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ARAB PASSENGERS' AIRLINES FRAMEWORK AND PERFORMANCE: A CROSS-COUNTRIES ANALYSIS

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Abstract

The present paper summarizes the findings of four country studies (Jordan, Egypt, Morocco and United Arab Emirates; UAE), which investigated the relationship between the current passengers' airlines framework and the performance of the sector in the country. Their analyses aimed at investigating the impact of further liberalization on passengers and on welfare. To address this question, the four studies adopted the same analytical framework, which is an extended version of the well-known Structure-Conduct-Performance (SCP) framework. Such a framework has been widely used and debated in the industrial organization literature. It states that the structure of an industry determines firms' conduct, which, in turn, determines performance. However, the literature suggests that the direction of causality might run in other directions. Hence, our extended version of the framework allows causality go either directions. The analysis shows that Arab countries perform less than the rest of the World and are losing ground in terms of passengers carried although the countries under consideration show a highly contrasted picture. The results suggest that that increased competition decreases fares as well as carriers' revenue but increases consumer surplus. The net effect on society welfare is positive; the consumer surplus increase outweighs the producers' surplus decrease.

JEL Classification: L9; D2

Keywords: Airline transportation; Arab passengers; cross-country analysis

ملخص

هذه الورقة تلخص نتائج الدراسات القطرية الأربعة (الأردن، مصر، المغرب والإمارات العربية المتحدة، الإمارات العربية المتحدة)، التي حققت في إطار العلاقة بين ركاب شركات الطيران وأداء القطاع في البلاد والتى تهدف تحليلاتهم إلى التحقيق في أثر زيادة تحرير القطاع على الركاب وعلى الرفاه الاجتماعي. يهتم سؤال البحث في هذه الورقة أيضا بأثر زيادة تحرير القطاع على الركاب وعلى الرفاه الاجتماعي .لمعالجة هذه المسألة، اعتمدت الدراسات الأربع نفس الإطار التحليلي، الذي هو صيغة موسعة لإطار المعروفة الهيكل والسلوك الأداء. وقد تمثل هذا الإطار المستخدم على نطاق واسع وتمت مناقشته في الأدب عن التنظيم الصناعي .وهو ينص على أن بنية الصناعة يحدد سلوك الشركات، والتي، بدورها، تحدد الأداء .ومع ذلك، فإن الأدب يشير إلى أن اتجاه السببية قد تعمل في اتجاهات أخرى .وبالتالي، لدينا نسخة موسعة من إطار يسمح للسببية بالذهاب فى الاتجاهين .يبين التحليل أن أداء الدول العربية أقل من بقية دول العالم، وتفقد الأرض من حيث عدد المسافرين .والبلدان الأربعة قيد النظر تظهر صورة تتناقض إلى حد كبير. وتشير النتائج إلى أن المنافسة المتزايدة تخفض الأسعار، فضلا عن عائدات شركات الطيران لكنها تزيد فائض المستهلك. الأثر الصافي على الرفاهه الاجتماعية هو إيجابي، وزيادة فائض المستهلك يفوق فائض انخفاض المنتجين.

1. Introduction

The performance of the Arab passengers' airlines industry has important implications for labor and non-labor mobility in the Region. Labor mobility is a notable component of intra-Arab integration as well as of Arab integration with the rest of the World. Through migration, labor mobility has historically played an important role in absorbing a part of Arab labor forces. For instance, around 10 percent of Egypt's and 15 percent of Yemen's labor force are employed in other Arab countries. There are also a number of Arab workers settling in non-Arab countries. Around 75% of Maghreb emigration is oriented toward Europe. Non-labor mobility, in particular tourism, contributes significantly to the economy in many Arab countries. International tourism receipts as a percentage of GDP represented around 4% in Arab countries over the 2000s against less than 2% in the rest of the world. According to World Tourism Organization (UNWTO) estimates, tourism to the region will grow at an average rate of 5 per cent per year through 2020.

The historical framework for airline traffic before 1978 has been a duopoly by route. With the deregulation initiated in 1978 by the USA, the world air transport industry witnessed major turbulences. A first reaction came from some airline companies through setting up alliances among themselves. Following the intense debate inside policy-making circles (mainly in the US) about the impact of alliances on competition, welfare and performance, the USA initiated Open Skies, bilateral or multilateral, Agreements (OSAs) in 1979. OSAs allow air carriers of the United States and the foreign signatory to make decisions on routes, capacity, and pricing and fully liberalize conditions for charters and other aviation activities including unrestricted code-sharing rights.

Different strategies have been adopted around the World. The USA is pursuing, through various bilateral and multilateral agreements, a strategy of liberalization (as full as possible) of the air markets. The European Union (EU) is following a regional strategy by implementing open skies among its members. The countries of the Association of South-East Asian Nations (ASEAN) have also agreed and are firmly proceeding with the formation of open skies within the region (Forsyth et al., 2006).

