Risk Sharing in the Middle East and North Africa: The Role of Remittances and Factor Incomes*

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Abstract

This paper investigates welfare gains and channels of risk sharing among 14 Middle Eastern and North African (MENA) countries, including the oil-rich Gulf region and the resource-scarce economies such as Egypt, Morocco and Tunisia. The results show that, for the 1992–2009 period, the overall welfare gain across MENA countries is higher than those documented for the Organization for Economic Cooperation and Development (OECD) nations. In the Gulf region, the amount of factor income smoothing does not differ considerably when output shocks are longer-lasting than transitory; whereas the amount smoothed by savings increases remarkably when shocks are longer-lasting. By contrast, both factor income flows and international transfers respond more to permanent shocks rather than to transitory shocks in the non-oil MENA countries. The results also show that a significant portion of shocks is smoothed via remittance transfers in the economically less developed MENA countries, but not in the oil-rich Gulf and OECD countries. Finally, for the overall MENA region, a large part of the shock remains unsmoothed, suggesting that more market integration is needed to remedy the weak link of incomplete risk-sharing.

Keywords: MENA region; remittance transfer; risk sharing; welfare gain.

JEL Codes: E21, E60, F36, I31.

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1 Introduction

Despite their homogeneity in terms of history, geography, culture, language, stage of development and political structure, the Middle Eastern and North Africa (MENA) countries[1] differ in their resource endowments. Some, especially the Gulf Cooperation Council (GCC) countries within the MENA region, are characterized by a relatively small population, scant water, poor farmlands and few complementary resources with stable oil reserves, a shortage of skilled labor and a small domestic market. Others, the non-oil MENA countries, are characterized by large populations, good agricultural potential, non-oil mineral resources, a large and better trained workforce and a generally more diversified economy. These physical differences *within* the MENA region have naturally opened up certain possibilities for greater market integration to diversify away some of the income risk associated with resource-based (oil and non-oil) economies. The observed cross-country heterogeneity in the MENA region has been the subject of a growing body of literature on economic growth, trade and financial integration, governance and international political relations, and so forth. The collection of papers in Nugent and Pesaran (2007) provides a comprehensive overview of the growth experience of the overall as well as selected individual countries in the MENA region.

There are four principal ways in which MENA countries are interlinked: trade in commodity and services, labor flows across the countries of the region, cross-border capital flows (especially foreign direct investment, FDI) and interlinkages through political relations, bilateral as well as multilateral – see Chapter 1 in Nugent and Pesaran (2007) for elaborate discussion. The 14 MENA countries considered in this study can be classified into three sub-regions: namely *GCC*, *Maghreb* and *Mashreq*.[2] The GCC has by far the most remarkable economic achievement, outpacing Maghreb and Mashreq countries. For instance, of the $795.9 billion of exports of goods and services in 2009, the GCC's export-earning contribution was a staggering $565.1 billion, followed by Maghreb ($133.3 billion) and Mashreq ($97.5 billion).[3] In many respects, the GCC is acting as an economic 'buffer zone' for capital and labor flows in the region. Within a short span of six years (2003–2008), the GCC's investment spending in the rest of the MENA region

[1]The MENA region generally includes 22 Arabic-speaking states plus Iran and Turkey. Due to differences in reliable statistics, only 14 member countries are considered in this study. Turkey is not included in our analysis.

[2]GCC: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). Maghreb: Algeria, Libya, Morocco, and Tunisia. Mashreq: Egypt, Jordan, and Syria. The remaining country, Iran, is considered in the literature as a MENA country. Except for Libya, both Mashreq and Maghreb countries can be referred to as 'non-oil' MENA countries.

[3]Regional Economic Outlook: Middle East and Central Asia. International Monetary Fund. October 2010, Table 13, p. 68.

amounted to over $110 billion, thanks to a period of high energy revenues and internal market reforms in many Mashreq and Maghreb countries (Burke *et al.*, 2009). Perhaps the most visible source of interdependence has been labor flows from Mashreq and Maghreb countries toward the GCC region, spurred by the GCC's dearth of population and labor force. In all these countries, oil is justifiably perceived as the most important source of growth in the MENA region, since part of the Arab oil revenues eventually spill over into the non-oil Arab countries through trade, migration and foreign investment.

How have these economic interlinkages materialized in terms of income smoothing among MENA countries over the past two decades? More precisely, what is the relative contribution of various economic mechanisms through which the MENA countries have achieved international risk sharing?[4] This paper attempts to provide an answer to these questions. Income smoothing involves strategies which reduce risk in the income process. Often, the strategy considered is diversification of income sources so that different income sources do not move together. For instance, as an oil-exporting nation, Saudi Arabia would benefit from diversifying away some of the income risk associated with oil price fluctuations through risk sharing agreements with, say, Egypt, which relies primarily on agriculture and manufacturing.[5] Generally, gains from risk sharing increase when countries are less similar. As such, more diversified countries tend to be more resilient to shocks and hence capable of achieving sustainable growth rates.

We have computed total welfare gains that can be achieved through risk sharing among 14 MENA countries. Sørensen and Yosha (2003) conduct a similar study for nine Middle Eastern countries over the 1980–94 period. They find a high potential gain from risk sharing, where the bulk of the smoothing was achieved via savings. Our investigation begins where Sørensen and Yosha's (2003) analysis ended. We extend their analysis by including more recent observations (1992–2009), adding new Middle East countries (with a particular emphasis on the GCC region) and differentiating between transitory and permanent shocks affecting the channels of risk sharing. Moreover, we estimated the amount of risk sharing through workers' remittances among the non-oil MENA economies. For the sake of comparison, we also estimate, using the same method, the extent of risk sharing among selected Organization for Economic Cooperation and Development (OECD) countries as well as European Monetary Union (EMU) countries. As a result, our study importantly complements the existing evidence of income

[4]Throughout the paper, we use the terms income smoothing and risk sharing interchangeably.

[5]See Table 2 in Makdisi *et al.* (2007) for an overview of sectoral distribution of production in selected MENA countries for the period 1960–1998.

smoothing in MENA countries.

