*** (0.317)	-0.545 (0.704)	-0.765 (0.576)	0.277*** (0.100)	-0.003 (0.149)	-0.255 (0.756)	1.468** (0.683)	-0.263 (0.212)
Urban Pop. (% of pop.)	0.193*** (0.055)	-0.148 (0.122)	0.344*** (0.100)	-0.044** (0.017)	-0.078*** (0.026)	0.195 (0.131)	-0.152 (0.118)	-0.108*** (0.037)
Urban Pop.* MENA	-0.125 (0.082)	0.128 (0.181)	-0.190 (0.148)	0.132*** (0.026)	0.103*** (0.039)	-0.130 (0.195)	-0.052 (0.176)	-0.009 (0.055)
Urban Pop.* Ot. Non-OECD	-0.151** (0.072)	-0.418*** (0.161)	-0.067 (0.132)	0.089*** (0.023)	0.066* (0.034)	-0.204 (0.173)	0.298* (0.156)	0.238*** (0.048)
Constant	87.181*** (21.675)	27.445 (48.159)	-11.322 (39.426)	12.058* (6.864)	4.383 (10.222)	-32.207 (51.743)	117.507** (46.703)	-18.804 (14.528)
Observations	908	909	909	908	906	906	906	906
R-squared	0.96	0.94	0.96	0.86	0.85	0.91	0.92	0.82

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

Dependent variables are shown in column headings. Standard errors in parentheses.

Country and year dummy variables are not shown in the table.

Figure 1: Tax Revenue Ratio and Quality of Governance (1982-97)
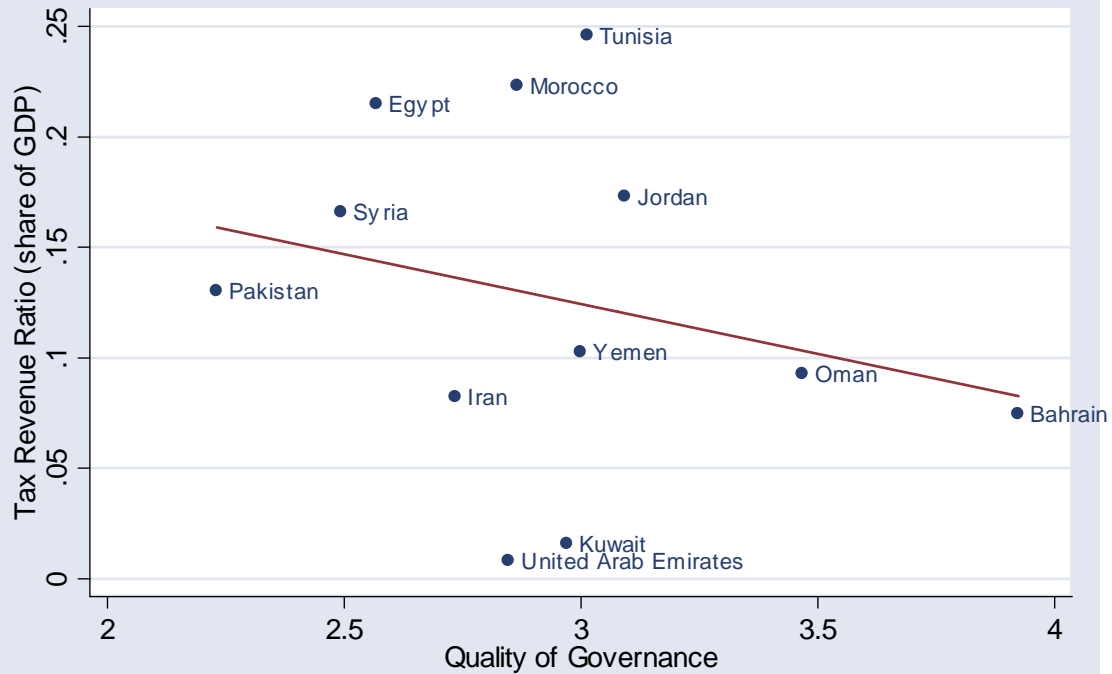### 12 MENA Countries