Arab countries entered this arena in dispersed order. Some became members of alliances, others are involved in bilateral OSAs and the rest is not taking part of any agreements. While the Arab Civil Aviation Council (ACAC) and Arab Air Carriers Organization (AACO) have agreed that bilateral OSAs should be started among Arab countries, arrangement dates were not respected and some countries have, even, unilaterally concluded OSAs with non-Arab partners.

A number of papers have investigated the impact of airline liberalization (e.g. Albers et al., 2005; Brueckner, 2001; Micco and Serebrisky; 2006 and Oum et al. 2000). They show that the issue is a major concern because the airline framework can have important effects on fares, profits, consumer welfare and labor and non-labor mobility. While the impacts on fares, profits, and consumer welfare are also important for the Region, the issue of mobility is crucial. Surprisingly (but not so much in the case of Arab countries), studies on the impacts of Arab strategies (or lack thereof) in an evolving airline industry framework on the Arab world are nonexistent. In this context, it is not possible to assess whether the strategies the countries are pursuing are adequate or adaptable i.e. should they go multilateral, bilateral or regional?

To the best of our knowledge, there is only one published paper, which deals with airlines passengers industry. Adler and Hashai (2005) estimated potential intra-regional passenger flows for air transport in the Middle East under OSA, once agreements are reached between neighboring countries. "To arrive at reasonable demand estimates, Western and Eastern European demand data was analyzed as a first step, since it is assumed that current Middle

Eastern demand is distorted as a direct result of regional political instability" (p. 878). Subsequently, a 21 country database was estimated for passenger flow in the Middle East region on an average peak season day. Finally, the authors show that intra-regional passenger demand flow could increase by 51% under OSAs. Beside some important methodological flaws, the study neither examines other components of Arab airlines performance (e.g. fares, consumer surplus, profits etc.) nor does it consider the role of possible airlines-airports alliances.

The present paper summarizes the findings of four country studies (Jordan, Egypt, Morocco and United Arab Emirates; UAE), which investigated the relationship between the current passengers' airlines framework and the performance of the sector in the country. Their analyses aimed at investigating the impact of further liberalization on passengers and on welfare. The paper is organized as follows: after the introduction, Section 2 presents a general background of the industry in Arab countries. Section 3 is devoted to the conceptual framework for the analysis. Section 4 and 5 concern the econometric and simulation analyses respectively. Section 6 concludes.

2. General background

2.1. Arab background

Table 1 presents selected indicators of the importance of Air passengers transport in the Arab world as compared to the whole world. It shows that the share of Arab countries in terms of passengers carried is low and decreasing as compared to their shares in terms of population and GDP. The figures also highlight the decline of the Region in terms of passengers carried as compared to population and GDP.

Taking international tourism receipts in percentage of GDP as a proxy of performance and the number of passengers carried in percentage of population as a proxy of labor mobility, the figures show stagnation. Both shares are unchanged over the last ten years.

The Aviation Market of many Arab countries has witnessed growth during the last decade. The passenger movements in 2008 have recorded an amount of around 85 million (Figure 1). Although, the number of passengers carried has been steadily increasing since the 1970s, the increase is much slower than in the rest of the World (Figure2).

Arab airlines and airports are mostly government-owned and there is rarely more than one major airline company per country. For a long time, Arab airlines operated, like many other airlines, in a "duopoly-per-route" market structure. This was the result of international air law, which was based on the principle of complete and exclusive sovereignty by a state over the airspace above its territory (Article 1 of the 1919 Paris Convention and reaffirmed in article 1 of the Chicago Convention). However, following the US deregulation in 1978 many other countries have deregulated their domestic markets. Therefore, significant structural and regulatory changes have occurred in the world's air transport market.

In 1999 the Arab Civil Aviation Council (ACAC) and Arab Air Carriers Organization (AACO) agreed that bilateral OSAs should be started among Arab countries to facilitate the implementation of a multilateral agreement approach by the end of 2003. They have also set a plan to achieve this objective and to have a yearly evaluation to its application where it should be reviewed in order to reach a final open skies agreement.

In this context, ACAC prepared a regional arrangement for gradual liberalization into four stages, starting in November 2000 and ending November 2006 with the liberalization of 5th freedom which concerns the right of an airline in one country to carry traffic between 2 countries outside its own country of registry as long as the flight originates and terminates in its own country of registry.

Unfortunately, arrangement dates were not respected. Instead some Arab countries unilaterally declared OSAs in some or all airports. Others have entered the scene with bilateral agreements either among them or with other non-Arab countries, such as the case of Jordan, Egypt and Morocco. Jordan has signed with the USA (1996), U.A.E and Bahrain (1999). Morocco has signed with the European Union (2000), Egypt and Saudi Arabia (2006). The rest of the Arab countries have not signed any agreements due to many explicit or implicit constraints, they are still applying the Air Bilateral Service Agreement (ABSA).

