FINANCIAL MARKET INTEGRATION IN THE MIDDLE EAST: HOW BIG IS THE PEACE DIVIDEND?

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Gains from capital and credit market integration are important sources of mutual benefits that have been neglected in the discussion of the economics of Middle East peace. Such integration entails smoother income and consumption as a result of international diversification of investments. We estimate the magnitude of the potential gains from sharing risk among the countries in the region, finding that they are of considerable magnitude, far exceeding the potential gain from sharing risk among OECD countries. The potential gains are high even for the small 'peace club,' Egypt, Israel, and Jordan. We find that, in practice, the bulk of the smoothing of country-specific output shocks for Middle Eastern countries has been achieved via saving (countries save less in bad years), and to some extent through international transfers. A considerable fraction of the shocks remains not smoothed, suggesting that the gains from further risk sharing through regional financial market integration are substantial.

1. INTRODUCTION

Since President Sadat's historic visit to Jerusalem (in 1977) there have been expectations of a large 'peace dividend' to be obtained from economic cooperation among Middle Eastern countries. The largest economic gains are expected simply from a reduction of defense expenditures. For instance, Fischer, Rodrik, and Tuma (1993)[1] suggest that this may release

[1] Fischer, Rodrik, and Tuma (1993, pp. 2–3) perform the following back-of-the-envelope calculation: 'Suppose that the countries concerned reduce their military spending from the current level of 15 percent of gross domestic product (GDP) to the developing-country average of 5 percent. This would release resources worth 10 percent of GDP.' The authors stress that this would be a permanent increase that would accrue year after year. They add: 'Now suppose further that only half of the resources saved (i.e., 5 percent of GDP) are invested. At an incremental capital/output ratio (ICOR) of 3, this would yield a permanent increase in the economy's growth rate of 0.05/3=1.67 percent.' Diwan and Papandreou (1993, p. 243) point out that in the past, military expenditures were partially allocated as investment, contributing to growth (especially in Egypt and Israel). This notwithstanding, they estimate that 'the total net effect of a reduction in military spending of 10 percentage points of GNP lies between 0.7 and 1.7 percentage points in GNP growth.'

resources worth 10 percent of gross domestic product (GDP). Further economic benefits will be obtained through increased regional trade, allowing countries to specialize and thus achieve higher international competitiveness.[2] Joint infrastructure development (transportation, energy, water) is further expected to generate gains from economies of scale and to boost development in less industrialized areas of the region.[3] Recently, the need for regional policy harmonization and the creation of an institutional framework for discussing and coordinating regional policy has been recognized.[4]

An important source of mutual gain, that to date has been neglected in the discussion of the economics of Middle East peace is enhanced risk sharing through capital and credit market integration among countries in the region. Economies that face idiosyncratic output risk may increase their welfare by providing income insurance for each other and achieve smoother income and consumption. This is particularly relevant for the Middle East, where several countries rely mainly on oil exports while other countries rely heavily on oil imports.[5] There are other important differences in the sectoral composition of GDP among Middle Eastern countries. In Sudan, for example, agriculture constitutes about 30 percent of GDP and manufacturing about 7 percent of GDP. In Morocco, each of these sectors constitutes about 15—20 percent of GDP.[6] Clearly, Sudan would benefit from diversifying away some of the income risk associated with agricultural production through risk-sharing agreements with countries like Morocco (or Israel), which rely less on agricultural income. It is worth stressing that the gains from cooperation mentioned in the previous paragraph increase when countries are more similar (as emphasized by El-Erian and Fischer, 1996, p. 4), while the gains from risk sharing increase when countries are less similar since idiosyncratic shocks are then less correlated.

We estimate the magnitude of the potential gains from risk sharing among Middle Eastern countries and find that they are indeed of very large magnitude—far exceeding the potential gains from sharing risk among OECD countries (which we also estimate, using the same method, for the sake of comparison). We further compute the potential welfare gains from risk sharing among sub-groups of Middle Eastern countries, for example, the 'peace club' composed of Egypt, Israel, and Jordan, finding very high potential gains even within such a small group of countries. Finally, we investigate whether the gains remain large if Israel is excluded from the risk-sharing 'arrangement' in the various risk-sharing groups.[7]

There are many good reasons why perfect risk sharing among countries will not be attained

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[2] See Hirsch, Ayal, Hashai, and Khesin (1996).

[3] El-Erian and Fischer (1996), for example, mention electricity generation, particularly better linkages of power grids within the region, as a significant example. See also various contributions in Fishelson (1989), Ben-Shahar, Fishelson, and Hirsch (1989), and Fischer, Rodrik, and Tuma (1993).

[4] See El-Erian and Fischer (1996).

[5] Diwan and Papandreou (1993) report that total Arab oil revenues declined from $ 213 billion in 1980 to about $ 53 billion in 1986. During this period the oil revenue of Egypt and Syria was halved, while importers of oil (e.g., Jordan and Israel) benefited from lower energy prices.

[6] El-Erian and Fischer (1996, p.11) point out that 'in some countries a single sector accounts for over half of GDP (e.g., oil in the [Gulf] economies and hydro-carbons in Algeria).'

[7] We do not measure potential gains from sharing risk with countries (or groups of countries) outside the region.

in practice. Asdrubali, Sørensen, and Yosha (1996) found that during 1963—90, capital markets in the United States diversified 39 percent of idiosyncratic state level output fluctuations (this number increased to about 50 percent in the 1980s), and that overall about 75 percent of idiosyncratic shocks to state output were diversified at the annual frequency. It is therefore unreasonable to expect that perfect or near-perfect risk sharing will be achieved among Middle Eastern countries even if the process of economic integration proceeds well. However, since the potential gains are so large, even if only, say, a quarter of the gains are achieved in practice in the near future, the welfare improvement will be substantial.

