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Mehmet Serkan Tosun

^a West Virginia University , Morgantown, USA

^b Bureau of Business and Economic Research , College of Business and Economics, West Virginia University , Morgantown, WV 26506-6025, USA E-mail:

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The Tax Structure and Trade Liberalization of the Middle East and North Africa Region

MEHMET SERKAN TOSUN

West Virginia University, Morgantown, USA

ABSTRACT *There has been an unprecedented trade liberalization which started in the mid-1980s in a wide spectrum of developing countries. In the same period, there have also been considerable changes in the tax structures of countries. This paper uses panel data on 65 countries, including 16 Middle East and North Africa (MENA) countries, for the period 1980–1997 to examine how tax structures responded to trade liberalization. It is found that, unlike other non-OECD countries, the MENA countries did not increase their reliance on domestic consumption taxes in response to trade liberalization. Trade liberalization did not seem to have a strong impact on major revenue sources of the MENA countries.*

KEY WORDS: Trade liberalization, tax structures, MENA countries

JEL CLASSIFICATIONS: E62, H20, H71, H87

Introduction

There has been widespread international trade and investment liberalization in developing countries throughout the 1980s and 1990s. There are two major events that led to significantly lower use of international trade taxes. The first was the Tokyo Round, completed in 1979, in which 99 participating countries agreed to a substantial reduction in tariff rates by 1986. Another important aspect of the Tokyo Round was that developing countries took part in the tariff reductions for the first time. The second major event was the Uruguay Round of trade talks, which started in 1986 and comprised 125 participating countries. With the formal signing in April 1994, countries reached substantial new agreements on general tariff reduction.¹ A key feature of these events is

Correspondence Address: Mehmet Serkan Tosun, Bureau of Business and Economic Research, College of Business and Economics, West Virginia University, Morgantown, WV 26506-6025, USA. Email: metosun@mail.wvu.edu.

that trade liberalization gained momentum for those countries not under the umbrella of the Organization for Economic Co-operation and Development (non-OECD countries) after the mid-1980s. In contrast, there was less of an effort within the OECD, as international trade taxes were already at considerably lower levels.

These widespread trade reforms in the mid-1980s provide an excellent natural experiment to analyze tax structure changes. These events indeed coincided with significant changes in the tax structures of countries. For example, Tosun (2002a) showed that there was a statistically and economically significant move from international trade taxes to domestic taxes on goods and services² in non-OECD countries from the mid-1980s. Michael *et al.* (1993), Hatzipanayotou *et al.* (1994) and Keen and Ligthart (2002) provided a rationale by arguing that replacement of tariffs with domestic consumption taxes improves welfare and increases revenues. Tosun (2002a) argued that potential exportability of domestic taxes on goods and services might also explain the move to these taxes.

While the tax structures of industrialized nations are similar to a certain extent, developing countries' tax structures vary extensively (Tanzi, 1992; Zee, 1996; Tanzi and Zee, 2000). Within that spectrum, Middle East and North Africa (MENA) countries have unique characteristics, such as economic dependency on sizeable oil reserves and astounding growth in the working-age population.³ Related to the latter characteristic, Tosun (2002b, 2003) argued that demographic differences between regions could lead to capital flows from low population-growth to high population-growth regions. Given the high population-growth rate in MENA countries,⁴ capital flows from the European Union (EU) and other developed countries can potentially change the economic growth and thereby the tax structure in the MENA region. A number of studies have addressed fiscal policy and tax structures in the MENA countries. Among these, a study by Abed (1998) gave a comprehensive overview of the trade liberalization experience of Southern Mediterranean region (SMR) countries through the EU's Association Agreements.⁵ He discussed various tax reform proposals needed to counteract revenue losses from tariff reductions. However, that study does not provide an empirical estimation of the effect of trade liberalization on the tax structures. It also focuses only on SMR countries. Eltony (2002) examined the tax structures and tax efforts of 16 Arab countries. Among other factors, he also showed that the share of exports and imports in GDP, which is used as a general measure of openness, is an important factor in the tax revenue performance of Arab countries. Furthermore, Nashashibi (2002) provided a detailed outlook of revenue performance in Southern Mediterranean Arab countries. He acknowledged that there is higher trade protection in these countries than in other regions and pointed to the expectation that trade liberalization would lead to further decreases in revenues. Nashashibi also argued various reform strategies and emphasized the role of value added taxation as a potential area for greater tax yields. However, a broad comparison that shows how the tax structures of different groups of countries within the general non-OECD group responded to widespread trade reforms

in mid-1980s has not yet been undertaken. It would be convenient and useful to include MENA in that comparison since MENA countries are all non-OECD countries and they differ considerably from both OECD and other non-OECD countries in their economic and demographic structures and trade orientation.⁶

This paper provides an empirical examination of how tax structures of MENA countries changed in response to extensive trade liberalization in the mid-1980s. Following the arguments in Keen and Lighthart (2002) and Tosun (2002a) about the desirability of the domestic consumption taxes for countries that are liberalizing their international trade, the main focus of the paper is to see whether the tax structure has, indeed, shifted to domestic taxes on goods and services in response to increased openness to trade. In view of that, a comparison of MENA countries to OECD and other non-OECD countries would give policy-makers in the MENA region insights in to how to reform their countries' tax structures.