2.2 Countries background

Table 2 presents similar indicators as Table 1 for the 4 countries under study. In terms of shares in passengers compared to shares in population and GDP in the Arab world, the Table shows that the share of Egypt is low but slightly increasing, the shares of Jordan and Morocco are high and increasing while the share of UAE is very high and quickly increasing. As a share of their GDP, international tourism receipts are increasing for the four countries. The number of passengers carried, as a share of population, is slightly increasing in Egypt and rapidly increasing in Jordan, Morocco, and UAE

Table 3 focuses on the main operators in each country. It shows that the number of domestic carriers is broadly comparable (given the size of the country) across the 4 countries. The number of foreign carriers is much higher in the UAE, which may indicate higher openness of the market. The number of airports seems comparable (given the size of the country) but a more precise indicators (Km2 per airport = total surface of the country / number of airports) shows that the UAE is offering much more.

Among the domestic carriers, Royal Jordanian is dominating the Jordanian airlines market scene since its establishment in 1963. Royal Air Maroc is the most important carrier in Morocco with 83% of domestic seat capacity operated in Morocco and 45% of international capacity. Although there are 10 domestic airline companies permitted to work in the market by law, the air services in Egypt is practically dominated by only one national flag carrier namely Egypt Air; it had a market share of more than 95 percent in 2009. Emirates airline, which has the largest fleet and controls 70% of air traffic, predominates the UAE airline industry.

Table 4 gives two main indicators (Number of international destinations and their Share in total passengers) of the foreign orientations of the major carrier in each country. Irrespective of the indicator under consideration, it appears that Royal Jordanian and EgyptAir are mainly oriented toward MENA, RAM is mainly oriented toward Europe while Emirates is mainly oriented toward Asia & Oceania (including Australia)

In terms of alliances the countries pursue very different strategies. There are 3 major alliances around the world: Star Alliance, SkyTeam and Oneworld. Only 2 Arab countries are part of an alliance: EgyptAir with Star Alliance and Royal Jordanian with Oneworld. Apart from the alliances, Jordan has signed 86 Air Service Agreements; among these is ARABESK, an unofficial voluntary cooperation agreement among 9 Arab airlines[1] under the auspices of the AACO. Egypt is a party of 123 bilateral Air Service Agreements including ARABESK. Morocco has concluded about 92 bilateral air agreements. Finally, the UAE has signed bilateral open skies agreements with more than 50 countries and has various other agreements with more than 40 countries at varying stages of completion.

Like for agreements, the four countries show a high contrast in term of performance (Table 5). Regarding the load factor, Emirates shows the best performance far ahead of the three other carriers, EgyptAir and RAM are the least performers. In terms of profit, Emirates shows

[1]Egypt Air, Saudi Airlines, Gulf Air, Yemen Airways, Royal Jordanian, Middle East, TunisAir, Syrian Air, and Ethihad Airways

the best performance and EgyptAir is doing better than the two others. Except for 2005, the worst results are those of RAM.

2.3 Summary

Overall, Arab countries perform less than the rest of the World and are losing ground in terms of passengers carried. The four countries under consideration show a highly contrasted picture. Egypt exhibits a low and slightly increasing share in terms of passengers carried, comparable number of domestic carriers and lower number of airports. Its major carrier, Egypt Air, is mainly oriented toward the MENA destinations, has a lower load factor and a low profit rate. Jordan exhibits a high and increasing share in terms of passengers carried, comparable number of domestic and foreign carriers and high number of airports. Its major carrier, Royal Jordanian, is mainly oriented toward the MENA destinations, has a reasonable load factor and a low profit rate. Morocco exhibits a high and increasing share in terms of passengers carried, comparable number of domestic and foreign carriers and lower number of airports. Its major carrier, Royal Air Maroc, is mainly oriented toward European destinations, has a lower load factor and a very low profit rate. The United Arab Emirates exhibits a very high and rapidly increasing share in terms of passengers carried, comparable number of domestic carriers, much higher number of foreign carriers and much higher number of airports. Its major carrier, Emirates, is mainly oriented toward Asia & Oceania (including Australia), has the highest load factor and the highest profit rate.

3. Conceptual Framework for the Analysis

The research question in this paper concerns the impact of further liberalization on passengers and on welfare. To address this question, the four studies adopted the same analytical framework, which is an extended version of the well-known Structure-Conduct-Performance (SCP) framework. Such a framework has been widely used and debated in the industrial organization literature. It states that the structure of an industry determines firms' conduct, which, in turn, determines performance. However, the literature suggests that the direction of causality might run in other directions. Hence, our extended version of the framework allows causality go either directions.