We conclude our study with an estimation, using the method developed in Asdrubali, Sørensen, and Yosha (1996), of the extent to which the smoothing of income and consumption was achieved in practice by the countries in the region during the past two decades, and the manner in which this smoothing was obtained. We find that there is no income insurance through intercountry ownership of productive assets,[8] that there is some income insurance via international transfers, and that the bulk of the smoothing of output shocks for Middle Eastern countries is achieved via saving: countries save less in bad years.

Finally, we find that about 70 percent of shocks to the output of countries in the region are not smoothed. This is the basis for the main conclusion of our study, namely, that the unexploited welfare gains from financial-market integration among Middle Eastern countries are substantial. Furthermore, even if the process of integration encompasses only a small number of countries (e.g., Israel and the countries with which it has already signed a peace agreement, or with which it has some sort of diplomatic and economic ties) the gain for these countries will be very high.

In the next section, we summarize the methodology for evaluating potential welfare gains from risk sharing among countries, and present the empirical results for various groups of Middle Eastern countries. In Section 3, we measure the amount of income and consumption smoothing achieved in practice through various mechanisms. Section 4 concludes.

2. POTENTIAL WELFARE GAINS FROM RISK SHARING

Conceptual framework

Under simplifying assumptions, a closed-form expression can be derived for the welfare gains that are achieved by moving from financial autarky to full risk sharing. Let GDP_{it} denote the per capita year t non-storable gross domestic product of country i, an exogenous random variable with a commonly known probability distribution. Further assume that the representative consumer of each country is a risk-averse expected-utility maximizer who derives utility from consumption.[9] If asset markets are complete then, under a well-known set of assumptions—symmetric information, no transaction costs, constant relative risk aversion (constant elasticity of substitution) utility, identical rate of time preference for all countries—perfect risk sharing among the countries in the group implies

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[8] We use the terms income insurance and income smoothing interchangeably.
[9] We do not distinguish between the government of a country and its residents.

(1) $c_{it} = k_i GDP_t$

where c_{it} is country i's year t per capita consumption, GDP_t is the year t per capita output of the group, and k_i is a country-specific constant, that is independent of time and of the realization of uncertainty, reflecting country i's 'strength' in the risk-sharing arrangement. In the Appendix, we derive a closed-form solution for k_i for logarithmic utility. (Kalemli-Ozcan, Sørensen, and Yosha, 2001, derive a closed-form solution for k_i for general constant relative risk-aversion utility).

Perfect risk sharing implies condition (1) regardless of the stochastic process governing the GDP of countries, but in order to compute welfare gains from risk sharing distributional assumptions are needed. Assume that, conditional on GDP_{i0} and GDP_0, the joint distribution of the log-differences of these processes is stationary and normal:

$\Delta \log GDP_t \sim N\left(\mu, \sigma^2\right)$ /, $\Delta \log GDP_{ti} \sim N\left(\mu_i, \sigma_i^2\right)$ and

$cov\left(\Delta \log GDP_{ti}, \Delta \log GDP_t\right) = cov_i$ for all t. This assumption involves an approximation since aggregate GDP cannot, in general, be strictly log-normally distributed if each region's GDP is log-normally distributed.

Further assuming a discount rate of δ, the gain achieved by country i when moving from financial autarky to perfect risk sharing can be expressed in terms of a permanent percentage increase in consumption relative to country i's period 0 consumption in autarky. More precisely, the gain in utility (of moving from autarky to full risk sharing) equals the gain in utility that would be achieved by increasing consumption permanently from GDP_{i0} to $GDP_{i0} * \left(1 + G_i\right)$ where

(2) $G_i = \dfrac{1}{\delta}\left(\dfrac{1}{2}\sigma^2 + \dfrac{1}{2}\sigma_i^2 - cov_i\right)$

(see Appendix for details). We use G_i as our measure of the potential gains from risk sharing for country i. When we report our empirical results, we multiply this number by 100 to express the welfare gain in percent.[10]

The terms in (2) are interpreted as follows. A country's welfare gain from participation in the risk-sharing arrangement is larger the lower the discount rate and the lower the covariance between its GDP and the group's aggregate GDP—reflecting a higher insurance value of the country for the other countries in the group. The gain is larger the higher the variance of the country's GDP since, other things equal, it can contribute more to smoothing shocks in other countries. Finally, the higher the variance of the group's aggregate GDP, keeping the variance of country i's GDP constant, the more other regions would be willing to 'pay' country i for joining the risk-sharing arrangement.[11]

We estimate the parameters σ^2, σ_i^2 and cov_i using GDP data. In our calculations, we deflate GDP by the Consumer Price Index (CPI), rather than by a GDP-deflator. The logic is that since our measure of welfare gains is utility based, we want measured output to reflect

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[10] By restricting attention to logarithmic utility we probably understate risk aversion and hence underestimate potential welfare gains from risk sharing.

[11] The latter is, of course, not a feasible experiment for a fixed set of countries, since σ^2 cannot change without any of the σ_i^2 s changing. The distributional approximation regarding aggregate GDP allows us to treat σ^2 as a parameter (that can be estimated from aggregate GDP data) rather than as a complicated function of the country-by-country σ_i^2 s .

consumption in autarky (with no risk sharing, countries consume the value of their GDP). Thus, we want to translate GDP to the amount of consumption that it can buy; this is obtained by deflating using the CPI. To illustrate, consider Saudi Arabia, and suppose that it produces only oil. Suppose now that physical production of oil remains fixed from period t to period $t+1$ but that the world price of oil doubles, whereas the CPI in Saudi Arabia is unchanged (this is a reasonable approximation since oil products constitute a small fraction of the Saudi consumption basket). Deflating by the GDP deflator would yield no change in Saudi Arabia's autarkic consumption, whereas deflating by the CPI would yield a doubling of autarkic consumption, which makes more sense since Saudi Arabians became 'richer' as a consequence of the oil-price increase. In sum, when using a utility-based welfare gains measure, output must be measured in consumption-equivalent terms.

