

The Effects of Wars and Financial Crises on Migration and Remittances in the Middle East

Hisham Foad*

June 2010

Abstract

A key feature of the regional economy in the Middle East and North Africa is the flow of migrants from resource poor, but labor abundant countries to the resource rich nations of the Persian Gulf. These workers send remittances back home in large quantities, in some cases exceeding the value of home country exports. The 1990-1991 Gulf War disrupted this dynamic as hundreds of thousands of migrants returned to their native countries, leading to significant decreases in remittance flows to these nations. Using a panel VAR analysis, I show that remittance inflows to the labor exporting countries in the region have a significant yet temporary impact on GDP growth. The major reductions in remittances during the Gulf War were at least partially responsible for the economic downturns suffered by many nations in the region during this period. This result is relevant today as the global financial crisis of 2008 has led to a similar downturn in remittance flows from the Gulf nations.

1 Introduction

On August 2nd 1990, the Iraqi army invaded Kuwait, launching what would become known as the Gulf War.¹ Though the war would be declared over by February 28th, 1991, the economic effects of the war were long standing and spread across the regional economy of the Middle East, North Africa, and beyond to South Asia. Clearly affected were the economies of Iraq and Kuwait, not only from the destruction of capital, political instability, and disruption of oil production, but also from economic sanctions in the case of Iraq. However, the Gulf War had deep effects in other nations that had close economic ties with these economies, particularly the labor exporting countries of the MENA.

Iraq and Kuwait had long been popular destinations for emigrants from resource poor but labor rich nations. Countries like Egypt and Jordan would supply workers to the oil rich nations in the Gulf Cooperation Council (GCC) and Iraq to work on capital projects financed by oil revenues. Out-migration eased labor markets in the migrants' home countries, raising wages and lowering unemployment. The migrants themselves would send a portion of their earnings back home (remittances), often in amounts that they could never have earned had they stayed behind. For most countries in the region, these remittances exceeded official foreign aid payments. In some cases remittances actually exceeded export earnings, providing a key source of foreign exchange.

*Department of Economics, San Diego State University. 5500 Campanile Drive, San Diego, CA 92182. The author would like to thank Catalina Amuedo-Dorantes for invaluable advice on this project. Please direct all correspondence to the author at hfoad@mail.sdsu.edu

¹The name of the war varies across countries and perspectives, with some calling it the First Gulf War, others the Second Gulf War (with the Iran-Iraq War being the first) and others Operation Desert Storm. Regardless, this paper refers specifically to the conflict running between August 1990 and February 1991.

With the outbreak of the Gulf War in 1990, the regional economic dynamic was thrown into upheaval. Hundreds of thousands of migrants that had been working and remitting income in Iraq and Kuwait fled these countries. UN Resolution 661 imposed trade sanctions against Iraq, removing a major trade partner for several countries in the region. The governments of Jordan, the Palestinian territories, Sudan, and Yemen initially sided with Iraq in the conflict.² As a result, GCC countries (most notably Saudi Arabia) tightened their migration policies against natives of these countries. It is estimated that 800,000 Yemenis, 200,000 Jordanians, 150,000 Palestinians, and nearly all Sudanese were effectively expelled from Saudi Arabia in response to their native countries' support for Iraq (Richards and Waterbury, 2007). Add that to the large number of migrants fleeing the war zones and we see a major impact on labor market and remittances.