The structure of an industry is reflected in the number and importance of players who are producers and consumers, and on the institutional context. Firms' conduct concerns pricing, collusion, foreclosure etc. Depending on the purpose of the study, performance is measured through profitability or welfare. Here, the two main variables of interest are the number of passengers and welfare. Assuming constant costs, the latter depends on the number of passengers and fares. Hence, the studies investigated the determinants of both. More precisely, they:

- Computed an indicator of openness; noted OI
- Estimated the model (derived from the same analytical framework) incorporating the OI and other determinants to see its contribution
- Used the estimation results to simulate the impact of further liberalization on passengers and on welfare

To travel from point A to point B, the passenger can either choose a direct itinerary or an indirect itinerary through a point C, which may affect the carriers involved in his/her trip. Moreover, the demand for air travel depends not only upon fares but also on frequencies and other service attributes such as the level and quality of air and airports services delivered. Hence, even with the same fares, the consumer may prefer different itinerary and different carriers. This has two implications for the choice of the framework to be used for the analysis. First, the analysis should be conducted at the route level and second the analysis should allow for diversity in consumers' choice. It follows that the analytical framework used here will consist of the Dixit-Stiglitz model at the route level. The model considers a

representative consumer faced with a variety of products and who choose the basket (composed of each variety), which maximizes his/her utility. The representative consumer's decision is, actually, reflecting the choice of the whole set of passengers to/from a given country.

3.1 The economic model

The representative consumer has a CES utility function of the type:

$$V_n(q_1,.....,q_n)=\left(\sum_{j=1}^{n} q_j^{\theta}\right)^{1/\theta}, \quad 0<\theta<1 \tag{1}$$

where q_j is the quantity of variety j, n the number of available varieties and θ reflects the elasticity of substitution between the different varieties.

The consumer chooses $q_j$so as to maximize its utility under the budget constraint:

$$\sum_{j=1}^{n} p_j q_j = I \tag{2}$$

where p_j is the price of variety j and I the consumer's budget.

The maximization gives the following demand function for a variety j

$$q_j=\left(\frac{p_j}{P}\right)^{-\sigma}\frac{I}{P} \tag{3}$$

where

$$\sigma=\frac{1}{1-\theta}$$

$$P=\left(\sum_{j=1}^{n} p_j^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$$

Let's assume that each variety is provided by a different producer having a constant marginal (average) cost c_j and that n is high enough that no individual producer can affect P. Producer j will set the price p_j so as to maximize its profit:

$$\max\left(p_j q_j - q_j c_{j;}\right) \tag{4}$$

This yields to the equilibrium price and quantity

$$p_j = c_j\frac{\sigma}{\sigma-1} \tag{5a}$$

$$q_j=\frac{\sigma-1}{\sigma}\left(\frac{c_j}{C}\right)^{-\sigma}\frac{I}{C} \tag{5b}$$

where

$$C=\left(\sum_{j=1}^{n} c_j^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$$

Coming back to the airline market, let's take Equations (3) and (5b) in log and use θ which has an easy interpretation:

$$\log(q_j) = -\left(\frac{1}{1-\theta}\right)\log(p_j) + \left(\frac{\theta}{1-\theta}\right)\log(P) + \log(I) \quad (6a)$$

$$\log(p_j) = \log(c_j) + \log(\frac{1}{\theta}) \quad (6b)$$

Equation (6a) shows that the number of passengers for a given carrier will depend on the elasticity of substitution between its product and other carriers', on consumer's income, on the number of variety (n via P) and on fares. The elasticity of substitution, reflecting difference between carriers in terms of frequencies, slots, itinerary and the level and quality of air and airports services delivered, is likely to affect the concerned carrier performance. Equation (6b) shows that fares depend on cots and on the elasticity of substitution between its product and other carriers'.

Openness of the airline market can involve both more carriers and a higher diversity in terms of itinerary and other services which may affect n and θ. Hence, to examine the impact of openness on passengers and fares, we will add to the equations an indicator of openness. Note that while such indicator will affect p_j only directly through θ, it will affect q_j both directly through θ and indirectly through p_j and P. Moreover the direct and the indirect on effects q_j go in opposite directions.

3.2 The openness indicator

Given the multiplicity of dimensions and provisions of airline agreements as well as the qualitative nature of many of them, it will be very difficult to incorporate them directly into estimation. It is, therefore, necessary to construct an index that transforms the qualitative nature of the agreements' provisions into a quantitative indicator. This is called the Openness Indicator (OI), which is derived using Multiple Correspondence Analysis (MCA). MCA is a descriptive method that helps identify patterns in latent variables and determines weights measuring the contribution of individual variables in explaining the OI.

Table 8 summarizes the main insights from the computation of the OI. It shows that the least open routes concern the major airport in each country. However, the main airport is sometimes linked to open routes. Finally, routes linked to airports other than the main one are, in general, the most open.

4. Econometric Analysis

As discussed above, the relevant unit of analysis in the airline market is the route level. However, deepening the analysis as such can only be done, especially when it comes to quantitative assessments, at the expense of exhaustiveness. Data availability didn't allow conducting an analysis for all routes.