The data

To calculate potential welfare gains from risk sharing, we use annual GDP series from the IMF International Finance Statistics. These series are available for several Middle Eastern countries without missing observations. In order to evaluate the amount of risk sharing that was actually achieved, we need National Accounts data that the IMF source does not contain. In the next section we therefore use the United Nations National Accounts Statistics (the details are provided later). Many observations are missing in these series, however, so that we can meaningfully evaluate the amount of risk sharing achieved only for a subset of Middle Eastern countries. For the sake of comparison with the results of the next section, we choose the same sample of countries for evaluating potential welfare gains. To select the sample, we decided to consider the set of Middle Eastern countries for which the United Nations source has less than 50 percent missing observations for the relevant variables. These countries are Algeria, Bahrain, Egypt, Israel, Jordan, Morocco, Saudi Arabia, Syria, and Tunisia. We use the sample period 1980—94, which is close to the sample used for measuring the amount of risk sharing achieved in practice. For this sample, the IMF data source has no missing GDP observations. Population data, CPI data, and exchange rates are also obtained from the IMF International Finance Statistics. Dividing GDP by country population, and deflating by each country's CPI, we transform the GDP series into real per capita terms. In order to calculate aggregate GDP, we translate local currencies into US dollars using 1990 dollar exchange rates. The log-GDP data are differenced at the annual frequency.

Empirical results

A country's potential gains from sharing risk within a group of countries are larger the higher the variance of the country's GDP, the lower the correlation of the country's GDP with the group's aggregate GDP, and the higher the variance of aggregate GDP.[12] The standard deviation of aggregate GDP growth (more precisely, of $\Delta \log GDP$) for the nine countries in the sample is 5 percent. The standard deviation of each country's GDP growth and its correlation with aggregate GDP growth are shown in Table 1. It is clear that GDP is very volatile in most Middle Eastern countries: for Egypt, Israel, and Tunisia the standard deviation of GDP growth

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[12] We estimate the variance of aggregate GDP directly, even though it is obviously a function of the stochastic properties of the GDP of the individual countries in the group (see the interpretation of equation (2) above).

Table 1
Standard Deviation of GDP Growth, and
Correlation with Aggregate GDP Growth

	Std. Dev.	Correlation
Algeria	9	0.7
Bahrain	8	0.72
Egypt	4	0.30
Israel	4	0.23
Jordan	9	-0.29
Morocco	6	-0.24
Saudi Arabia	12	0.88
Syria	9	0.64
Tunisia	3	0.53

Sample: 1980–94. 'Std.Dev.' is the standard deviation of percentage per capita real GDP growth rates, where 'real GDP' refers to nominal GDP deflated by the CPI of the country. 'Correlation' is the correlation of the per capita real GDP growth rate with the growth rate of aggregate per capita real GDP. 'Aggregate GDP' is the sum of the GDP of the 9 countries in 1990 prices aggregated using 1990 dollar exchange rates.

is in the range of 3–4 percent—higher than the figure for most OECD countries. For Morocco, the standard deviation is 6 percent, while Algeria, Bahrain, Jordan, Saudi Arabia, and Syria all have very variable GDP growth rates, with standard deviations above 8 percent. The high variance for the latter countries, with the exception of Jordan, most likely reflects the combination of a high dependence on oil production and variable world oil prices.[13]

The GDP of oil-producing countries dominates the region's aggregate GDP. For example, Saudi Arabian GDP growth has a very high correlation (0.88) with the aggregate. Only Jordan and Morocco exhibit a negative correlation with aggregate GDP growth. These two countries, being small with GDP that is highly variable and negatively correlated with the aggregate, are expected to obtain considerable gains from sharing risk with other Middle Eastern countries (see the interpretation of equation (2), above).

This is borne out in Table 2, where the estimated potential gains from risk sharing (equation (2)) are reported using the intertemporal discount factor $\delta = 0.02$. As explained above, these numbers represent a utility gain equivalent to a permanent percentage increase in the per capita consumption of each country as a result of moving from financial autarky (each country consumes its GDP) to perfect risk sharing (each country consumes the allocation described in equation (1)). Here, the increase in consumption is measured relative to the period 0 consumption in autarky (i.e., relative to the country's period 0 GDP). The estimated gains for all countries are very large, with a population-weighted average equivalent to a 12 percent permanent increase in per capita consumption.[14]

For the sake of comparison, we conducted an analogous exercise for a group of twenty three OECD countries for the same time period, obtaining a population-weighted average potential welfare gain equivalent to a permanent increase in consumption of about 1.4 percent. We do not tabulate the details (Kalemli-Ozcan, Sorensen, and Yosha, 2003, obtain similar numbers for members of the European Union). For some OECD countries with highly variable GDP (e.g, Iceland and Turkey), the gains are much larger (7.8 and 9.3 percent, respectively).

One can debate the absolute magnitude of these estimates but their relative magnitude conveys the entire story in a nutshell—economies in the Middle East are very volatile, with

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[13] Recall that we deflate nominal GDP by the CPI.
[14] Even if we take $\delta = 0.04$, the average welfare gain is large (6 percent).

shocks that are not highly correlated due to the considerable diversity among those countries. To a large extent this is due to some countries being oil exporters while others are oil importers.

As a result, the insurable (idiosyncratic) components of shocks to country output are substantial and there are exceptionally large benefits from income and consumption insurance among countries.[15]

The peace process in the Middle East is extremely slow. Its roots can be traced to the period following the October 1973 Yom Kippur War. Thirty years later, Israel has official peace agreements only with Egypt and Jordan, and economic cooperation with these two countries—not to speak of capital and credit market integration—is still scant. A common interpretation is that as long as there is no peace agreement with Syria and Lebanon, Israel's other two neighbors, and the Palestinian issue is not resolved (most likely through the creation of an independent and sovereign Palestinian state), the peace with Egypt and Jordan will stay 'cold' and potential gains from economic cooperation will remain unexploited.