The paper is structured as follows. The next section reviews changes in tax revenue structures. Section 3 describes the variables in the empirical analysis, the empirical specification and the data. The econometric considerations that guide the empirical work are explained in Section 4. Section 5 presents the empirical results and provides interpretations, while the final section comprises concluding remarks and proposes directions for further study.

Widespread Trade Liberalization and Tax Structure of MENA Countries

The Uruguay and Tokyo rounds of trade talks paved the way for unprecedented trade liberalization in the 1980s and 1990s in a wide spectrum of developing countries. Ebrill *et al.* (1999) showed a steady decline in the tariff rates in OECD countries from 1975 onwards, while tariff rates in non-OECD countries were shown to decline only after 1985. In the same period, there have also been considerable changes in the tax structures of many countries. Table 1 shows the tax structure changes for a selection of 65 countries between 1980–1982 and 1995–1997.⁷

Comparing first the differences in tax composition in 1995–1997 across countries, OECD countries rely less on international trade taxes and more on income taxes compared with 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 with all other countries. Next, table 1 shows that OECD, MENA and other non-OECD countries all decreased their reliance on international trade taxes between 1980–1982 and 1995–1997. Another visible trend is the considerable increase in the reliance on domestic taxes on goods and services in these groups.

While table 1 shows the clear trend towards greater reliance on domestic taxes on goods and services and lower reliance on international trade taxes, the question of whether this has, indeed, been due to greater openness of these countries to trade still needs to be addressed explicitly. The next section

Table 1. Changes in tax composition (1980–1997) shares in total tax revenues*

	1980–1982	1988–1990	1995–1997
OECD			
Taxes on income, profits and capital gains	0.37	0.37	0.35
Social security contributions	0.25	0.25	0.26
Payroll tax	0.01	0.01	0.01
Taxes on property	0.02	0.03	0.02
Domestic taxes on goods and services	0.29	0.30	0.34
Taxes on international trade and transactions	0.05	0.03	0.01
Other taxes	0.01	0.01	0.01
MENA			
Taxes on income, profits and capital gains	0.30	0.27	0.30
Social security contributions	0.07	0.09	0.08
Payroll tax	0.01	0.01	0.02
Taxes on property	0.03	0.03	0.02
Domestic taxes on goods and services	0.23	0.27	0.25
Taxes on international trade and transactions	0.33	0.30	0.29
Other taxes	0.03	0.03	0.04
Other non-OECD			
Taxes on income, profits and capital gains	0.33	0.33	0.33
Social security contributions	0.08	0.10	0.10
Payroll tax	0.01	0.01	0.01
Taxes on property	0.02	0.02	0.02
Domestic taxes on goods and services	0.34	0.35	0.36
Taxes on international trade and transactions	0.19	0.17	0.15
Other taxes	0.03	0.02	0.03

*The tax classifications are adopted from the International Monetary Fund (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 unemployed; *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 non-recurrent taxes on property; *domestic 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. *Source:* Government Finance Statistics (CD-ROM) (IMF, 2003).

describes the empirical approach used to examine how different tax groups in table 1 have responded to trade liberalization.

Empirical Analysis

Multilateral trade liberalization efforts in the 1980s provide a valuable experiment to examine tax structure changes, particularly in non-OECD countries. As a widespread policy change covering a wide variety of countries, trade liberalization is expected to affect the tax structures directly by reducing taxes on international trade. Hence, focus will be on the direction of causality from trade liberalization to tax structures.⁸

Dependent Variables

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

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

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, 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 equation (1) to total tax revenue on the left-hand side of equation (1). This implies that

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

Tax structure changes can be examined by using each of the seven tax shares in equation (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 dependent variable definitions in equation (2).

Explanatory Variables and Other Control Variables

One of the key explanatory variables is the *openness* index, defined as the ratio of the sum of exports and imports to the gross domestic product.⁹ Clearly, a liberalized trade structure is expected to trigger a shift from international trade taxes to other taxes in the tax structure.