The empirically testable equations are drawn from the model in Section 3.1. The analysis there has shown that the number of passengers depends on the elasticity of substitution between carriers, consumer's income, on the number of variety and on fares. Fares depend, in turn, on costs and on the elasticity of substitution between carriers'. Since the openness of the airline market potentially has an effect on these determinants, the analysis of the impact of

openness should add the OI to these determinants, or interact it them with. Moreover, there is a consensus in the empirical literature that the plane capacity utilization (also called load factor) is an important determinant of fares. The latter are decreasing in this variable. This variable will be incorporated into the analysis. These lead to the following version of the two simultaneous equations system (6a) and (6b) which are estimated using the GMM:

$$\log(Pas)_{it} = \alpha_0 + \alpha_1 \log(GDPpc)_{it} + \alpha_2 \log(Pop)_{it} + \alpha_3 \log(Fare)_{it} + \alpha_4 (OI)_{it} + \varepsilon_{it} \quad (7a)$$

$$\log(Fare)_{it} = \beta_0 + \beta_1 \log(Cost)_{it} + \beta_2 (OI)_{it} + \beta_3 \log(Load)_{it} + \eta_{it} \quad (7b)$$

where

Pas: Number of passengers

Fare: Air Fares

Pop: Total population in the spaces linked by the route

GDPpc: Total GDP per capita in the spaces linked by the route

OI: Openness Index

Cost: Costs as explained below

Load: Load factor

i , t : Route and year respectively.

ε , μError terms

From the discussion in Section 3, the expected signs of the coefficients of interest are:

$\alpha_1 > 0, \alpha_2 > 0, \alpha_3 < 0, \alpha_4 < 0$

and

$\beta_1 > 0, \beta_2 < 0, \beta_3 < 0$

The International Civil Aviation Organization (ICAO) provided the number of passengers. Data on *airfares* per route come from the International Airline Industry Association (IATA). They represent the average fare per seat without any information on classes; discount or other loyalty rebates. It is important to keep in mind that defined this way the fare already includes the distance. Since they are available annually, the effect of seasons is not an issue.

Data on *costs* are not easily available per route. Our approach is the following. From carriers' annual reports, unit costs per kilometer are drawn. Then, for each route these "unit costs" are multiplied by the number of kilometers. Note that since both the fare and costs already include distance, the latter needs not enter the specification separately.

The load factor is from IATA. The *GDP per capita* and *population* concern the country from which a particular flight leaves or arrives (e.g. for the route Agadir-London, it is British data; for the route London-Agadir it is the British data again). These data are drawn from the World Development Indicators (WDI). Data on *distance per route* are available from the Centre de Prospective et d'Information Internationale (CEPII, Paris).

The estimation results are presented in Table 9. The overall quality of the fit is good or very good for the fare equation irrespective of the country under consideration (the adjusted R^2 is at least 0.39). The overall quality of the fit for the passengers' equation is lower than for fares

but remains good for all countries (the adjusted R^2 is above 0.33) except Morocco (the adjusted R^2 is below 0.20). Except for Jordan, the coefficients in both the passengers and the fares equations are, in general, significant with the expected sign. In the passengers' equation, the coefficient of fare is negative and differs highly across countries. It implies that when fares rise by 1 percent, the number of passengers decline by about 0.5 and 8 percent in Jordan and Morocco respectively. This result is quite predictable by the law of demand. The rise in airfares makes flights more expensive for people, reducing their purchase of flights tickets and hence decreasing the number of passengers. The OI's coefficient is statistically significant at the 1 percent level in Egypt, Morocco and the UAE. It is negative in the first two countries indicating that as the aviation market becomes more liberalized, the number of passengers decreases in these countries. In the UAE, the coefficient is positive implying more competition increases the number of passengers.

Regarding the fare equation, the costs coefficient is statistically significant with a positive sign in the three countries i.e. Egypt, Morocco and the UAE. However, it differs highly across countries implying when costs rise by 1 percent, fares increase by about 0.15 and 0.7 percent in Morocco and the UAE respectively. The coefficient of the load factor is statistically significant and negative only in Morocco and Egypt. It suggests that the increase in the load factor by 1 percent reduces fares by around 0.02 and 0.23 in Egypt and Morocco respectively. Finally, the OI's coefficient is statistically significant with a negative sign in the three countries i.e. Egypt, Morocco and the UAE. This means thatas the aviation environment becomes less restricted and more liberalized, fares will decline. Overall, focusing on our variables of interest, the results uncover the theoretical expectations.

5. Simulation Analysis

The previous section examined the relationship between the structure of the airline market and the number of passengers and fares to and from Morocco, taken the structure as given. In the present section, we will examine the impact of further liberalization (changing the structure) on these variables as well as on the welfare. Welfare is composed of consumers' and firms' surpluses. The impact on consumers' surplus is, in general, captured by combining the impacts of output and prices, while firms' surplus is measured by profit. Hence our intermediate variables of interest are output, prices and profits.