Figure 2: Income Tax Share and Quality of Governance (1982-97)
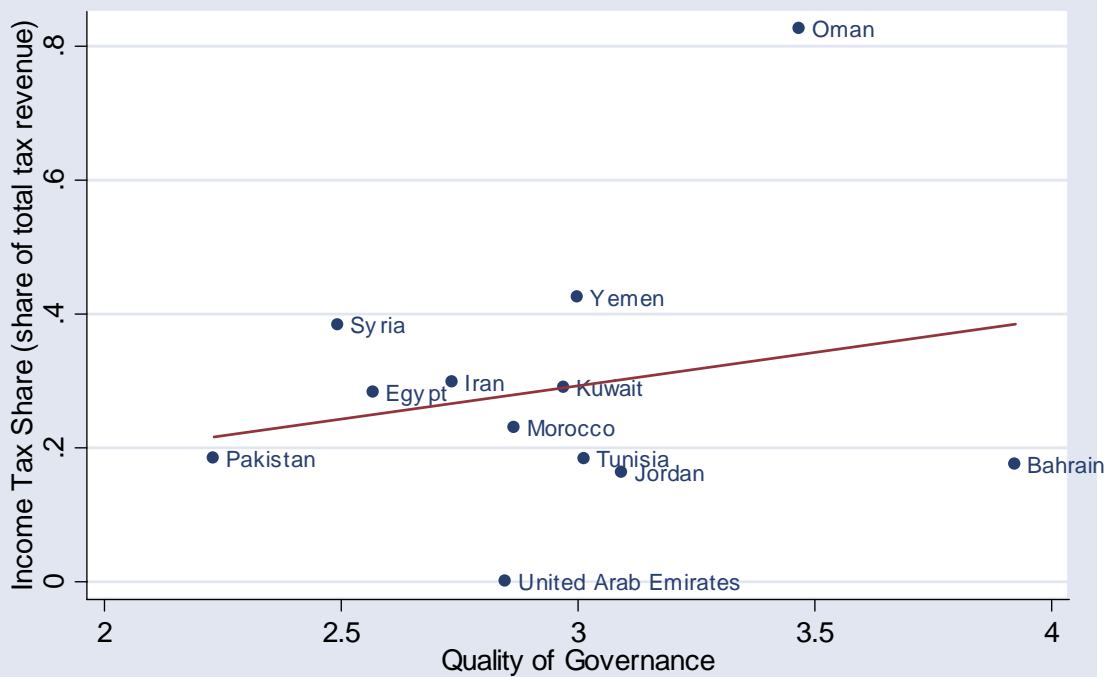### 12 MENA Countries

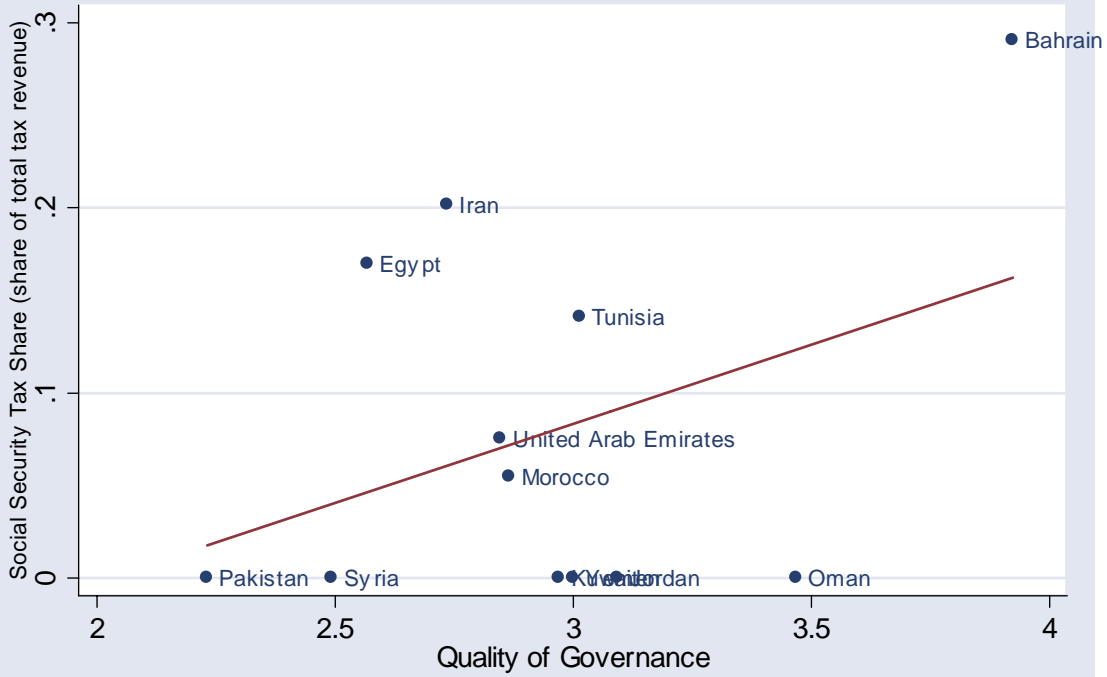Figure 3: Social Security Tax Share and Quality of Governance (1982-97)
12 MENA Countries