Figure 1: Remittance Inflows for Egypt

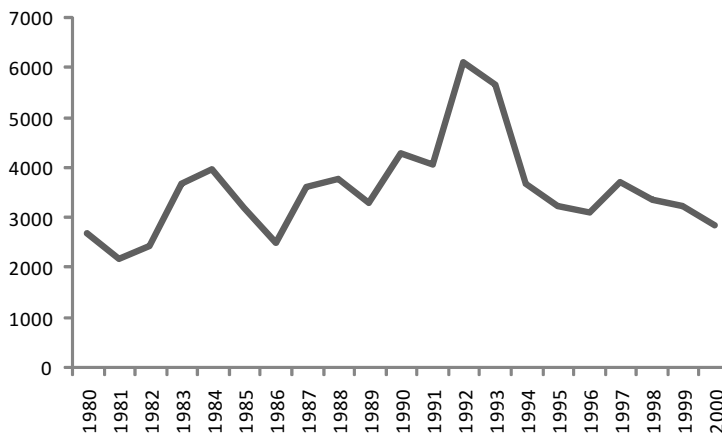
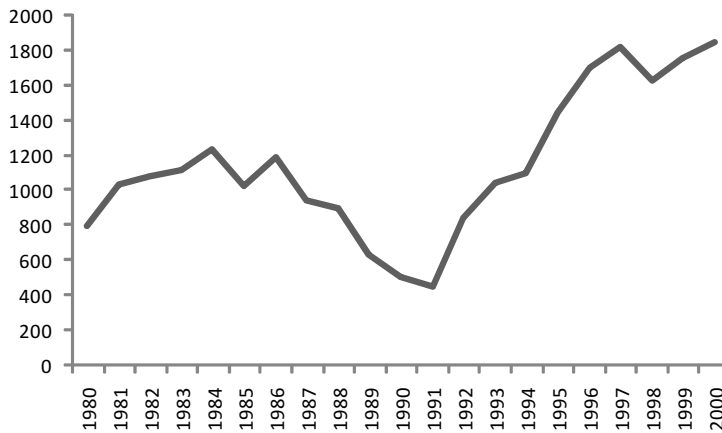


Figure 2: Remittance Inflows for Jordan



Figures 1-2 show remittance inflows for Egypt and Jordan. These are total inflows of remittances into these countries, not remittances specifically coming from the GCC and Iraq, but

²Or at least were opposed to military action against Iraq.

the diagrams show a clear pattern. For these two labor exporting MENA countries, there is a noticeable drop in remittance inflows from 1990-1991. The decline is much larger for Jordan, which may be explained by the larger proportion of Jordanian migrants being repatriated, driven in part by the Jordanian government's support for Iraq and the fact that an estimated 50% of Jordanian emigrants lived in Iraq and Kuwait. Figures 3-4 depict remittance inflows for Bangladesh and India, two Asian countries that have become increasingly important sources of labor in the GCC. There is no noticeable drop in remittance inflows between 1990-1991, due in part to the fact that most Asian migrants working in the MENA during this period were in other GCC countries like Bahrain, Oman, and the UAE. The steady increase in remittance inflows to these Asian nations reflects the increased preference towards migrants from these countries by the GCC, a topic that will be explored in detail later in this paper.

Figure 3: Remittance Inflows for Bangladesh

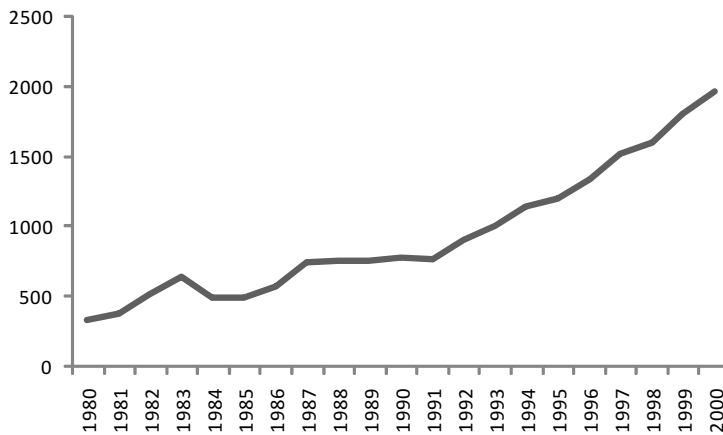
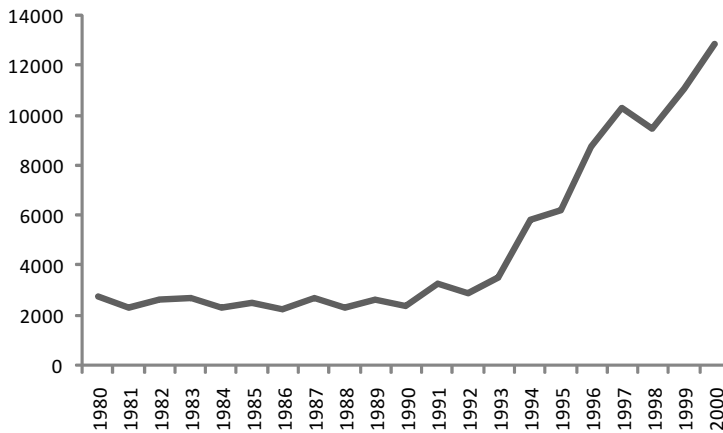