Our results can be summarized as follows. First and foremost, for the 1992–2009 period, the total welfare gains from international risk sharing among a set of 14 MENA countries are large by international standards, implying that further benefits to be had from a deeper integration of the intraregional goods and financial markets. We find that, in the overall MENA region, only 8 percent of output shocks are absorbed by factor income flows, while the bulk of the smoothing stems from saving (40 percent). International transfers contribute to about 4 percent of risk sharing in the non-oil MENA economies. Finally, a considerable fraction (over 60 percent) of the shocks remains unsmoothed. We also study how income smoothing is affected when shocks are more longer lasting. We find that, in the Gulf states, although factor income smoothing declines marginally, contrary to the prediction of the permanent income theory, saving smoothing increases substantially. By comparison, in the non-oil MENA countries, both factor income and international transfers smoothing respond more robustly to longer lasting (relative to transitory) shocks to output. Surprisingly, the amount of total smoothing in the overall MENA region increases, in contrast to a decrease in the OECD countries, in response to a more permanent output shock. Finally, workers' remittance (residents and non-residents) absorb a hefty 11 percent of output shocks in the non-oil MENA countries, emphasizing the notion that workers' remittances are an ever-increasingly important aspect of the economies of most MENA countries.

The rest of the paper is organized as follows. Section 2 summarizes the concepts for evaluating potential welfare gains and the channels of risk sharing, while the empirical results are presented in Section 3. In Section 4, we measure the amount of income smoothing achieved through workers' remittance in the non-oil MENA countries. Section 5 concludes the paper.

2 Conceptual framework

This section briefly explains the concepts underlying the empirical results presented below. International economic integration could result in potentially large welfare gains, as it allows domestic residents, firms and countries to smooth fluctuations in their consumption/income by diversifying away country-specific risks. Moreover, there are different ways that countries can achieve risk sharing. For example, during recessions, countries can borrow from international markets and mitigate the adverse impact of declines in aggregate output on consumption and

investment. The potential welfare gains from international risk sharing and the various channels through which countries pool their risks can be calculated using methods developed in the literature. Some of these methods are discussed in turn below.

2.1 Utility-based measure of gains from international risk sharing

Recently, Kalemli-Ozcan, Sørensen and Yosha (2001) (KSY hereafter) proposed a measure of welfare gains from risk sharing that uses counter-factual thought experiments, judging what would happen under alternative states of the economy. Roughly, the KSY measure can be approximated as follows. In the first environment, there is no additional risk sharing relative to what is already implied by the observed output level. In the second environment, there is perfect risk sharing as countries are able to diversify away all country-specific risk associated with domestic output. The difference represents *potential* welfare gains from risk sharing. The gains are expressed as the permanent percentage increase in the level of each country's consumption. For the case of logarithmic utility, the measure takes the form:

$$G_i^{KSY} = 100 \times \frac{1}{\delta}\left(\frac{1}{2}\sigma^2 + \frac{1}{2}\sigma_i^2 - cov_i\right), \tag{1}$$

where δ is the intertemporal discount rate, cov_i is the covariance of country i's endowment with the world endowment, and σ^2 and σ_i^2 are the variance of the group-wide and country per capita output growth respectively. The KSY measure states that the gains from risk sharing for country i will be larger when both the group-wide and country-specific variance of output growth is larger, and when the covariance of output growth between country i and the rest of the area is smaller. The interpretation of the negative sign on the covariance is straightforward, as joining an area with largely unrelated fluctuations will provide more insurance by stabilizing aggregate output. Furthermore, the higher the variance of growth, the more is gained by risk sharing.

To compute the KSY measure, either consumption or gross domestic product (GDP) data, or both, can be used. However, when consumption data is used, the gains should be interpreted as the 'unexploited' gains from risk sharing, while it represents 'total' welfare gains from risk sharing when GDP data are used.

2.2 Decomposing the cross-sectional variance of shocks to GDP

There are different ways countries can share risk with each other. These include, for example, investing in foreign capital markets and/or by simply saving for a rainy day. In an influential paper, Asdrubali *et al.* (1996) offered an intriguing way of assessing different mechanisms for sharing risk among countries. Their approach involves a simple decomposition of output (that is, GDP) that allows one to quantify three alternative channels of risk sharing, namely the 'capital', 'credit' and 'federal government' channels. Any remaining shocks that are not smoothed through these three channels are identified as *unsmoothed* risk. Later, Sørensen and Yosha (1998) extended the Asdrubali *et al.* (1996) framework to include two additional sources of risk sharing: international transfers and capital depreciation. In this paper, we followed Sørensen and Yosha (1998) to measure the fraction of shocks to GDP absorbed at different levels among the 14 MENA economies. For brevity, the discussion is kept short. Interested readers are referred to the original papers for full details.

Suppose we have a panel data set of GDP^i, gross national income (GNI^i), national income (NI^i), disposable national income (DNI^i), and consumption (private and public consumption, $\text{C}^i + \text{G}^i$), all stated in real terms. Consider the following cross-sectional variance decomposition of shocks to GDP, holding for any period t:

$$\text{GDP}^i = \frac{\text{GDP}^i}{\text{GNI}^i}\frac{\text{GNI}^i}{\text{NI}^i}\frac{\text{NI}^i}{\text{DNI}^i}\frac{\text{DNI}^i}{\text{C}^i + \text{G}^i}(\text{C}^i + \text{G}^i), \tag{2}$$

where all the magnitudes are in per capita terms and i is the country index. To stress the cross-sectional nature of our derivation, we suppress the time index.[6] Following Sørensen and Yosha (1998), we obtain the decomposition of the cross-sectional variance in GDP:

$$\begin{aligned}
\text{var}\{\Delta \log \text{GDP}^i\} \;=\;& \text{cov}\{\Delta \log \text{GDP}^i - \Delta \log \text{GNI}^i, \Delta \log \text{GDP}^i\} \\
&+ \text{cov}\{\Delta \log \text{GNI}^i - \Delta \log \text{NI}^i, \Delta \log \text{GDP}^i\} \\
&+ \text{cov}\{\Delta \log \text{NI}^i - \Delta \log \text{DNI}^i, \Delta \log \text{GDP}^i\} \\
&+ \text{cov}\{\Delta \log \text{DNI}^i - \Delta \log(\text{C}^i + \text{G}^i), \Delta \log \text{GDP}^i\} \\
&+ \text{cov}\{\Delta \log(\text{C}^i + \text{G}^i), \Delta \log \text{GDP}^i\}.
\end{aligned}$$

[6]The national accounting identities relevant to the present analysis are: GNI = GDP+ net factor income, NI = GNI− capital depreciation, DNI = NI+ international transfers, and C + G = DNI− net saving.