One scenario is based on the premise that the peace process in the region involves many psychological barriers and, therefore, will draw in additional countries only slowly and gradually, as it progresses. The peace with Egypt and Jordan will slowly 'warm up,' and benefits from economic cooperation will gradually begin to be felt. Then, countries such as Tunisia and Morocco will feel more comfortable strengthening their ties (and signing official agreements) with Israel and, finally, additional countries such as Syria and Saudi Arabia will develop economic ties with Israel. According to this scenario, the gains from economic cooperation, and risk sharing in particular, will be achieved in stages with growing subgroups of Middle Eastern countries.

Table 2
Potential Welfare Gains from Risk Sharing among Middle Eastern Countries

Algeria	11
	(2)
Bahrain	8
	(3)
Egypt	8
	(3)
Israel	8
	(2)
Jordan	32
	(9)
Morocco	18
	(5)
Saudi Arabia	15
	(5)
Syria	12
	(7)
Tunisia	4
	(1)

Sample: 1980–94. The displayed numbers represent the gain in utility, for each country, as a result of moving from financial autarky (each country consumes its GDP) to perfect risk sharing (each country consumes the allocation described in equation (1)). The gain can be interpreted as a permanent percentage increase in the country's per capita consumption, relative to its initial (1980) consumption in autarky, i.e. relative to its 1980 per capita real GDP. The potential welfare gains are calculated under the assumption of logarithmic utility and with the log-difference of each country's GDP, and of the total GDP of the nine countries, all following a joint normal distribution, the parameters of which are estimated from the individual time series. Standard errors are in parentheses. The average potential welfare gain is calculated as a weighted average, by population, of the individual country gains.

[15] The relatively small average potential welfare gain for OECD countries (emphasis on the qualifier 'relatively,' since a permanent increase of 1.4 percent in consumption is far from negligible) is due to the fact that giants such as the United States, Germany, and France exhibit a well diversified industrial structure and considerable within-country variation in economic activity, and hence, enjoy milder GDP shocks.

A pertinent empirical question is, therefore, whether the potential gains from risk sharing are also large among sub-groups of Middle Eastern countries. Table 3 shows potential gains within the relevant sub-groups: the restricted 'peace club,' consisting of Egypt, Jordan, and Israel, a larger set of countries that have limited ties with Israel, and a yet larger group of countries—including Saudi Arabia and Syria—that are likely to be part of a future peace agreement.

The main finding is that the potential welfare gains for all the countries involved are considerable even within these restricted groups of countries. If, indeed, the peace between

Table 3
Potential Welfare Gains from Risk Sharing Within Sub-Groups of Middle Eastern Countries

Peace club			
Egypt	Israel	Jordan	Average
2	3	15	3
(1)	(1)	(5)	

Peace club plus Morocco and Tunisia					
Egypt	Israel	Jordan	Morocco	Tunisia	Average
2	3	17	11	1	5
(1)	(1)	(5)	(3)	(0)	

Enhanced peace club							
Egypt	Israel	Jordan	Morocco	Saudi Arabia	Syria	Tunisia	Average
7	6	29	18	13	12	4	11
(2)	(2)	(9)	(5)	(5)	(8)	(1)	

Sample: 1980–94. The displayed numbers represent the gain in utility, for each country, as a result of moving from financial autarky (each country consumes its GDP) to perfect risk sharing (each country consumes the allocation described in equation (1)). The gain can be interpreted as a permanent percentage increase in the country's per capita consumption, relative to its initial (1980) consumption in autarky, i.e. relative to its 1980 per capita real GDP. The potential welfare gains are calculated under the assumption of logarithmic utility and with the log-difference of each country's GDP, and of the total GDP of the nine countries, all following a joint normal distribution, the parameters of which are estimated from the individual time series. Standard errors are in parentheses. The average potential welfare gain is calculated as a weighted average, by population, of the individual country gains.

Egypt and Israel, and Jordan and Israel, 'warms up' (e.g., as a result of real progress in the negotiations with the Palestinians), we can expect more foreign direct investment across these countries. Recently, a large Israeli textile manufacturer, Delta Galil, set up productive capacity in Jordan. Hopefully, in the future, such investments will go in both directions. For example, Egyptian or Jordanian banks may want to enter the Israeli market and compete, especially in the Arab segment of the population, where they are likely to capture a large market share quite quickly.

Note that as the risk-sharing group becomes larger, so does the average potential gain from risk sharing. This is plausible since the fluctuations in each additional country's GDP are not perfectly correlated with those in the group's aggregate GDP. The estimated potential gains from risk sharing for individual countries also typically increase with group size although this need not be the case. The intuition is straightforward. To take an extreme example, consider a risk-sharing group composed of several countries which produce no oil and one country that produces only oil. The latter country is of huge insurance value to the group and, in a perfect risk-sharing arrangement, will be duly compensated by the other group members and will thus obtain large welfare gains. The oil producing country can be thought of as a 'monopolist' producing a differentiated product—it is the only country that 'sells' the contingent commodity

Table 4
Potential Welfare Gains from Risk Sharing among Middle Eastern Countries, Excluding Israel

	Peace club		
	Egypt	Jordan	Average
	0	20	2
	(0)	(7)	

	Peace club plus Morocco and Tunisia				
	Egypt	Jordan	Morocco	Tunisia	Average
	1	21	11	2	5
	(1)	(6)	(3)	(1)	

	Enhanced peace club					
Egypt	Jordan	Morocco	Saudi Arabia	Syria	Tunisia	Average
8	34	20	11	12	6	12
(3)	(10)	(7)	(4)	(7)	(2)	

		Countries in Table 2						
Algeria	Bahrain	Egypt	Jordan	Morocco	Saudi Arabia	Syria	Tunisia	Average
9	9	9	37	20	13	13	6	12
(2)	(3)	(3)	(11)	(6)	(4)	(7)	(2)	

Sample: 1980–94. The displayed numbers represent the gain in utility, for each country, as a result of moving from financial autarky (each country consumes its GDP) to perfect risk sharing (each country consumes the allocation described in equation(1)). The gain can be interpreted as a permanent percentage increase in the country's per capita consumption, relative to its initial (1980) consumption in autarky, i.e. relative to its 1980 per capita real GDP. The potential welfare gains are calculated under the assumption of logarithmic utility and with the log-difference of each country's GDP, and of the total GDP of the nine countries, all following a joint normal distribution, the parameters of which are estimated from the individual time series. Standard errors are in parentheses. The average potential welfare gain is calculated as a weighted average, by population, of the individual country gains.

