ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية
2009

working paper series

AN ESTIMATION OF SERVICE SECTORS RESTRICTIVENESS IN THE MENA REGION

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Working Paper No. 489

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May 2009

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Acknowledgement: The authors would like to thank Raed Safadi for his constant support. Thanks are also due to Giovanni Bruno, Rodolfo Helg, Przemyslaw Kowalski and Ben Shepherd for their technical support. The paper has benefited from helpful comments from Bernard Hoekman, Laura Munro and participants at the ERF 15th Annual Conference in Cairo, Egypt. The authors also gratefully acknowledge the financial support of the International Development Research Centre (IDRC) for the realization of this study.

Abstract

This paper aims at assessing barriers to service provision in the banking, telecom (fixed and mobile), insurance and transport (air and maritime) sectors of four MENA countries, by including both trade and domestic restrictions. The qualitative information gathered is the basis of the computation of sectoral aggregate and modal trade restrictiveness indexes (TRIs). These TRIs, already computed in the previous chapter, are used as regressors of firms' economic performance indicators to capture the economic impact of restrictions. The estimated coefficients of the TRIs are then used to compute the aggregate and modal tax equivalents of service restrictions by sector. The results show that service restrictions have an impact on economic performance in the three studied sectors. While a rent-creating effect seems to dominate restrictions on banking and fixed telecom sectors, a cost-inefficiency effect seems to dominate the mobile telecom sector. Moreover, interactions between modal restrictions seem to be taking place, especially in the telecom sectors. Finally, higher levels of tax equivalents in the insurance and transport sectors characterize MENA countries in comparison to OECD countries.

ملخص

يهدف هذا الفصل إلى تقييم العوائق التي تحول دون تقديم الخدمات في القطاع المصرفي وقطاع الاتصالات (شاملاً الخطوط الثابتة والنقالة) والتأمين والنقل (الجوي والبحري) في أربعة بلدان من منطقة الشرق الأوسط وشمال إفريقيا عن طريق إلقاء الضوء على القيود التجارية والمحلية. والمعلومات النوعية التي جمعت هي الأساس في حساب المؤشرات الكلية والقطاعية والشكلية الأكثر تقييداً للتجارة وهذه المؤشرات التي تم حسابها بالفعل في الفصل السابق تستخدم كمعاملات تراجع لمؤشرات الأداء الاقتصادي للشركات من أجل الوقوف على التأثير الاقتصادي للقيود، كما تستخدم المعاميل المقدرة لهذه المؤشرات في حساب المعادلات الضريبية الكلية والشكلية لقيود الخدمة في كل قطاع. وتبين النتائج أن القيود على خدمةٍ ما لها تأثير على الأداء الاقتصادي في القطاعات الثلاثة محل الدراسة، بينما نجد إن تأثيراً يتعلق بالإيجار يسيطر على القيود المفروضة على قطاعي الخدمات المصرفية والاتصالات الثابتة، وتأثيراً يتصل بعدم فاعلية التكلفة يبدو مسيطراً على قطاع الاتصالات النقالة. علاوة على ذلك فإن التفاعلات بين القيود الشكلية تحدث على ما يبدو لاسيما في قطاعات الاتصالات. وأخيراً فإن فرض مستويات أعلى من الضرائب في قطاعات النقل والتأمين هو أحد ما يميز بلدان الشرق الأوسط وشمال أفريقيا عن البلدان الأعضاء في منظمة التعاون والتنمية الاقتصادية.

I Introduction

Measuring restrictions faced by service providers can serve at least two main policy objectives: helping decision-makers to assess the impact of these barriers on the economy and facilitating bilateral and multilateral negotiations on trade in services liberalization (Findlay and Warren, 2000). However, assessing trade in services barriers is more difficult than assessing barriers for trade in goods. Indeed, since services are generally intangible, barriers to trade do not take the form of import tariffs but, rather, of quotas, prohibitions, and government regulations. A useful tool to overcome this assessment problem is the Trade Restrictiveness Index (TRI)[1]. Although this method has been mainly applied in manufacturing sector analysis (Irwin, 2007), it has also been adapted for services studies. The TRI translates qualitative information on services regulations into an aggregated quantitative score by sector. The two main benefits of synthesizing qualitative information in a quantitative index are first, to enable the comparison of restrictions across countries at the sectoral level, as already exploited in Marouani and Munro (2009), and second, to determine the impact of barriers on trade in services and on economic performance and successively the tax equivalents estimation of restrictions to trade in services. A tax equivalent is the wedge between the actual price and the price that would prevail without service barriers. The estimation of tax equivalents of services barriers was pioneered by the Australian Productivity Commission.

The objective of this article is to estimate tax equivalents[2] of barriers in the banking, telecom (fixed and mobile), insurance and transport sectors of four MENA countries (Egypt, Jordan, Morocco and Lebanon (for the banking sector only)). Our country selection is primarily driven by recent reforms that have been implemented by the governments in these sectors. Given the scarce evidence available for the MENA region and for developing countries in general, our analysis improves the understanding of service barriers and offers useful policy implications.

The tax equivalent estimation requires different steps of analysis that mirrors the non-quantitative nature of the barriers to these sectors. The first step involves the computation of TRIs. Then, the computed restrictions are regressed on sectoral performance[3] to identify their economic impact. Finally, the estimated TRI coefficients are matched with the TRI index and transformed into tax equivalents. Based on the data availability, in the proceeding of the paper we follow two different approaches with regards to the second step: for the banking and telecom sector we estimate the TRI's economic impact; for the insurance and transport sectors, we take the estimated economic impact from previous analysis and we interact it with our own TRI.

For the banking and telecom sector, following Dihel and Shepherd (2007) we use sectoral firm performance indicators as a proxy for the price-cost margin and we estimate the impact of TRI (both aggregate and modal TRI) on them. In particular, the inclusion of modal TRI

[1] It is worth noting that this index captures restrictions to both foreign and domestic firms. Hence it is not a pure 'trade' restrictiveness index but it includes also constraint on domestic provision. For a detailed description of the methodology and the main features, see Marouani and Munro (2009).

[2] Given that we use data for both domestic and foreign firms, our analysis identifies the impact of restrictions on general service provision and not only on trade in services. For this reason, throughout the paper we talk about 'tax' and not 'tariff' equivalents.

[3] Performance indicators are not the same for banking and telecom: the net interest margin (NIM) used in the banking sector is more important for consumers, while the performance indicator used in telecom, EBITDA is more a profit index for firms.

(the four modes defined by the GATS[4]) allows us to investigate the issue of complementarity and substitution between modes. The innovation of our work includes improvement in the regression's econometric specification and greater reliance on developing countries data in the samples.

Different useful policy insights could be drawn from this analysis and they are not just based on the tax equivalent estimation. Indeed, the sign of the TRI coefficient in the regression also offers relevant policy conclusions. A positive impact of the TRI on the price-cost margin suggests a *rent-creating effect*, that is, policy that protects the local market by allowing firms to charge a price mark up over marginal costs. On the other side, a negative sign indicates a *cost-creating effect,* and consequently, a cost-inefficient market. As suggested by Hoekman (2006), "if the policies generate real costs, removing them may give rise to much greater welfare gains than is the case if the policies generate rents that are captured by domestic agents." Indeed, while in the first case we would remove market inefficiency; in the second case we support a redistribution of income. While domestic firms could suffer market share losses owing to the increased competition, local consumers (final and intermediate) would gain in terms of better service quality, wider choice and lower prices. However, in reality, service barriers are always rent-creating and cost-creating at the same time. Given that performance indicators include both effects, the sign of the coefficient gives us the dominant effect. A powerful tool to disentangle the two different effects would be to separately regress the TRI on costs and prices. However, as these kinds of data are rarely available, following the literature, we rely on price-cost margins which are accessible through company account databases.

The rest of the article is organized as follows: section two describes the methodology used for computing the tax equivalent in the different sectors; section three is devoted to descriptive statistics analysis of the banking and telecom sectors. Section four presents the econometric analysis of the TRI's economic impact for the banking and telecom sectors and the tax equivalent computation for all the sectors. Section six concludes the chapter.

II Methodology

Given the intangible nature of trade in services and service provision, it is more difficult to assess barriers for these sectors than for the manufacturing or agricultural sectors. In the service sectors, barriers take the form of quotas, prohibition, licenses and government regulation, which cannot be directly quantified. Owing to these features, tax equivalent estimation requires different steps of analysis. The first one involves the computation of TRIs. Then, the computed restrictions are regressed on sectoral performance[5] to identify their economic impact. Finally, the estimated TRI coefficients are matched with the TRI index and transformed into tax equivalents. While a detailed discussion of TRI computation can be found in the previous chapter, this section provides a detailed explanation of the methodology applied in the last two steps enumerated above.

6 Cross-border supply (mode 1) refers to the supply of a service from the country of the supplier into the country of the consumer. Consumption abroad (mode 2) involves the purchase of services by the consumer while abroad in the country of the supplier. Commercial presence (mode 3) entails the supplier providing services through foreign-based establishments in the country of the consumer. Movement of natural persons (mode 4) relates to the supply of services by an individual from the country of the supplier (for short or long-term) in the country of the consumer.

[5] Performance indicators are not the same for banking and telecom: the net interest margin (NIM) used in the banking sector is more important for consumers, while the performance indicator used in telecom, EBITDA is more a profit index for firms.

II.1 The Economic Impact of TRI.

Given the tax equivalent's definition, the best way of estimating the impact of TRI on banking and telecom companies' performance would be to use price data[6] as a dependent variable (Johnson et al (2000) and Doove et al (2001) for international air service; Kalirajan et al (2000) for banking; Trewin (2000) for telecommunications services, and Kang (2000) for maritime transport). However, owing to the lack of this kind of information, we use price-cost margins, which are readily available from accounting datasets.

The main advantage of this kind of data is that problems of international comparability are overcome, as data included in the financial statements follow international standards[7]. There are drawbacks to this approach, but they do not seriously compromise the results.

First of all, MNEs operate on both domestic markets and overseas, or engage in other activities (for example some fixed telecom companies participate also in mobile companies). Since company financial statements are derived from consolidated balance sheets, data refer to the general firm activities and hence include profit, assets and liabilities related also to other markets and activities. We control for this problem by excluding from our dataset firms that rely much more on overseas activities, such as in Mexico.

Secondly, price-cost margin could include changes in prices and costs due to 'second round effects', which dilute the direct effects of the restrictions. Consequently the real direct effects could be underestimated (Kalirajan 2000).

Given our final aim to estimate the tax equivalents for MENA countries the first best scenario would be to use data only for these countries or at least for similar developing countries. However, this approach is not feasible due to the small size of the sample. We would need more MENA countries and series for the TRIs variation (which do not exist). Hence, to overcome this problem we use both data for developing and developed countries. In doing so, we fulfill the variability requirement and still base our estimates on a fairly representative sample. On the other hand, relying only on developed countries data could be misleading given the difference of business environments between firms operating in these countries, and firms operating in developing countries.