In the equation above var{X} and cov{X,Y} denote the statistics $\frac{1}{N}\sum_{i=1}^{N}(X^i - \bar{X})^2$ and $\frac{1}{N}\sum_{i=1}^{N}(X^i - \bar{X})(Y^i - \bar{Y})$, respectively, where N is the number of countries in the sample. Dividing the result by $\text{var}\{\Delta \log \text{GDP}^i\}$, we get $1 = \beta_f + \beta_d + \beta_\tau + \beta_s + \beta_u$, where, for example:

$$\beta_f = \frac{\text{cov}\{\Delta \log \text{GDP}^i - \Delta \log \text{GNI}^i, \Delta \log \text{GDP}^i\}}{\text{var}\{\Delta \log \text{GDP}^i\}}, \tag{3}$$

is the estimated slope in the cross-sectional regression of $\Delta \log \text{GDP}^i - \Delta \log \text{GNI}^i$ on $\Delta \log \text{GDP}^i$, and similarly for β_d, β_τ, β_s, and β_u.

The coefficients β_f, β_d, β_τ, and β_s are interpreted as the fraction of shocks absorbed through factor income flows, depreciation, international transfers, and savings, respectively. If full risk sharing is achieved only through factor income flows, then $\beta_f = 1$. If full risk sharing is achieved through both factor income flows and capital depreciation, then $\beta_f + \beta_d = 1$. Similar reasoning applies for other combinations. The bottom line is that these coefficients reflect the incremental amount of smoothing achieved through the various channels discussed above. If full risk sharing is achieved through all four channels – that is, if the real consumption per capita growth is statistically uncorrelated with real output per capita growth (that is, $\text{cov}\{\Delta \log(\text{C}^i + \text{G}^i), \Delta \log \text{GDP}^i\} = 0$) – this implies that $\beta_u = 0$. Conversely, $\beta_u > 0$ when full risk sharing is not achieved. The coefficient β_u is thus interpreted as the fraction of shocks to GDP that is not smoothed. Following Sørensen and Yosha (1998), our analysis does not impose any restrictions on the sign of the β-coefficients.

We estimate the following panel equations:

$$\begin{aligned}
\Delta \log \text{GDP}_t^i - \Delta \log \text{GNI}_t^i &= \nu_{f,t} + \beta_f \ \Delta \log \text{GDP}_t^i + \epsilon_{f,t}^i, \\
\Delta \log \text{GNI}_t^i - \Delta \log \text{NI}_t^i &= \nu_{d,t} + \beta_d \ \Delta \log \text{GDP}_t^i + \epsilon_{d,t}^i, \\
\Delta \log \text{NI}_t^i - \Delta \log \text{DNI}_t^i &= \nu_{\tau,t} + \beta_\tau \ \Delta \log \text{GDP}_t^i + \epsilon_{\tau,t}^i, \\
\Delta \log \text{DNI}_t^i - \Delta \log(\text{C}_t^i + \text{G}_t^i) &= \nu_{s,t} + \beta_s \ \Delta \log \text{GDP}_t^i + \epsilon_{s,t}^i, \\
\Delta \log(\text{C}_t^i + \text{G}_t^i) &= \nu_{u,t} + \beta_u \ \Delta \log \text{GDP}_t^i + \epsilon_{u,t}^i,
\end{aligned} \tag{4}$$

where $\nu_{\cdot,t}$ are time fixed effects (time dummy variables) which capture year-specific impacts on growth rates, most notably the impact of the growth in aggregate output. Furthermore, with time-fixed effects, the β-coefficients are weighted averages of the year-by-year cross-sectional regressions. Following Sørensen and Yosha (1998), we model autocorrelation using a first or-

der autoregressive, or AR(1), process, which is assumed to be identical across countries and equations. We allow for state-specific variances of the error terms. We estimate the system in Equation (4) using a two-step Generalized Least Squares (GLS) procedure as described in Asdrubali *et al.* (1996).

3 Empirical results

3.1 Output and consumption growth

Table 1 presents selected summary statistics for GDP and consumption per capita growth rates of individual MENA countries for the period of 1992–2009.[7] Comparable figures, over the 1994–2005 period, for European Union (EU) countries are reported in Demyanyk and Volosovych (2008) and are therefore not repeated here to save space. The yearly average GDP growth rate of the GCC countries in the 1992–2009 period was 2.56 percent compared to 0.73 percent for non-oil MENA countries. Algeria, Egypt, Iran and Libya have done rather poorly, while none of the non-oil MENA countries grew faster than the GCC countries over the whole period. A common feature of the growth performance of the MENA countries (both oil and non-oil) is its high volatility in comparison to other regions. The rather surprisingly (slightly) lower standard deviation of output growth in oil-exporting GCC countries compared to non-oil MENA countries possibly indicates that the latter countries were frequently affected by unfavorable weather conditions that threatened their agricultural output, which outpaced the GCC's exposure to the vagaries of the international oil market. Likewise, the GCC fared better in its consumption growth and its variability compared to non-oil MENA countries. The average growth rate of consumption for the former is 2.13 percent versus 1.24 percent for the latter; the average standard deviations are 3.40 percent and 4.36 percent, respectively. In the 1994–2005 period, the yearly average output growth rate for the 15 EU member countries was 2.46 percent with a standard deviation of 1.7 percent, while the growth rate of consumption and its variability was 2.12 percent and 1.09 percent (Demyanyk and Volosovych, 2008).

The risk sharing behavior of a country can be measured by the relative volatility (in terms of the standard deviation) of consumption growth to that of output growth. From the statistics reported in Table 1, it is evident that, during the sample period, consumption was less variable than income in Jordan, implying high risk sharing. The reverse was true for Egypt and

[7] See Appendix A for a description of the data used in this study.

Morocco. On average, consumption was as variable as income in the non-oil MENA countries, thus indicating little risk sharing. Whereas, consumption growth was less variable than income growth in the GCC region (barring Bahrain), consistent with the generous and extensive welfare system of these oil-based economies. Table 1 also presents correlations between consumption and output across countries. These correlations are calculated with respect to the 14-country aggregate, based on the Hodrick and Prescott (1997) filtered data. Contrary to previous theoretical predictions (see, for example, Backus *et al.*, 1992), we find that in most countries, consumption was much less correlated across countries than output. This was reflected in the overall averages of consumption vis-à-vis output correlation for both groups of countries. It is possible that consumption growth rates in these groups of countries are more synchronized with their major external trading partner countries than those prevailing in their own region. Overall, the results suggest that economic activities are more synchronized among GCC economies than across the non-oil MENA economies.