'high GDP when oil prices are high.'[16] Suppose that another country that produces only oil joins the group. The non-oil-producing countries are thrilled, but the 'monopolist' oil producing country is not, since the 'price' of its differentiated good falls and its welfare gains from risk sharing are now smaller (although the average welfare gains from risk sharing within the enhanced group are larger).

A relevant question is whether the gains from risk sharing discussed so far are related to economic cooperation with Israel or can be achieved among Middle Eastern countries without including Israel. Table 4 shows the estimated potential welfare gains from risk sharing within the same groups of countries as in Tables 2 and 3, excluding Israel from all the groups. In general, Israel plays no particular role in the provision of risk sharing except, perhaps, for the fact that the absence of Israel improves Tunisia's situation. Also, in the small 'peace club,' the absence of Israel entails a loss for Egypt and a gain for Jordan. Jordan's economy is too small, in terms of GDP per capita and of population (i.e., in terms of total GDP), to provide substantial income insurance for Egypt. Thus, with Israel in the 'peace club,' Egypt's gain from risk sharing increases but at the same time Jordan's gain declines, since Jordan's 'rent' from the provision of income insurance to Egypt falls.

These results indicate that virtually all the potential gains from risk sharing through financial market integration in the Middle East can be achieved without Israel. Thus, one may argue that these gains are unrelated to the peace process, and can be achieved via cross-country asset holdings among Arab countries alone. As a matter of fact, the same holds true for other forms of economic cooperation in the region. Groups of Arab countries without Israel can achieve substantial gains by cooperating in the areas of water, energy, tourism, or transportation. Why, then, have these sources of mutual gains been brought up almost entirely in the context of the peace process with Israel? The most plausible answer is that the peace process is a catalyst, a symbolic event that motivates the governments, business communities, and professionals of the region to engage in mutually beneficial activities. Of course, this answer applies to gains from both financial-market integration and from most other forms of economic cooperation.

Assistance from world organizations, the United States, or the European Community is often regarded as essential for the successful take-off of joint ventures in the region, and the peace process is a precondition for such assistance. Finally, and most relevant for financial market integration, is investor sentiment. Without confidence in the stability of the political regimes and of financial markets in the various countries of the region, there can be no investments and hence no insurance across Middle Eastern countries. In other words, there can be no risk sharing without peace in the region, so that it makes sense to discuss the potential gains from risk sharing in the Middle East in the context of the peace process between Israel and both its close and its more distant neighbors.

3. HOW WERE GDP SHOCKS SMOOTHED IN PRACTICE?

To assess the extent to which the large potential welfare gains from risk sharing were achieved in practice, we measure income and consumption smoothing among Middle Eastern countries

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[16] The model by Martin and Rey (2000) formalizes precisely this sort of intuition.

using the methodology developed in Asdrubali, Sørensen, and Yosha (1996) and further developed by Sørensen and Yosha (1998) and Mélitz and Zumer (1999). We briefly present the basic intuition of the approach and its empirical implementation.

There are several mechanisms that allow countries to absorb output shocks. Countries can smooth their income through cross-border ownership of productive assets, which will tend to pool country-specific production shocks. For example, individuals or institutional investors in Israel or Jordan might purchase shares in Saudi oil extraction companies resulting in a transfer of income from Saudi Arabia to these (non-oil producing) countries when oil prices are high. Saudi Arabia might reciprocate by purchasing shares in, e.g., Israeli and Jordanian tourist hotels which tend to do well when the price of oil (and therefore of airline tickets) is low. As a consequence, the income of countries will be smoother than their output. We will define the term 'smoother' shortly but, intuitively, it means that, within the group of countries we are considering, the cross-sectional variance of income is lower than that of output.

This form of international risk sharing, namely, income smoothing through cross-border ownership of productive assets, is reflected in the National Accounts data as the difference between GDP and gross national product (GNP). The difference between a country's GNP and its GDP is precisely the net flow of factor income to that country. We denote GNP as smoother than GDP if the elasticity of GNP with respect to GDP is lower than unity, controlling for 'world-wide' shocks to GDP (in our case, shocks that hit the entire Middle East).

International transfers, e.g., aid from international organizations, constitute another income-smoothing mechanism since, typically, foreign aid constitutes a larger fraction of output when the receiving country is in recession. In Jordan, for example, output per capita decreased sharply during the late 1980s, from $ 2,084 in 1986 to $ 1,120 in 1990 while per capita foreign aid remained relatively stable, decreasing from $ 250 per capita in 1986 to $ 181 in 1990, contributing to smoother income.[17] Since oil-exporting Arab countries in the Middle East have traditionally extended aid to other Arab countries, it is interesting to assess whether such aid has smoothed income across countries in the region. In the National Accounts, net transfers are measured as the difference between disposable national income (DNI) and national income (NI). Another example of international transfers that may have contributed to income smoothing among Middle Eastern countries are worker remittances (e.g., Egyptian workers in Iraq or Palestinian workers in the Persian Gulf). Conceptually, these belong to income smoothing through cross-border factor income flows, but in the National Accounts data remittances are included in international transfers. We denote DNI as smoother than NI if the elasticity of DNI with respect to GDP is lower than that of NI with respect to GDP, controlling for 'world-wide' GDP shocks.[18]

Countries may further smooth their consumption after shocks to income (more precisely, to DNI), through their saving behavior. This can be achieved via intercountry lending and borrowing or through asset purchase and sale (i.e., in a good year the residents or government of one country increase their investment in others), or through adjustment of the domestic investment rate, increasing investment in booms and decreasing it in slumps. In either event, the empirical implication is that cross-country consumption variability will be lower than

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[17] See Hani Abu-Jabarah (1993).