II.2 The Estimation Strategy

The Australian Productivity Commission proposes a two-stage approach to estimating the impact of TRI on firm performance. The first stage estimation investigates the firm-level determinants of firm performance in order to capture the sectoral performance due solely to specific country features[8], the so-called 'adjusted price-cost margin'. The estimation equation for the first stage is the following:

$$\log(PCM_{ij}) = c_j + \beta X_{ij} + \epsilon_{ij} \qquad (1)$$

Where i refers to the firm in a particular sector, j to the country. PCM is the firm performance (NIM for banks and EBITDA margin for telecom firms), X is the firm level characteristics described above, c is the country dummy. All the variables are average values over the period 2002-2006. Equation (1) is estimated using country-level fixed effect.

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[6] Also quantitative data could be used as a dependent variable in the regression (Warren 2000 for telecom). In this case, calculating the tax equivalent requires additional information: the elasticity of demand which allows us to transform percentage variation in quantities into percentage variation in prices (%ÄP=%ÄQ/ç)

9 However the use of this kind of data is widespread in trade and service literature; see for example Nguyen-Hong (2000).

[8] It corresponds to the 'pure spread' in the banking sector. It doesn't take a specific name in the telecom sectors.

The country dummies capture the adjusted price-cost margin and then are used as dependent variables in the second stage:

$$\hat{c}_j = \alpha + \gamma Z_j + \vartheta TRI_j + \epsilon_j \quad (2)$$

Where Zj includes all the country-specific features presented above and TRI refers both to the aggregate and modal TRI. Equation (2) is estimated using OLS. The TRI is the base for the tariff equivalent computation. The main rationale behind the two-stage approach is to avoid a bias estimation due to the inclusion of both firm and sectoral-level regressors. In the presence of group effects of firms within an economy errors may be correlated and a single-stage estimation could produce a bias estimate (Moulton, 1986). Conversely, this technique has three severe drawbacks. First, it assumes two independently distributed error terms, but the first step ignores it (Nguyen-Hong, 2000). Second, the country dummy estimation heavily depends on the regressor choice in the first stage and this could impact the TRI significance in the second stage. Lastly, the second step estimation relies on a very limited variation (we have just one observation for each country). The final drawback is particularly striking in the estimation for the telecom sector where the limited number of observations for the mobile adjusted price-cost margin leads us to put fixed and mobile telecom companies in the same sample.

The single-step estimation, with the inclusion of both firm-level and country-level data, allows us to overcome these shortcomings. In particular, this approach directly captures the impact of barriers on each firms' profit margin instead of only explaining the economy wide-effect of restrictions on each country. In doing so, it exploits the firm level variation in price-cost margin as opposed to an aggregate fixed effect. Thanks to this additional variability we could estimate separately the impact of TRI on the fixed and mobile sector. Moreover, the bias-estimation problem is evaded by clustering the errors at the country level, after testing for the real importance of the country level effect. The main problem using this approach is the multicolinearity among country level variables. However, the variables that are dropped owing to multicolinearity were usually not significant in the two-stage approach. The estimated model is the following:

$$\log(PCM_{ij}) = \alpha + \gamma Z_j + \vartheta TRI_j + \beta X_{ij} + c_j + \epsilon_{ij} \quad (3)$$

We estimate the impact of TRI on banking and telecom firm performance using both the two-stage and one-stage approach[9]. Given the similarity of the estimates, both in terms of coefficients signs, size and significance, we base our comments on the two-stage results and use the one-stage approach as a term of comparison (reported in the Appendix 2). Finally, while in the two-stage approach errors are corrected by heteroschedasticity, in the one-stage approach the clustering of data at country level already gives robust standard errors.

II.2.1 The Tax Equivalent Estimation

Finally the estimated TRI coefficients (both aggregated and modal TRIs) are included in the following formula to compute tax equivalents[10]:

$$t = 100\left(\frac{PCM_{ij} - PCM_{oj}}{PCM_{oj}}\right) = 100\left(e^{\hat{X}*TRI_j} - 1\right)$$

[9] The one-stage approach was applied also by Nguyen-Hong (2000). They estimate the model using country-level fixed effect. To overcome the multicollinearity problem that would drop the main variable of interest (TRI), they interact country-level data with the firm market share.

[10] In doing so, for each MENA country and each sector, we would get a value for 'aggregate tax equivalent' and one for each mode.

Where PCM_{0j} indicates the price-cost margin in country j in the case of no restrictions (i.e. TRI equal to zero), *ceteris paribus*. The inclusion of the minimum and maximum of the estimated 95% confidence interval provides policymakers with a more flexible tool, which is necessary given the nature of the analysis. Unlike Shepherd and Dihel (2007), we do not apply the bootstrapping technique, since it often produces non-significant coefficients and, consequently, wide intervals that are not very relevant for policy reform design.

However, while for the banking, telecom and insurance sectors[11] the transformation is straight, that is, we simply substitute the *estimated beta* in Equation 4; for maritime and air service we need some further transformation. For maritime, Kang (2000) uses a log-log estimation also in the second stage regression, instead of a semi-log as we do in Eq. 2. The introduction of the TRI in logarithm, impedes us from comparing the situation with the actual level of TRI with the case of total liberalization (TRI=0), so we need to use a benchmark to overcome this problem. We use two different benchmarks: first of all we choose the country that reports the lowest TRI value in the Kang paper, that is, the United Kingdom. Unfortunately since Kang (2000) does not compute modal TRIs, we can obtain only aggregate – and not modal- tax equivalents. Secondly, we use Jordan –the country with the lowest maritime TRI among MENA countries- as a benchmark.

For the air transport sector, Piermartini and Rousová (2008) construct a new index of bilateral air transport liberalization and introduce it in a gravity model to estimate its impact on passenger flows. Hence, their approach differs from ours in different ways, but these differences do not impede us from using their estimated beta. Indeed, as they explain in the paper, the index of bilateral air transport liberalization (TL_index) could be easily transformed in a restriction index by taking (1-TLindex). Secondly, the average index of bilateral air transport liberalization for Egypt, Morocco, and Jordan does not differ too much from our computed TRI[12], so we can use our TRI for computing the tax equivalent. This would allow us to compute also a proxy for the modal tax equivalents, under the strict assumption that the estimated economic impact of aggregate TRI is common to other modes. Finally, Piermartini and Rousová (2008) use the number of passengers, instead of an economic performance indicator, as dependent variable in their estimation. To convert the impact of the TRI on the international air passenger traffic to its impact on prices, we should simply divide the computed tax equivalent by the price elasticity of air travel demand. The price elasticity of the air travel demand is taken from Barons et al (2002).

II.3 Data Source and Variable Description

The estimation of this type of model requires the availability of both firm and country-level data. Consequently, data are collected from different sources. Firm level data, for firms in both developed and developing countries, are derived from the financial statements reported by Datastream[13]. Regulation data for the banking sector are taken from the Banking Regulation Survey (2003-2005), the quarterly interest rates are from IMF data, and telecom sectoral indicators are from the ITU Yearbooks of Statistics (1996-2005). TRI computation for non-MENA countries (both aggregate and modal) are taken from Dihel and Shepherd (2007).

[11] In this case the estimated beta is taken from Dihel and Shepard (2007).

[12] Although the aggregate bilateral TRI computed by Piermartini and Rousovà are slightly higher than those computed in our analysis -indeed they amount to 0.86 for Egypt and Morocco and 0.81 for Jordan- they reflect the greater openness of Jordan.

[13] Data for the Egyptian telecom sector and for some Lebanese banks are taken from the financial statement available online.

The main variables in this stage of the analysis are the aggregate and modal TRIs. Moreover, our estimation analysis requires the inclusion of different controls, both at the firm and country level, which are described in the following section.

II.3.1 The Banking Sector

Following the literature, the specification of the econometric model for the banking sector is based on the Ho and Saunders (1981) theoretical model that investigates bank margins determinants. This model has been the basis of many empirical analyses and has been enhanced with the inclusion of other variables such as the effect of regulation (Saunders and Schumacher 1997; Kalirajan et al. 2000; Dihel and Shepherd 2007).

Price-cost margin in the banking sector is usually captured by the net interest margin (NIM). NIM is computed as the sum of total net interest income (interest earned minus interest paid on borrowed funds) divided by total interest-earning assets (any asset, such as a loan, that generates interest income). This measure is closest to what the price customers pay for bank services and, hence, is better suited to the aim of our analysis. Moreover, it is usually preferred to other bank performance indicators, such as return on equity (ROE).

Saunders and Schumacher identify three main determinants of NIM: prudential regulation; net expenses from other activities, and the pure spread. Prudential regulation is measured as liquidity (LIQ_ratio) and capital requirement (K_ratio) ratios. These requisites are necessary to limit risk of default and preserve the solvency of banks. Usually these requirements represent additional costs for banks and could be compensated by raising NIMs (Kalirajan et al. 2000). For this reason, we would expect positive estimated coefficients of these two regressors.

Net expenses from other activities are measured as the difference between other operational costs, other than interest expenses, and other earnings divided by total assets (NIERAT). Also in this case, an increase in net non-interesting operating expenses could be covered by an increase in NIMs.

Finally, the 'pure spread' represents country-specific features, that is, economy-wide characteristics that are constant across all banks in a specific country. It includes the market structure computed as the fraction of deposits held by the five largest banks[14] (concentration ratio or C5); the interest rate volatility computed as the variance of annualized quarterly deposit rates (INT_VAR); and prudential regulation (3.1 = capital adequacy, 7.1 = existence of explicit diversification requirements, 7.3.1 = liquidity reserves, 8.10 = compulsory deposit insurance, 9.1 = formal definition of non-performing loans). The aggregate TRI (TRI_AGG) and the different TRIs by mode (TRI_M1; TRI_M2; TRI_M3; TRI_M4) are important components of the pure spread as well.

II.3.2 Telecommunication Sector

Specification of the econometric model for the telecommunication sectors relies on a general specification that is based on models for other sectors that emphasize the importance of controlling for both firm and country level features (Betancourt and Gautschi 1993; and Saunders and Schumacher 1997).

Following the empirical analysis for other services (engineering, accounting, and distribution), the price-cost margin is measured as the EBITDA margin, that is, earnings before interest, taxes and accounting depreciation divided by revenues. Among the firm-level determinants of the telecom sector performance[15] we identify capital intensity (K_int), which

[14]The market structure is captured also by a firm-level variable that measures the bank's market share.