Interacting this openness index with dummy variables that represent country groups and the period of heightened trade liberalization creates various interaction variables. Thus, the interactions consist of three variables: a dummy variable that is set to 1 for the period after 1986, which identifies the change in trade regimes through the Tokyo and Uruguay rounds; a dummy variable for the country group, such as non-OECD, MENA, or non-OECD excluding MENA, which is used to identify the 'experiment' group that experienced a rise in openness; and, as explained before, an openness index which indicates whether a country really opened its trade. The interaction variables created with different combinations of these three variables will provide the complete effect of trade reform in the specific group of countries that became relatively open after the mid-1980s. The variable of interest is the interaction of openness index, country group dummy and post-1986 dummy. This triple interaction gives the combined effect and is expected to capture the relationship between trade reform and change in the tax mix. The triple interaction would provide the so-called 'difference-in-differences'.¹⁰ The question is whether the countries in a specific group (experiment group) that became more open in the post-1986 period significantly changed their tax structure relative to a control group (OECD countries). This resembles the

natural experiment approach that has been popularized recently by Martin Feldstein (1995) and Nada Eissa (1995, 1996). In this approach, tax reforms are used as natural experiments to analyze behavioral changes. Here, the reform is widespread trade liberalization of the mid-1980s.

The remaining control variables include the share of international tourism receipts in total exports; fuel exports as percent of total merchandise exports; population aged 65 and above; government spending lagged one year; GDP per capita; population density; and, finally, year dummies to capture the effect of any time-specific events. The share of international tourism receipts in total exports and fuel exports as percent of total merchandise exports are used to control for the tax exporting behavior of countries. In his seminal paper, McIure (1967) showed the importance of interstate tax exporting for the tax systems of US states. Tosun (2002a) argued that countries attracting considerable numbers of tourists are expected to rely more on general sales or excise taxes, as taxes on international tourism expenditures are easy to export. Similarly, oil-exporting MENA countries may rely more on certain excise taxes and corporate income tax in the hope of exporting those taxes. Old-age population aged 65 and above dependency ratio is used to control for relatively heavy reliance on certain taxes such as social security contributions due to a higher proportion of the elderly population. Lagged government spending controls for the size of the public sector. The size of the public sector may affect tax composition because the marginal cost of various taxes may change at different rates when the size of the public sector changes (Hettich and Winer, 1984; Gade and Adkins, 1990).

Two controls are used for the size of countries. Population density is a control for population differences relative to the land area of countries. Kenny and Winer (2001) used population per square kilometer as a factor that affects tax bases. They argued that 'land is more valuable in urban and densely populated areas and thus offers a larger tax base' (Kenny and Winer, 2001, p. 26). Their results showed that population density has a positive and significant effect on the property tax share. GDP per capita controls for the size of the economies, taking into consideration the population size. This is important because the sample includes low, lower-middle, upper-middle and high-income countries. In addition, GDP growth affects tax bases directly, particularly income and consumption. Tosun and Abizadeh (2003) showed that growth in GDP per capita has had a significant impact on the tax structures of OECD countries. The authors argued that the greatest impact was, indeed, on personal income taxes and goods and services taxes.

In addition, political and institutional variables potentially play a role in the analysis of tax systems. There are studies that examined specifically the political and institutional variables as determinants of tax structure. Among these, a recent study by Volkerink and de Haan (1999) on OECD countries concluded that these variables do not influence the tax structure significantly.¹¹ Additionally, if the institutional characteristics are significantly different between countries but do not change over time, they would be indirectly controlled for in a fixed-effects regression. Therefore, the fixed-effects estimation technique used in this paper limits the use of political

and institutional variables directly. Thus, these variables are not used in the regression analysis. Finally, year dummies are used to capture any time-specific effects.

Empirical Specification

As also argued by Kenny and Winer (2001), a way to estimate the seemingly unrelated system in equation (2) efficiently is to include exactly the same set of explanatory variables described in the previous section in each regression.¹² 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 equation (2) is the share of each tax in total tax revenues. The following specification is used to run regressions with tax shares as dependent variables:

$$\begin{aligned} TaxShare_{it}^j = & \alpha + \beta_1 Group * Openness * Post-1986 + \gamma_1 Group * Openness \\ & + \gamma_2 Group * Post-1986 + \gamma_3 Openness * Post-1986 + \delta_1 Openness \\ & + \delta_2 Group + \eta Z_{it} + f_i + \phi_t + \varepsilon_{it}, \end{aligned} \quad (3)$$

where ' $TaxShare_{it}^j$ ' is the share in total tax revenues for tax j in country i at time t . Interaction variables that capture the effect of openness to trade in the post-1986 period are included. Interactions consist of three variables: ' $Openness$ ' is an openness index measured as the ratio of the sum of exports and imports of goods and services to the gross domestic product; ' $Post-1986$ ' is a dummy that is set to 1 for the period after 1986 in order to identify the change in the trade regimes; ' $Group$ ' is a dummy variable for the country group that is being analyzed, which constitutes the 'experimental group'. $Group$ takes the value 1 for the country that belongs to the group under study. The country groups that are compared are non-OECD, MENA and non-MENA-non-OECD. Thus, three sets of regressions (one for each case) are run for the specification in equation (3). While the variable of interest is the interaction of $Openness$, $Post-1986$ and $Group$, all other combinations among the three dummy variables (including separate dummies for each) are included in regressions to get the net effect from the triple interaction dummy.¹³ The triple interaction, $Group * Openness * Post-1986$, gives the combined impact of increased openness in the post-1986 period on the specific tax share in the country group that is examined. This variable is expected to capture the relationship between the trade reform and the share of different taxes in total tax revenues. f_i represents the unobservable country-specific, time-invariant effects, ϕ_t represents unobservable time-specific effects,¹⁴ 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 coefficient of

interest is β_1 which is an indicator of the response of different tax shares to the increased openness of the specific group of countries through extensive trade liberalization, controlling for all other plausible factors. The analysis of β_1 will also constitute a test of the difference-in-differences procedure explained in the previous section.