[18] The method of estimating these elasticities is based on a cross-country variance decomposition of the idiosyncratic (country-specific) shocks to GDP (Asdrubali, Sørensen, and Yosha, 1996).

cross-country disposable income variability. In the National Accounts data, consumption smoothing is manifested as the difference between DNI and total (private plus government) consumption. We measure consumption as being smoother than DNI if the elasticity of consumption with respect to GDP is lower than that of DNI with respect to GDP, controlling for 'world-wide' GDP shocks.[19]

In the National Accounts, depreciation is responsible for the discrepancy between GNP and NI. Depreciation is calculated according to fixed accounting rules. Therefore, since the capital/output ratio is typically counter-cyclical, the officially calculated depreciation will constitute a larger fraction of output in recessions and a smaller fraction in booms, resulting in cross-sectional 'dis-smoothing' of shocks.[20]

We estimate the fraction of idiosyncratic output shocks absorbed through each of these mechanisms. It is worth recalling that saving behavior smoothes both idiosyncratic (country-specific) as well as aggregate (Middle-East-wide in our case) output shocks. Our focus here is to quantify the extent to which country-specific shocks are smoothed through various channels.

We estimate the following (panel) equations:

$$
(3) \qquad \Delta \log GDP_{it} - \Delta \log GNP_{it} = v_{f,t} + \beta_f \, \Delta \log GDP_{it} + \varepsilon_{f,it}
$$

$$
\Delta \log GNP_{it} - \Delta \log NI_{it} = v_{d,t} + \beta_d \, \Delta \log GDP_{it} + \varepsilon_{d,it}
$$

$$
\Delta \log NI_{it} - \Delta \log DNI_{it} = v_{\tau,t} + \beta_\tau \, \Delta \log GDP_{it} + \varepsilon_{\tau,it}
$$

$$
\Delta \log DNI_{it} - \Delta \log C_{it} = v_{s,t} + \beta_s \, \Delta \log GDP_{it} + \varepsilon_{s,it}
$$

$$
\Delta \log C_{it} = v_{u,t} + \beta_u \, \Delta \log GDP_{it} + \varepsilon_{u,it}
$$

where $v_{f,t}$, $v_{d,t}$, $v_{\tau,t}$, $v_{s,t}$, and $v_{u,t}$ are time-fixed effects (time dummy variables) that capture year-specific impacts on the left-hand side variables—most notably the impact of growth in the aggregate output of the Middle Eastern countries.[21]

We interpret the β coefficients (with the exception of β_u) as the incremental percentage amounts of smoothing achieved at each level, and β_u as the percentage of country-specific shocks not smoothed. When the coefficients are estimated by Ordinary Least Squares, they add up to 1. If $\beta_u = 0$, there is full risk sharing and the remaining coefficients sum to 1. Otherwise, they add up to less than 1. We do not constrain any of the-coefficients, at any level, to be positive or less than 1. Therefore, if there is dis-smoothing at some level, it will be reflected in a negative value of the corresponding β-coefficient. In the actual estimation, we correct for heteroskedasticity and we are not able to use all countries in all regressions (due to missing data), resulting in β coefficients that do not exactly add up to one.[22]

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[19] Smoothing national consumption through borrowing and lending is not the same as smoothing national income through cross-country factor income flows, since loans have to be repaid whereas factor income flows do not. This implies that borrowing and lending is not a viable option for smoothing permanent shocks.

[20] Of course, real (as opposed to accounting) capital depreciation may be affected by economic conditions. For example, capital may depreciate faster during booms because it is utilized more intensely. Such effects are typically not reflected in the National Accounts data.

[21] The β-coefficients are weighted averages of the year-by-year cross-sectional regressions; see Asdrubali, Sørensen, and Yosha (1996), footnote 5, for further details.

[22] We assume $\operatorname{var} \varepsilon_{x,it} = \sigma_{xi}$ for $x = f, d, \tau, s$ and u, and perform a two-step estimation.

The data

We use annual GDP series from the United Nations National Accounts Statistics: Main Aggregates and Detailed Tables (1983–93). The National Accounts Statistics contain consistent series for GDP, GNP, NI, and DNI, and private and government consumption. This data set is therefore well suited for estimating how country-specific shocks were absorbed in practice through various income and consumption smoothing mechanisms. The series contain many missing observations but the regressions in (3) can still meaningfully run with some missing observations. For the countries in our sample: Algeria, Bahrain, Egypt, Israel, Jordan, Morocco, Saudi Arabia, Syria, and Tunisia, there are less than 50 percent missing observations for all relevant variables. Population data are from the IMF International Finance Statistics. The data are differenced at the annual frequency.

Empirical results

Table 5 gives the estimated fractions of country-specific GDP shocks absorbed through the various income and consumption-smoothing mechanisms. The number in the last row is the fraction of shocks not smoothed.

We find that there is no income insurance through intercountry ownership of productive assets, in line with the well-documented home bias in securities holdings (e.g., French and Poterba, 1991, Tesar and Werner, 1995) and with lack of intercountry income insurance among OECD countries as documented in Sørensen and Yosha (1998).[23] In fact, the estimate in the first row of the table indicates that cross-border factor-income flows actually dis-smoothes GNP—meaning that when a country suffers a negative idiosyncratic GDP shock, GNP declines by even more than GDP. Similar results were found for Latin American countries by Arreaza (1999). The interpretation of this result (which does not hold for developed countries) is not clear and requires further scrutiny.