[15] These variables are the same both for the mobile and for the fixed telecom firms.

measures the firm's use of capital in producing services and is measured as the ratio of capital over total sales. It represents both support capacity for the innovation process and the availability of transmission infrastructure[16], and thus it should exert a positive impact on firm profit. Sales (net_sales) and total employment (tot_empl) are used as proxies for firm size. Large firms are expected to be more stable, as they would generally offer a wider assortment of products and have broader network coverage, as they have reached a critical size to stay in the market and are better known. Hence, size is expected to increase the profit. Growth in sales (g_sales) captures the firms' performance and competitiveness. Indeed, it is always linked to an increase in demand boosted by the introduction of a new product, the acquisition of other companies, etc. The increase in sales induces an increase in firm profits. Market share (mkt_share) is computed as firm revenue divided by total telecom revenues. Given that some firms operate in both the fixed and mobile sectors, the denominator is computed as the sum of mobile and fixed revenues. An increase in market share mirrors an increase in the firm's market power and could lead to an increase in its profit.

Moving to the economy-wide features, we control for specific fixed and mobile elements. The sector performance data are captured by the recent growth in fixed telecom or mobile revenue (fx_revenue_g, mobile_revenue_g), the number of main lines per capita (fx_tel_lines_pop), or the number of cellular subscribers per capita in the case of mobiles (mob_subs_pop). All of these elements should have a positive impact on firm profit. The quality of service provision and the technological level are captured by the percentage of digital mainlines (mob_subs_digitalshare). Finally, we control for regulation (calculated as the first principal component of different indicators; this variable is taken from Dihel and Shepherd (2007)) and for trade restrictions (both aggregate and by mode).

III Descriptive statistics

Before moving to the tax equivalent computation for all the sectors, it is worth presenting some descriptive statistics on the two sectors that are the core of our analysis: the banking and telecom sector.

III.1 The banking sector

Countries are divided into three groups: MENA countries, developing countries (excluding MENA), and developed countries. This section aims to provide some preliminary evidence on the differences between these countries in the banking and telecom sectors.

With regards to the banking sector, the main insight from the descriptive statistics analysis is that net interest margins (NIM) are higher in developing and MENA countries than developed countries. A high NIM could be driven by low interest rates paid on the deposit and/or high interest loans, which discourage savings and investments. Hence, high NIM in these countries could indicate the presence of market inefficiency[17]. Also TRIs are the highest in developing non-MENA countries (tables 1 and 2) and this raises the hypothesis that higher TRIs induce higher interest margins, that is, TRIs would be rent-creating. We also found that TRIs in the MENA countries lie in between the values for other developing countries and developed countries. However, the differences are not statistically significant[18]. The same pattern holds for the modal TRI.

[16] However telecom firms often rent transmission supports rather than buying them.

[17] However, very low interest rates cannot always be taken as a positive indicator as in the case of some Latin American countries (Brock and Suarez, 2000). Moreover, Sounders and Schumacher (2000) affirm that high NIM may also contribute to a strengthening of the country's banking system.

[18] The low mode 3 TRI among MENA countries is due to the very low value reported by Lebanon. Moreover, the lack of significance in the equal mean test could be explained by the limited size of the MENA countries group in comparison to the others.

Concerning prudential variables, we found evidence for a statistical difference between developed and developing countries for the capital adequacy (three_one) and liquidity reserves (seven_three_one) variables. This result could mirror the need to compensate for a higher exposure to risk in developing countries. MENA countries are similar to developing countries in terms of capital adequacy and liquidity reserves. The same message is echoed by the higher interest variation that characterized developing countries and it is a consequence of the financial crisis that took place in the 1990s in Argentina, Russia, and East Asia. Finally, the three groups of countries are very similar in terms of the percentage of deposits held by the five largest banks (concentration ratio or C5).

III.2 The fixed telecom sector

Table 3 shows that EBITDA is higher in MENA and in non-MENA developing countries than in developed countries. The difference is statistically significant. This could be the result of a less competitive and more protective environment that characterizes these countries. Moreover, the coverage of the fixed network in MENA countries is lower than in other developing countries, which is itself much lower than the coverage in developed countries. Once again, this result is not surprising given the generally lower level of economic development in these countries, and it shows the potential of expansion in this sector.

Unlike in the banking sector, MENA countries present the highest aggregate TRI in the fixed telecom sector (Table 4). Hence, despite the recent policy reforms implemented in this field, these countries are still highly protected. Matching this information with the EBITDA values discussed above, we could infer a positive correlation between TRI and performance indicators. Once again, TRI seems to exert a rent creating effect.

The analysis at the modal level reveals a slightly different pattern. Indeed, MENA countries present higher regulation only in comparison to developed countries, with the exception of mode 4 for which there is no difference between the different groups of countries[19]. For modes 1 and 2, however, Table 6 indicates a lack of any restrictiveness and generally low restrictions in developing countries. A wide gap is noted among countries in terms of Mode 3.

III.3 The mobile telecom sector

Also with regards to the mobile sector, the statistical analysis reported in Table 5 reveals that EBITDA is highest in the MENA countries group, followed by the non-MENA developing countries group. Concerning the number of subscribers over the population, the highest rate is observed in developed countries and the lowest rate in MENA countries (a statistically significant difference). Mobile revenues growth is the lowest in the developed countries group, the difference between developed and developing countries being statistically significant. This last result is certainly due to the spectacular development of mobile telephony in MENA and non-MENA developing countries since the beginning of the new millennium. This development only became possible when the PTO monopolies on mobile telephony were lifted and licenses were granted to foreign companies. This has boosted a technological improvement that is mirrored in the similarity among country groups in terms of digital share per mobile subscriber.

As observed in the fixed sector, the variable synthesizing sectoral regulation reg_var is higher in developed countries than in developing countries (a statistically significant difference).

[19] As already emphasized in the previous paragraph, mode 4 plays an important role in fixed telecom sector and surprisingly doesn't widely vary across countries.

The analysis of TRIs (Table 6) reveals that, despite the recent development of the mobile sector in developing countries, and particularly in MENA countries, barriers are still significantly higher in these countries. At the modal level, as noticed for the fixed telecom sector, there is no difference in mode 4 between the three groups. On the other hand, TRIs are lower for developed countries than for developing countries for modes 1, 2 and 3 (a statistically significant difference)[20].

IV Tax Equivalent Estimation

Tax equivalent is defined as the wedge between the actual price and the price that would prevail without service barriers. Hence, the *first best* in the tax equivalent estimation would an analysis based on service price. However, given the scarce availability of these data, mainly for developing countries, we proxy the price gap with the economic impact of TRI on the firm performance. We estimate the TRI's economic impact only for the banking and telecom sectors. For the insurance, air and maritime sectors, the estimated coefficient is taken from other analysis (Shepherd and Dihel (2007), Piermartini and Rousová (2008) and Kang (2008), respectively). This choice is mainly driven by the lack or scarcity of firm level data for developing countries in these sectors. Finally, an *ad hoc* transformation of the estimated economic impacts gives us the tax equivalent value.

IV.1: The impact of TRI on economic performance.

IV.1.1 Banks

In the first stage, the firm level estimations[21] (Table 1 –left side- in Appendix 1) show that the *capital ratio* and the *liquidity ratio* are positive and significant. This is the expected sign, as these two ratios are prudential factors that ensure the solvency of banks. The *non-interest expenses ratio* is also positive and significant, which could mean that banks charge a higher interest margin to compensate for higher non-interest costs. These results are coherent with the wide empirical evidence on net interest margin determinants (Kunt and Huizinga, 1998). The market share is not significant. The estimations are robust to the introduction of dummies for MENA and developing countries.

Moving to the second stage of the analysis[22], where we regress country level variables on the estimated 'pure spread', our results suggest that the main variable of interest, the *aggregate TRI*, is positive and significant (Table 1 -right side- in Appendix 1). In particular a 1% increase in the aggregate TRI would induce a 0.1% increase in the 'pure' spread in MENA countries, on average and ceteris paribus [23]. Hence higher TRI would lead to higher pure spread and consequently an increase in the rent effect, which dominates the cost-inefficiency effect. This result is robust to the inclusion of different controls and is confirmed by the one-stage regressions (see Table 1 in Appendix 2). Removing restrictions in the banking sector would favor income redistribution from banks to customers.

[20] Table 9 suggests that MENA countries are totally liberalized with regards to mode 1, compared with a low level of restriction in developed countries, This result should be interpreted with caution: first of all, the index is based only on one question (the percentage of leased lines) and secondly, data for MENA countries are more recent than those for developed countries.

[21] When the variables are significant, the null hypothesis of coefficients non-different from zero is rejected at the 1% level. However, given the presence of non-normally distributed residuals, their significance could actually be lower. The same holds for the estimation of country dummies, which are used as dependent variables in the second stage of the analysis, but there is no reason to expect insignificant coefficients. The R-square is around 0.8 meaning that the regression explains 80% of the estimated model.

[22] The R-squared at the second level of the analysis are generally lower (below 20%) but the regression specification tests are largely satisfied since they fail to reject the null hypothesis at the 10% level.

[23] The increase in developing and developed countries would be of 0.14% and 0.04%, respectively. It is important to highlight that a percentage increase of TRI is not easy to determine given the nature of the index.

The analysis at the modal level (regression mode by mode, Table 2 in Appendix 1) reveals that *mode 3* is positive and highly significant[24]. In particular, a 1% increase in mode 3 would induce a 0.25% increase in the 'pure' spread, on average and ceteris paribus [25]. The impact of a change in mode 3 is more effective then a general change in the aggregate TRI. This suggests that restrictions to commercial presence are rent-creating. However it is possible that some restrictions composing mode 3 could be cost-creating while others could be rent-creating, since what we observe is the net effect. It would thus be interesting to regress individual index modal components on the performance indicator to disentangle the different effects. Finally *mode 4* is negative but not robust *and modes 1 and 2* are not significant. This is not surprising given the low importance of these modes in the banking sector[26]. If we put the four modal TRIs together in the regression we obtain the same results except that mode 4 turns to be strongly significant. This result suggests some complementarity between mode 4 and other modes.

With regards to other control variables, they are almost stable across different models. First of all, among the prudential regulation variables, the only significant one is the '*compulsory deposit insurance*' (eight_one), which has a negative impact on the pure spread. This is understandable since countries that are subject to this requirement face lower risk and hence lower interest spreads. The *net interest variation* presents the expected positive sign[27] but is not significant. A possible explanation for this result is that our sample included countries that were hit by financial crises during the period of analysis (in particular Argentina and Uruguay) and consequently report very high interest variation. Excluding these countries from the sample, the interest variation turns to be significant. Countries recently hurt by financial crises deserve special attention. Indeed, these countries simultaneously present lower net interest margins (the *financial crisis dummy* is negative and significant) and aggregate TRI above the sample mean. As a result aggregate TRI in these countries is not significant (*TRI_aggFinancialCrisis*). These results could suggest that the financial crisis has induced a strengthening of the banking regulation, which had a positive impact on the banking sector performance[28].