Data Sources

Data for the regression analysis comes from two main sources: *World Development Indicators* CD-ROM (World Bank, 2002) and *Government Finance Statistics* CD-ROM (IMF, 2003) and Yearbook (INF, 1999, 2002). The years 1980–1997 are the focus due to data availability. Pre-1980 data are unavailable for many countries and for many data series. There are 65 countries in the sample, of which, 26 are OECD countries. Out of 39 non-OECD countries, 16 are MENA countries. 19 of the sample countries are in Europe, two are in North America, seven are in Latin America, 16 are in MENA, nine are in Sub-Saharan Africa, three are in South Asia and nine are in the East Asia and Pacific region. Table 2 presents the descriptive statistics of the data.

Econometric Tests

The first series of tests involves testing for the fixed-effects specification. A simple F -test for the joint significance of the dummies that form the fixed effects begins. In all regressions, the null hypothesis, which says that fixed-effect dummies are ‘not significant’, is rejected resoundingly.¹⁵ In addition to this, the Hausman specification test¹⁶ 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 equation (3) and all other regressors 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. 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 almost all of the regressions. However, the null hypothesis is not rejected in 2 out of 21 regressions. Thus, in these two regressions, random-effects models can still be run. However, it is known that fixed-effects regression produces unbiased and consistent estimates even when the random-effects model is valid.¹⁷ Therefore, the fixed effects is used as a base model for comparison of results.

Another potential problem with cross-sectional units of the panel is that variances of the errors across countries may not be identical. Test for heteroskedasticity is conducted by using the Breusch–Pagan/Cook–Weisberg test. Based on the results of this test, the null hypothesis, which says that variances are constant, is rejected in all regressions. Subsequently, Huber/White/Sandwich robust standard errors were used to correct for the heteroskedasticity in errors.

Table 2. Descriptive statistics

Variable	Number of observations	Mean	Standard error	Minimum	Maximum
Personal and corporate taxes on income, profits and capital gains (% share)	1068	33.68	17.94	0	95
Social security contributions (% share)	1068	15.57	16.82	0	59
Payroll tax (% share)	1065	0.80	1.70	0	11
Property taxes (% share)	1065	2.30	2.51	0	20
Domestic taxes on goods and services in total tax revenues (% share)	1065	31.97	15.75	0	97
International trade taxes (% share)	1065	13.76	15.22	0	79
Other taxes (% share)	1063	1.94	3.33	0	50
Openness	1120	72.85	55.21	9	439
GDP per capita	1140	10 847	11 445	85	47 821
Fuel exports (% of merchandise exports)	995	15.96	26.51	0	98
International tourism, receipts (% of total exports)	1097	8.12	7.91	0	89
Lagged government expenditure (% of GDP)	994	31.43	13.97	9	212
Population density (people per km ²)	1139	197.39	632.97	2	6220
Population aged 65 and above (% of total population)	1170	7.44	4.93	1	18
<i>Non-OECD</i>	1170	0.61	0.49	0	1
<i>Non-OECD*Openness</i>	1120	43.69	59.56	0	439
<i>Openness*Post-1986</i>	1120	45.27	55.79	0	407
<i>Non-OECD*Post-1986</i>	1170	0.37	0.48	0	1
<i>Non-OECD*Openness*Post-1986</i>	1120	27.23	50.98	0	407
<i>MENA</i>	1170	0.25	0.43	0	1
<i>MENA*Openness</i>	1120	16.60	37.82	0	251
<i>MENA*Post-1986</i>	1170	0.15	0.36	0	1
<i>MENA*Openness*Post-1986</i>	1120	10.36	30.31	0	210
<i>Non-MENA-non-OECD</i>	1170	0.36	0.48	0	1
<i>Non-MENA-non-OECD*Openness</i>	1120	27.09	54.92	0	439
<i>Non-MENA-non-OECD*Post-1986</i>	1170	0.22	0.41	0	1
<i>Non-MENA-non-OECD*Openness*Post-1986</i>	1120	16.86	45.06	0	407

Source: Author's calculations.