For examining the impact of less restricted aviation environment on the producer, consumer and society welfare, we use the reduced form of the structural system together with the estimated parameters ($\hat{\alpha}_k and \hat{\beta}_k$) and the exogenous variables. We considered the impact of an increase in the Openness Indicator by one standard deviation on all routes. The results in Table 10 compare the simulated values to the fitted values with the observed Openness Indicator.

As a consequence of increased competition, fares decreased in the four countries while the number of passengers decreased in Jordan and Egypt and increased in Morocco and the UAE. One important question now is what would be the producer, consumer benefits, and society welfare of having less restricted aviation market? We assume, in accordance, with the theoretical model that the decrease in fares will benefit all passengers irrespective of the carrier they choose. We can observe from Table 10 that while the total revenue of producers decreases the consumer surplus increases. Note, however, that the decline in producers' total revenue doesn't correspond to the decrease in their surplus (profits). One should deduce the companying decrease in expenses. To get an idea of the decrease in producers' surplus, which is the relevant variable for computing welfare, we draw on companies report. They suggest that on average the producers' surplus is around 2.5% of total revenue. We, therefore, apply this percentage to get an estimate of the decrease in producers' surplus. Adding this decrease

to the increase in consumer's surplus gives an estimate of the impact on welfare.[2] The net effect of producer and consumer surplus changes on society welfare is positive; the consumer surplus increase outweighs the producers' surplus decrease. Note that even doubling the percentage of the surplus (i.e. to 5%) would not change the conclusion.

6. Conclusion

Given the importance of the Arab passengers' airlines industry for labor and non-labor mobility in the region, this papers analyses the main findings of four country studies (Jordan, Egypt, Morocco and United Arab Emirates; UAE), which investigated the relationship between the current passengers' airlines framework and the performance of the sector in the country. The analyses aimed at investigating the impact of further liberalization on passengers and on welfare.

The analysis shows that Arab countries perform less than the rest of the World and are losing ground in terms of passengers carried. The four countries under consideration show a highly contrasted picture. Egypt exhibits a low and slightly increasing share in terms of passengers carried, its major carrier, EgyptAir, is mainly oriented toward the MENA destinations and has low load factor and low profit rate. Jordan exhibits a high and increasing share in terms of passengers carried, its major carrier, Royal Jordanian, is mainly oriented toward the MENA destinations. It has a reasonable load factor and a low profit rate. Morocco exhibits a high and increasing share in terms of passengers carried, its major carrier, Royal Air Maroc, is mainly oriented toward European destinations and has a low load factor and a very low profit rate. The UAE exhibits a very high and rapidly increasing share in terms of passengers carried, its major carrier, Emirates, is mainly oriented toward Asia & Oceania (including Australia) and has the highest load factor and the highest profit rate.

To investigate the impact of further liberalization on passengers and on welfare, the four studies adopted the same analytical framework: computed an indicator of openness (OI), estimated the same econometric model incorporating the OI and used the estimation results to simulate the impact of further liberalization on passengers and on welfare. The analysis was conducted at the route level and allowed for diversity in consumers' choice.

The simulation shows that increased competition decreases fares as well as carriers' revenue but increases consumer surplus. To get an idea of the decrease in producers' surplus, which is the relevant variable for computing welfare, we assumed that the producers' surplus is around 2.5% of total revenue. Applying this percentage to get an estimate of the decrease in producers' surplus and adding this decrease to the increase in consumer's surplus shows that the net effect on society welfare is positive; the consumer surplus increase outweighs the producers' surplus decrease. Note that even doubling the percentage of the surplus doesn't change the conclusion.

[2] Here some of caveats are in order regarding the impact on each country welfare i.e. nationality of competitors, existence of fixed/sunk costs, impact on the whole demand for travel to or from Morocco, etc.

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Figure 1: Number of Passengers to Arab Countries