V.1.2 Fixed telephony

The first stage regression (Table 3 in Appendix 1, left side)[29] suggests that *capital intensity* and *market share* have a positive impact on EBITDA, which conforms to the theory. On the other side, *net sales* have a negligible impact (also when transformed in elasticity) and *sales growth* is not significant. Once again these results are robust to the inclusion of MENA and developing dummies.

Moving to the second stage of the analysis, the impact of the *aggregate TRI* on 'country level EBITDA' is positive and significant (Table 3 in Appendix 11, right side). In particular, a 1% increase in the aggregate TRI induces a 0.33% increase in the 'country level EBITDA', on

[24] Not surprisingly, the aggregate TRI and the variable that presents the higher weight in its computation present the same sign and same significance level.

[25] The increase in developing and developed countries would be of 0.51% and 0.4%, respectively.

[26] Moreover, these two modes turn to be significant in the one-stage approach. So, evidence of their influence on the pure spread is not clear and requires further analysis.

[27] The literature suggests that a higher interest variation induces a higher net interest margin to compensate for higher risk.

[28] Evidence on the improvement in the financial sector indicators are provided by the World Bank (2007) with regards to the sharp decrease in the share of non-performing loans and, more generally, by Turner (2007).

[29] As we already highlighted for the banking sectors, the first stage regressions in the fixed telecom sector are also characterized by high R-squared (the model estimation explains around 80% of dependent variable variation) and non-linear residuals. The second stage regressions are very strong: the R-squared is around 60% and the diagnostic test usually does not reject the null hypothesis.

average and ceteris paribus [30]. The estimation results are robust to different specification and are corroborated by the results in the one-stage approach (Table 2 in Appendix 2). We can infer that restrictions in the fixed telephony sector TRI have mainly a rent-creating effect. At the modal level, *TRI_M3* is positive and significant. In particular, a 1% increase in the TRI mode 3 induces a 0.34% increase in the 'country level EBITDA', on average and ceteris paribus[31]. Contrarily to the banking sector, a policy focused only on mode 3 restrictions would not have a greater impact on the telecom sector performance than a general reform dealing with all restrictions. Once again, it mirrors the sign and significance of the aggregate TRI. *TRI_M1*, *TRI_M2 and TRI_M4* are positive and significant, but not robust (Table 4 and 5 in Appendix 1).

When the four modal TRIs are put in the same regression (Table 6 in Appendix 1), only TRI_M3 is still significant, but is less robust. This suggests strong modal interactions in the fixed telecom sector, higher than in the banking sector where the results were relatively stable.

If we observe the other control variables, *prudential regulation in fixed telecom* has a positive effect on EBITDA. The *rate of fixed lines over population* has a negative impact on EBITDA, which can be explained by lower opportunities to increase the size of the domestic market in countries where this rate is high (i.e. mature sectors). Finally, while the mobile *subscribers digital share* is not significant, *the share of mobile subscribers over the population* has a positive coefficient. This could seem counterintuitive given the expected substitution between fixed and mobile services. A possible explanation could be that many companies that offer fixed telecom services also entered into the mobile telecom business, and the increase in the number of subscribers had a positive impact on their profits.

V.1.3. Mobile telephony

Looking at the first stage regression results (Table 7 in Appendix 1, left side)[32] we notice that capital intensity is not significant, while sales growth has a positive and significant effect on EBITDA. These results shed light on the structural difference between the mobile and the fixed telecom sectors. Unlike the latter, the mobile sector is younger and more dynamic, mainly in terms of sales growth in developing countries, and it requires lower capital intensity (in terms of tangible fixed assets)[33].

Moving to the second stage regression, Table 7 in Appendix 1 (right side) shows that the aggregate TRI has a negative and significant effect on EBITDA in the mobile telephony, suggesting a cost-creating effect. In particular, a 1% increase in the aggregate TRI induces a 0.59% increase in the 'country level EBITDA', on average and ceteris paribus [34]. At the modal level (Table 8 in Appendix 1); TRI_M1 and TRI_M4 are positive but not significant[35], while TRI_M2 and TRI_M3 are negative and significant. In particular, a 1% increase in the TRI mode 3 induces a 0.50% increase in the 'country level EBITDA', on average and ceteris

[30] The increase in developing and developed countries would be of 0.30% and 0.06%, respectively.

[31] The increase in developing and developed countries would be of 0.28% and 0.07%, respectively.

[32] Regression results for the mobile sector are less sound than for other sectors. Indeed, while the other sector is high in the first stage and the residuals are non-normally distributed; in the second stage the R squared are very low and the null hypothesis of the diagnostic test are not rejected. The one stage approach presents a discrete R squared (48%, closed to the fixed telecom one).

[33] For example mobile companies can rent the signal towers which can be shared by different companies.

[34] The increase in developing and developed countries would be of 0.58% and 0.11%, respectively.

[35] However, they are positive and significant in the one-stage approach (Table in Appendix 2). We can thus not draw any strong conclusions on the significance of these variables. However, given their limited impact on the mobile sector, this result is not too worrying.

paribus[36]. Also in this case, as already emphasized for the fixed telecom sector, aggregate TRI and mode 3 would have a similar impact on the sector performance. These results show that the policy implications of liberalizing mobile and fixed telephony markets will not be the same. The gains in terms of mobile liberalization should be higher because it should induce a reduction of production costs and the removal of market inefficiency.

However, one can wonder why barriers to fixed telephony liberalization are more rent-creating while restrictions on mobile telephony are more cost-increasing. This result observed for the aggregate TRI is echoed by the mode 3 coefficient. The main difference could thus come from the different implications of foreign investments in the two sectors. Indeed, while a significant part of the fixed network is already there, the cellular network is still in progress, especially in developing countries. Thus, increased foreign participation in the fixed telephony would mainly have an impact on the rent distribution, while an increase in investment in mobile telephony could reduce costs by expanding the network (i.e. increasing the number of subscriber permits to reduce fixed costs per subscriber).

Concerning interactions between modes, we observe that mode 2 turns to be non significant when the four modes are included simultaneously in the regression. However, the sign of mode 3, which is by far the main vector of trade in mobile telephony, remains negative and strongly significant. This would indicate that mode 3 is not influenced by modal interaction in the mobile sector (we found the opposite result for fixed telephony).

V.2 Tax equivalents

The analysis of tax equivalents results provides two main insights. First, our results are higher than those obtained in previous studies (e.g. Dihel and Shepherd 2007), an expected result given our reliance on developing countries' firm data in the sample. Indeed the impact of TRI on economic performance is usually higher in developing countries than in developed countries.

Second, in Table 7 we note that tax equivalents are higher in the mobile sector than in the fixed sector, despite higher restrictions in the fixed sector in the three studied countries[37]. This is due to the fact that the impact of restrictions on firm performance is higher in mobile telephony. Indeed, tax equivalents result from the combination of a level of restrictions and an impact of these restrictions on the price-cost margin. This result could be explained by the larger diffusion of mobile than fixed telecom service and the consequent stronger impact of mobile restrictions on the economy.

Given the different methodology applied for estimating the impact of TRI on firm performance in the air and maritime service, a comparison between these sectors and the banking and telecom sectors is meaningless. However, we can compare tax equivalents in MENA countries with those in the most open countries: from Table 8 we can see the higher level of restrictions in the maritime and air service sector in MENA countries than in the UK[38]. With regards to tax equivalent estimation in the insurance sector, the main constraint for the cross-sector comparison is the different sample used for our analysis and the Dihel and Shepherd's one: given that Dihel and Shepherd's analysis relies mainly on developed countries data, the tax equivalent for MENA countries in the insurance sector is underestimated.

[36] The increase in developing and developed countries would be of 0.50% and 0.08%, respectively.

[37] The higher impact of mobile TRI on the sector performance was already evident by the elasticity comparison presented in the previous section. Indeed, while a 1% increase in fixed telecom TRI induces only a 0.33% increase in the 'country level EBITDA' for the fixed telecom sector, the effect of mobile TRI on the mobile sector performance is equal to 0.50%.

[38] Maritime tax equivalent in MENA countries are, on average, 257% higher than in UK, while for air they are 1.31% higher than in the UK. Unfortunately, we cannot conclude that maritime is more restricted than air service given the different methodology applied in the two cases.

VI Conclusions and Policy Implications

Our study aimed to assess the restrictiveness of barriers to trade in banking, telecom, insurance and transport services in the MENA region.

The empirical analysis for the banking and telecom services shows that restrictions have an impact on economic performance in these sectors. While a rent-creating effect seems to dominate restrictions on banking and fixed telecom sectors, a cost-inefficiency effect seems to dominate the mobile telecom sector. This means that liberalizing mobile sector telephony would induce potentially higher gains than liberalizing the two other sectors. But this conclusion could be modified if we think in terms of input-output analysis. Indeed, fixed telephony for example is the main input of internet providers and is an important input of many back-bone services. Thus, a reduction of fixed telephony prices is not simply a matter of rent redistribution, but also a matter of technical development and of competitiveness.

On the modal level, we do not obtain the same results when we put the four modal TRIs at the same time versus when we put them separately in the regressions. This is due to interactions between modes. When put separately for the banking sector, the mode 3 TRI has a positive effect on the net interest margin, while the mode 4 TRI has a negative effect on NIM. Modes 1 and 2 are not significant. In the fixed telephony sector only mode 3 TRI has a positive and significant effect on EBITDA. In the mobile telephony sector, mode 2 and 3 TRIs have a negative effect on EBITDA, while mode 1 and 4 are not significant. Hence, as suggested by the trade restrictiveness analysis, mode 3 seems the most critical feature. Liberalizing mode 3, by relaxing limitations on commercial presence, would have the greatest impact on firms' performances and on income redistribution. This holds not only because tax equivalents are higher but also because it would remove a cost-inefficiency. On the other side, the same intervention in the banking and fixed telecom sector would favor a better income distribution. However, in the fixed telecom sector characterized by a monopoly, there is the risk of a 'rent drain' from domestic firms to foreign firms without any positive implication for customers, in term of better quality and lower prices.

When put together in the regression for the banking sector, mode 3 remains positive and significant and mode 4 TRI becomes negative. In the fixed telephony sector mode 3 significance is less robust and mode 2 is not anymore significant. In the mobile telephony, mode 2 turns to be non significant while mode 3 does not vary. These results suggest some degree of interaction between modes, mainly in the banking and fixed telecom sectors. These interactions (complementarity or substitution) have significant policy implications. Indeed, the impact of reforming regulations concerning one of the four modes will be different depending on the regulations dealing with the other modes interacting with the former. If these interactions exist, governments should take them into account in their reform agendas. Future research should focus more on interactions between modes by adding interaction (between modal TRIs) variables among the regressors.

Among the innovations in the empirical framework we estimate the impact of TRI on firm performance using the `one-stage approach`, that is, we regress the TRI directly on firm performance, clustering the errors at the country level to avoid biased estimates. Moreover, we increase the dataset coverage by adding firms from developing countries and we cover a more recent time period than previous studies.