Figure 4: Remittance Inflows for India



So the Gulf War had a large impact on labor migration, remittances, and trade flows. Many countries in the region suffered through economic downturns during this period, but how much can be attributed to the Gulf War itself? How much is due to the loss of Iraq and Kuwait as trade partners? How much is due to increased political instability in the region? How much

can we attribute to the sharp downturn in remittances to several countries? How much is due to the increased burden imposed on countries by returning migrants and refugees? To answer these questions, I use a panel VAR analysis which relates growth in GDP, total trade, the real exchange rate, and remittances across a sample of eighteen countries representing the key labor exporters in the region over the period 1977-2008.³ By controlling for both endogeneity and persistence across these economic variables, I am able to disentangle the effects of the Gulf War on the regional economy.

I estimate that remittances have a significant, yet temporary effect on economic growth in receiving countries. Remittance inflows can explain over 10% of the long run forecast error variance in GDP growth, and a negative shock to remittances is predicted to reduce GDP growth for at least one year. Given that there were sharp reductions in both remittances and GDP growth for many of the countries that export labor to the GCC during the Gulf War, this result is not terribly surprising. Interestingly, remittances explain more of the variation in GDP growth than international trade or real exchange rates, underscoring their importance to the regional economy.

These results are relevant not only from a historical perspective, but also have immediate significance. The global financial crisis in 2008 led to sharp economic downturns in many of the GCC countries. Construction projects around the region were halted as financing dried up and the demand for migrant labor greatly diminished. This has led to sharp downturns in remittances flowing out of the GCC countries. While the migrants affected today are primarily coming from Asia rather than the MENA, the shock to remittance flows is similar to that which occurred in the Gulf War. Understanding the impact of the Gulf War on the regional economy can help us forecast the impact of the current financial crisis.

2 The Economic Importance of Remittances

The economic impact of remittances fits within the larger discussion of the costs and benefits of migration to sending countries. Outward migration eases labor markets at home, leading to higher wages and lower unemployment rates. In addition, a growing literature has documented the importance of diaspora networks in promoting trade and investment between migrants' home and host countries⁴. Finally, migrants that maintain close ties with their native countries may send home remittances, often in excess of what these migrants could have earned had they stayed behind. Table 1 lists inflows of remittances for several countries in this sample across 1985, 1991, 2000, and 2005. Remittances are listed in millions of dollars, as a percentage of GDP, and as a percentage of exports.

The numbers in Table 1 indicate that remittances are not insignificant financial flows for many of the countries in this study. In 1985, remittances in Egypt totaled \$3.2 billion, nearly 14% of GDP and more than 1.7 times larger than exports. Looking at the data for 1991, which reflects the immediate impact of the Gulf War, we see that remittances declined noticeably in Jordan, Pakistan, and the Sudan. Interestingly, two of those countries (Jordan and Sudan) initially supported Iraq in the conflict and many of their emigrants faced formal and informal discrimination abroad because of their home countries political stances.⁵ Looking at remittance data for 2000 and 2008, we see increases in the value of flows for most countries, but the largest

³The countries are Algeria, Bangladesh, Egypt, India, Indonesia, Lebanon, Malaysia, Morocco, Pakistan, the Philippines, Sri Lanka, Sudan, Syria, Thailand, Tunisia, Turkey, and Yemen. Not all countries have data starting in 1977, but every country starts no later than 1990.

