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► **To cite this version:**

Thierry Montalieu, Isabelle Rabaud. The Impact of Restrictions in Trade in the Telecommunications: an Application to Middle East and North African Countries. 2012. halshs-00827761

**HAL Id: halshs-00827761**

**<https://shs.hal.science/halshs-00827761>**

Preprint submitted on 29 May 2013

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## **Document de Recherche**

**n° 2012-09**

**« The Impact of Restrictions in Trade in the  
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# The Impact of Restrictions in Trade in the Telecommunications: an Application to Middle East and North African Countries

Thierry Montalieu et Isabelle Rabaud<sup>1</sup>

## Résumé

En théorie, les gains en termes de bien-être liés à la libéralisation des échanges de services proviennent de la baisse des prix et des transferts de technologie réalisés par les entreprises étrangères. Empiriquement, en raison du rôle du cadre réglementaire en matière de barrières aux échanges de services (les lois « derrière la frontière »), des gains substantiels ne sont obtenus que lorsque l'on élargit l'entrée d'entreprises étrangères. Nous avons examiné comment les barrières aux échanges de services affectent la marge coût-prix dans les télécommunications dans les pays du Moyen Orient et d'Afrique du Nord (MOAN). Premièrement, nous critiquons les mesures des barrières aux échanges de services qui tendent vers une surestimation. Deuxièmement, nous montrons que les analyses penchent vers une surévaluation de l'impact des réglementations sur la marge coût-prix dans les télécommunications pour les pays du MOAN, en raison de techniques économétriques inadéquates ou d'une sous-estimation de l'effet du progrès technique. C'est pourquoi, la meilleure méthode en matière de libéralisation des échanges de services consiste à opter pour une interprétation flexible, qualitative des résultats quantitatifs et une classification ordinale des pays.

## Abstract

Theoretically, welfare gains from liberalisation of trade in services arise from falling prices and technology transfers from foreign firms. Empirically, due to the role of the regulatory framework in barriers to trade in services ('behind-the-border' laws) substantial gains are only reached when entry of foreign firms is widened. We have a close look at the way impediments to trade in services affect cost-price margin in telecommunication in Middle East and North Africa (MENA) countries. First, we criticise the measurements of barriers in trade in services, which tend towards an overestimation. Second, we show that analyses bend to overvalue the impact of regulations on the cost-price margin in telecommunications for MENA countries, in line with inadequate econometric techniques or underestimation of the effect of technical progress. Therefore, the best way in terms of trade in services liberalisation is to opt for a flexible, qualitative interpretation of the quantitative results and rank ordering of countries.

**Mots clés :** Restrictions à l'échange, Présence commerciale, Libéralisation des échanges de services, Télécommunications, Pays du Sud et de l'Est de la Méditerranée

**Keywords:** Trade restrictions, Commercial presence, Liberalisation of trade in services, Telecommunications, MENA countries

**JEL codes:** F13, F14, F53, L96, O14, O55

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## **1. Introduction**

In May 2011, a report of the Institute for International Finance highlighted the importance for Middle East and North African (MENA) countries to “commit to a medium term framework of reforms that would help secure their long-term growth and prosperity” (IIF, 2001, p. 6). This echoes with the statement of the Group of Eight in Deauville of Friday May 27 to give financial support to Egypt and Tunisia democratic efforts confronted with expectations of economic recession and huge current account deficits.

In a moment of disruption of exports, intense pressure on tourism and reduction of FDI inflows, the strong dependency of MENA countries on tourism, foreign investment and public sector pleads for a diversification of economic activity. In this context, telecommunication has a key role to play to build the infrastructure of those emerging countries. Increasing opportunity of access to world technology in such backbone activities improves productivity in forward user industries due to cheaper backward service inputs. Most economists expect stronger trade creation and welfare improvements from liberalisation of trade in services than from further openness of good trade. Therefore, the aim of this paper is to analyse the impact of the liberalisation of trade in telecommunications on the economy of MENA countries.

Measuring the effect of the removal of barriers to services trade on their prices is difficult. In fact, there is no tariff for services so that impediments to trade in services impact all regulatory framework and concern prohibitions, quotas and public regulations, difficult to identify and to measure. The lack of information on transactions abroad, the absence of cross-border operations for some service activities, the diversity and interactions between trade modes increase greatly the complexity of measurement of barriers to trade in services (Francois and Hoekman, 2010).

We describe the various barriers to trade in services, focused on telecommunications, and we present the different methods used to measure those impediments to trade, in a second section. In a third section, we assess the impact of liberalisation of trade in telecommunication services on the economies of some MENA countries, with a particular attention on the breakdown between cost-increasing and rent-creating barriers.

## **2. Evaluation of actual impediments to trade in services**

Compared with goods, services really possess two special features. They have to be customised to the needs of individual purchasers (consumers or firms). Therefore, firms incur fixed costs to learn about either the regional characteristics of individuals they are servicing or the regional regulatory framework in which they are operating. Moreover, some service activities require a direct contact between user and producer (Dee, 2003). Aware of this particularity, WTO (World Trade

Organisation) negotiators have recognised commercial presence (mode 3) and the temporary movement of people (mode 4) as ways by which services are traded<sup>2</sup> aside of traditional cross-border trade (mode 1) and movement of consumer abroad (mode 2).