With regards to the technical issues, we would improve the analysis by better exploiting the time dimension. In particular we would apply a random effect estimator on a firm level panel, which would allow us to estimate time-invariant firm features, such as the TRI. Moreover, tax equivalent estimations would be more accurate if we could rely only on developing country data and if we could use price data instead of firm performance data as dependent variables. However, data availability is a major constraint for such improvements.

As a next step, an assessment of the impact of the different reforms engaged by the analyzed countries would be useful. However, such an evaluation is not an easy task given the multiplicity of direct and indirect effects of reforms, including the trade liberalization one. Ex ante and ex post qualitative and quantitative assessments must be conducted at the sectoral level but also at the economy-wide level to capture the interaction between the various sectoral reforms.

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Table 1: Banking Sector: Descriptive Statistics

	Variable	Obs	Mean	Std.Dev.
Firm Level Variable				
Mena Countries	NIM	27	0.024	0.010
Developing Countries	NIM	218	0.045	0.030
Developed Countries	NIM	708	0.030	0.010
Structural Variables				
Mena Countries	C5	4	0.619	0.147
	int_var	4	0.985	0.662
	eight_ten [1]	3	1.000	0.000
	three_one	4	0.105	0.019
	nine_one	4	1.000	0.000
	seven_one	4	0.750	0.500
	seven_three	4	0.134	0.037
Developing Countries	C5	33	0.688	0.138
	int_var	33	197.904	917.896
	eight_ten	31	0.871	0.341
	three_one	33	0.092	0.014
	nine_one	33	0.818	0.392
	seven_one	33	0.455	0.506
	seven_three	29	0.122	0.137
Developed Countries	C5	19	0.632	0.237
	int_var	19	0.124	0.110
	eight_ten	19	0.789	0.419
	three_one	19	0.080	0.000
	nine_one	19	0.684	0.478
	seven_one	19	0.526	0.513
	seven_three	17	0.014	0.014

[1] Prudential regulation variables included in the regression are 8.10 = compulsory deposit insurance, 3.1 = capital adequacy, 9.1 = formal definition of non-performing loans, 7.1 = existence of explicit diversification requirements, and 7.3.1 = liquidity reserves. These variables are obtained from the World Bank regulation and supervision database (2007).

Table 2: TRI for the Banking Sector

	Variable	Mean	Std.Dev.
Mena Countries	Tri_agg	0.655	0.432
	Tri_m1	1.143	0.842
	Tri_m2	0.913	1.665
	Tri_m3	0.408	0.433
	Tri_m4	1.443	1.066
Developing Countries	Tri_agg	1.046	0.620
	Tri_m1	1.440	0.935
	Tri_m2	1.003	0.945
	Tri_m3	0.941	0.233
	Tri_m4	1.181	0.819
Developed Countries	Tri_agg	0.292	0.386
	Tri_m1	0.430	0.585
	Tri_m2	0.122	0.197
	Tri_m3	0.721	0.119
	Tri_m4	1.233	0.616

Table 3: Fixed Telecom

	Variable	Mean	Std.Dev.
Mena Countries	EBITDA-margin	0.489	0.080
Developing Countries	EBITDA-margin	0.355	0.136
Developed Countries	EBITDA-margin	0.252	0.168
Mena Countries	Fx_tel_line_pop	0.096	0.048
	Fx_revenue_g	0.059	0.062
Developing Countries	Fx_tel_line_pop	0.199	0.069
	Fx_revenue_g	0.087	0.071
Developed Countries	Fx_tel_line_pop	60.607	5.545
	Fx_revenue_g	0.054	0.192

Table 4: Fixed telecom: TRI

	Variable	Mean	Std.Dev.
Mena Countries	tri_agg	1.007	0.229
	tri_m1	0.507	0.439
	tri_m2	0.937	1.036
	tri_m3	1.083	0.200
	tri_m4	1.050	0.503
Developing Countries	tri_agg	0.869	0.556
	tri_m1	0.671	0.852
	tri_m2	1.537	0.876
	tri_m3	0.850	0.623
	tri_m4	1.386	0.615
Developed Countries	tri_agg	0.268	0.215
	tri_m1	0.000	0.000
	tri_m2	0.000	0.000
	tri_m3	0.327	0.352
	tri_m4	1.321	0.605

Table 5: Mobile Sector, descriptive statistics

	Variable	Mean	Std.Dev.
Mena Countries	EBITDA-margin	0.417	0.142
Developing Countries	EBITDA-margin	0.340	0.158
Developed Countries	EBITDA-margin	0.255	0.166
Mena Countries	mob_subs_pop	0.297	0.142
	mobile_revenue_g	0.303	0.064
	mob_subs_DigitalShare	100	0
Developing Countries	mob_subs_pop	0.426	0.214
	mobile_revenue_g	0.277	0.168
	mob_subs_DigitalShare	95.343	8.870
Developed Countries	mob_subs_pop	75.935	14.333
	mobile_revenue_g	0.096	0.157
	mob_subs_DigitalShare	99.711	0.701

Table 6: TRI in the mobile telephony

	Variable	Mean	Std.Dev.
Mena Countries	tri_agg	0.787	0.200
	tri_m1	0.000	0.000
	tri_m2	0.000	0.000
	tri_m3	0.763	0.092
	tri_m4	1.447	0.723
Developing Countries	tri_agg	1.174	0.814
	tri_m1	0.984	0.969
	tri_m2	0.660	1.083
	tri_m3	1.250	1.035
	tri_m4	1.386	0.615
Developed Countries	tri_agg	0.310	0.385
	tri_m1	0.241	0.572
	tri_m2	0.000	0.000
	tri_m3	0.243	0.483
	tri_m4	1.321	0.605

Table 7: Tax equivalents of restrictions in banking, fixed and mobile telecom in four MENA countries (in %).

		Banking			Fixed Telecom			Mobile telecom		
		Tax Equiv	Min	Max	Tax Equiv	Min	Max	Tax Equiv	Min	Max
					Egypt					
	AGG	35	21	50	54	33	79	101	9	271
	M1	28	17	40	15	1	30	0	0	0
	M2	5	3	8	2	0	47	0	0	0
	M3	136	96	184	67	40	98	51	5	118
	M4	63	44	84	68	5	169	356	267	466
					Jordan					
	AGG	15	10	22	35	22	50	73	7	181
	M1	20	12	28	0	0	1	0	0	0
	M2	5	3	8	0	0	0	0	0	0
	M3	20	15	25	50	31	72	43	4	97
	M4	129	86	183	89	6	239	506	368	684
					Morocco					
	AGG	50	30	74	33	21	46	52	5	118
	M1	39	23	56	15	1	30	0	0	0
	M2	853	187	3063	2	0	47	0	0	0
	M3	32	25	41	35	22	50	43	4	97
	M4	9	12	7	23	2	49	119	96	145
					Lebanon					
	AGG	7	5	10						
	M1	0	0	0						
	M2	5	2	8						
	M3	3	2	4						
	M4	241	150	365						
UK	**AGG**	7	4	9	4	3	5	12	1	24

Table 8: Tax Equivalent Estimation in Air, Maritime and Insurance Sector

			Air	Maritime	Insurance		
		Tax Equivalent P&M[1]	Tax Equivalent	Tax Equivalent	Tax Equivalent	Min	Max
				Egypt			
	AGG	25	21	249	14	69	207
	M1		18		0	0	0
	M2				0	0	0
	M3		24		21	183	176
	M4		10		77	581	2698
				Jordan			
	AGG	23	13	154	27	151	615
	M1		13		96	356	153
	M2				57	205	249
	M3		13		10	71	69
	M4		10		100	918	5518
				Morocco			
	AGG	25	13	367	54	440	3593
	M1		11		176	897	309
	M2				98	442	565
	M3		17		33	361	346
	M4		3		16	65	138
UK	**AGG**	18			2	9	22

[1] The computation is based on the average bilateral TRI reported by Piermartini and Rousova (2008).

Appendix 1: Two-Stage Estimation

Table 1: Banking Sector -First and Second Stage (TRI agg) Estimation

	FE_1_1	FE_1_2	FE_1_3	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8
ln_K_RATIO	0.203	0.203	0.206								
	(6.34)***	(5.18)***	(6.00)***								
ln_LIQ_RATIO	0.06	0.06	0.06								
	(3.47)***	(3.66)***	(4.22)***								
ln_NIERAT	0.289	0.289	0.292								
	(9.61)***	(8.83)***	(9.52)***								
MENA_dummy		-2.381									
		(1.83)*									
ln_mkt_share			0.003								
			(0.41)								
TRI_agg				0.225	0.241	0.278	0.285	0.248	0.187	0.266	0.259
				(2.03)**	(1.98)*	(2.00)*	(1.95)*	(1.89)*	(1.93)*	(1.85)*	(1.96)*
C5				0.437	0.448	0.474	0.285	0.45	0.432	0.475	0.503
				(1.28)	(1.28)	(1.32)	(1.12)	(1.28)	(1.27)	(1.32)	(1.27)
eight_ten				-0.389	-0.401	-0.413	-0.341	-0.397	-0.398	-0.42	-0.382
				(2.52)**	(2.53)**	(2.50)**	(2.33)**	(2.49)**	(2.49)**	(2.38)**	(2.35)**
int_var					0.001	0.002	0.001	0	0.001	0.001	0.001
					(1.19)	(1.55)	(1.22)	(0.19)	(0.99)	(1.21)	(1.24)
Financris_dummy				-0.371	-0.453	-0.637	-0.564		-0.312	-0.486	-0.483
				(2.79)***	(2.41)**	(2.68)**	(2.28)**		(1.63)	(2.39)**	(2.34)**
TRI_agg Financial Crisis								-0.21			
								(2.32)**			
seven_one									-0.198		
									(1.53)		
three_one										-6.047	
										(0.72)	
nine_one											-0.113
											(0.68)
Country Dummy	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Constant				-1.855	-1.868	-1.925	-1.774	-1.874	-1.738	-1.347	-1.843
				(6.47)***	(6.32)***	(6.09)***	(8.53)***	(6.30)***	(6.63)***	(2.33)**	(6.78)***

Table 1: (Continued)

	FE_1_1	FE_1_2	FE_1_3	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8
Observations	923	923	923	46	46	46	46	46	46	46	46
Adjusted R-squared	0.77	0.77	0.77	0.11	0.09	0.09	0.22	0.08	0.11	0.11	0.08
Breusch-Pagan: Ho=constant variance	0.25	0.25	0.21	0.04	0.02	0.01	0	0.02	0	0	0.01
Ramsey-Reset Test: Ho=no omit. Var	0.09	0.11	0.12	0.13	0.18	0.15	0	0.11	0.29	0	0.16
Shapiro-Wilk W test: Ho=normality	0	0	0	0	0	0	0	0	0	0	0