Finally, given the panel nature of the data there is potential for serial correlation of errors. Baltagi (1995) proposed a Lagrange Multiplier test for first-order serial correlation in residual terms for fixed-effects models.¹⁸ Accordingly, Baltagi's Lagrange Multiplier test rejects the existence of serial correlation under the assumption that residuals are AR (1) in all of the regressions.¹⁹

Empirical Results

In all of the regressions, the key variable is the triple interaction '*Non-OECD*Openness*Post-1986*'. The fixed-effects regression results are presented in tables 3–5.²⁰

Table 3 shows the results for all non-OECD countries (Group = 1 if non-OECD country). The coefficient estimates for *non-OECD*Openness*Post-1986* are statistically significant in regressions with personal and corporate income taxes, property taxes, and domestic taxes on goods and services, shown respectively in columns (1), (4) and (5). The sign for the trade taxes is negative, as expected, but the coefficient estimate is not statistically significant. Among the taxes that are significantly affected, the largest impacts were on personal and corporate taxes and domestic taxes on goods and services. Therefore, a non-OECD country that became more open in the post-1986 period tended to increase its share of domestic taxes on goods and services and decrease its share of personal and corporate taxes. For example, the coefficient estimates indicate that an increase in openness by 10 percentage points in non-OECD countries in the post-1986 period would have led to a 0.42 percentage point increase in domestic taxes on goods and services, holding other factors constant. This result is in line with the arguments put forth by Keen and Ligthart (2002) regarding the welfare improvement from switching to domestic consumption taxes and by Tosun (2002a) regarding the desirability of these taxes by policy-makers due to their potential exportability to non-residents.

The results for MENA countries (Group = 1 if MENA country) in table 4 show significant differences from the results for all non-OECD countries. The coefficient estimates for *MENA*Openness*Post-1986* are statistically significant in social security contributions, payroll tax and other taxes regressions. The estimate for the international trade taxes regression is, again, negative but not significant. Change in openness in the post-1986 period did not seem to trigger a move from personal and corporate income taxes to domestic taxes on goods and services in MENA countries as it did in the inclusive group of non-OECD countries. Instead, the shift seemed to have been towards social security contributions and the payroll tax with the greatest impact on social security contributions. However, as shown in table 1, social security contributions and the payroll tax make only a fraction of total tax revenues in the MENA region. Thus, these results indicate that none of the major tax revenue sources were significantly impacted by the increased trade openness in the post-1986 period.

While tables 3 and 4 show the contrast between the impact of openness on the tax structures for MENA group and non-OECD in general, comparing the results for the MENA group with results for the non-OECD group excluding MENA countries provides a clearer picture about the distinctiveness of the MENA results. For this, table 5 presents the results for the non-OECD countries excluding the MENA countries (Group = 1 if non-MENA–non-OECD country). The coefficient estimate of *non-OECD–non-MENA*Openness*Post-1986* for the domestic taxes on goods and services

Table 3. Fixed-effects regressions for non-OECD countries

Variable	Personal and corporate income taxes (1)	Social security contributions (2)	Payroll tax (3)	Property taxes (4)	Domestic taxes on goods and services (5)	International trade taxes (6)	Other taxes (7)
Openness	−0.033 (−0.85)	0.046 (1.60)	−0.002 (−0.47)	−0.012 (−1.60)	0.034 (0.62)	−0.017 (−0.46)	−0.013* (−1.8)
Logged GDP per capita	2.509 (1.04)	0.777 (0.48)	0.081 (0.46)	0.582 (1.25)	−2.457 (−0.93)	−3.67 (−1.55)	2.188* (3.29)
Fuel exports (% of merchandise exports)	0.049 (1.61)	−0.013 (−1.44)	−0.001 (−0.37)	0.001 (0.36)	−0.028 (−1.13)	−0.001 (−0.02)	−0.009* (−2.26)
International tourism, receipts (% of total exports)	−0.019 (0.24)	−0.262* (−2.80)	0.012* (1.68)	0.046* (2.82)	0.191 (1.87)	0.018 (0.2)	0.018 (0.56)
Lagged government expenditure (% of GDP)	0.055 (0.67)	0.034 (1.28)	0.002 (0.86)	0.065* (2.82)	−0.023 (−0.34)	−0.138 (−0.94)	0.006 (1.38)
Population density (people per km ²)	0.005* (2.23)	−0.002 (−1.16)	−0.002* (4.90)	−0.002* (−3.24)	−0.006* (−2.58)	0.001 (0.36)	0.006* (5.30)
Population aged 65 and above (% of total population)	0.864 (1.5)	0.3 (0.45)	0.055 (0.82)	−0.27* (−2.44)	−0.219 (−0.46)	−0.52 (−1.28)	−0.295* (−2.30)
<i>Non-OECD</i>	−8.259* (−2.66)	−0.13 (−0.06)	0.396 (1.3)	−1.238* (−2.01)	12.23* (2.98)	−0.166 (−0.06)	−2.622* (−3.15)
<i>Non-OECD*Openness</i>	0.13* (3.05)	−0.077* (−2.52)	−0.005 (−1.00)	0.014* (1.69)	−0.101* (−1.8)	0.03 (0.72)	0.005 (0.47)
<i>Openness*Post-1986</i>	−0.003 (−0.19)	−0.005 (−0.43)	−0.002 (−1.40)	0.007* (2.20)	0.012 (0.73)	−0.011 (−0.95)	0.002 (1.34)
<i>Non-OECD*Post-1986</i>	2.672* (2.10)	1.952 (1.51)	−0.062 (−0.38)	0.604 (1.59)	−4.513* (−2.72)	−1.152 (−0.98)	0.337 (0.78)
<i>Non-OECD*Openness*Post-1986</i>	−0.03* (−2.01)	0.003 (0.18)	0.003 (1.53)	−0.014* (−4.13)	0.042* (2.26)	−0.005 (−0.34)	0.001 (0.29)
Constant	32.805* (2.06)	−5.106 (−0.500)	−0.925 (−0.73)	−2.732 (−0.88)	40.688* (2.25)	47.797* (2.85)	−9.938* (−2.41)
Observations	847	847	845	845	844	844	843
R ²	0.94	0.95	0.88	0.84	0.88	0.9	0.82