Figure 4: Payroll Tax Share and Quality of Governance (1982-97)
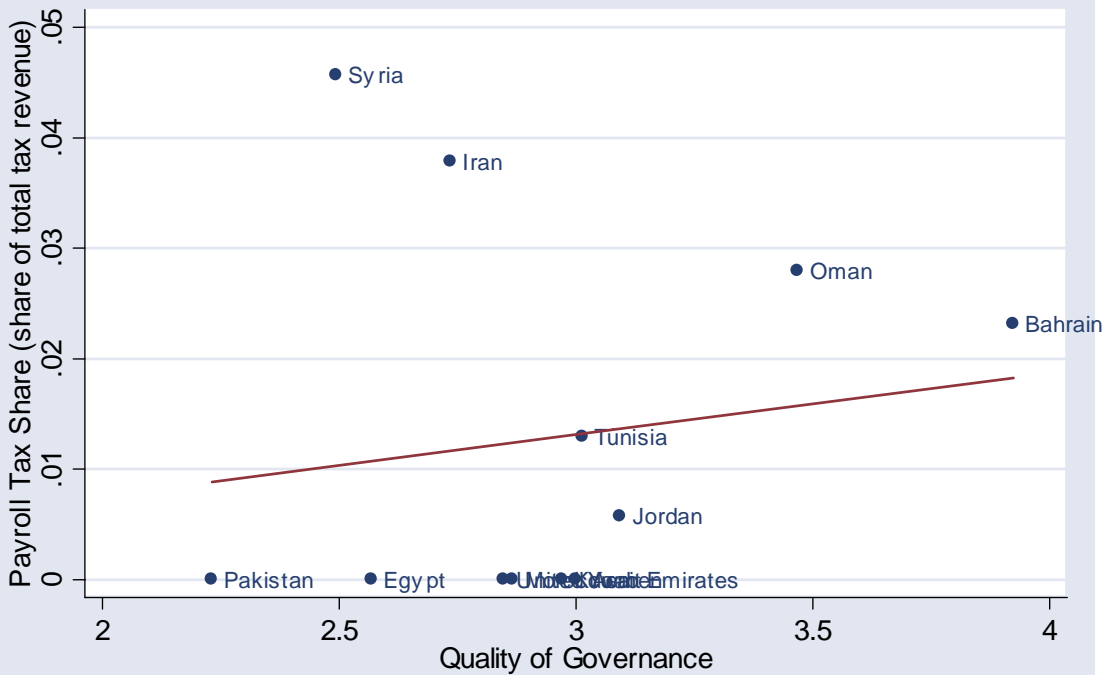12 MENA Countries