⁴Gould (1994), Rauch (2001), and Kugler and Rapoport (2005) present just a few examples of this line of research

⁵Remittance data for Yemen, the other country in the sample that supported Iraq, only begins in 1990. However, there is a \$500 million decline (33%) in remittance inflows for Yemen between 1990 and 1991, a substantial loss that reflects one of the economic penalties these nations faced for backing Iraq in the Gulf War.

Table 1: Remittance Inflows

		1985	1991	2000	2008
Bangladesh	Inflows (\$ mil)	502	769	1,968	8,985
	% of GDP	2.4%	2.5%	4.2%	11.3%
	% of Exports	50.3%	45.5%	41.1%	76.3%
Egypt	Inflows (\$ mil)	3,212	4,054	2,852	8,694
	% of GDP	13.7%	11.4%	2.9%	5.3%
	% of Exports	174.7%	110.8%	61.0%	33.1%
India	Inflows (\$ mil)	2,469	3,289	12,890	51,581
	% of GDP	1.1%	1.2%	2.8%	4.3%
	% of Exports	27.0%	18.6%	30.4%	28.4%
Jordan	Inflows (\$ mil)	1,022	448	1,845	3,794
	% of GDP	20.5%	10.3%	21.8%	17.9%
	% of Exports	129.6%	39.7%	97.1%	48.7%
Pakistan	Inflows (\$ mil)	2,537	1,549	1,075	7,032
	% of GDP	7.1%	3.0%	1.5%	4.8%
	% of Exports	92.6%	23.7%	11.9%	34.6%
Philippines	Inflows (\$ mil)	806	1,850	6,212	18,643
	% of GDP	2.6%	4.1%	8.2%	11.1%
	% of Exports	17.5%	21.0%	15.6%	37.9%
Sudan	Inflows (\$ mil)	261	45	641	3,100
	% of GDP	4.3%	1.0%	5.2%	5.6%
	% of Exports	69.8%	14.8%	35.5%	24.9%
Turkey	Inflows (\$ mil)	1,714	2,819	4,560	1,360
	% of GDP	2.6%	1.9%	1.7%	0.2%
	% of Exports	21.5%	20.7%	16.4%	1.0%
Yemen	Inflows (\$ mil)	n.a.	998	1,288	1,420
	% of GDP	n.a.	21.3%	12.8%	4.9%
	% of Exports	n.a.	151.4%	31.6%	15.3%

Source: IFS (GDP and trade data) and World Bank (remittance data).

increases for Asian nations.⁶ These figures support the general trend across the labor importing nations in the MENA toward more migrants from Asia and away from those from Arab countries, a topic to be discussed in the next section.

Remittances across the MENA are substantial. Given this, it is important to consider the effects of these remittance flows on the receiving nations. Several studies have shown that remittances can be an invaluable source of foreign exchange that can be used to pay down foreign debt and finance imports. Fajnzylber and Lopez (2008) document that in Latin America, remittances are a vital source of capital investment. Edwards and Ureta (2003) find that remittance inflows are associated with increased schooling of children, leading to a vital acquisition of human capital in developing countries. That remittance inflows are decentralized is a key distinguishing feature from foreign aid, which often passes through government institutions. Public investment in developing countries, particularly in the MENA, has a longstanding track record of underperforming private investment. Alesina and Weder (2002) find that centralized foreign aid often

⁶The outlier in this sample is Turkey. The largest source of remittances for Turkey is from Turks working abroad in Germany. Over the past few decades there have been reductions in temporary migration between Turkey and Germany, leading to diminished remittances.

gets diluted due to bribes, fraud and extortion. Remittances may therefore be more vital to development than foreign aid.