In the late 1990's, impediments to trade in services have been measured by commitments to the GATS (General Agreement on Trade in Services). Then in the early 2000's, restrictiveness indexes have been calculated based on specific surveys assessing the degree of restrictiveness of services regulations. After a brief presentation of the main barriers to trade in services, section 2 is devoted to the analysis of these approaches, before a summary of their common loopholes.

## 2.1. Assessment of impediments to trade in services

Free trade in goods focuses mainly on tariffs and quantitative barriers to trade. Since there is no custom clearance, no national borders apply for services. Thus, commercial policy instruments are more numerous and complex than for goods trade as they all concern the regulatory framework ("behind-the-border" laws).

According to Francois and Hoekman (2010), major barriers to services trade split into two broad headings. First, limitations are enforced on the ability of services suppliers to establish physical outlets in a country and then to supply services through those outlets, increasing thus fixed costs. Impediments to trade in services differ whether they create an artificial scarcity, so that incumbent firms benefit from economic rents (similar to a tariff) or increase production and transaction costs (similar to low productivity or inefficient technology). The former ones have a *competition effect*; local firms charge a price mark-up ( $v_i$ ) over marginal cost ( $c_i$ ) when they fix their price ( $p_i = c_i(1 + v_i)$ ). Openness to trade genders the usual 'triangle gains': tariff equivalents permit to measure their price impact. As for the latter ones, a *cost inefficiency effect* occurs; excluding foreign suppliers, possessing a more advanced technology with lower costs, coupled with absorption of resource-using service barriers  $\lambda_i$ , induces costs that exceed global 'best practice' (cost-increasing barriers):  $c_i = c_i^*(1 + \lambda_i)$ . Free trade would then have similar effects as productivity enhancement or downward shift in the supply curve and lead to 'rectangle gains'. Only the former should be formalised as tariff equivalents, whereas the removal of the latter leads to productivity enhancement.<sup>3</sup> Second, impediments and control on ongoing operations affect variable cost. These

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<sup>2</sup> The impact of commercial presence, when the firm is implemented in the foreign market and contributes to foreign GDP is, of course, sensibly different from that of usual cross-border trade, in which the service is still produced in the home country and contributes to domestic GDP. Nevertheless, in 1994, the GATS has included commercial presence into the four modes of trade in services and we adopt that extensive definition.

<sup>3</sup> The measurement gap of the impact of the removal of barriers in the rent-creating and in cost-increasing cases is underlined by Whalley (2004), Dee (2005) and Hoekman and Francois (2010).

two constraints can be either, discriminatory, imposed only to foreigners, or non-discriminatory, applied equally to all suppliers (see table 1).

**Table 1: A typology of policies affecting foreign services transactions**

	Impact on entry / fixed cost	Impact on operations (variable cost)
Non discriminatory	E.g., a limit of two mobile phone providers permitted to operate in the country	E.g., introduction of an independent regulator in telecommunications, at the initiative of the government
Discriminatory	E.g., maximum equity ownership limit for foreign investors	E.g., local language knowledge required for members of the board

(Source: Synthesis of the authors from Dee, 2005, for more details see appendix 1)

However, not all regulations of services should be viewed as protectionist; many regulations serve legitimate purposes, such as protecting health and safety or preventing fraud and other misconduct. On the one hand, such regulation, if applied in a non-discriminatory manner, is not protectionist and should not be viewed as a barrier to service trade, even though it may maintain a higher standard than prevails abroad and thus reduce imports compared to what they would be without regulation (Deardorff and Stern, 2008 and Matoo, 2005). It is the case of prudential regulation in financial services and security regulation in air passenger transport. On the other hand, non-discriminatory barriers are not absolved from being protectionist, that is limits on the number of providers in a market regardless of nationality, or enforcing a standard that has no legitimate purpose but happens to be met by domestic providers and not by foreign ones (Deardorff and Stern, 2008 and Dee, 2005).

Nevertheless, in order to distinguish between legitimate and illegitimate regulations, a detailed knowledge of a given sector is needed. Only professionals of the very activity possess the necessary information and their objectivity and disinterestedness can be questioned (Deardorff and Stern, 2008). Moreover, despite the specific difficulties of discussion and classification of barriers to service trade, trade economists are usually drawn back to analogies with restrictions on goods flows, and look for tariff-like measures of barriers (Dee, 2005). Many analogies can be misleading and even ultimately uninformative insofar as market access and regulation are closely linked (Whalley, 2004 and Hoekman, 2006). *'In many markets the key need is to address regulatory policies that impede contestability'* (Hoekman, 2006).

Finally, services are highly differentiated among and within activities. The sector by sector approach reveals the most relevant one (Dee, 2005).

## **2.2. Measurements of NTBs (Non Tariff Barriers) in services**

Those measures are based on the assumption that all service trade restrictions can be converted into tariff equivalents, evaluating a wedge between actual price and the price that would prevail without barriers to trade in services, even though no customs clearance applies (Whalley, 2004). We will present the methodology of the three sources the most frequently quoted: Hoekman (1996) indicator, the joint-research of APC (Australian Productivity Commission) and ANU (Australian National University) at the dawn of the 2000's, then OECD's analyses.