Figure 5: Property Tax Share and Quality of Governance (1982-97)
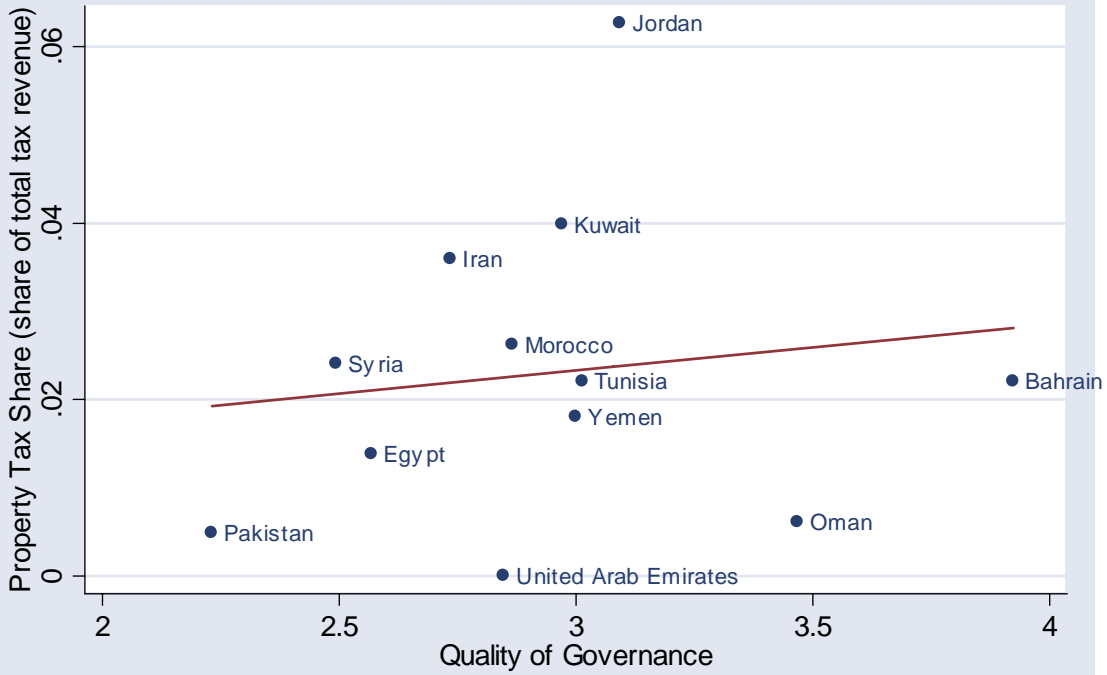**12 MENA Countries**

Figure 6: Domestic Goods and Services Tax Share and Quality of Governance (1982-97)
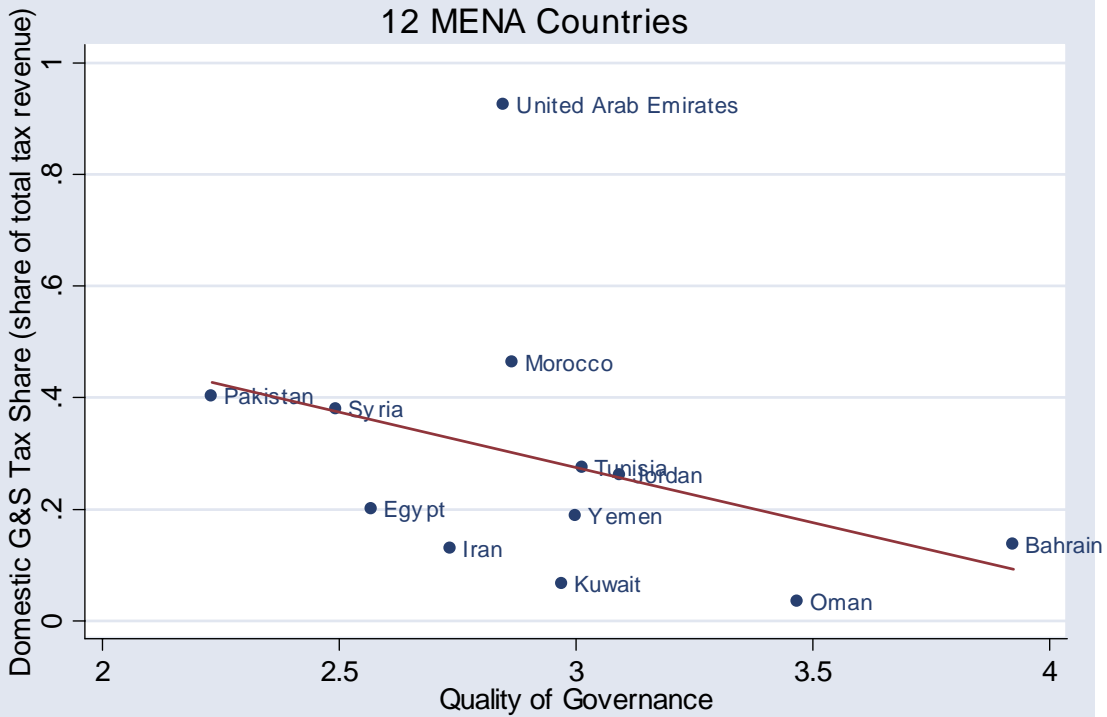**12 MENA Countries**