3.2 Potential welfare gains from risk sharing among MENA countries

Table 2 presents the potential welfare gains based on the KSY method for all 14 countries. The numbers are expressed as percentages and are obtained using the assumption of full risk sharing within the MENA region. It is apparent that the potential gains for Algeria, Iran and Libya are relatively large compared to other countries, particularly with respect to the GCC countries. The average gains for non-oil MENA countries well exceeded those of the GCC countries (7.11 percent versus 3.78 percent). In the 1994–2005 period, Demyank and Volosovych (2008) obtained an average welfare gain of 4.11 percent for the new EU countries (those that became members after 2004) and a mere 0.69 percent for the original 15 EU member countries. The relatively large welfare gains for the non-oil MENA countries can be explained in light of the high volatility of output and consumption (Table 1), particularly in Iran and Libya. As such, countries with large variance and a counter-cyclical pattern of output growth would contribute the most in stabilizing the regional aggregate consumption pattern. The estimated gains reported in Table 2 are based on an intertemporal discount rate of $\delta = 0.03$. As a sensitivity analysis, we also estimated the KSY gains using different discount parameters ($\delta = 0.02, 0.04, 0.06$). Roughly, the results reveal that a lower intertemporal discount rate increases the welfare gains from risk sharing (data not shown but available from the authors upon request).

3.3 Channels of risk sharing among MENA countries

Table 3 displays the estimated percentages of GDP shocks smoothed through each channel for the GCC and non-oil MENA countries. For the sake of comparison, we also report similar results separately for OECD and EMU countries. We find significant evidence of income insurance through inter-country ownership of productive assets, contrary to the well-documented home bias in security holdings (see, for example, French and Poterba, 1991). For the resource-rich GCC economies, the factor income channel includes the surplus oil revenues invested in foreign assets (real and financial), typically through sovereign wealth funds (SWFs).[8] The SWFs were created to smooth the macroeconomic impact of oil price fluctuations. It is, therefore, not surprising to find that the extent of income smoothing achieved through factor income flows (β_f) was higher in GCC countries compared with non-oil MENA, EMU and OECD countries. However, given the number and size of sovereign wealth funds (SWFs) in the Gulf region, one would have expected a much higher larger contribution from the factor income channels, relative to other regions considered in the analysis. Our results are different from those of Sørensen and Yosha (2003), who found evidence of income dis-smoothing through factor income flows for selected Middle Eastern countries over the 1983–93 period. Continuous improvement in cross-border market integration and a reduction in home bias underlies the positive income smoothing documented in the recent decades. The relatively lower amount of factor income smoothing documented in the EMU and OECD countries (as indicated by the estimated coefficient β_f in Table 3) is in line with the results obtained by Sørensen and Yosha (1998).

Capital depreciation (β_d) provides dis-smoothing (-8 percent for GCC and -3 percent for non-oil MENA countries, and similar levels for OECD and EMU countries, though in different magnitudes) since it generally constitutes a large fraction of output during recessions and a smaller fraction in boom years. As stated earlier, capital depreciation is responsible for the difference between national income and GNI, and its negative contribution to smoothing may be, in part, the result of how national accounts data are calculated (see, Marinheiro (2003) for further details). International transfers (β_τ) smooth only 4 percent shocks to output in non-oil MENA countries. This channel of income smoothing includes aid from international institutions, aid from Arab oil-exporting countries (including GCC countries) and remittances by foreign workers, which are counted in the National Accounts as part of international trans-

[8] See Castelli and Scacciavillani (2012) for an excellent economic analysis of the SWFs.

fers.[9] The extent of smoothing is much lower than that given by Sørensen and Yosha (2003), who obtained about 9 percent smoothing for selected Middle East countries over the 1983–93 period. Likewise, international transfers delivered positive income smoothing in EMU countries, but was absent in OECD countries. As indicated by Marinheiro (2003), in the EU countries, such transfers are mainly due to the Common Agricultural Policy, structural funds and their counterpart – the member states' contributions to the EU budget. The negative coefficient of the international transfers for GCC countries is consistent with the huge outflow of remittances from GCC countries to the rest of the world. For example, over the 2008–2010 period, an estimated US$179 billion was transferred from the GCC to the rest of the world through remittances flows, partially mitigating the impact of the global financial crisis on many countries in the non-oil MENA region (IMF, 2011).

A significant amount of the smoothing of output shocks for the GCC and MENA countries is achieved via savings. For the GCC countries, about 44 percent of the country-specific shocks are buffered through this channel, as opposed to 33 percent in the non-oil MENA countries. When combined, saving is able to reduce 40 percent of shocks to output in MENA countries, similar to the magnitude observed in EMU countries (but much less than documented in OECD countries) in the same table. By comparison, Sørensen and Yosha (2003) documented a 42 percent smoothing via saving for their sample of Middle East countries. Finally, a large amount of shocks to the output of countries in the region are not smoothed. The magnitude of the unsmoothed portion is much higher than that of OECD and EMU countries, suggesting potential welfare gains to be had from a deeper goods and financial market integration in the MENA region.[10]

[9] A recent IMF (2011) study shows that aid flows – mainly from Kuwait, Saudi Arabia, and the UAE – have averaged about 1.5 percent of their combined GNI between 1973 and 2008; many MENA countries have received between 10 percent and 70 percent of their total official development assistance from other countries in the MENA region.

[10] We have repeated the above analysis over two subperiods, namely 1992–2000 and 2001–2009, to find out the extent of changes in the levels of smoothing over time. We did not find any considerable differences from the pattern of risk sharing for the entire sample, save in one case: the income insurance through factor income flow in the non-oil MENA region for the subperiod 1992–2000 is negative but statistically insignificant. This result, in line with Sørensen and Yosha (2003), possibly indicates how less integrated some Middle Eastern countries were with the world's capital markets. Overall, the magnitude of risk sharing achieved through different channels was higher during the 2001–2009 subperiod, magnifying the vital role of oil revenues in the GCC countries and the resulting spillover of the accumulated oil wealth in the MENA region. These results are not presented here to conserve space, but are available from the authors upon request.