### **2.2.1. The forerunner: the 'so-called' index of restrictiveness by Hoekman**

When it comes to trade in services, the most used 'so-called' frequency index was developed by Hoekman (1996). He derived impediments to trade from a country's GATS commitments schedule, for the four modes of trade in services. No restrictions to market access or national treatment for a given mode or activity correspond to a score of one; commitment toward partial liberalisation counts as one-half, and absence of commitment as zero. This method presents some weaknesses. The absence of commitment does not always indicate the presence of restrictions; new industries are *a priori* considered as completely closed to entry; and actual restrictions differ from commitments. Moreover, the same weight is given to all impediments, whatever their actual degree of restrictiveness (Whalley, 2004; FEMISE, 2007; Deardorff and Stern, 2008).

Hoekman (1996) assumes that the absence of openness in a given industry is equivalent to a particular level of tariff, he chooses from his knowledge of the activity. He then applies these maximum tariffs to his frequency ratios to build tariff equivalents. Hoekman's method is limited insofar as the tariff equivalent of the most protectionist country is estimated arbitrarily (FEMISE, 2007). Therefore, Deardorff and Stern (2008) refer to Hoekman's measurements as "guestimates" and only use them as indications of the relative degree of restriction.

Subsequent authors have constructed more elaborate frequency measures, based on specific surveys. We will label them synthetic trade restrictiveness indices.

### **2.2.2. The Australian restrictiveness indexes**

The APC and the ANU have carried-out a three-year joint research leading to measurement of restrictions to trade in services and their price-impact. This work has resulted in a series of augmented frequency indexes for six service industries: air transport, banking, distribution, electricity generation, professional services and telecommunications. Their methodology follows three steps. First, for each country, using improved data sources (mostly based on surveys) allowing a better distinction of different types of barriers to trade, Australian researchers have scored actual

restrictions on commercial presence and current activities according to their perception of their degree of restrictiveness. Then, an average of the score has been calculated, using the relative economic significance of each restriction for weights, and converted into a quantitative synthetic trade ‘restrictiveness index’ (STRI). Second, for each service industry, they have entered the STRI into an econometric model of economic performance (price, quantity, price/cost margin above productivity) along with the other important determinants (see table 2). Third, using their sectoral restrictiveness index, the effects of current restrictions on economic performance relative to a free-trade benchmark have been converted into a percentage “tax equivalent” Thus the “first round” effects of liberalisation can be predicted for around forty countries members of APEC, before 1993, MERCOSUR and OECD, before 1995.

**Table 2: Main performance determinants in service industries, other than elements of STRI<sup>4</sup>**

<b>Industry</b>	<b>Air transport</b>	<b>Banking services</b>	<b>Distribution services</b>	<b>Electricity generation</b>	<b>Professional services</b>	<b>Telecommunications</b>
<b>Market concentration</b>	n.s. (origin) (-) destination	Yes (+)	Yes (n. s.)	No	Yes (+)	No
<b>Real GDP/capita in PPP</b>	Yes (+)	No	No	Yes (n. s.)	No	Yes (+) fixed and mobile
<b>% of government ownership</b>	Yes (+)	Yes (-)	No	Yes (-)	No	No
<b>Infrastructure</b>	Yes (+)	No	Yes (-) (sectoral)	Yes (-) (sectoral)	No	Yes (-) fixed (sectoral)
<b>Diversification</b>	No	No	Yes (-)	No	No	No

Reading note: n. s. = non significant; performance in price except for telecommunications, where performance is measured in quantity (share of infrastructure in percentage of population); Yes (No) signifies that the variable is (not) included in the performance equation; a sign + (-) indicates an impact increasing (decreasing) with price (penetration for telecommunications).

(Source: Synthesis of the authors from Dee, 2003 and 2005; and Deardorff and Stern, 2008)

This method genders estimates of the trade impact, which are explicitly linked to the restrictions’ characteristics. The gap between countries in terms of barriers to trade and its impact on performance of a given service activity permits then to measure an ‘average relation among countries’ between barriers and performance (Dee, 2003 and 2005). The latter can then be used to project the impacts on a given country, as soon as its current level of restriction can be estimated by a STRI; the econometric model has thus been used to estimate barriers in third countries, for ‘out-of-sample’ forecasting, (see applications to MENA countries, in section 4).

<sup>4</sup> In addition to indicators mentioned in the table, for each industry, following specific control variables have been used: time spend since liberalisation and privatisation for electricity generation; capital and liquidity requirements, operational expenditures and interest rate volatility for banking services; information, share of retail trade, restriction on commercial land for distribution services; R&D expenditures, capital cost and population density for professional services; propensity to consume services at destination and duration of the fly for air transport.