Figure 7: International Trade Tax Share and Quality of Governance (1982-97)
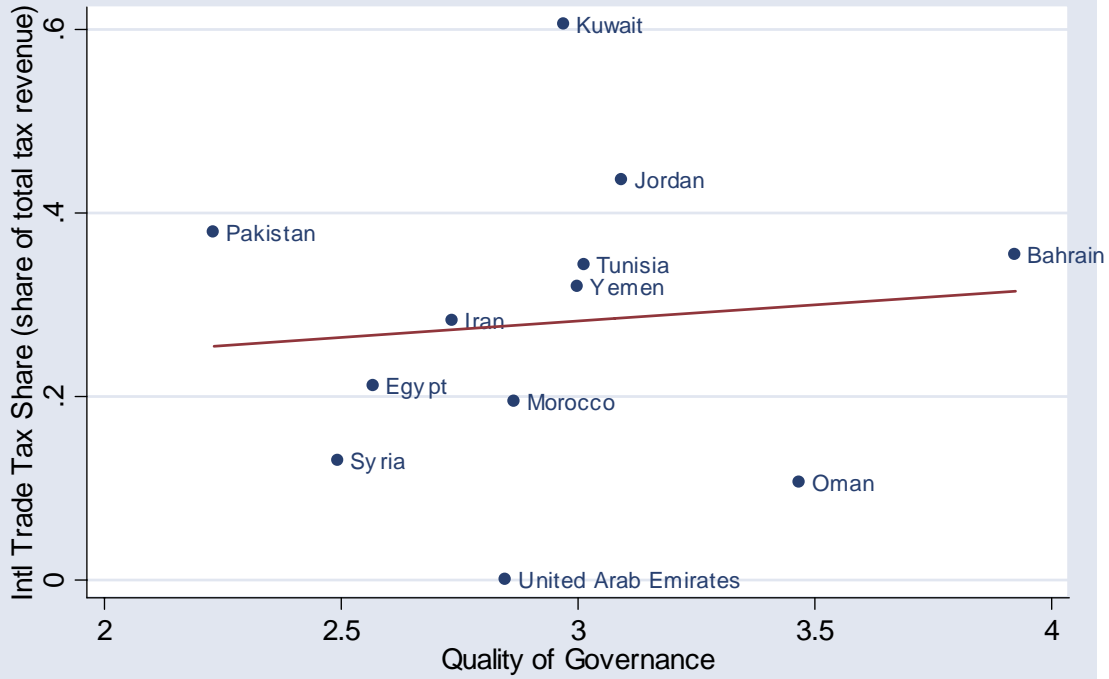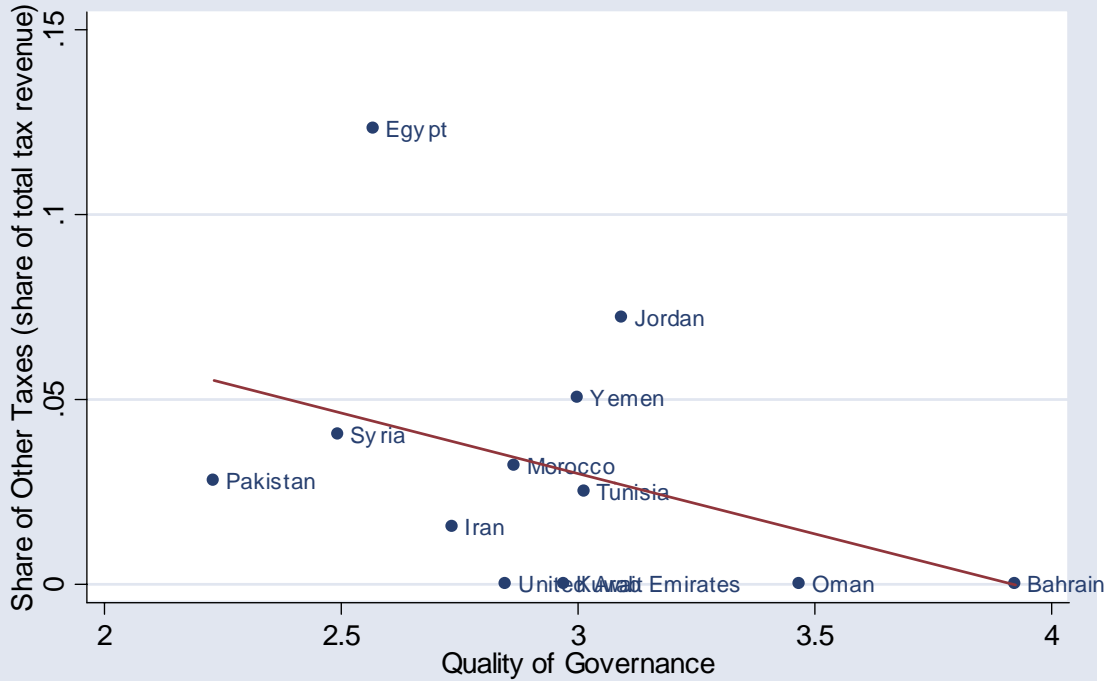### 12 MENA Countries