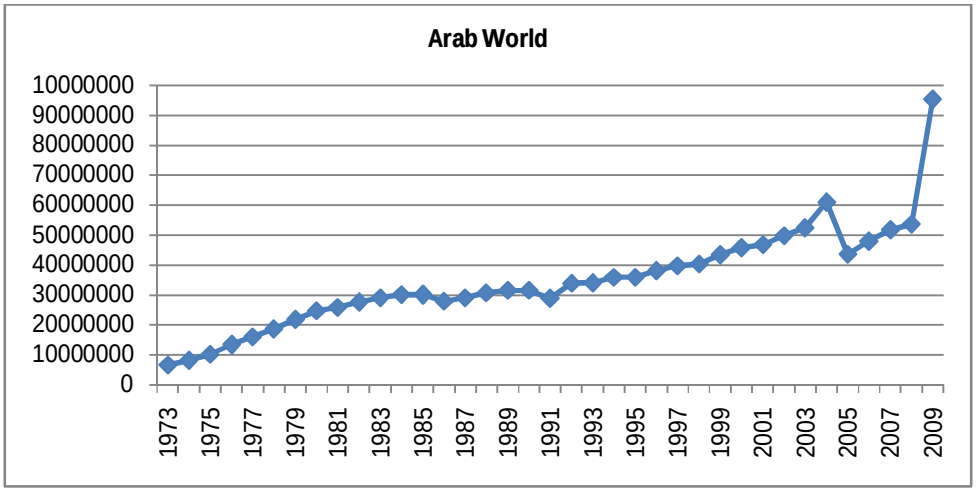

Figure 2: Share of Arab Countries in World's Number of Passengers

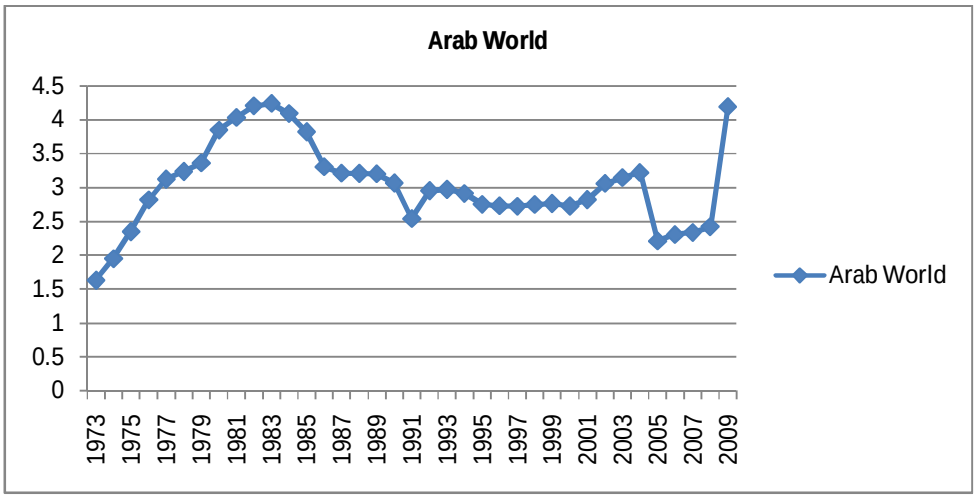

Table 1: Selected Indicators of Performance for the Arab World

Indicator Name	Average 2000-2004	Average 2005-2009	
	In % of World		
Population	4.78	5.06	(+)
GDP	2.08	2.78	(+)
Air transport passengers carried	3.01	2.72	(-)
	In % of GDP		
International tourism receipts	4.03	4.16	(=)
	In % of population		
Air transport passengers carried	17.16	17.48	(=)

Table 2: Selected Indicators by Country

Indicator Name	Egypt		Jordan		Morocco		UAE	
	2000-04	2005-09	2000-04	2005-09	2000-04	2005-09	2000-04	2005-09
				In % of Arab world				
Population	23.55	23.02	1.69	1.69	9.88	9.28	1.11	1.63
GDP	12.13	9.05	1.32	1.25	6.02	5.07	11.04	13.27
Air transport passengers	8.69	9.79	2.65	3.67	6.27	7.56	19.61	54.36
				In % of GDP				
International tourism receipts	5.35	7.29	12.25	14.87	7.55	9.85	1.63	2.89
				In % of population				
Air transport passengers	6.34	7.44	26.87	37.82	10.90	14.24	304.06	582.08

Table 3: Main Operators by Country

	Jordan	Egypt	Morocco	UAE
Number of Carriers				
Domestic	7	11	4	5
Foreign	47	NA	50	216
Airports				
Number	3	20	17	7
Km^2 per airport	29 973	48 898	39 657	15 260

Table 4: International Destinations

	Number				Share in total passengers			
	Royal Jordanian	Egyptair	RAM	Emirates	Royal. Jordanian	Egyptair	RAM	Emirates
MENA	26	27	9	21	38	47	4	11
Europe	18	26	36	13	29	27	79	37*
Africa	0	9	19	11	4	15	17**	11
America	4	2	2	4	20	4		
Asia & Oceania	5	10	0	34	9	7		41
Total	53	74	66	83	100	100		100

Notes: *Europe and America; ** All other connections

Table 5: Selected Performance Indicators

	2005	2006	2007	2008	2009
			Passenger load factor (in %)		
Royal Jordanian	69.40	66.39	70.65	72.04	68.17
Egypt Air	63.50	61.33	63.67	67.00	67.63
RAM				69.00	65.00
Emirates	74.6	75.9	76.2	79.8	75.8
			Profit in % of total revenue		
Royal Jordanian		1.37	3.74	-3.52	4.78
Egypt Air		2.91	4.47	2.64	2.14
RAM	7.79	1.46	0.95	0.79	-6.92
Emirates	14.62	11.70	11.45	11.47	5.27