### 2.2.3. Product market regulations' indexes of the OECD

Since the late 1990's, the OECD has developed product market regulation (PMR) indicators to assess the strictness of economic and administrative regulation and their likely influence on the intensity of product market competition for the years 1998, 2003 and 2008. Based on a bottom-up approach, allowing to tracing the indicator scores back to individual policies, these measures focus on formal regulation and only to a limited extent on *de facto* regulation. Derived mainly from a survey of OECD member countries, policy focused qualitative and – to a smaller extent – quantitative information is summarised in low-level indicators, which are subject to peer review by the national administrations of OECD member states. Equal weight is then assigned to aggregate these indicators within each of the main regulatory domain (state control, barriers to entrepreneurship and barriers to trade and investment). The new “integrated PMR indicator” for 2008 brings together previously separate economy-wide and sectoral indicator (the indicator of regulation in non-manufacturing (NMR) sectors and the FDI-restrictiveness indicator) into a single, more comprehensive measure of product market regulations. The NMR indicator comprises two broad groups of sectors: the network sectors, energy (electricity and gas), communications (post and telecommunications), and transport (air, maritime, and road transport), on the one hand, and retail trade and professional services, on the other hand. Regulations in network sectors cover entry, public ownership, vertical integration and market structure.

Whereas most countries have changed their regulatory environment in a consistent way over the past ten years, reforms have slowed in the most recent period (2003-2008) as compared with the earlier period (1998-2003). Easing of product market regulation has been driven by reforms in sector-specific regulations, notably the gas, electricity and telecommunications markets. According to the OECD, considerable scope for reforms remains in professional services and retail trade (Kozluk et al., 2009).

Arnold et al. (2010) test the effect of NMR on firm-level productivity for 39 sectors, 21 to 30 OECD countries during the period 1975-2003. They first find that countries and industries where regulatory burdens are lighter have generally experienced the highest productivity growth. Then, they consider a catch-up specification of firm-level productivity whereby, within each industry, the production possibility set is influenced by technological and organisational transfer from the technology-frontier to other firms. Using Error Correction Model, they explain firm-level multi-factor productivity (MFP) for a given country, industry and time by an auto-regressive distributed lag process, i.e. depending on the MFP level at the technological frontier and the lagged indicator of the effects of NMR in each sector/country/period, plus sector and country-year fixed effects. The regulatory impact variable (NMR for 2003) has a statistically-significant negative effect on firm-

level productivity, mainly coming from inappropriate domestic regulations, while border regulations have no statistically significant effects. Dynamic firms are severely affected by domestic and border regulations, while firms operating in ICT-intensive industries are hurt by border regulations and more severely affected by cumbersome domestic regulations than firms in more mature sectors.

#### **2.2.4. Limits of synthetic trade restrictiveness indexes (STRI)**

Price-based measures of impediments to trade in services can be misleading, since price differences across markets may merely reflect either differences in domestic regulatory environments or quality differentials across countries rather than formal barriers such as impediments to entry for foreign services providers. In services, a higher index can reflect more information available. Given fragmentation of production and trade of intermediate services, even masked by in aggregate data categories like “business services”, price comparisons may not indicate which markets are actually restricted. Moreover, econometric models not control enough for quantity effects gendered by an impediment so that price-elasticity estimates of supply and demand would be necessary to move easily from observed price difference to *ad valorem* barriers which models implicitly assume generated them (Dee, 2005 ; Whalley, 2004 ; Deardorff and Stern, 2008 ; Francois and Hoekman, 2010).

Comparing impediments and transforming them into tariff equivalents is still ambiguous. Barriers differ whether they are rent-creating or cost-increasing. Only the former can be considered as equivalent to tariffs (see above).

While the Australian STRI connects prices differences to barriers, the weights of restrictions are subjective; the same remark holds for the equal weight aggregation used for the OECD PMR. Finally, estimates of performance equation developed by the Australian teams have been applied to other countries and periods<sup>5</sup>.

Therefore, price-based measurements of trade barriers used for goods may be inappropriate to assess the impact of entry or competition barriers in services. They tend to overestimate the scope of impediments insofar as all price or regulatory gaps are considered as protectionist (Francois and Hoekman, 2010).

We will now show how those STRI have been adapted and used in performance equations to assess their impact on cost-price margin in telecommunications in MENA countries.

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<sup>5</sup> The drawbacks of this method are presented for telecommunications in MENA countries in the next session.

### 3. Assessment of gains from trade in telecommunication in MENA countries

In 2005, the FEMISE (Forum Euroméditerranéen des Instituts de Sciences Economiques) has applied the Australian methodology to telecommunications, in some MENA countries, namely Egypt, Morocco, Tunisia and Turkey. These four countries have undertaken a survey on the regulatory environment affecting market access and national treatment, in fixed lines and mobile phones and the Internet. These studies assess indexes of discriminatory and non-discriminatory restrictions. Quantity effects of impediments have been transformed in price effects using a demand price-elasticity of -1.2 (estimated from a 1997 analysis and used by Warren (2000) in the course of the Australian research).