Table 5
Income and Consumption Smoothing among Middle Eastern Countries: Fractions of Output Smoothed (Percent) through Various Channels

Factor income flows	-7
	(3)
Capital depreciation	-7
	(2)
International transfers	9
	(4)
Saving	42
	(9)
Not smoothed	70
	(6)

Sample: 1983–93. 'Not smoothed' is calculated for the 9 countries analyzed in Table 1 (Algeria, Bahrain, Egypt, Israel, Jordan, Morocco, Saudi Arabia, Syria, Tunisia). The other rows are calculated for Algeria, Bahrain, Israel, Jordan, Morocco, and Tunisia only, since our data source had no observations for the relevant variables in most years for Egypt and Saudi Arabia. Percentages are of country-specific shocks absorbed at each level of smoothing. Standard errors are in parentheses. We interpret the displayed numbers in the first four rows as the incremental amount of smoothing achieved at each level, and the number in the last row as the amount not smoothed. The fractions do not add up to 100 percent due to missing observations and correcting for heteroskedasticity.

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[23] See also Sørensen, Wu, and Yosha (2002), who provide evidence that lack of international risk sharing and home bias are indeed related phenomena.

International transfers smooth about 9 percent of shocks to output. This channel of income smoothing includes aid from international institutions, aid from Arab oil-exporting countries, and remittances by foreign workers, which are counted in the National Accounts as part of international transfers. The fraction of shocks smoothed by international transfers in the Middle East is roughly twice as large as the fraction smoothed by international transfers for OECD countries (Sørensen and Yosha, 1998).

Most of the smoothing of output shocks for Middle Eastern countries is achieved via saving, namely, countries save less in bad years. About 40 percent of country-specific shocks are buffered through this channel. Sørensen and Yosha (1998) report a similar number for OECD countries. Smoothing via saving is probably not a good substitute for smoothing via cross-ownership. Asdrubali, Sørensen, and Yosha (1996), examining U.S. states, show that smoothing through saving goes to zero as longer time horizons are considered while income smoothing is of the same magnitude regardless of the time horizon.[24] Our sample of Middle East countries is too short to examine longer horizons, but this caveat should be kept in mind.

The interpretation is that the more persistent the shocks, the less they are smoothed through (ex-post) saving behavior, in line with the permanent income theory (Becker and Hoffmann, 2002, provide a fully-fledged dynamic analysis of risk-sharing over time horizons of varying length). Our sample of Middle Eastern countries is too short to examine longer horizons but this caveat should be kept in mind.

Finally, we find that about 70 percent of shocks to the output of countries in the region are not smoothed. This is the basis for the main conclusion of our study, namely, that the unexploited welfare gains from financial market integration among Middle Eastern countries are substantial. Furthermore, even if the process of integration encompasses only a small number of countries (e.g., Israel and the countries with which it has already signed a peace agreement or with which it has some sort of diplomatic and economic ties), the gain for these countries will be very high.

A similar fraction of country-specific shocks are not smoothed among OECD countries (Sørensen and Yosha, 1998), but since the potential welfare gains from risk sharing are much greater for Middle Eastern countries, this is also the case with the unexploited welfare gains. The conclusion is that the gains from further smoothing of country-specific output shocks through regional financial market integration are substantial.

4. SUMMARY

We have argued that gains from capital and credit-market integration are important sources of mutual benefits that have been neglected in the discussion of the economics of peace in the Middle East. Such integration entails smoother income and consumption as a result of international diversification of investments. We estimated the magnitude of the potential gains from such risk sharing for a sample of countries in the region, and found that they are of considerable magnitude—far exceeding the potential gains from sharing risk among OECD countries—and that these gains are high even for the small 'peace club' of Egypt, Israel, and

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[24] The interpretation is that the more persistent the shocks, the less they are smoothed through (ex-post) saving behavior, in line with the permanent income theory (see Becker and Hoffmann, 2002, for a full-fledged dynamic analysis of risk sharing over time horizons of varying length).

Jordan. In practice, most of the smoothing of country-specific output shocks for Middle Eastern countries has been achieved via saving (countries save less in bad years) supplemented to some extent by smoothing through international transfers. A considerable fraction of the shocks remains not smoothed, suggesting that the scope for gains from further risk sharing through regional financial-market integration is considerable.

APPENDIX
DERIVATION OF POTENTIAL WELFARE GAINS FROM RISK SHARING

Consider a group of countries subject to output shocks. We think of GDP_{it}, the per capita year t non-storable gross domestic product of country i, as an exogenous random variable with a commonly-known probability distribution.[25] We do not distinguish between the government of a country and its residents. The representative consumer of each country is a risk-averse expected-utility maximizer who derives utility from consumption.[26]

If asset markets are complete then, under a well-known set of assumptions—symmetric information, no transaction costs, constant relative risk aversion (constant elasticity of substitution) utility, identical rate of time preference for all countries—perfect risk sharing among the countries in the group is implied.[27]

$$(1) \qquad c_{it} = k_i \, GDP_t$$

where c_{it} is country i's year t per capita consumption, GDP_t is the year t per capita output of the group, and k_i is a country-specific constant, that is independent of time and of the realization of uncertainty, reflecting country i's 'strength' in the risk-sharing arrangement. Condition (1) states that risk is fully shared among a group of countries if the consumption of each country comoves with (aggregate) shocks to the group's output but does not commove with (idiosyncratic) country-specific shocks.

With logarithmic utility, the following closed-form solution for k_i can be derived:[28]

$$(2) \qquad k_i = \delta \int_0^\infty e^{-\delta t} E_0 \frac{GDP_{it}}{GDP_t} \, dt$$

where E_0 denotes the expectation in period 0. The share of country i's consumption in the group's consumption is the discounted expected share of its future output in the group's output.

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[25] If output is storable, intertemporal smoothing of consumption is facilitated, but it is not a perfect substitute for insurance against output shocks. The general spirit of the analysis and the results if output is storable are similar.

[26] This formulation is suitable for the study of risk sharing between countries but not within countries.

[27] For a derivation of optimal risk sharing allocations, see, e.g., Huang and Litzenberger (1988), Chapter 5. Early empirical tests of perfect risk sharing include Altug and Miller (1990)**,** Cochrane (1991), Mace (1991), Obstfeld (1994b), Townsend (1994), and Canova and Ravn (1996).