On the other hand, several studies have found evidence that remittances are not quite the “manna from heaven” they appear to be. Remittance inflows, much like natural resource exports, may induce “Dutch Disease” in which an appreciation of the real exchange rate damages a country’s long run global competitiveness (for example Amuedo-Dorantes and Pozo, 2004 or Acosta, Lartley, and Mandelman, 2009). As remittances flow into a country, they may be used to purchase non-tradable goods such as housing. This leads to an increase in the price of non-tradables and an appreciation of the real exchange rate. At the same time, increased demand for non-tradables causes this sector to expand at the expense of the domestic tradables (i.e. export) sector. Labor flows from the export sector to the non-tradables sector, causing exports to decline as employment costs rise. If remittance flows were to decline suddenly, the country would find itself without the ability to earn foreign exchange since it had become so reliant on remittance inflows to purchase imports and pay foreign debt. Of course this Dutch Disease story only holds if remittances are used primarily to purchase non-traded goods. El Sakka and McNabb (1999) find that imports financed through remittances tend to have the high income elasticities associated with consumer durables or luxury goods, thus supporting this theory.

Given the substantial remittance flows across the MENA, an event that triggers a sharp downturn in these flows is likely to have a deep economic impact. With the drop in remittances brought on by the Gulf War, a key source of foreign exchange was curtailed, limiting a nation’s ability to pay foreign debts and finance imports. The reduction in remittance inflows reduced an important revenue source for private investment, placing greater burdens on an already overtaxed public sector. On the other hand, the drop in remittances may have led to real exchange rate depreciations, expanding exports. In this case, the drop in foreign exchange from remittances may have been mitigated somewhat.

3 The Effect of the Gulf War on Migration

On the eve of the Gulf War, over five million migrant workers lived in the six countries of the GCC. Including accompanying family members and children raised this number to over seven million (Addleton, 1991). In countries such as Kuwait, Qatar, and the UAE, migrant workers made up over eighty percent of the workforce. Migrants to the GCC came from numerous countries, though the majority arrived from South Asia and the labor exporting MENA nations. A breakdown of the foreign born population across the GCC for 1985 is given in Table 2. Saudi Arabia hosted the largest number of migrants, with 3.5 million immigrants living in Saudi Arabia in 1985. Kuwait had the second most immigrants, with over half a million migrants. While Kuwait and Saudi Arabia had a roughly even number of migrants from the MENA and South and Southeast Asia, the other GCC countries saw immigration primarily from Asia. This is a key feature of the Gulf War on the regional economy, in that the countries most affected were the most popular destinations for migrants from the labor exporting MENA countries.

The invasion of Kuwait in August 1990 caused many people living in that country, both nationals and immigrants, to flee. In 1990, the Kuwaiti population was 2.1 million, with an estimated 1.4 million immigrants. Estimates suggest that a few months after the invasion, nearly one million immigrants had fled Kuwait. Those fleeing the country lost out on anticipated future wages, material possessions, and life savings in Kuwaiti banks (whose currency was now linked to the Iraqi monetary system and basically worthless). Many of the fleeing migrants were from the MENA, as an estimated 1 in 6 Arab migrants working in the Gulf was working in Kuwait. Compare this figure to 1 in 10 for South Asia and 1 in 20 for SE Asia. In the span of a few months, a nation that provided lucrative wages to both migrants and their home countries, turned into a major exporter of refugees who would become a burden on their native lands.

Table 2: Foreign Born Population in the GCC, 1985

	MENA	South Asia	SE Asia	Other	Total
Bahrain	7,600 (7.8%)	70,900 (73.2%)	10,700 (11.1%)	7,700 (7.9%)	96,900
Kuwait	252,900 (46.5%)	242,700 (44.6%)	31,200 (5.7%)	17,100 (3.2%)	543,900
Oman	20,900 (6.6%)	280,800 (89.4%)	4,600 (1.5%)	7,800 (3.2%)	314,100
Qatar	16,400 (23.2%)	46,200 (65.3%)	4,000 (5.7%)	4,100 (5.8%)	70,700
Saudi Arabia	1,154,200 (32.8%)	1,126,300 (32.0%)	968,400 (27.4%)	273,800 (7.8%)	3,552,700
U.A.E.	95,500 (16.0%)	447,700 (74.8%)	25,000 (4.2%)	30,300 (5.0%)	598,500
Total	1,547,500 (30.1%)	2,214,600 (43.0%)	1,043,900 (20.3%)	340,800 (6.6%)	5,146,800

Source: J.S. Birks et al. 1988. The share of migrants from each of the four sending regions (MENA, South Asia, SE Asia, and Other) is given in parentheses below each entry.