This index has been introduced in performance equations, which take back the coefficient estimated by Warren (2000) for fixed lines and mobile phones, and explained by GDP per capita, household density, percentage of mainlines connected to digital exchange, waiting list as percentage of mainlines. Finally, those tariff equivalents' estimates are coupled with input-output tables, describing the use of services as intermediate consumption, to evaluate the impact of liberalisation of trade in services on economies' welfare. The regulation generally seems less restrictive in Egypt and Turkey than in Maghreb countries and softer in mobile phone than for the Internet and *a fortiori* fixed lines, except for Turkey. Welfare gains remain limited (FEMISE, 2005).

Marouani and Munro (2009) rely on the STRI methodology developed by the Australian team to assess modal *de facto* restrictions in fixed and mobile telecommunications in Egypt, Jordan and Morocco. The impediments to trade are evaluated through a survey of expert opinion (government agencies, trade experts in MENA) based on the questionnaire of Dihel and Shepherd (2007). The results of the latter for non-MENA countries are used to increase the number of countries in order to perform a component analysis to determine the weights of each restriction by its contribution to the whole variance (principal component analysis), method which limits the degree of subjectivity of such synthetic indexes. While MENA countries rank among the most restrictive emerging economies for trade in fixed telecom services, their aggregate scores have decreased between 2004 (analysis of Dihel and Shepherd, 2007) and 2007 (study of Marouani and Munro, 2009). In all investigations (including FEMISE, 2005) and for all countries, the mobile sector is less regulated than fixed lines. In telecommunications, information concerns mainly restrictions on cross-border trade and commercial presence. Compared to other modes, restrictions on mode 1 are low. Mode 2 refers to call-back services, which are permitted in Jordan, but still not in Egypt and Morocco. The three countries have very close levels of restrictions for mode 3, which are again lower for mobile phones. As for Mode 4, Jordan records the highest restriction levels as it imposes particularly short

limitations on the time allowed in the temporary movement of long stay employees, while Morocco is the most liberal (see table 3; Marouani and Munro, 2009).

**Table 3: STRI, in fixed and mobile telecommunications, for four MENA countries, in 2004 and 2007 (%)**

	Fixed-line Telecommunications									
	Aggregate		Mode 1		Mode 2		Mode 3		Mode 4	
	2004	2007	2004	2007	2004	2007	2004	2007	2004	2007
<b>Egypt</b>	229	122	78	64	205	205	268	136	120	181
<b>Jordan</b>	168	85	141	2	0	0	184	108	191	223
<b>Morocco</b>	248	80	205	64	205	205	268	81	67	73
<b>Tunisia</b>	256		205		205		268		308	
	Mobile Telecommunications									
	Aggregate		Mode 1		Mode 2		Mode 3		Mode 4	
	2004	2007	2004	2007	2004	2007	2004	2007	2004	2007
<b>Egypt</b>	66	99	153	0	0	0	51	77	120	224
<b>Jordan</b>	45	78	0	0	0	0	51	67	191	266
<b>Morocco</b>	87	59	306	0	0	0	32	67	67	116
<b>Tunisia</b>	64		153		0		26		308	

(Source: Dihel and Shepherd, 2007 for 2004 results; Bottoni and Marouani, 2009, for 2007 estimates).

Reading note: Higher levels of STRI correspond to stricter restrictions.

In reality, services barriers are simultaneously rent-creating and cost-increasing, but without information on cost and price at firm level, these effects cannot be analysed separately. Thus, firm price-cost margin, that is the sum of earnings before interest, taxes and depreciation divided by net sales, is used as exogenous variable in performance equations. When the coefficient of STRI variable is positive, it is interpreted as rent-creating barriers, whereas if negative, it is taken as cost increasing impediments to trade. As stated by Dihel and Shepherd (2007), in order to avoid correlated error terms due to the presence of firm and country level explaining variables, a two-stage approach estimation is used. First, “adjusted” price-cost are estimated as country-level fixed effects, after controlling for firm level differences, while the second stage regression seeks to explain the adjusted margins from the first stage in terms of the STRI and country-level control variables. For Dihel and Shepherd (2007), barriers (STRI) are cost-increasing for fixed and mobile telecommunications for aggregated Modes and for Mode 1, which seems in contradiction with previous results, whereas they are rent-creating for Mode 2, 3 and 4 (see table 6). Their estimated 70% confidence intervals for the tariff equivalents, based on a bootstrap technique, are huge and larger for fixed-line telecommunications than for mobile-phone and for commercial presence, than for cross-border trade (see tables 4 and 5). They highlight the small degree of confidence of such measures applied to trade in services. Therefore, interpretation needs to be cautious.

**Table 4: Estimated tax equivalents of restrictions (70% confidence interval for fixed-line and mobile telecommunications), for three MENA countries, in 2004 (% on cost)**

	Fixed-line telecommunications									
	Aggregate		Mode 1		Mode 2		Mode 3		Mode 4	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
<b>Egypt</b>	0.00	180.85	0.00	27.29	7.77	71.69	35.42	311.53	7.44	66.80
<b>Jordan</b>	0.00	113.69	0.00	54.87	0.00	0.00	23.14	164.10	12.12	126.08
<b>Morocco</b>	0.00	206.65	0.00	88.42	7.77	71.69	35.42	311.53	4.12	33.36
<b>Tunisia</b>	0.00	217.97	0.00	88.42	7.77	71.69	35.42	311.53	20.30	273.53
	Mobile telecommunications									
	Aggregate		Mode 1		Mode 2		Mode 3		Mode 4	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
<b>Egypt</b>	0.00	32.16	0.00	39.14	0.00	0.00	0.00	7.97	9.34	58.62
<b>Jordan</b>	0.00	20.99	0.00	0.00	0.00	0.00	0.00	7.97	15.30	108.67
<b>Morocco</b>	0.00	44.37	0.00	93.61	0.00	0.00	0.00	4.93	5.15	29.64
<b>Tunisia</b>	0.00	31.20	0.00	39.14	0.00	0.00	0.00	3.96	25.85	228.16

(Source: Dihel and Shepherd, 2007).