Note that Group = 1 if country is non-OECD. Robust *t*-statistics are shown in parentheses. The dependent variables shown in columns 1–7 are the shares in total tax revenues

*Indicates 10% significance level; * indicates 5% significance level; † indicates 1% significance level

Table 4. Fixed-effects regressions for MENA countries

Variable	Personal and corporate income taxes (1)	Social security contributions (2)	Payroll tax (3)	Property taxes (4)	Domestic taxes on goods and services (5)	International trade taxes (6)	Other taxes (7)
Openness	0.087 [†] (4.13)	0.01 (0.73)	0.002 (1.05)	−0.009* (−1.8)	−0.086 [†] (−3.21)	−0.001 (−0.02)	−0.007 (−1.08)
Logged GDP per capita	2.317 (0.9)	1.912 (1.14)	0.299* (1.71)	0.686 (1.44)	−2.531 (−0.91)	−4.34* (−1.81)	1.676 [‡] (2.55)
Fuel exports (% of merchandise exports)	0.048 (1.57)	−0.016* (−1.91)	0.000 (0.22)	0.000 (0.05)	−0.026 (−1.03)	0.003 (0.07)	−0.01 [‡] (−2.56)
International tourism, receipts (% of total exports)	−0.026 (−0.33)	−0.263 [†] (−2.90)	0.018 [†] (2.79)	0.042 [†] (2.66)	0.223 [‡] (2.20)	0.012 (0.14)	−0.004 (−0.14)
Lagged government expenditure (% of GDP)	0.049 (0.59)	0.027 (1.21)	0.001 (0.37)	0.066 [†] (2.84)	−0.01 (−0.18)	−0.136 (−0.91)	0.006 (1.21)
Population density (people per km ²)	0.005 [‡] (2.24)	0.002 (1.04)	−0.001 [†] (−3.21)	−0.003 [†] (−4.45)	−0.007 [†] (−2.92)	−0.001 (−0.28)	0.005 [†] (5.62)
Population aged 65 and above (% of total population)	0.639 (1.1)	−0.158 (−0.25)	0.066 (1.18)	−0.315 [†] (−3.09)	0.304 (0.69)	−0.244 (−0.64)	−0.35 [†] (−3.97)
<i>MENA</i>	−47.205 [†] (−4.86)	27.941 [†] (4.00)	1.262 [‡] (2.32)	−0.403 (−0.2)	−14.174 (−1.47)	33.052 [†] (2.97)	−2.004 (−0.63)
<i>MENA*Openness</i>	−0.037 (−1.00)	−0.045 (−1.77)	−0.011 [‡] (−1.97)	0.016* (−1.91)	0.108 [‡] (2.90)	−0.008 (−0.18)	−0.019 (−1.35)
<i>Openness*Post-1986</i>	−0.028 [†] (−4.29)	−0.016 [†] (−2.67)	−0.003 [‡] (−2.03)	−0.003 (−1.25)	0.053 [†] (6.71)	−0.011* (−1.88)	0.007 [‡] (2.06)
<i>MENA*Post-1986</i>	1.264 (0.67)	−6.234 [†] (−4.59)	−1.295 [†] (−2.96)	−0.455 (−1.33)	1.856 (1.02)	1.847 (0.66)	2.915 [†] (2.84)
<i>MENA*Openness*Post-1986</i>	−0.009 (−0.51)	0.073 [†] (4.76)	0.019 [†] (4.73)	−0.002 (−0.49)	−0.017 (−1.04)	−0.03 (−1.2)	−0.034 [†] (−3.71)
Constant	27.735 (1.63)	−11.235 (−1.07)	−2.224* (−1.86)	−3.587 (−1.11)	48.549 [†] (2.77)	52.358 [†] (3.11)	−9.025 [‡] (−2.24)
Observations	847	847	845	845	844	844	843
<i>R</i> ²	0.94	0.95	0.89	0.83	0.88	0.9	0.82