Absolute value of t statistics in parentheses
* Significant at 10%; ** significant at 5%; *** significant at 1%

Table 2: Banking Sector - Second Stage (modal TRI) Estimation

	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8	FE_2_9	FE_2_10	FE_2_11	FE_2_12	FE_2_13	FE_2_14	FE_2_15
tri_m1	0.123	0.122	0.138										0.077	0.069	0.12
	(1.41)	(1.39)	(1.16)										(0.92)	(0.76)	(1.17)
tri_m2				0.049	0.052	0.043							-0.032	-0.023	-0.103
				(0.89)	(0.91)	(0.52)							(0.5)	(0.32)	(1.35)
tri_m3							1.006	1.038	0.984				0.968	0.978	0.975
							(1.92)*	(1.94)*	(1.78)*				(2.18)**	(2.16)**	(2.22)**
tri_m4										-0.214	-0.215	-0.251	-0.195	-0.193	-0.224
										-1.63	-1.6	(1.92)*	(2.08)**	(2.06)**	(2.54)**
C5	0.414	0.416	-0.415	0.382	0.386	0.41	0.39	0.4	0.418	0.43	0.429	0.394	0.443	0.446	0.45
	(1.24)	(1.22)	(2.25)**	(1.18)	(1.17)	(0.99)	(1.35)	(1.35)	(1.15)	(1.43)	(1.41)	(1.11)	(1.66)	(1.64)	(1.32)
eight_ten	-0.413	-0.416	-0.455	-0.389	-0.396	-0.414	-0.335	-0.349	-0.373	-0.411	-0.409	-0.443	-0.383	-0.387	-0.407
	(2.49)**	(2.43)**	(1.83)*	(2.29)**	(2.25)**	(2.14)**	(2.35)**	(2.40)**	(2.25)**	(2.70)***	(2.65)**	(2.97)***	(3.07)***	(3.04)***	(2.87)***
financial_crisis_dummy	-0.278	-0.292	0	-0.138	-0.175	-0.304	-0.56	-0.652	-0.776	-0.064	-0.056	-0.1	-0.598	-0.63	-0.706
	(2.20)**	(2.06)**	(0.68)	(1.23)	(1.24)	(1.36)	(2.32)**	(2.23)**	(2.75)***	(0.43)	(0.39)	(0.48)	(2.48)**	(2.30)**	(2.79)***
interest_variaton		0	-8.287		0	0.001		0.001	0.002		0	0		0	0.001
		(0.27)	(0.86)		(0.57)	(0.97)		(1.36)	(1.65)		(0.11)	(0.01)		(0.6)	(0.73)
three_one			-0.139			-7.182			-3.152			-2.353			0.553
			(0.58)			(0.76)			(0.5)			(0.37)			(0.1)
nine_one			1.047			-0.04			-0.086			-0.012			-0.125
			(1.41)			(0.21)			(0.43)			(0.07)			(0.62)
seven_three_one			-0.082			0.934			0.275			0.545			-0.029
			(0.54)			(1.45)			(0.45)			(0.85)			(0.05)
seven_one			-0.154			-0.148			-0.122			-0.307			-0.269
			(0.73)			(0.93)			(0.8)			(1.70)*			(1.59)

Table 2: (Continued)

	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8	FE_2_9	FE_2_10	FE_2_11	FE_2_12	FE_2_13	FE_2_14	FE_2_15
Country Dummy	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Constant	-1.793	-1.793	43	-1.715	-1.717	-1.023	-2.498	-2.526	-2.076	-1.442	-1.441	-1.014	-2.265	-2.277	-2.035
	(6.34)***	(6.27)***	(0.1)	(6.79)***	(6.72)***	(1.46)	(4.53)***	(4.51)***	(4.53)***	(7.90)***	(7.78)***	(1.6)	(5.55)***	(5.45)***	(4.58)***
Observations	46	46	46	46	46	43	46	46	43	46	46	43	46	46	43
Adjusted R-squared	0.09	0.07	0.06	0.05	0.03	0.05	0.3	0.3	0.29	0.17	0.15	0.22	0.39	0.38	0.42
Breusch-Pagan: Ho=constant variance	0.02	0.02	0	0.23	0.18	0	0	0	0	0	0	0	0	0	0
Ramsey-Reset Test: Ho=no omitted var	0.04	0.05	0	0.56	0.38	0.09	0	0	0	0	0	0	0	0	0
Shapiro-Wilk test: Ho=normality	0	0	0	0	0	0	0	0.01	0.04	0	0	0	0.06	0.08	0.39

Absolute value of t statistics in parentheses
* Significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Fixed Telecom Sector -First and Second Stage (TRI agg) Estimation

	FE_1_1	FE_1_2	FE_1_3	FE_1_4	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8
K_intensity	0.217	0.217	0.217	0.197								
	(2.07)**	(2.08)**	(2.07)**	(1.85)*								
net_sales	0	0	0									
	(2.29)**	(2.31)**	(2.29)**									
tot_empl				0								
				(0.56)								
mkt_share	1.22	1.22	1.22	1.021								
	(3.64)***	(3.67)***	(3.64)***	(2.36)**								
sales_growth	-0.017	-0.017	-0.017	-0.002								
	(0.32)	(0.33)	(0.32)	(0.04)								
tri_agg_fx					0.5	0.599	0.592	0.601	0.562	0.388	0.395	0.354
					(2.28)**	(2.77)**	(2.77)**	(2.75)**	(2.56)**	(2.01)*	(2.03)*	(2.02)*
developing_dummy		-1.371							0.451			-1.509
		(5.27)***							(0.75)			(2.26)**
mena_dummy			-1.811	-1.732				-0.132			-0.213	
			(6.12)***	(4.61)***				0.5			0.9	
fx_tel_lines_pop					-0.008	-0.009	-0.008	-0.009	-0.001	0.003	0.004	-0.012
					(2.19)**	(2.61)**	(2.38)**	(2.38)**	0.1	0.52	0.61	1.36
fx_revenue_g					-0.507	-0.719	-0.814	-0.796	-0.729	-0.193	-0.252	-0.388
					(0.96)	(1.39)	(1.57)	(1.51)	(1.36)	(0.28)	(0.36)	(0.61)
Regulation FX						0.125	0.139	0.132	0.124	0.082	0.076	0.093
						(1.82)*	(2.01)*	(1.84)*	(1.72)	(0.81)	(0.75)	(1.03)
mob_subs_digitalshare							-0.014	-0.012	-0.012	-0.013	-0.008	-0.014
							(1.19)	(0.94)	(1.04)	(1.16)	(0.67)	(1.36)
regvarspc1_mob										0.047	0.027	0.048
										(0.41)	(0.24)	(0.47)
mob_subs_pop										0.013	0.014	0.022
										(3.21)***	(3.29)***	(4.10)***
mobile_revenue_g										-0.462	-0.296	-0.302
										(0.66)	(0.41)	(0.47)
Country_dummy	yes	yes	yes	yes	no	no	no	no	no	no	no	no
Constant					-2.072	-2.111	-0.768	-0.937	-1.323	-0.505	-0.956	1.058
					(9.04)***	(9.62)***	(0.67)	(0.77)	(0.96)	(0.42)	(0.73)	(0.82)

	FE_1_1	FE_1_2	FE_1_3	FE_1_4	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8
Observations	120	118	120	110	27	27	27	27	27	27	27	27
Adjusted R-squared	0.77	0.78	0.77	0.79	0.54	0.58	0.59	0.57	0.58	0.7	0.7	0.75
Breusch-Pagan	0	0	0	0	0.34	0.51	0.4	0.45	0.45	0.71	0.82	0.82
Ramsey-Reset Test	0	0	0	0	0.18	0.04	0.07	0.05	0.01	0.37	0.11	0.94
Shapiro-Wilk W test	0	0	0	0	0.55	0.41	0.34	0.56	0.55	0.85	0.45	0.71

Robust t statistics in parenthesis
* Significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Fixed Telecom Sector -Second Stage (TRI Mode 1 and 2) Estimation

	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8	FE_2_9	FE_2_10	FE_2_11	FE_2_12
m1_tri_fx	0.211	0.178	0.157	0.187	0.174	0.186						
	*(2.81)***	*(1.78)**	*(1.43)*	*(3.45)****	*(2.88)***	*(2.50)***						
m2_tri_fx							0.208	0.178	0.176	0.034	-0.002	0.109
							*(2.48)***	*(1.89)**	*(1.76)**	*(0.32)*	*(0.01)*	*(1.21)*
fx_tel_lines_pop	-0.011	-0.012	-0.012	0.003	0.003	-0.013	-0.008	-0.01	-0.009	0.003	0.003	-0.012
	*(3.75)****	*(3.19)****	*(3.06)****	*(0.53)*	*(0.58)*	*(1.53)*	*(2.29)***	*(2.07)**	*(1.85)**	*(0.69)*	*(0.54)*	*(1.46)*
fx_revenue_g	-0.341	-0.416	-0.515	0.447	0.38	0.212	-0.508	-0.554	-0.656	0.008	-0.005	-0.323
	(0.58)	*(0.73)*	*(0.85)*	*(0.92)*	*(0.77)*	*(0.44)*	*(0.77)*	*(0.88)*	*(0.97)*	*(0.01)*	*(0.01)*	*(0.52)*
Refulation FX		0.051	0.067	0.041	0.037	0.057		0.047	0.063	0.05	0.042	0.073
		(0.8)	*(1.12)*	*(0.44)*	*(0.4)*	*(0.72)*		*(0.77)*	*(1.11)*	*(0.5)*	*(0.42)*	*(0.83)*
mob_subs_digitalshare			-0.013	-0.014	-0.011	-0.015			-0.015	-0.013	-0.009	-0.013
			*(2.78)***	*(2.58)***	*(1.64)*	*(3.04)****			*(3.22)****	*(2.38)***	*(1.28)*	*(3.09)****
mena_dummy					-0.152						-0.194	
					(1.13)						*1.15*	
developing_dummy						-1.62						-1.766
						(2.30)**						(2.39)**
Regulation MOB				0.042	0.028	0.043				0.033	0.029	0.006
				(0.42)	*(0.27)*	*(0.49)*				*(0.28)*	*(0.24)*	*(0.05)*
mob_subs_pop				-0.016	-0.016	-0.024				-0.015	-0.016	-0.025
				(4.22)***	(4.14)***	(5.75)***				(3.83)***	(3.79)***	(5.46)***
mobile_revenue_g				-0.932	-0.784	-0.754				-0.453	-0.346	-0.174
				*(1.98)**	*(1.61)*	*(1.61)*				*(0.72)*	*0.6*	*(0.34)*
Constant	-1.76	-1.718	-0.432	-0.055	-0.38	1.591	-1.909	-1.849	-0.447	-0.261	-0.569	1.332
	*(18.12)****	*(17.23)****	*(0.91)*	*(0.09)*	*(0.54)*	*(1.52)*	*(16.76)****	*(15.08)****	*(1.03)*	*(0.39)*	*(0.84)*	*(1.35)*
Observations	27	27	27	27	27	27	27	27	27	27	27	27
Adjusted R-squared	0.47	0.46	0.46	0.66	0.65	0.73	0.48	0.46	0.47	0.63	0.62	0.71
Breusch-Pagan	0.04	0.03	0.02	0.15	0.15	0.19	0.08	0.05	0.03	0.29	0.35	0.38
Ramsey-Reset Test	0.79	0.71	0.81	0.93	0.91	0.83	0.84	0.95	0.9	0.98	0.87	0.97
Shapiro-Wilk W test	0.47	0.24	0.08	0.28	0.18	0.34	0.69	0.29	0.16	0.45	0.2	0.64