**Table 5: Tax equivalents of restrictions, fixed-line and mobile telecommunications, for four MENA countries, in 2004 and 2007 (%)**

	Fixed-line Telecommunications									
	Aggregate		Mode 1		Mode 2		Mode 3		Mode 4	
	2004	2007	2004	2007	2004	2007	2004	2007	2004	2007
<b>Egypt</b>	9.36	54.00	7.43	15.00	36.11	2.00	132.24	67.00	8.77	68.00
<b>Jordan</b>		35.00		0.00		0.00		50.00		89.00
<b>Morocco</b>	10.19	33.00	20.71	15.00	36.11	2.00	132.24	35.00	33.4	23.00
<b>Tunisia</b>	10.54		20.71		36.11		132.24		110.07	
	Mobile Telecommunications									
	Aggregate		Mode 1		Mode 2		Mode 3		Mode 4	
	2004	2007	2004	2007	2004	2007	2004	2007	2004	2007
<b>Egypt</b>	5.73	101.00	13.43	0.00	0.00	0.00	2.34	51.00	32.47	356.00
<b>Jordan</b>	3.88	73.00	0.00	0.00	0.00	0.00	2.34	43.00	56.56	506.00
<b>Morocco</b>	7.61	52.00	28.66	0.00	0.00	0.00	1.46	43.00	17.14	119.00
<b>Tunisia</b>	5.57		13.43		0.00		1.18		106.31	

(Source: Dihel and Shepherd, 2007 for 2004 results; Bottoni and Marouani, 2009, for 2007 estimates).

Bottini and Marouani (2009) choose the same type of econometric estimation as Dihel and Shepherd (2007). They use the UK as the benchmark country, having the lowest STRI. In both fixed and mobile telecommunications, the price-cost margin is the highest in MENA countries, compared to non-MENA developing and developed countries. For fixed telecommunication, in the first stage, firm capital intensity and market share have a positive impact on price-cost margin, while the effect of net sales is negligible and that of sales growth is not significant. In the second stage, a 1% increase in the aggregate STRI induces a 0.33% increase in the country level before-tax profit, whereas, for Mode 3, it induces a 0.34% rise. Thus, restrictions in the fixed telecommunications STRI have mainly rent-creating effects. Prudential regulation and the share of

mobile subscribers over the population have a positive impact on price-cost margin in fixed telecommunications. When it comes to mobile phone, firm sales growth has a positive impact on before-tax profit while capital intensity is not significant. A 1% increase in the aggregate STRI induces a 0.59% decrease in the country level price-cost margin on average, whereas a 1% increase in the Mode 3 STRI induces a 0.50% increase in the country level price-cost margin. Regulations are cost-increasing in the mobile phone sector, which, according to the authors, suggest higher gains from liberalisation due to the removal of market inefficiency (see table 6). Despite higher restrictions in fixed telecommunications, tariff equivalents are higher in mobile phone in line with a greater impact of restriction in the latter activity (see table 5). Mode 3 seems thus the most critical to liberalise in order to improve firm's performance and income redistribution (Bottini and Marouani, 2009).

Drawing on Dihel and Shepherd (2007) and Bottini and Marouani (2009), Fontagné and Mitaritonna (2009) build a STRI for fixed and mobile telecommunications for eleven emerging countries including Egypt, Morocco and Tunisia. The qualitative information on regulation comes from a survey conducted by Queen Mary University. The regulations are scored depending on their degree of restrictiveness. Then, the scores are aggregated into a weighted average, relying on principal component analysis to calculate the weights. In a second stage, the authors measure the impact of STRI on price-cost margin after controlling for its usual determinants for each sector. The combined presence of firm and country level variable leading to correlated residuals is handled by clustering the error terms at country level. In fixed telecommunications, while firm's productivity is not significant, price-cost margin is positively related to firm's market share, the growth of firm sales, the capital intensity. The STRI alone has no impact, but when interacting with RTA (Regional Trade Agreements) or MFN (Most Favoured Nation) exception, the STRI has a significant negative, cost-increasing, effect on before-tax profit, suggesting that discriminatory regulations and treatment of trade partners impede incumbent firms to accede to world leading technology rather than creating rents. In mobile telecommunications, sales growth and MFN exceptions are not significant, while market share has a very significant and positive effect on price-cost margins (see table 6). Morocco has one of the largest rent in fixed telecommunications accruing to domestic provider of services (38.6%), similar to that of Egypt and India (37.1%), while Tunisia appears less restricted (18.8%). Morocco performs better for mobile telecommunications (18.4%), above Egypt (21.3%) and Tunisia (33.6%).