Note that Group = 1 if country is MENA. Robust *t*-statistics are shown in parentheses. The dependent variables shown in columns 1–7 are the shares in total tax revenues

*Indicates 10% significance level; [‡]indicates 5% significance level; [†]indicates 1% significance level

Table 5. Fixed-effects regressions for non-OECD countries excluding MENA countries

Variable	Personal and Corporate Income Taxes (1)	Social Security Contributions (2)	Payroll Tax (3)	Property Taxes (4)	Domestic Taxes on Goods and Services (5)	International Trade Taxes (6)	Other Taxes (7)
Openness	0.025 (1.01)	−0.021 (−0.98)	−0.011 [†] (−2.92)	0.005 (0.91)	0.018 (0.61)	0.001 (0.02)	−0.015* (−1.80)
Logged GDP per capita	2.299 (0.94)	0.93 (0.57)	0.075 (0.45)	0.723 (1.56)	−2.302 (−0.87)	−3.738 (−1.57)	2.057 [†] (3.19)
Fuel exports (% of merchandise exports)	0.054* (1.72)	−0.01 (−1.17)	0.00 (0.06)	0.001 (0.20)	−0.036 (−1.42)	0.00 (0.01)	−0.009* (−2.04)
International tourism, receipts (% of total exports)	−0.024 (−0.29)	−0.251 [†] (−2.76)	0.015 [‡] (2.14)	0.05 [†] (3.02)	0.192* (1.91)	0.015 (0.17)	0.008 (0.25)
Lagged government expenditure (% of GDP)	0.047 (0.55)	0.035 (1.37)	0.002 (0.62)	0.065 [†] (2.88)	−0.014 (−0.23)	−0.139 (−0.94)	0.006 (1.32)
Population density (people per km ²)	0.007 [†] (2.71)	0.001 (0.52)	−0.001 [‡] (−1.97)	−0.002 [†] (−3.92)	−0.009 [†] (−3.17)	0.00 (0.16)	0.005 [†] (3.66)
Population aged 65 and above (% of total population)	0.787 (1.35)	0.269 (0.43)	0.089 (1.26)	−0.221 [‡] (−2.13)	−0.215 (−0.47)	−0.352 (−0.69)	−0.422 [†] (−2.91)
<i>Non-MENA–non-OECD</i>	−5.72 [‡] (−2.29)	−5.229 [†] (−2.95)	−0.662 [‡] (−1.98)	−0.172 (−0.36)	13.432 [†] (4.32)	0.658 (0.28)	−2.165 [‡] (−2.23)
<i>Non-MENA–non-OECD*Openness</i>	0.096 [†] (2.87)	0.009 (0.38)	0.016 [†] (3.37)	−0.009 (−1.33)	−0.129 [†] (−3.46)	0.013 (0.34)	0.001 (0.09)
<i>Openness*Post-1986</i>	−0.02 [‡] (−2.16)	0.025 [‡] (2.49)	0.006 [†] (3.48)	−0.001 (−0.42)	0.022 [‡] (1.97)	−0.025* (−1.86)	−0.006 [‡] (−2.01)
<i>Non-MENA–non-OECD*Post-1986</i>	1.259 (1.16)	4.93 [†] (4.26)	0.606 [†] (2.98)	0.384 (1.23)	−4.49 [†] (−3.23)	−2.005* (−1.71)	−0.793 (−1.55)
<i>Non-MENA–non-OECD*Openness*Post-1986</i>	−0.016 (−1.47)	−0.042 [†] (−3.52)	−0.01 [†] (−3.68)	−0.005* (−1.72)	0.044 [†] (2.93)	0.013 (0.89)	0.016 [†] (2.95)
Constant	30.585* (1.91)	−2.167 (−0.21)	−0.856 (−0.73)	−4.703 (−1.54)	39.59 [‡] (2.19)	48.00 [†] (2.85)	−8.95 [‡] (−2.23)
Observations	847	847	845	845	844	844	843
R ²	0.94	0.95	0.88	0.83	0.88	0.90	0.82

Note that Group=1 if country is non-MENA–non-OECD. Robust *t*-statistics are shown in parentheses. The dependent variables shown in columns 1–7 are the shares in total tax revenues

*Indicates 10% significance level; [‡]indicates 5% significance level; [†]indicates 1% significance level

is positive, significant and it looks very similar to its counterpart in table 3 for all non-OECD countries. The estimate in table 5 indicates that an increase in openness by 10 percentage points in non-OECD countries excluding MENA countries in the post-1986 period would have led to a 0.44 percentage point increase in domestic taxes on goods and services, holding other factors constant. At the same time, the estimate for personal and corporate income taxes also looks similar to the one in table 3 but the significance is lost. The results in table 5 also show that social security contributions and payroll tax were significantly and negatively affected, contrary to positive and significant results for MENA countries.