3.4 Risk sharing with longer-lasting shocks

The preceding discussion is based on the specification where data were differenced at the one year frequency, which made no allowance for longer lasting shocks to influence risk sharing process. Hence, it is useful to repeat the above analysis using a higher differencing interval, to capture the response of changes in income to longer lasting-shocks to GDP. Following Sørensen and Yosha (1998), we used a slightly longer length of the differencing interval to perform the variance decomposition in a manner analogous to that used for one-period differencing. Due to the short sample period, we use a difference interval of three years. Results are presented in Table 4. We find that with longer differencing, smoothing via factor income flows in the GCC region declined marginally, while factor income smoothing increased by 50 percent among the non-oil MENA countries. This finding challenges the notion, prevalent among the GCC countries, that investing surplus oil revenues in foreign assets (particularly financial assets) contribute to larger future flows of goods and services. The higher amount of smoothing through international transfers in the non-oil MENA countries suggest that transfers respond to shocks with higher lag (see the discussion in David, 2010).

According to the permanent income theory (see, for example, Becker and Hoffmann, 2006), when shocks to output are more persistent, the incremental percentage amount of smoothing through saving behavior is lower. Although the results are consistent with the prediction of the theory for non-oil MENA, EMU and OECD countries, for the GCC countries, savings smoothing increases sharply with higher differing frequency, from 44 percent of shocks smoothed for one-year frequency to 63 percent for three-year frequency. This puzzling result is a reflection of the unique economic and sociopolitical attributes that are hardly found in any other comparable group of states. As savings smoothing takes place ex post (i.e. after shocks occur),[11] the finding that saving provides insurance against permanent shocks in the GCC countries is evidence of GCC governments' ability to finance large fiscal deficits, which typically emerged as a result of decline in oil prices, through heavy borrowing from the banking sector.[12] Since smoothing through savings does not need to involve actual cross-border flows of funds, and given that the financial structure in the GCC is heavily dominated by the banking system with a significant public and quasi-public sector ownership (Al-Hassan *et al.*, 2010), the savings channel has

[11] By contrast, smoothing via factor income flows is a result of ex ante arrangements, prior to the occurrence of shocks. See Asdrubali *et al.* (1996) for further discussion.

[12] In the GCC region, private saving does not play a significant role as provider of income smoothing, due mainly to the generous social welfare system for the nationals. Public saving, in contrast, represents the major source of income/consumption insurance via borrowing and lending internationally or within their own country.

arguably over-compensated the reduced factor income smoothing arising from a longer lasting shock. Finally, and interestingly, the increase in total smoothing (which can be seen from a decrease in the fraction of shocks not smoothed) with a more permanent shock evident in the overall MENA region, which is opposite to what was observed in the EMU/OECD countries, is noteworthy and justifies further investigation.

4 Workers' remittances and risk sharing in MENA countries

The preceding discussion showed that potential welfare gains from risk sharing are large among MENA countries, often exceeding the potential gain from sharing risk among EMU/OECD countries. Further, we find that the bulk of the smoothing of country-specific output shocks for MENA countries has been achieved via savings and international transfers. International transfers, which typically include foreign aid and workers' remittance income, constitute a larger fraction of output when the receiving country is in recession. As the oil-exporting GCC countries have traditionally relied mostly on workers from the labor-surplus countries of the MENA region (alongside those of Asian and European origin) for continued economic activity and growth, it is interesting to assess whether remittances transferred by migrant workers smoothed income in the non-oil MENA countries.[13] In general, workers' remittances provide a stable source of external funding (Ratha, 2003), lower the probability of current account crisis (Bugamelli and Paterno, 2009), reduce poverty rates in the country of origin (Adams and Page, 2003) and provide a host of other benefits including fostering consumption of both durable and nondurable goods, accumulating human capital and increasing physical and financial investment.[14]

For some non-oil MENA economies (for example, Jordan), remittances constitute the single largest source of foreign exchange, exceeding export revenues, FDI and other private capital inflows. Over the 1992–2009 sample period, the annual average remittances contribution to a country's GDP across the seven non-oil MENA countries varied: Algeria (2.04 percent), Egypt (5.47 percent), Iran (0.79 percent), Jordan (20.12 percent), Morocco (6.90 percent), Syria (2.50 percent) and Tunisia (3.98 percent). In the case of Maghreb countries (Algeria, Morocco and Tunisia), the remittances received were largely from Europe, especially from France and

[13] Due to the unavailability of a reasonably long sample data span on aid from oil-exporting Arab countries to the MENA region, we could not analyze the foreign aid channel of risk sharing.

[14] See Chapter II of the 'World Economic Outlook' prepared by the International Monetary Fund (April 2005) for a recent contribution in this area.

Germany.[15] Remittances have especially proved to be remarkably resilient during economic downturns and crises, hence providing an important channel of international risk sharing. However, in extreme situations, such as the Iraqi invasion of Kuwait in 1990, unexpected swings in remittance flows could spoil risk sharing in the country of origin. The substantial loss of unremitted savings from Egyptian workers in Kuwait in 1990 is clearly an example of this sad event. The departure of thousands of workers from GCC countries in the wake of the recent financial crisis caused unpleasant economic disturbances in labor-exporting countries that rely heavily on remittances.

Ilahi and Shendy (2008) have documented the positive spillover effects of financial and remittance outflows from Saudi Arabia – which accounts for roughly three-quarters of the GCC's outward remittances – into real GDP growth in non-oil MENA economies. A number of studies (for example, Glytos, 2002; Makdisi *et al.*, 2007; Mohamed and Sidiropoulas, 2010) have documented the positive effect of remittance inflows on economic growth in MENA countries; however, the question of to what extent remittance inflows buffer output shocks in the recipient MENA economies has not yet been addressed in the literature. This section aims to fill this gap by quantifying the amount of shocks to output absorbed by remittance inflows.

Data on workers' remittances are taken from the IMF's Balance of Payments Statistics Yearbook (5th ed.), which reports two components of remittances registered in the current account. These are *workers' remittances*, which 'cover current transfers by migrants who work and are considered residents of new economies'; and *compensation of employees*, which refers to 'wages, salaries, and other benefits earned by individuals for work that they performed in economies in which they are not residents'. In the former, workers staying in the new economy for more than a year are considered residents; workers expected to stay less than a year are treated as examples of 'compensation of employees'. We use *net* figures, which are adjusted for all remittance outflows from the non-oil MENA countries. In order to measure the degree of risk sharing in income through workers' remittances, we estimate the following panel regression equation:

$$\Delta \log \text{GDP}_t^i - \Delta \log(\text{GDP}_t^i + \text{WR}_t^i) = \nu_{k,t} + \beta \, \Delta \log \text{GDP}_t^i + \epsilon_{i,t}, \tag{5}$$

where WR_t^i is the net workers' remittances received by country i in year t, and $\nu_{k,t}$ is the time fixed effects. Equation 5 examines whether domestic income plus workers' remittances (which

[15]The authors' calculation is based on the World Development Indicators databank of the World Bank.

can be considered as 'total income' available before other mechanisms of risk sharing take place) varies less than one-to-one with output. Treated this way, the coefficient β measures the degree of international income smoothing achieved by country i in year t.