**Table 6: Main results of estimates of the impact of STRI in fixed and mobile telecommunications in MENA countries**

Authors	Countries in the sample	Impact of the STRI on profit		Significant independent variables	
		Total	By Mode	“adjusted” price-cost, firm-level control	“adjusted” margin, country-level control
Dihel and Shepherd (2007)	28 emerging countries (2002-2004), including Egypt, Jordan, Morocco and Tunisia	Cost-increasing (fixed and mobile): sensitive to specification Rent-creating combined with RTA; Cost-increasing combined with MFN	Cost-increasing for Mode1, and rent-creating for Modes 2-4 (fixed and mobile)	<u>Fixed:</u> (+) Capital intensity (+) Net sales <u>Mobile:</u> (+) Sales (+) Growth of firms sales (+) Market share	<u>Fixed:</u> (-) STRI (+) % of digital mainlines (+) growth of industry revenue <u>Mobile:</u> (-) STRI (+) Teledensity (mobile) (+) growth of industry revenue
Bottoni and Marouani (2009)	Egypt, Jordan, and Morocco + countries in Dihel and Shepherd (2007)	<u>Fixed:</u> rent-creating (-0.33) <u>Mobile:</u> cost-increasing (+0.59)	<u>Fixed:</u> rent-creating, Mode 3 (-0.34) <u>Mobile:</u> cost-increasing, Modes 2 and 3 (+0.50)	<u>Fixed:</u> (+) Capital intensity (+) Net sales (+) Market share <u>Mobile:</u> (+) Sales (+) Growth of firms sales	<u>Fixed:</u> (-) STRI (+) Rate of fixed lines (+) Teledensity (mobile) (+) Prudential regulation <u>Mobile:</u> (-) STRI (+) Teledensity (mobile)
Fontagné and Mitaritonna (2009)	11 emerging countries, including Egypt, Morocco and Tunisia (Queen Mary University) + Dihel and Shepherd (2007)	Cost-increasing STRI, associated with RTA or MFN, rent-creating for fixed and mobile telecommunications		<u>Clustering errors terms at country level (one-step):</u> <u>Fixed:</u> (+) Capital intensity (+) Firm market share (+) Growth of firms sales (-) STRI; (+) STRI/RTA; (+) STRI/MFN <u>Mobile:</u> (+) Capital intensity (++) Firm market share (-) STRI; (+) STRI/RTA; (+) STRI/MFN	

(Source: Synthesis of the authors from quoted papers)

RTA: Regional Trade Agreements

MFN : Most Favoured Nation

### **3.1. Limits of the analyses of gains from trade in telecommunications in MENA countries**

These analyses suffer from some drawbacks. Using coefficient of a regression estimated on 1997 data pour 136 countries, as the FEMISE studies did, that is at constant market structure, to analyse an ‘out-of-sample’ country’s performance in 2005, coupled with old input-output tables (1997 for Morocco) to estimate welfare gains, this analysis is subject to Lucas’s criticism (1976). In other words, this method assumes that, for MENA countries, the average answer of performance to the regulatory framework is identical to the average of the sample used by Australian researchers. These estimates can become biased or wrong when structure changes occur, such as technological progress and openness to international competition in telecommunications in the decade 2000. Moreover, for each new estimate, the performance response to a given regulatory framework is supposed identical to the average of the countries in the initial sample. This hypothesis does not take into account institutional specificities of the new countries tested, which differ from world average.

Divergences in prices are not just reflecting the strictness of regulations; they can be imputed to improvement in the quality of services and differences of regulatory framework. In the works of Bottoni and Marouani (2009) and Fontagné and Mitaritonna (2009), the lack of data on firm level costs and price lead the authors to measure at the same time rent-creating and cost-increasing restrictions regulations. But, the result of cost decreasing with STRI obtained by the former could also be linked to increasing competition in mobile telecommunications in a time when the people of MENA countries are acquiring their first mobile phone. To our view, the breakdown between technology inefficiency and rent in wedge-price remains unfortunately unknown, which questions the robustness of the results. Thus, these findings are imprecise and over-estimated insofar as these kinds of models are highly sensitive to initial assumptions.

In regressions merging aggregate country level data with firm level micro data, error terms may be correlated within groups. “*Failing to account for correlation of errors within-group can result in spurious regression in estimating the effects of aggregate variables on micro units*” (Moulton, 1990). To avoid these disturbances, Dihel and Sheperd (2007) or Bottoni and Marouani (2009) opt for two-stage estimations, which consist in estimating bidimensional (firm-level) variables (capital intensity, percentage of digital mainlines, growth of industry revenue) impact on the price-cost margin in services and then in regressing the residual (“adjusted” price-cost margins estimated as country-level fixed effects) of the first regression on unidimensional country level variables (trade restrictions and regulatory level). Since country specific variables included in the second step regression are likely to be correlated with unobserved firm specific variables, the estimates on the unidimensional variables are still likely to suffer from omitted variable bias, in a similar way as that



stated by Anderson and Van Wincoop (2003) for gravity equations. In order to avoid the overestimation of the impact of STRI on the price-cost margin, clustering of error terms as done by Fontagné and Mitaritonna (2009) and recommended by Wooldridge (2003) seems more convincing than the two-stage approach.