Nevertheless, the strong shift in non-OECD countries to domestic taxes on goods and services due to openness in the post-1986 period seems to be prevailing for non-OECD countries excluding MENA countries, as well. This leaves MENA as the remaining non-OECD group that failed to exhibit the positive and significant link between trade openness and domestic taxes on goods and services in the post-1986 period.

Policy Implications and Concluding Remarks

This paper highlights the specificity of the MENA countries within a broader group of non-OECD countries. Evidence is provided to show that there was a statistically significant move to domestic taxes on goods and services in trade liberalizing non-OECD countries. This finding is in line with the findings of Michael *et al.* (1993), Hatzipanayotou *et al.* (1994) and Keen and Ligthart (2002), which show welfare improvement for developing countries that liberalize their trade and concurrently reform their tax structures by raising domestic consumption taxes. While this finding is supported for non-OECD countries in general and for other non-OECD countries excluding the MENA countries, it failed to materialize for the MENA countries. This suggests that the composition of available tax instruments in the MENA countries did not change in favor of those taxes that are thought to be welfare improving compared with international trade taxes. This could pose several problems for the MENA countries, such as lower economic growth, lower revenue available for economic development and high unemployment due to lack of job opportunities. The MENA countries, indeed, exhibit these problems. However, the growth implications of tax structure changes require a more detailed analysis, which is beyond the scope of this paper. This remains as an important question for further study.

Nevertheless, this paper shows that there is room for tax reform in the MENA region that would aim at decreasing the reliance on international trade taxes and increasing the reliance on domestic taxes on goods and services while liberalizing their trade structures concurrently.

This study did not find a significant impact of trade openness in the post-1986 period on major tax revenue sources of MENA countries. This hints that other forces—economic, demographic or political—might have been at play in these countries. Political factors may be particularly important for the MENA countries. Due mainly to endemic corruption in the government,

quality of governance is low compared with OECD countries and many other non-OECD countries. A corrupt government sector and bureaucracy might have hindered the tax reforms throughout the trade liberalization efforts in 1980s and 1990s. As explained in the empirical analysis section, the fixed-effects estimation technique used in this paper limits the use of institutional variables in the empirical specification. As a future study, alternative estimation techniques could be used to analyze the effects of political and institutional characteristics on the tax structures of MENA countries.

Thus, a broader examination of MENA tax structures and how they compare to other economic or geographic regions would be a natural extension of this paper. This would make it possible to examine the roles of demographic change (particularly high population growth in the region) and institutional characteristics in determining the tax structures. To date, the links between demographics, institutional characteristics and tax structures have been mainly left unexamined.

Appendix A

Table A1. List of sample countries

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

Note: Mexico and South Korea became OECD members in 1994 and 1996, respectively.

Notes

1. The average decrease in all duties for the Tokyo Round and the Uruguay Round was 29.6% and 38%, respectively. See Yarbrough and Yarbrough (2000: 320).
2. These taxes include general sales, turnover, or value-added taxes and excise taxes.
3. Dhonte *et al.* (2000) call this a demographic explosion.
4. Abed and Davoodi (2003) mention high population growth in the MENA region as a major factor in the region's economic performance.
5. Another study by Eken *et al.* (1997) examines the effect of fiscal structure on economic growth in the MENA countries.
6. Oliva (2000) provides a detailed analysis of how MENA countries differ among themselves in terms of openness to trade.
7. See Appendix Table A1 for a list of sample countries classified into different regional or economic groups.
8. This is also the approach in other studies that examined trade liberalization and tax structure changes. See Abed (1998), Ebrill *et al.* (1999) and Kenny and Winer (2001).
9. While this measure of openness is used widely 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.
10. For example, difference-in-differences will reveal whether a MENA country that became relatively open in the post-1986 period experienced a significant increase or decrease in a specific tax compared with all other countries in the sample.
11. However, there is no similar study for the MENA region. A good source for panel data on institutional characteristics is the International Country Risk Guide (ICRG) data released by the IRIS Center of the University of Maryland. This data set provides various indicators of quality of governance for more than 100 countries. However, data start from 1982–1984 for most of the countries in the data set. This does not help in the current study since the pre-1986 data are critical in this paper. However, it may be worth examining the role of institutional factors in the tax structures of MENA countries in a future study.
12. 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 the same set of explanatory variables is used, SUR gives the same results in terms of coefficients and standard errors as separate regressions.
13. However, the dummy variable 'Post-1986' is omitted to avoid the dummy variable trap.
14. The year 1980 is excluded to avoid the dummy variable trap.
15. See Baltagi (1995, p. 12) for the specifics of this test.
16. See Hausman (1978) for the original description of this test.
17. However, the fixed-effects estimator is not as efficient as the random-effects estimator.
18. See Baltagi (1995, p. 93).
19. Lagrange Multiplier test statistic is asymptotically distributed as χ^2_1 .
20. The coefficients for country and year dummies are not shown in any of the tables due to limited space.

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