Figure 8: Share of Other Taxes and Quality of Governance (1982-97)
12 MENA Countries

Appendix

Formal definitions of the variables used in the IRIS data are written below. These are excerpts from the ICRG.

Corruption in Government

Lower scores indicate "high government officials are likely to demand special payments" and that "illegal payments are generally expected throughout lower levels of government" in the form of "bribes connected with import and export licenses, exchange controls, tax assessment, police protection, or loans."

Rule of Law (named "Law and Order Tradition" in ICRG)

This variable "reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes." Higher scores indicate: "sound political institutions, a strong court system, and provisions for an orderly succession of power." Lower scores indicate: "a tradition of depending on physical force or illegal means to settle claims." Upon changes in government new leaders "may be less likely to accept the obligations of the previous regime."

Quality of the Bureaucracy

High scores indicate "an established mechanism for recruitment and training," "autonomy from political pressure," and "strength and expertise to govern without drastic changes in policy or interruptions in government services" when governments change.

Ethnic Tensions

This variable "measures the degree of tension within a country attributable to racial, nationality, or language divisions. Lower ratings are given to countries where racial and nationality tensions are high because opposing groups are intolerant and unwilling to compromise. Higher ratings are given to countries where tensions are minimal, even though such differences may still exist."

Risk of Repudiation of Contracts by Government

"This indicator addresses the possibility that foreign businesses, contractors, and consultants face the risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down" due to "an income drop, budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities." Lower scores signify "a greater likelihood that a country will modify or repudiate a contract with a foreign business."

Risk of Expropriation of Private Investment

This variables evaluates the risk "outright confiscation and forced nationalization" of property. Lower ratings "are given to countries where expropriation of private foreign investment is a likely event."

Appendix Table 1.   List of Sample Countries[a]

OECD	Non-OECD	
Australia	Argentina	Sri Lanka
Austria	Bahrain (MENA)	Syria (MENA)
Belgium	Botswana	Thailand
Canada	Brazil	Tunisia (MENA)
Denmark	Chile	U.A.E. (MENA)
Finland	Cameroon	Uruguay
France	Costa Rica	Yemen (MENA)
Germany	Egypt (MENA)	Zambia
Greece	Ethiopia	Zimbabwe
Iceland	India	
Ireland	Indonesia	
Italy	Iran (MENA)	
Japan	Israel	
Luxemburg	Jordan (MENA)	
Mexico	Kenya	
Netherlands	Kuwait (MENA)	
New Zealand	Malaysia	
Norway	Malta	
Portugal	Morocco (MENA)	
South Korea	Nigeria	
Spain	Oman (MENA)	
Turkey	Panama	
Sweden	Pakistan (MENA)	
Switzerland	Philippines	
United Kingdom	Singapore	
United States	South Africa	

[a] Note that Mexico and South Korea became OECD members in 1994 and 1996, respectively.