As international sanctions were levied against Iraq and the retaliatory bombing of Iraq intensified, the flood of refugees from Kuwait was joined by one leaving Iraq. Iraq had long been a popular destination for migrants coming from Egypt and Jordan, with many moving to Iraq during the long-running Iran-Iraq war to fill the posts vacated by Iraqis drafted into the army. An estimated one million workers from Egypt lived in Iraq, sending home over a billion dollars in remittances per year (Addleton, 1991). As migrants fled the war zones in Iraq, these remittances undoubtedly were curtailed.

While migrants in Kuwait and Iraq were the first to be affected by the Gulf War, the conflict quickly spread to migrants living elsewhere in the GCC, particularly in Saudi Arabia, the nation that hosted the largest number of migrants and led the region in remittance outflows. Prior to the Gulf War, Yemeni migrants in Saudi Arabia had certain advantages over other migrant groups. They could operate shops and businesses without a Saudi sponsor, were not required to have work permits, and could enter the country without visas. As Yemeni support for Iraq at both the public and private levels emerged, these privileges granted exclusively to Yemeni migrants were revoked. Hundreds of thousands of Yemeni migrants left the country, often selling their businesses to Saudis at bargain prices. As Yemenis returned home, not only were the remittances they used to send home curtailed, but the Yemeni economy was left with the burden of dealing with these returning migrants. For example, the taxicab market in Sanaa crashed as returning Yemenis undercut their local competitors. Labor markets tightened and greater demands were placed on an already overburdened public sector.

With immigrants fleeing war zones and being “persuaded” to leave other GCC countries, the major labor exporting nations in the MENA were faced with an influx of returning migrants. Other countries, most notably Jordan, were further burdened by an influx of refugees from Iraq and Kuwait. Between 1980 and 1990, the average annual population growth rate in Jordan was about 3.8%. Between 1990 and 1991, the Jordanian population increased by nearly 10%. This influx of returning migrants and refugees tightened labor markets, leading to lower wages and higher unemployment rates. While there is some evidence that not all displaced migrants returned to their native countries, the large increases in population for countries like Jordan,

Sudan, and Yemen at this time suggest that a handful of these nations dealt not only with reduced remittance inflows but also a supply shock to labor markets. While Jordan did receive foreign aid to help with the influx of refugees, this was unlikely to defray the cost imposed by them. Sudan and Yemen received no such foreign aid to deal with their own refugee/returning migrant problems.

The Gulf War marked a shift in migration policy for the GCC countries. First, there was an increased willingness to use migration policy as a political tool. A migrant's status in a country became increasingly dependent on relations between the migrant's home and host countries. In the case of migrants from Jordan, the Palestinian territories, Sudan, and Yemen, their host country governments' support for Iraq directly affected their migrants' status in the GCC. Second, there was a shift in the composition of migrants away from those from the MENA to those coming from Asia. At one level this was driven by economic considerations, as Asian migrants were willing to work for lower wages. However, there was a political aspect as well, as Asian migrants were viewed as being more "politically tractable" than those from other Arab nations. In Kuwait, the government placed increased emphasis on "Kuwaiti Nationalism" following the Gulf War. The implication of this was that Kuwaiti immigration policy would favor temporary rather than permanent migrants. As Asian immigrants were more likely to be temporary migrants (and viewed as more politically docile), they were given preference in migration policy. This trend has continued today with GCC turning to a sponsorship (kafala) system in which migrants receive an entry visa and work permit only if a GCC citizen or institution employs them. Such a system gives countries greater control not only over where migrants arrive from, but also in how long they stay.