A similar type of regression is estimated to measure the effect of compensation of employees in risk sharing. More precisely:

$$\Delta \log \text{GDP}_t^i - \Delta \log(\text{GDP}_t^i + \text{CE}_t^i) = \nu_{k,t} + \beta \, \Delta \log \text{GDP}_t^i + \epsilon_{i,t}, \tag{6}$$

where CE_t^i refers to the net compensation of employees received for country i in year t, and $\nu_{k,t}$ is the time fixed effects. The coefficient β has a similar interpretation as above.

The estimation results for panel specifications in Equations 5 and 6 are given in Table 5. Similar equations are estimated for the OECD countries to facilitate comparison. As can be seen in Panel A in Table 5, about 6 percent of the country-specific (output-specific) risks for the group of non-oil MENA economies over the entire sample period is shared by workers' remittances. Not surprisingly, the degree of risk sharing was especially higher during the 2001–2009 subperiod, possibly indicating the burgeoning of remittance outflows in the face of persistently strong oil surpluses in the GCC region. Similar calculations done for the group of OECD countries do not provide evidence of significant risk sharing. Panel B in Table 5 presents results for the compensation of employees over three different periods. The findings are again stronger for MENA countries than that of their OECD counterparts, supporting the notion that workers' remittances are an ever-increasingly important aspect of the economies of most MENA countries. Finally, the results shown in Table 5 were reestimated by considering a differencing interval of three years (analogous to that discussed in Section 3.4). The result did not change noticeably. Unreported results point towards a slight increase in income smoothing, for both categories of workers' remittances, under a more permanent shock to output. In the interests of brevity, these results are not presented here but they are available upon request.

Overall, the shortfall in income smoothing through other mechanisms (such as, factor income flows and savings) is partly compensated by migrant workers' remittances in the MENA countries. While our results support remittances as being an important channel through which the process of international risk sharing is taking place in the MENA countries, the *actual* impact of remittances in absorbing idiosyncratic earning risks may be far greater as not all cross-border remittance flows are officially recorded. This is because the IMF data, which we have used in

our analysis, only count remittances which enter official banking channels, and do not include the large – but unknown – amount of remittances that are transmitted through information and unrecorded channels (Adams, 2006). Clearly, an improved reporting of workers' remittances will likely strengthen the role of workers' remittance in income insurance.

5 Conclusions

In this article, we explored the channels of risk sharing associated with international asset diversification, transfers, savings and workers' remittances flows among a set of 14 MENA countries over the 1992–2009 period. Our results show that total welfare gains from international risk sharing among the MENA countries are large, however, we also find evidence that a large part of shocks to regional output has remained uninsured. This calls for an even deeper intraregional economic integration for improving risk sharing. Among the various market and non-market channels, through which risk sharing is achieved, saving stands out as a key market mechanism for risk sharing in MENA countries. Particularly, for the GCC region, saving provided the needful insurance at times when GCC countries were hit by shocks that are expected to persist. On the other hand, both GCC and non-oil MENA countries achieved internationally comparable levels of income smoothing via the factor income channel, although the effect was more favorable in non-oil MENA countries when faced with longer lasting output shocks. Finally, the non-oil MENA countries achieved additional income smoothing by means of international transfers and workers' remittance, in which the contribution of the oil-rich Gulf region was very critical.

We conclude our paper with a caveat. While the main contribution of this paper is to offer empirical evidence on the channels of risk sharing in MENA countries, we have remained silent on the critical role of institutions in risk diversification. Particularly for the MENA countries, growth-enhancing economic institutions are crucial in light of the very high amount of unsmoothed shocks documented in our analysis. Countries with "strong" institutions tend to perform better macroeconomic policies that are helpful in reducing output volatility and promoting growth, thereby facilitating risk diversification. By contrast, countries with "weak" institutions tend to implement poor economic policies (and therefore lower risk diversification) since these countries lack proper political institutions that constrain their politicians and governments from widespread corruption, ineffective enforcement of property rights for investors

and a high degree of political instability (Acemoglu et al., 2003). The empirical relationship between risk sharing and corrupt economies suggest that higher risk sharing could be observed in corrupt economies, given that they are open to international markets (Fratzscher and Imbs, 2009). In other words, quality of institutions and openness seem to act as substitutes in enabling risk diversification. Within the MENA region, the GCC region is highly open with relatively low tariff rates, while the average unweighted tariff rate in the non-oil MENA region is high relative to most regions of the world (Makdisi et al., 2007). If risk sharing depends on both institutions and openness (and their interaction), it is worthwhile to revisit our empirical exercise in light of Middle East's often touted underdeveloped commercial institutions (Kuran, 2007). We hope future research will investigate this issue further.

A Data Appendix

Gathering long-span balanced data across developing countries is always a daunting task. While long-span GDP is generally available, very little information is usually available for other national income aggregates such as GNI, NI or DNI. Due to the paucity of long-span data, our sample period is 1992–2009 for 14 MENA countries. National accounts aggregate data (that is, GDP, GNI, NI, DNI) and consumption (public plus private) were extracted from the United Nations's National Accounts Main Aggregates Databases (unstats.un.org). Population and exchange rate data were also obtained from the same source. The consumer price index (CPI) series for each country was obtained from the IMF's International Financial Statistics database. The nominal income aggregates are converted into real per capita variables by dividing by the economy's population by the CPI.

As mentioned, we compare out results with OECD and EMU countries. Comparable national accounts data for the OECD countries were taken from the OECD National Accounts: Main Aggregates (vol. I) and Detailed Tables (vol. II). Our sample OECD countries include all OECD members except Luxembourg (very small and atypical), Iceland (incomplete data), and Czech Republic, Hungary, Korea, Mexico, Poland, Slovakia and Turkey (less developed countries). The EMU sample includes Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. Data on remittance flows were collected from the World Bank's Migration & Remittances Data, while data on (net) compensation of employees from the rest of the world were obtained from the United Nations database.