In summary, due to lack of data, to the small effective sample in the second-stage regression in Dihel and Shepherd (2007) and Bottoni and Marouani (2009), and the huge interval of confidence of tax equivalent estimates, these results need to be considered with great caution, in particular before being generalised to other countries, sectors and/or time periods.

#### **4. Conclusion**

Considering the importance of proximity between supplier and client, heterogeneity and differentiation of services industries, measurement of flows and impediments to services trade reveals fussy. In fact, barriers to trade in services include domestic regulations, or non-discriminatory quotas and prohibitions. All these considerations make more fragile the results of huge gains due to liberalisation of trade in services found using those measures.

As illustrated in the case of MENA countries, due to huge interval of confidence for tax equivalents, the important and precise quantitative results of those analyses should be regarded with caution. They only represent the best attempt of the various authors at drawing appropriate conclusions given the current level of data. Therefore, rather than drawing detailed policy conclusions based on point estimates, it would be more appropriate to opt for a flexible, qualitative interpretation of the quantitative results and ranking based on relative position of countries. Deep changes in domestic regulations are burdensome and were never undertaken for opening trade in goods, therefore a qualitative approach, taking into account the institutional differences of countries, would be preferable.

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**Appendix 1: Typology of trade barriers in services by modes, based on examples for financial services and telecommunications\***

Mode of supply	Nature of the restriction	General type of restriction	Restrictions specific to the sector	
Mode 1	National treatment	Barriers to trade: discriminatory procedures	Car and fire insurance supplied by domestic companies only, telecommunications	
Mode 2	National treatment	Barriers to trade: discriminatory procedures	Life insurance contracts bought abroad subject to a x% tax	
Mode 3	Discriminatory entry limitations	Barriers to entrepreneurship: regulatory and administrative opacity	Policy score for competition in the provision of the relevant telecommunication services	
		Barriers to entrepreneurship: quotas, economic tests	Number of banking agencies	
		Barriers to entrepreneurship: utility tests, screening	Requirement to demonstrate the economic interest of the investment for approbation	
		Barriers to entrepreneurship: number of competitors on the market	Limitation of the number of foreign mobile suppliers at two	
		Barriers to entrepreneurship: percentage of incumbents privatised	Telecommunications	
		FDI barriers: foreign participations, <i>joint ventures</i>	Entry of new banks only in joint-venture with a domestic bank; limitation at 25% (49%) of foreign ownership; Requirement to transfer part of ownership to local partners at a given time horizon	
		FDI barriers: equity participation, FDI	Limitation to ten of the number of foreign non-life insurers; no more than five affiliates per company	
		FDI barriers: allowing third party access	New telecommunication suppliers entering into the market	
	Discriminatory limitations on entry and on-going operations	Barriers to entrepreneurship - regulatory and administrative opacity: Licences (number, requirement)	Number of bank licenses ; Number of bank outlets	
	Discriminatory limitations on ongoing operations	Barriers to entrepreneurship - Administrative burden		Restrictions on public deposits or raising funds from domestic capital markets
				Restrictions on the type and amount of loans, directed towards real estate and small and medium enterprise loans
			Restrictions on local content	
		Barriers to entrepreneurship - barriers to competition: performance requirements		Export requirements
			Restrictions on profit and capital repatriation (financial services)	

<b>Mode of supply</b>	<b>Nature of the restriction</b>	<b>General type of restriction</b>	<b>Restrictions specific to the sector</b>
	Non discriminatory entry barriers	Barriers to entrepreneurship - number of competitors in the market	Limitation at two of the number of mobile suppliers
	Non discriminatory limitations on ongoing operations	State control: introduction of an independent regulator	Telecommunications
		Barriers to entrepreneurship - regulatory and administrative opacity: Capacity regulation	Additional requirements in capital (car and fire insurance)
		Barriers to entrepreneurship - administrative burden: restrictions on multidisciplinary practices	Excluding banks from insurance services and share issuing
		Barriers to entrepreneurship - administrative burden	Lending and raising funds by banks
Modes 3 & 4	Discrimination on entry and on ongoing operations	Barriers to entrepreneurship - regulatory and administrative opacity: nationality, citizenship, residency, local content requirements	No more of 10% of staff as persons of foreign nationality
Mode 4	Discrimination on entry & on ongoing operations	Barriers to trade and investment: restrictions on natural person movement	Number of years (days) that executive, managers and professionals can stay
		Barriers to trade and investment	Problems of recognition of the skill level (education and professional)
	Discrimination on ongoing operations	Barriers to entrepreneurship - regulatory and administrative opacity	Local language knowledge required for members of the board

(Source : Dee, 2005 ; Dihel and Shepherd, 2007; Kozluk, et al., 2009)

\* Barriers classification draws on regulations' tree on which the PMR indicator is based (see Kozluk et al., 2009)