Robust t statistics in parentheses

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

Table 5 Fixed Telecom Sector -Second Stage (TRI Mode 3 nd 4 Estimation)

	FE_2_12	FE_2_13	FE_2_14	FE_2_15	FE_2_16	FE_2_17	FE_2_18	FE_2_19	FE_2_20	FE_2_21	FE_2_22	FE_2_23
m3_tri_fx	0.374	0.555	0.565	0.384	0.399	0.319						
	(2.12)**	(3.13)***	(3.26)***	(2.35)**	(2.44)**	(2.06)*						
m4_tri_fx							0.277	0.268	0.244	0.203	0.194	0.137
							(2.16)**	(2.08)**	(1.75)*	(1.76)*	(1.62)	(1.18)
Fx_tel_lines_pop	-0.01	-0.011	-0.01	0.002	0.002	-0.011	-0.013	-0.014	-0.014	0.002	0.002	-0.011
	(3.10)***	(3.82)***	(3.47)***	(0.32)	(0.42)	(1.29)	(4.65)***	(4.55)***	(4.31)***	(0.24)	(0.3)	(1.21)
Fx_revenue_g	-0.491	-0.806	-0.927	-0.472	-0.554	-0.576	-0.517	-0.606	-0.641	0.144	0.105	-0.08
	(0.92)	(1.61)	(1.87)*	(0.67)	(0.79)	(0.88)	(0.97)	(1.12)	(1.15)	(0.2)	(0.15)	(0.12)
Regulation Fixed		0.172	0.19	0.104	0.099	0.108		0.066	0.073	0.063	0.059	0.071
		(2.41)**	(2.69)**	(1.05)	(1)	(1.17)		(0.92)	(0.99)	(0.62)	(0.56)	(0.74)
Mob_subs_digitalshare			-0.016	-0.013	-0.008	-0.014			-0.007	-0.008	-0.005	-0.01
			(1.45)	(1.23)	(0.68)	(1.38)			(0.49)	(0.63)	(0.37)	(0.88)
Mena_dummy					-0.24						-0.132	
					(1.05)						(0.53)	
developing_dummy						-1.328						-1.334
						(1.96)*						(1.77)*
Regulation Mobile				0.053	0.032	0.053				0.017	0.006	0.027
				(0.49)	(0.29)	(0.53)				(0.14)	(0.05)	(0.25)
Mob_subs_pop				-0.012	-0.013	-0.02				-0.015	-0.015	-0.023
				(3.02)***	(3.13)***	(3.64)***				(3.80)***	(3.76)***	(3.98)***
mobile_revenue_g				-0.242	-0.045	-0.141				-0.668	-0.557	-0.468
				(0.35)	(0.06)	(0.22)				(0.92)	(0.73)	(0.67)
Constant	-1.953	-2.046	-0.495	-0.513	-1.028	0.895	-1.993	-1.955	-1.283	-0.921	-1.161	0.682
	(9.94)***	(11.20)***	(0.46)	(0.44)	(0.82)	(0.69)	(9.57)***	(9.18)***	(0.92)	(0.71)	(0.83)	(0.45)
Observations	27	27	27	27	27	27	27	27	27	27	27	27
Adjusted R-squared	0.52	0.61	0.63	0.72	0.72	0.76	0.53	0.52	0.51	0.69	0.67	0.72
Breusch-Pagan: Ho=constant variance	0.57	0.86	0.99	0.76	0.55	0.82	0.15	0.12	0.11	0.2	0.21	0.31
Ramsey-Reset Test: Ho=no omitted var	0.35	0.16	0.22	0.27	0.02	0.72	0.85	0.9	0.89	0.4	0.4	0.9
Shapiro-Wilk Test: Ho=normality	0.95	0.88	0.83	0.35	0.14	0.69	0.41	0.15	0.1	0.89	0.75	0.89

Robust t statistics in parentheses

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

Table 6 Fixed Telecom Sector -Second Stage (all modal TRI) Estimation

	FE_2_23	FE_2_24	FE_2_25	FE_2_26	FE_2_27	FE_2_28
m1_tri_fx	0.084	-0.01	-0.031	0.112	0.089	0.094
	(0.53)	(0.06)	(0.19)	(0.63)	(0.5)	(0.54)
m2_tri_fx	0.085	0.009	0.023	-0.125	-0.168	-0.038
	(0.56)	(0.06)	(0.15)	(0.81)	(1.06)	(0.23)
m3_tri_fx	0.287	0.483	0.514	0.277	0.328	0.236
	(1.61)	(2.40)**	(2.51)**	(1.34)	(1.55)	(1.17)
m4_tri_fx	0.195	0.182	0.135	0.17	0.152	0.1
	(1.45)	(1.43)	(0.98)	(1.36)	(1.21)	(0.77)
fx_tel_lines_pop	-0.007	-0.011	-0.01	-0.002	-0.002	-0.01
	(1.53)	(2.24)**	(2.05)*	(0.25)	(0.32)	(1.1)
fx_revenue_g	-0.634	-0.866	-0.957	0.127	-0.022	-0.145
	(1.19)	(1.66)	(1.79)*	(0.13)	(0.02)	(0.15)
Regulation_FX		0.151	0.171	0.088	0.084	0.095
		(1.79)*	(1.96)*	(0.84)	(0.8)	(0.94)
mob_subs_digitalshare			-0.012	-0.011	-0.006	-0.012
			(0.93)	(0.91)	(0.45)	(1.07)
mena_dummy					-0.26	
					(1.02)	
developing_dummy						-1.14
						(1.38)
Regulation mobile				0.072	0.069	0.049
				(0.58)	(0.55)	(0.4)
mob_subs_pop				-0.013	-0.014	-0.02
				(3.09)***	(3.20)***	(3.18)***
mobile_revenue_g				-0.868	-0.615	-0.567
				(0.92)	(0.63)	(0.6)
Constant	-2.307	-2.239	-1.065	-0.638	-1.06	0.566
	(8.50)***	(8.61)***	(0.83)	(0.49)	(0.77)	(0.37)
\						
Observations	27	27	27	27	27	27
Adjusted R-squared	0.55	0.59	0.59	0.7	0.7	0.72
Breusch-Pagan: Ho=constant variance	0.26	0.62	0.69	0.76	0.82	0.79
Ramsey-Reset Test: Ho=no omitted var	0.49	0.3	0.23	0.51	0.37	0.41
Shapiro-Wilk W test: Ho=normality	0.99	0.72	0.74	0.72	71	0.71

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Mobile Telecom Sector -First and Second Stage (TRI agg) Estimation

	FE_1_1	FE_1_2	FE_1_3	FE_1_4	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7
K_intensity	0.158	0.158	0.158	0.145							
	(0.99)	(1.01)	(1.01)	(0.86)							
sales_growth	0.024	0.024	0.024	0.023							
	(2.77)***	(2.81)***	(2.81)***	(2.59)**							
tot_empl				0							
				(1.83)*							
net_sales_USD	0	0	0								
	(2.73)***	(2.76)***	(2.76)***								
tri_agg_mob					-0.662	-0.671	-0.629	-0.845	-0.762	-0.552	-0.652
					(2.33)**	(2.28)**	(2.05)*	(2.21)**	(2.13)**	(1.88)*	(2.08)*
mob_subs_pop					-0.009	-0.009	-0.008	0.008	-0.004	-0.004	-0.009
					(1.98)*	(1.95)*	(1.59)	(0.64)	(0.57)	(0.69)	(1.81)*
mobile_revenue_g					0.822	0.927	0.853	0.383	0.552	2.959	0.836
					(0.87)	(0.85)	(0.77)	(0.43)	(0.51)	(1.67)	(0.74)
Regulation_mobile					-0.202	-0.215	-0.213	-0.179	-0.171	-0.305	-0.134
					(1.41)	(1.35)	(1.3)	(1.24)	(1.21)	(1.33)	(0.48)
mob_subs_digitalshare						0.008	0.006	0.007	0.006	0.026	0.009
						(0.66)	(0.43)	(0.58)	(0.48)	(1.83)*	(0.68)
fx_tel_lines_pop									-0.013		
									(1.22)		
fx_revenue_g										-1.98	
										(1.01)	
Regulation FX											-0.096
											(0.45)
mena_dummy							0.353				
							(1.42)				
developing_dummy								1.776			
								(1.75)*			
Country_Dummy	Yes	Yes	Yes	Yes							

Table 7 (Continued)

	FE_1_1	FE_1_2	FE_1_3	FE_1_4	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7
Constant					-0.797 (1.99)*	-1.629 (1.19)	-1.483 (1.03)	-2.661 (1.72)	-1.012 (0.76)	-3.75 (2.33)**	-1.655 (1.25)
Observations	105	101	101	102	26	26	26	26	26	24	26
R-squared	0.85	0.85	0.85	0.85	0.03	0.01	0.05	0.07	0.02	0	0.06
Adjusted R-squared	0.26	0.27	0.27	0.23	0.02	0.02	0.02	0	0.01	0.01	0.02
F_test: Prob > F	2.12	2.27	2.27	1.97	0.37	0.26	0.26	0.14	0.71	0.48	0.8
Shapiro-Wilk W test	0	0	0	0	0.01	0.01	0.01	0.01	0.02	0.01	0

Robust t statistics in parentheses
* Significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Mobile Telecom Sector -Second Stage (modal TRI) Estimation