Table 1: Selected summary statistics of output and consumption growth rates in MENA countries

	GDP		Consumption			GDP	Consumption
	Mean	St. Dev.	Mean	St. Dev.	Rel. Vol.	Correlations	
Algeria	0.41	6.66	0.98	5.17	0.78	0.45	0.50
Bahrain	2.12	2.91	3.13	3.42	1.18	0.70	0.65
Egypt	0.38	5.01	1.21	6.82	1.36	0.13	0.19
Iran	0.65	7.30	1.15	6.87	0.94	0.71	0.51
Jordan	1.13	4.6	1.89	2.12	0.46	0.30	0.14
Kuwait	4.67	7.64	2.99	5.71	0.75	0.41	0.26
Libya	0.33	4.54	0.34	5.62	1.23	0.43	0.21
Morocco	1.11	2.13	0.96	2.89	1.36	0.24	0.20
Oman	3.04	3.78	2.10	2.69	0.71	0.21	0.11
Qatar	3.31	4.51	0.80	2.78	0.62	0.25	0.33
Saudi Arabia	1.89	2.88	1.91	3.05	1.21	0.58	0.45
Syria	1.03	2.68	0.92	3.91	1.31	0.13	0.16
Tunisia	0.90	2.04	0.78	1.43	0.71	0.30	0.32
UAE	2.31	2.33	1.87	2.31	0.99	0.51	0.40
MENA (except GCC) average	0.73	4.42	1.24	4.36	1.02	0.36	0.28
GCC average	2.56	4.01	2.13	3.40	0.91	0.44	0.37

Notes: The sample period was 1992–2009. Relative volatility (Rel. Vol.) is the ratio of the standard deviation (St. Dev.) of consumption per capita growth rate to that of GDP per capita growth rate. Correlations are calculated with respect to the 14-country aggregate. Means and standard deviations are multiplied by 100.

Table 2: Potential welfare gains from risk sharing across MENA countries

Iran	10.71	Oman	4.61
Libya	10.03	Qatar	4.16
Algeria	8.52	U.A.E.	4.23
Syria	8.41	Morocco	4.16
Tunisia	5.68	Jordan	3.18
Egypt	6.22	Saudi Arabia	2.81
Kuwait	5.12	Bahrain	1.76
MENA (except GCC) average	7.11		
GCC average	3.78		

Notes: The sample period was 1992–2009. The welfare gains are based on the method of Kalemli-Ozcan *et al.* (2001). The gain parameters are interpreted as the total potential welfare gains that a country would obtain from fully diversifying any country-specific variance in output, expressed as a percentage of the permanent increase in consumption as a share of a country's own GDP. The potential welfare gains are calculated under the assumption of logarithmic utility with the log-difference of country-specific and group GDP, all following a joint normal distribution, the parameters of which are estimated from the individual time series.

Table 3: Channels of risk sharing (percent)

	GCC	MENA (excluding GCC)	MENA	OECD	EMU
Factor income flows (β_f)	10	8	8	3	7
	(3)	(3)	(3)	(1)	(3)
Capital depreciation (β_d)	-8	-3	-6	-10	-3
	(5)	(4)	(4)	(1)	(1)
International transfers (β_τ)	-16	4	-10	0	4
	(10)	(2)	(4)	(1)	(1)
Saving (β_s)	44	33	40	65	37
	(13)	(8)	(11)	(4)	(6)
Not Smoothed (β_u)	69	57	63	42	53
	(6)	(6)	(6)	(3)	(5)

Notes: The sample period was 1992–2009.

GCC: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the U.A.E.

MENA: Algeria, Egypt, Iran, Jordan, Libya, Morocco, Syria, Tunisia, and GCC countries.

OECD: Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States.

EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain.

Standard errors are given in parentheses. Percentages of shocks absorbed at each level of smoothing: β_f is the GLS estimate of the slope in the regression of $\Delta \log \text{GDP}^i - \Delta \log \text{GNI}^i$ on $\Delta \log \text{GDP}^i$; β_d is the slope in the regression of $\Delta \log \text{GNI}^i - \Delta \log \text{NI}^i$ on $\Delta \log \text{GDP}^i$ (β_τ and β_s are derived by a similar process). β_u is the estimate of $\Delta \log(\text{C}^i + \text{G}^i)$ on $\Delta \log \text{GDP}^i$. The β-coefficients are interpreted as the incremental percentage amounts of smoothing achieved at each level, and β_u is the percentage of shocks not smoothed. See Section 2 for further details.

Table 4: Channels of risk sharing with three-year frequency of the data (percent)

	GCC	MENA (excluding GCC)	MENA	OECD	EMU
Factor income flows (β_f)	8	12	9	8	12
	(2)	(3)	(3)	(3)	(2)
Capital depreciation (β_d)	-17	-6	-1	-8	0
	(8)	(4)	(4)	(1)	(2)
International transfers (β_τ)	-18	12	1	3	4
	(6)	(3)	(6)	(1)	(1)
Saving (β_s)	63	31	44	36	18
	(10)	(4)	(12)	(6)	(4)
Not Smoothed (β_u)	60	50	48	60	66
	(15)	(5)	(10)	(4)	(6)

Notes: The sample period was 1992–2009.

GCC: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the U.A.E.

MENA: Algeria, Egypt, Iran, Jordan, Libya, Morocco, Syria, Tunisia, and GCC countries.

OECD: Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States.

EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain.

Standard errors are given in parentheses. Percentages of shocks absorbed at each level of smoothing: β_f is the GLS estimate of the slope in the regression of $\Delta \log \text{GDP}^i - \Delta \log \text{GNI}^i$ on $\Delta \log \text{GDP}^i$; β_d is the slope in the regression of $\Delta \log \text{GNI}^i - \Delta \log \text{NI}^i$ on $\Delta \log \text{GDP}^i$ (β_τ and β_s are derived by a similar process). β_u is the estimate of $\Delta \log(\text{C}^i + \text{G}^i)$ on $\Delta \log \text{GDP}^i$. The β-coefficients are interpreted as the incremental percentage amounts of smoothing achieved at each level, and β_u is the percentage of shocks not smoothed. See Section 2 for further details.