[28] See Kalemli-Ozcan, Sørensen, and Yosha (2001) who also derive a closed form solution for K_i for general constant relative risk aversion (constant elasticity of substitution) utility. Obstfeld and Rogoff (1996) devote a section of Chapter 5 to the evaluation of welfare gains from risk sharing, and provide many useful references.

Perfect risk sharing implies condition (1) regardless of the stochastic process governing the gross domestic output of countries, but to compute welfare gains from risk sharing distributional assumptions are needed. Let the natural logarithm of the per capita gross product of a group of each country and the natural logarithm of the per capita gross domestic product of the group be random walks with linear trend drift. More specifically, assume that conditional on GDP_{i0} and GDP_0 the joint distribution of the log-differences of these processes is stationary and normal:

$$\Delta \log GDP_t \sim N\left(\mu, \sigma^2\right), \ \Delta \log GDP_{it} \sim N\left(\mu_i, \sigma_i^2\right), \text{ and}$$
$$\text{cov}\left(\Delta \log GDP_{it}, \Delta \log GDP_t\right) = \text{cov}_i \text{ for all } t$$

This assumption involves an approximation, since the aggregate GDP cannot, in general, be strictly log-normally distributed if each region's GDP is log-normally distributed.

With these distributional assumptions, the constant k_i can be expressed in the following even simpler and economically intuitive manner (Kalemli-Ozcan, Sørensen, and Yosha, 2001):

$$(3) \qquad k_i = \left(\frac{GDP_{i0}}{GDP_0}\right)\left(\frac{\delta}{\delta - \left(\mu_i - \mu + \frac{1}{2}\sigma^2 + \frac{1}{2}\sigma_i^2 - \text{cov}_i\right)}\right)$$

Thus, region i's claim to output in the risk-sharing arrangement is higher for regions with a larger initial share in aggregate output, and for regions with a lower covariance between $\Delta \log GDP_{it}$ and $\Delta \log GDP_t$, reflecting a higher insurance value of region i for the other regions. The higher the variance of region i's gross product, other things equal, the more it can contribute to smoothing shocks in other regions; the higher the variance of the aggregate gross product of the regions, keeping the variance of region i's gross product constant, the more other regions would be willing to 'pay' region i for joining the risk-sharing arrangement.

We stress that the random walk assumption is important for the results: the welfare gains from risk sharing are substantial because shocks (even small shocks) have a large cumulative effect over longer horizons. If gross state product were not highly persistent, the welfare gains from risk sharing would be small. This insight is due to Obstfeld (1994a) who noted that risk sharing has significant welfare consequences only if shocks to output are highly persistent.[29]

We turn to the welfare-gains measure. The discounted expected utility gain to country of moving from no to full risk sharing is

$$(4) \qquad \int_0^\infty e^{-\delta t} E_0 \log\left[k_i GDP_t\right] dt - \int_0^\infty e^{-\delta t} E_0 \log GDP_{it} \, dt$$

$$\approx \int_0^\infty e^{-\delta t} \frac{1}{\delta}\left(\frac{1}{2}\sigma^2 + \frac{1}{2}\sigma_i^2 - \text{cov}_i\right) dt + \frac{1}{\delta^2}\left(\mu_i - \mu\right) - \frac{1}{\delta}\left(\mu_i - \mu\right)$$

(Kalemli-Ozcan, Sørensen, and Yosha, 2001). The third term in the second line of (4) is the discounted expected utility gain or loss from initially being a lender or a borrower. A low trend growth of country i relative to other countries entails a utility gain reflecting the

[29] See also van Wincoop (1994).

compensation for initially being a 'net lender' to other countries. A high trend growth relative to the average entails a utility loss reflecting the 'payment' to other countries for initially being a 'net borrower.'

The second term in the last line of (4) originates from the denominator of the expression for k_i (see the last line of (2)). A high trend growth of country i relative to other countries entails a high consumption share for this country, and therefore, a high utility gain from risk sharing. This term is an order of magnitude larger than the third (off-setting) term discussed in the previous paragraph.

The logarithmic utility specification allows us to study (and estimate) the gains from 'pure' risk sharing without confounding them with gains from intertemporal substitution. Therefore, in what follows, we will ignore the second and third terms in (4), and focus on the first term, which is the discounted expected utility gain of moving from no risk sharing to perfect risk sharing.[30] As our measure of the gains from risk sharing we use the term inside the integral in the last line of (4),

$$(5) \quad \frac{1}{\delta}\left(\frac{1}{2}\sigma^2 + \frac{1}{2}\sigma_i^2 - \mathrm{cov}_i \right)$$

To further interpret this measure, note that adding and subtracting $\log GDP_{i0}$ inside the integral in $\int_0^\infty e^{-\delta t} E_0 \log GDP_{it}$, expected utility in autarky can be written as $\int_0^\infty e^{-\delta t} \left[\log GDP_{i0} + \mu_i t \right] dt$. Using (3), the expected utility under full risk sharing $\int_0^\infty e^{-\delta t} E_0 \log\left[k_i GDP_t \right]$, becomes approximately:

$$\int_0^\infty e^{-\delta t} \left[\log GDP_{it} + \frac{1}{\delta}(\mu_i - \mu)t + (\mu - \mu_i)t + \frac{1}{\delta}\left(\frac{1}{2}\sigma^2 + \frac{1}{2}\sigma_i^2 - \mathrm{cov}_i \right) \right] dt$$

Therefore, ignoring the terms involving the trend growth of GDP, the transition from autarky to full risk sharing is equivalent to a permanent increase of $\frac{1}{\delta}\left(\frac{1}{2}\sigma^2 + \frac{1}{2}\sigma_i^2 - \mathrm{cov}_i \right)$ to the natural logarithm of country i's consumption.

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[30] With constant relative risk-aversion utility there is no such separability.

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