Table 6: Comparative summary

	Share of passengers	Country Domestic carriers	Foreign carriers	Airports per Km^2
Egypt	Low =	Comparable	Comparable	Lowest
Jordan	High +	Comparable	Comparable	Second
Morocco	High +	Comparable	Comparable	Third
The UAE	Very high +	Comparable	Very high	Highest

	Main destinations	Major carrier Load factor	Profit rate
Egypt Air	MENA	Third/Fourth	Second
Royal Jordanian	MENA	Second	Third
Royal Air Maroc	Europe	Third/Fourth	Lowest
Emirates	Asia & Oceania (including Australia)	Highest	Highest

Table 7: Questions for the Openness Index

Topic	Questions
Open Sky	Are domestic airlines allowed to join Open Skies agreements?
Code Share	Is it allowed that a seat purchased on one airline be operated by another?
5th Freedom	Can a foreign airline carry traffic between two other countries (flight originates and terminates in its own country)?
6th Freedom	Can a foreign airline carry traffic between two other countries (via its own country)?
Low cost carriers	Are foreign low cost carriers permitted to operate?
Airports	Is foreign movement is permitted?
Alliance	Are domestic airlines allowed to join alliances and which one?
Foreign ownership 1	Is foreign ownership in the provision of international services allowed?
Foreign ownership 2	Is foreign ownership in the provision of domestic services allowed?
Foreign ownership 2	Is foreign ownership allowed for domestic airports?
Airport management	Are foreign companies allowed to manage domestic airports?

Table 8: Results: Openness Index for Selected Routes

	Least open		Most open	
Jordan	Queen Alia	Bole International	Queen Alia	Donetsk International
	Queen Alia	Bangor International	Queen Alia	Frankfurt International
	Queen Alia	Quantico Nas	Queen Alia	Zhulyany
Egypt	Cairo	Bahrain	Cairo	Hamburg
	Cairo	Khartoum	Cairo	Manchester
	Cairo	London	Alexandria	Abu Dhabi
	Cairo	Madrid	Hurghada	Zurich
	Cairo	Singapore	Sharm El Sheik	London
Morocco	Casablanca	All international	Agadir	All international
		All international	Marrakech	All international
UAE	Dubai	Johannesburg	Dubai	Bahrain
	Dubai	London	Dubai	Bangalore
	Dubai	Osaka	Dubai	Islamabad
	Dubai	Beijing	Dubai	Jeddah
	Dubai	Athens	Dubai	Karachi

Table 9: Econometric Results

	Jordan	Egypt	Morocco	UAE
		Dependent Variable: Log(Passengers)		
Log (GDP per capita)	**0.594**	**0.047**	**3.75**	0.03
	2.828	2.449	3.69	1.18
Log(Population)	**0.838**	**0.074**	0.57	-0.01
	3.133	3.240	1.54	-0.80
Log (Fare)	**-0.571**	**-0.243**	**-8.07**	-0.09
	-2.020	-3.065	-4.48	-1.39
Openness Index	0.258	**-0.13**	**-0.19**	**0.11**
	1.405	-4.427	-2.54	3.96
Adjusted R^2	0.33	0.67	0.16	0.91
		Dependent Variable: Log(Fares)		
Log(Raw materials)	-	**0.147**	**0.16**	**0.694**
	-	6.724	3.77	1.820
Openness Index	0.005	**-0.013**	**-0.02**	**-0.163**
	0.336	-1.657	-3.62	-4.570
Log(Load factor)	0.003	**-0.020**	**-0.23**	-0.114
	0.243	-1.716	-3.05	-0.960
Adjusted R^2	0.95	0.82	0.39	0.74
Number of observations	90	468	143	155
Period for the estimations	2001-2008	2005-2009	2005-2008	2007

Table 10: Simulation results of the impact of one standard deviation improvement in the OI all routes

	Jordan	Egypt	Morocco	UAE
a. Actual number of passengers in 000	204.17	2324.89	9768.37	119.19
b. Simulated number of passengers in 000	180.39	2054.13	10742.82	228.25
c. Difference: (b - a) in 000	-23.78	-270.76	974.46	109.06
d. Actual average fare US$	264	280	175.00	555
e. Simulated average fare US$	260	276	154.00	255
f. Difference: (e - d) US$	-4	-3	-20	-300
g. Difference in total revenue: (b – a) * d +(b * f) in 000 US$	-6957.49	-82742.54	-55069.13	-7932.64
h. Change in consumer surplus: (- f * a) in 000 US$	770.00	7986.35	195367.30	35743.65
i. Change in carriers surplus: g * 2.5% in 000 US$	-173.94	-2068.56	-1376.73	-198.32
j. Net impact: (h – i) in 000 US$	596.06	5917.79	193990.57	35545.33