Table 5: Risk sharing through workers' remittances (percent): MENA versus OECD countries

Panel A. Net remittance transfers from immigrants			
	1992-2000	2001-2009	1992-2009
MENA	3	7	6
(except GCC)	(3)	(2)	(2)
OECD	0	0	0
	(1)	(1)	(1)
Panel B. Net compensation of employees from abroad			
	1992-2000	2001-2009	1992-2009
MENA	3	5	5
(except GCC)	(1)	(2)	(2)
OECD	1	0	1
	(1)	(1)	(1)

Notes: The sample period was 1992–2009.
MENA: Algeria, Egypt, Iran, Jordan, Libya, Morocco, Syria, and Tunisia.
OECD: Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States.
Standard errors are given in parentheses. Income Smoothing through net remittance inflows is obtained by estimating $\Delta \log \text{GNI}^i - \Delta \log(\text{GNI} - \text{WR})^i$ on $\Delta \log \text{GDP}^i$. Income smoothing through net compensation of employees is obtained by estimating $\Delta \log \text{GDP}^i - \Delta \log(\text{GDP} + \text{CE})^i$ on $\Delta \log \text{GDP}^i$. See Section 4 for further details.

References

Acemoglu, D., Johnson, S., Robinson, J. and Thaicharoen, Y. (2003). 'Institutional causes, macroeconomic symptoms: volatility, crises and growth', Journal of Monetary Economics 50, 49–123.

Adams, R.H. Jr. and Page, J. (2003). 'International migration, remittances and poverty in developing countries', World Bank Policy Research Working Paper No. 3179. Available online: `http://ideas.repec.org/p/wbk/wbrwps/3179.html` (Last accessed: February 16, 2012).

Adams, R.H. Jr. (2006). 'Migration, remittances and development: The critical nexus in the Middle East and North Africa', UN/POP/EGM/2006/021. Beirut, United Nations Secretariat. Available online: `http://www.un.org/esa/population/meetings/EGM_Ittmig_Arab/P01_Adams.pdf` (Last accessed: February 16, 2012).

Al-Hassan, A., Khamis, M. and Oulidi, N. (2010). 'The Gulf Cooperation Council (GCC) banking sector: Topography and analysis', Banks and Bank Systems, 5, pp. 15–28.

Asdrubali, P., Sørensen, B.E. and Yosha, O. (1996). 'Channels of interstate risk sharing: United States 1963–90', Quarterly Journal of Economics, 111, pp. 1081–1110.

Backus, D., Kehoe, P. and Kydland, F. (1992). 'International real business cycles', Journal of Political Economy, 100, pp. 745–775.

Becker, S.O. and Hoffmann, M. (2006). 'Intra- and international risk sharing in the short-run and the long-run', European Economic Review, 50, pp. 777–806.

Bugamelli, M. and F. Paterno (2009). 'Do workers' remittances reduce the probability of current account reversals?', World Development, 37, pp. 1821–1838.

Burke, E., Echagüe, A. and Youngs, R. (2009). 'Why the European Union needs a 'broader Middle East' Policy', Documenti IAI 09/37. December, Istituto Affari Internazionali. Available online: `http://www.iai.it/pdf/DocIAI/iai0937.pdf` (Last accessed: February 16, 2012).

Castelli, M. and Scacciavillani, F. (2012). The New Economics of Sovereign Wealth Funds. United Kingdom: John Wiley & Sons Ltd.

David, A.C. (2010). 'How do international financial flows to developing countries respond to natural disasters'? IMF Working Paper No. 10/166. International Monetary Fund, Washington DC.

Demyanyk, Y. and Volosovych, V. (2008). 'Gains from financial integration in the European Union: Evidence for new and old members', Journal of International Money and Finance, 27, pp. 277–294.

Fratzscher, M. and Imbs, J. (2009). 'Risk sharing, finance and institutions in international portfolio', Journal of Financial Economics, 94, 428–447.

French, K. and Poterba, J. (1991). 'International diversification and international equity markets', American Economic Review, 81, pp. 222–226.

Glytos, N.P. (2002). 'The role of migrant remittances in development: Evidence from Mediterranean countries', International Migration, 40, pp. 5–26.

Hodrick, R. and Prescott, E. (1997). 'Postwar U.S. business cycles: An empirical investigation', Journal of Money, Credit, and Banking 29, 1–16.

Ilahi, N. and Shendy, R. (2008). 'Do the Gulf oil-producing countries influence regional growth? The impact of financial and remittance flows', IMF Working Paper No. 167. International Monetary Fund, Washington DC.

IMF (2011). 'Spillover from the GCC', in Regional Economic Outlook: Middle East and Central Asia, April 2011. Washington D.C., International Monetary Fund, p. 21.

Kalemli-Ozcan, S., Sørensen, B.E. and Yosha, O. (2001). 'Regional integration, industrial specialization and the asymmetry of shocks across regions', Journal of International Economics, 55, pp. 107–137.

Kuran, T. (2007). 'Institutional causes of underdevelopment in the Middle East: A historical perspective', in Kornai, J., Matyas, L. and Roland, G. (eds.), Institutional Change and Economic Behaviour, pp. 64–76. Palgrave-Macmillan.

Makdisi S., Fattah, Z. and Limam, I. (2007). 'Determinants of economic growth in the MENA countries', in Nugent, J.B. and Pesaran, H. (eds.), Explaining Growth in the Middle East, Contributions to Economic Analysis 278, pp. 31–60. The Netherlands, Elsevier.

Marinheiro, C.F. (2003). 'Output smoothing in EMU and OECD: Can we forego government contribution? A risk sharing approach', CESifo Working Paper No. 1051. Available online: `http://econpapers.repec.org/paper/cesceswps/_5f1051.htm` (Last accessed: February 16, 2012).

Mohamed, S.E. and Sidiropoulos, M.G. (2010). 'Does workers' remittances affect growth: Evidence from seven MENA labor exporting countries', International Research Journal of Finance and Economics, 46, pp. 181–194.

Nugent, J.B. and Pesaran, H. (2007). 'Explaining Growth in the Middle East', Contributions to Economic Analysis 278. The Netherlands, Elsevier.

Ratha, D. (2003). 'Workers' remittances: An important and stable source of external development finance', in Global Development Finance: Striving for Stability in Development Finance, World Bank, pp. 157–175.

Sørensen, B.E. and Yosha, O. (1998). 'International risk sharing and European monetary unification', Journal of International Economics, 45, pp. 211–38.

Sørensen, B.E. and Yosha, O. (2003). 'Financial market integration in the Middle East: How big is the peace dividend?', Israel Economic Review, 2, pp. 1–19.

van Wincoop, E. (1994). 'Welfare gains from international risk sharing', Journal of Monetary Economics, 34, pp. 175–200.