	FE_2_1	FE_2_2	FE_2_3	FE_2_4	FE_2_5	FE_2_6	FE_2_7	FE_2_8	FE_2_9	FE_2_10	FE_2_11	FE_2_12	FE_2_13	FE_2_14	FE_2_15
m1_tri_mob	0.129	0.217	0.06										0.362	0.404	0.236
	(0.61)	*(0.94)*	*(0.29)*										*(1.56)*	*(1.54)*	*(1.08)*
m2_tri_mob				-0.601	-0.569	-0.576							-0.448	-0.448	-0.345
				*(2.54)***	*(2.36)***	*(2.50)***							*(1.73)*	*(1.66)*	*(1.33)*
m3_tri_mob							-0.586	-0.565	-0.693				-0.693	-0.672	-0.728
							*(2.37)***	*(2.12)***	*(2.36)***				*(2.28)***	*(2.11)**	*(2.35)***
m4_tri_mob										0.334	0.294	0.405	0.05	0.006	0.189
										(1.49)	*(1.27)*	*(1.68)*	*(0.19)*	*(0.02)*	*(0.73)*
mob_subs_pop	0	0.002	0.011	0	0.001	0.01	-0.01	-0.01	0.006	0	0.001	0.016	-0.009	-0.008	0.006
	(0.02)	*(0.5)*	*(0.73)*	*(0.08)*	*(0.12)*	*(0.69)*	*(2.37)***	*(1.97)**	*(0.55)*	*(0.11)*	*(0.29)*	*(1.01)*	*(2.00)**	*(1.61)*	*(0.46)*
mobile_revenue_g	0.864	0.668	0.545	1.264	1.138	0.932	0.733	0.703	0.168	0.754	0.67	0.287	0.923	0.863	0.341
	(0.75)	*(0.59)*	*(0.53)*	*(1.06)*	*(0.94)*	*(0.87)*	*(0.71)*	*(0.66)*	*(0.19)*	*(0.63)*	*(0.56)*	*(0.29)*	*(0.86)*	*(0.81)*	*(0.32)*
Regulation_Mobile	-0.055	-0.06	-0.021	-0.219	-0.221	-0.171	-0.217	-0.215	-0.172	-0.071	-0.08	-0.012	-0.304	-0.301	-0.241
	(0.43)	*(0.47)*	*(0.18)*	*(1.32)*	*(1.29)*	*(1.12)*	*(1.38)*	*(1.33)*	*(1.24)*	*(0.56)*	*(0.62)*	*(0.11)*	*(1.58)*	*(1.51)*	*(1.33)*
mena_dummy		0.922			0.529			0.179			0.497			0.384	
		*(2.45)***			*(2.42)***			*(0.69)*			*(1.94)**			*(0.96)*	
developing_dummy			1.05			1.011			1.721			1.411			1.51
			(0.87)			*(0.86)*			*(1.77)**			*(1.13)*			*(1.59)*
mob_subs_digitalshare	0.007	0.003	0.004	-0.033	-0.034	-0.033	0.015	0.013	0.014	0.005	0.002	0.003	-0.005	-0.007	-0.002
	(0.46)	*(0.19)*	*(0.28)*	*(2.78)***	*(2.83)***	*(3.01)****	*(1.1)*	*(0.87)*	*(1.1)*	*(0.42)*	*(0.16)*	*(0.29)*	*(0.39)*	*(0.51)*	*(0.17)*
Constant	-2.547	-2.303	-3.064	1.563	1.635	0.732	-2.217	-2.124	-3.364	-2.759	-2.436	-3.814	-0.444	-0.281	-1.995
	(1.46)	*(1.35)*	*(1.5)*	*(1.29)*	*(1.34)*	*(0.49)*	*(1.6)*	*(1.42)*	*(2.07)**	*(1.79)**	*(1.53)*	*(1.82)**	*(0.36)*	*(0.21)*	*(1.27)*
Observations	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Adjusted R-squared	0.15	0.15	0.16	0.04	0.07	0.04	0.04	0.01	0.12	0.09	0.13	0.06	0.08	0.04	0.12
Breusch-Pagan	0.03	0.03	0	0.01	0.01	0	0.01	0.01	0	0.06	0.05	0	0	0	0
Ramsey-Reset Test	0.72	0.9	0.2	0.22	0.09	0.06	0.29	0.22	0.1	0.56	0.58	0.17	0.13	0.03	0.18
Shapiro-Wilk test	0	0	0.01	0	0	0.01	0.01	0.01	0.01	0	0	0.01	0.06	0.06	0.01

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%;
*** significant at 1%

Appendix 2: One-Stage Estimation

Table 1: One-stage regression results, banking sector

	FE_1	FE_2	FE_3	FE_4	FE_5	FE_6
ln_K_RATIO	0.195	0.195	0.195	0.195	0.195	0.195
	(3.55)***	(3.55)***	(3.55)***	(3.55)***	(3.55)***	(3.55)***
ln_LIQ_RATIO	0.065	0.065	0.065	0.065	0.065	0.065
	(3.04)***	(3.04)***	(3.04)***	(3.04)***	(3.04)***	(3.04)***
ln_NIERAT	0.269	0.269	0.269	0.269	0.269	0.269
	(6.57)***	(6.57)***	(6.57)***	(6.57)***	(6.57)***	(6.57)***
ln_mkt_share	0	0	0	0	0	0
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
mena_dummy	-1.827	-2.182	-2.146	-0.881	-1.078	-0.203
	(3.02)***	(3.97)***	(3.80)***	(3.72)***	(4.12)***	(1.76)*
tri_agg	0.156					
	(8.88)***					
tri_m1		0.109				-0.209
		(5.97)***				(2.40)**
tri_m2			0.713			0.17
			(4.54)***			(3.49)***
tri_m3				2.656		1.916
				(3.81)***		(5.31)***
tri_m4					-0.594	-0.322
					(3.99)***	(3.64)***
eight_ten	-0.248	-0.715	-0.694	-1.001	-0.495	-0.97
	(7.84)***	(24.32)***	(7.97)***	(50.63)***	(4.76)***	(8.59)***
financris_dummy	-1.29	-0.22	-1.513	-2.036	0.111	-1.322
	(19.40)***	(4.99)***	(4.44)***	(3.73)***	(1.75)*	(15.82)***
int_var	0	-0.001	0.005	0.007	-0.002	0.006
	(1.02)	(8.97)***	(3.90)***	(3.43)***	(6.81)***	(4.27)***
nine_one	0.078	0.452	0.343	0.137	0.102	0.255
	(1.38)	(6.65)***	(5.59)***	(1.3)	(0.68)	(2.45)**
Seven_one	-0.151	0.034	0.123	-0.346	-0.757	-0.721
	(4.57)***	-0.95	(2.50)**	(2.03)**	(4.01)***	(2.94)***
Country Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.071	-1.775	-1.879	-3.095	-0.357	-1.984
	(12.67)***	(12.56)***	(14.07)***	(10.77)***	(0.87)	(13.48)***
Observations	875	875	875	875	875	875
Adjusted R-squared	0.78	0.78	0.78	0.78	0.78	0.78
Breusch-Pagan: Ho=constant variance	0	0	0	0	0	0

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2: one-stage regression results, fixed telecom sector

	FE_1	FE_2	FE_3	FE_4	FE_5	FE_6
K_intensity	0.176	0.176	0.176	0.176	0.176	0.211
	(2.11)**	(2.11)**	(2.11)**	(2.11)**	(2.11)**	(12.68)***
mkt_share	1.208	1.208	1.208	1.208	1.208	1.219
	(3.29)***	(3.29)***	(3.29)***	(3.29)***	(3.29)***	(4.60)***
net_sales_USD	0	0	0	0	0	0
	(2.06)**	(2.06)**	(2.06)**	(2.06)**	(2.06)**	(2.88)***
mena_dummy	-0.304	-0.011	0.02	-0.321	0.174	
	(1.93)*	(0.68)	(0.3)	(2.01)*	(1.36)	
tri_agg_fx	0.313					
	(7.02)***					
m1_tri_fx		0.136				0.159
		(1.03)				(4.79)***
m2_tri_fx			0.039			-0.087
			(0.44)			(2.21)**
m3_tri_fx				0.319		-0.063
				(7.02)***		(3.75)***
m4_tri_fx					-0.057	0.137
					(1.85)*	(8.19)***
fx_tel_lines_pop	-0.015	-0.012	-0.015	-0.016	-0.017	-0.017
	(4.88)***	(4.64)***	(4.04)***	(5.09)***	(3.15)***	(7.58)***
fx_revenue_g						
mob_subs_digitalshare	0	-0.009	-0.014	0	-0.02	-0.007
	(0.08)	(1.62)	(2.81)***	(0.11)	(5.02)***	(4.48)***
Regulation FX	0.111	0.059	0.137	0.139	0.195	0.031
	(3.03)***	(1.4)	(4.94)***	(3.42)***	(2.92)***	(2.42)**
Country_Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.679	-0.819	-0.269	-1.66	0.44	-1.179
	(6.74)***	(1.6)	(0.69)	(6.64)***	(1.09)	(123.7)***
Observations	103	103	103	103	103	109
R-squared	0.46	0.46	0.46	0.46	0.46	0.45
F_test: P > F	2.08	2.08	2.08	2.08	2.08	2.08

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: one-stage regression results, mobile telecom sector

	FE_1	FE_2	FE_3	FE_4	FE_5	FE_6
K_intensity	0.158	0.158	0.158	0.158	0.158	0.158
	(0.88)	(0.88)	(0.88)	(0.88)	(0.88)	(0.88)
sales_growth	0.024	0.024	0.024	0.024	0.024	0.024
	(3.22)***	(3.22)***	(3.22)***	(3.22)***	(3.22)***	(3.22)***
net_sales_USD	0	0	0	0	0	0
	(2.21)**	(2.21)**	(2.21)**	(2.21)**	(2.21)**	(2.21)**
mena_dummy	1.434					
	(4.00)***					
tri_agg_mob	-0.704					
	(2.34)***					
m1_tri_mob		0.114				-0.292
		(2.64)**				(2.39)**
m2_tri_mob			-0.449			0.403
			(6.88)***			(1.88)*
m3_tri_mob				-0.539		-0.443
				(2.34)**		(3.49)***
m4_tri_mob					0.677	0.154
					(14.42)***	-0.69
Mobile_revenue_g						
mob_subs_digitalshare	-0.031	-0.006	-0.001	-0.015	-0.001	-0.01
	(5.40)***	(7.59)***	(7.10)***	(4.32)***	(2.61)**	(2.63)**
mob_subs_pop	0.016	-0.001	-0.024	0.002	-0.003	0.01
	(4.00)***	(0.52)	(7.84)***	(0.52)	(4.57)***	(1.31)
regvarspc1_mob	-0.205	0.262		-0.025	0.129	0.103
	(1.33)	(14.42)***		(0.22)	(4.97)***	(2.89)***
Country_Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.11	-0.84	1.516	-0.577	-1.996	-1.853
	(2.52)**	(10.04)***	(8.18)***	(3.40)***	(8.13)***	(4.61)***
Observations	100	100	100	100	100	100
Adjusted R-squared	0.28	0.28	0.28	0.28	0.28	0.28
F_test: Prob > F	2.35	2.35	2.35	2.35	2.35	2.35
R-squared	0.48	0.48	0.48	0.48	0.48	0.48

* Significant at 10%; ** significant at 5%; *** significant at 1%
Robust t statistics in parentheses