4 Empirical Model

Remittance inflows of the magnitude observed in the MENA are likely to have significant impacts on economic growth, trade, and real exchange rates. As remittance inflows are often used to finance the acquisition of human and physical capital, a drop in these remittances suggests less investment leading to slower growth. A drop in remittances will also lower a country's foreign exchange earnings, limiting its ability to purchase imports. If remittances lead to Dutch Disease effects, then a drop in remittances is likely to lead to a real exchange rate depreciation as consumption of non-tradables drops.

At the same time, inflows of remittances are likely to be affected by home country growth, trade and real exchange rates. Strong growth in a migrants home country may reduce remittances motivated by altruism or increase self-interested remittances from migrants looking to invest in home country assets. Increased trade between a migrants home and host countries may increase remittance flows as the cost of sending money back home falls with improved infrastructure between the two countries. A real exchange rate depreciation in the migrants home country may induce an increase in remittance flows as the migrant is able to get more "bang" for their remittance dollar. Given these theories and several others that could be posited here, there is likely to be simultaneity between these four variables. As a result, an analysis trying to infer causality from remittances to any of these other variables will yield biased estimates. Rather, we must treat these variables as a system of equations.

One approach would be to use a vector auto-regression (VAR) for each country in the sample. However, high frequency data on remittances, particularly from years in the past is simply not available. Annual remittance data from the World Bank is available for most countries ranging back to 1977, and to 1970 for a few countries. The last year of data is 2008. This leaves us with a relatively short time period with which to estimate a VAR for each country individually. Any asymptotic results would be hard to justify given the small sample size.

An alternative is to use a panel VAR (PVAR) in which we utilize variation in both the cross-

section and time dimensions to estimate the dynamic system connecting output growth, trade, remittances, and real exchange rates. Define the vector $Y_{i,t} = \{gdp_{i,t}, trade_{i,t}, rer_{i,t}, remit_{i,t}\}$. The four variables in the system are the growth rate in gross domestic product for country i at time t , the percentage change in total trade (exports plus imports) for country i at time t , the percentage change in the real exchange rate index for country i , and the percentage change in remittance inflows into country i . Changes of these four variables were used to ensure stationarity. GDP, trade data, and the real exchange rate index were collected from the International Financial Statistics, while remittance inflows are from the World Development Indicators.⁷ The basic PVAR econometric specification is given by:

$$Y_{i,t} = \alpha_i + \beta_t + \Gamma(L)Y_{i,t} + e_{i,t}$$

$\Gamma(L) = \Gamma_1 L + \Gamma_2 L^2 + \dots + \Gamma_p L^p$ is a polynomial in the lag operator, where the lag length p is selected by information criteria. α_i is a country specific fixed effect, β_t is year specific effect, and $e_{i,t}$ is a time and country varying error term. In order to eliminate the year and country fixed effects, I make two transformations. First, the data are time demeaned by subtracting each observation from its year specific mean. Since country fixed effects are correlated with the regressors by virtue of the lagged dependent variables in $Y_{i,t}$, the mean differencing procedure commonly used to eliminate these fixed effects will yield biased estimates (Blundell and Bond, 1998). Rather, we must employ a procedure called forward mean differencing as defined by Arellano and Bover (1995). All variables are transformed into deviations from their forward means. Let $\bar{Y}_{i,t}$ denote the average constructed from future values of a variable constructed at time t . For example, $\overline{gdp}_{i,1990}$ would be the average GDP growth rate for country i measured over the period 1991 through 2008. $\overline{gdp}_{i,1991}$ would be the average GDP growth rate for country i measured over the period 1992-2008. Using forward means, we transform each variable in the system as:

$$Y_{i,t}^* = \delta_{i,t}(Y_{i,t} - \bar{Y}_{i,t})$$

Where $\delta_{i,t} = \sqrt{(T_i - t)/(T_i - t + 1)}$ is a weight dependent on the total number of observations for each country T_i and the distance into the future we are differencing ($T_i - t$). This weight is used to standardize the variance across observations and preserve homoskedasticity. Since we are using forward means, this procedure necessitates the loss of the last year of data. The final transformed model is then:

$$Y_{i,t}^* = \Gamma(L)Y_{i,t}^* + e_{i,t}^*$$

If the original errors are not auto-correlated and homoskedastic, then the transformed errors $e_{i,t}^*$ should exhibit similar properties. Furthermore, the GMM procedure used to estimate the parameters of the PVAR model uses lagged values of $Y_{i,t}$ as instruments for contemporaneous variables. Since these instruments are lagged values of $Y_{i,t}$, they should remain uncorrelated with the transformed errors preserving consistency (Holtz-Eakin et. al. 1988, Gilchrist and Himmelberg 1998).

Once we estimate the coefficients of the PVAR model, we can proceed with forecast error variance decompositions (VDC) and impulse response functions (IRF). The VDC's indicate the variance of the forecast error variance for each variable that is attributable to its own innovations as well as innovations in other variables in the system. For example, if we estimate that 10% of the forecast error variance in GDP growth is due to remittance inflows, then we may have evidence that the drop in GDP in a country like Jordan following the Gulf War was due to the

⁷The real exchange rate used was the real effective exchange rate index published by the International Financial Statistics. To fill in gaps in this data set, real exchange rates were constructed by using a trade weighted average of nominal exchange rates and inflation rates.

drop in remittances. The IRF's are useful for estimating both the magnitude and persistence of a one standard deviation shock in one of the system variables to one of the other variables in the model. For example, the IRF's may indicate that a one standard deviation decrease in remittances (note that the decrease was much larger than this in several countries) has both an immediate and persistent effect on GDP growth. Alternatively, the IRF analysis may show an immediate response, but one that dissipates after one year.

In order to compute VDC's and IRF's, the residuals from the PVAR estimation must be orthogonalized. Effectively, we must identify which variables affect the others contemporaneously and which variables affect the others only with a lag. For example, if we believe that home country GDP is only affected by remittances with a lag, but a drop in home country GDP will immediately affect remittance inflows (due to altruism for example), then home country GDP is considered to be more exogenous than remittance inflows. A recursive ordering is used to orthogonalize the residuals, with variables listed from the most exogenous to the least. Home country GDP growth is listed first, followed by home country trade growth, then real exchange rate appreciations, and finally the change in remittance inflows. Consider a positive shock to GDP growth. The increase in income leads to an increase in imports, which should lead to a real exchange rate appreciation (through higher prices). Remitters will respond to changes in the real exchange rate as currency fluctuations change the value of remittances (c.f. Faini, 1994). While there is some evidence that remittances have Dutch Disease effects on real exchange rates, I argue that these effects occur only with a lag.

Finally, confidence intervals need to be constructed for the IRF's. Since the IRF's are computed using the estimated PVAR coefficients, we must take the standard error of these coefficients into account. This is done with Monte Carlo simulation, in which the parameters of the model are re-calculated multiple times (10,000 draws) using the estimated coefficients and their variance covariance matrices as an underlying distribution. The 5th and 95th percentiles from this new resulting distribution are then used to generate lower and upper bounds for the IRF's.

5 PVAR Estimates

Table 3 gives the forecast error variance decomposition across variables in the PVAR system. Looking at the first row, we see that remittances can explain up to 10.7% of the forecast error variance in GDP growth after 10 periods. Thus, remittances appear to have a long run effect on economic growth across the sample of countries that export labor to the GCC. This result fits in with studies showing that remittances are used to finance investments in human and physical capital and are a key driver of growth in developing countries. Remittances can also explain 11.1% of the forecast error variation in trade and 18.9% of the variation in real exchange rates. Remittances may affect trade because they provide foreign exchange with which to purchase imports or by simply helping to expand output leading to increased exports and imports. The real exchange rate may be affected by remittances if an inflow of foreign exchange causes consumers at home to increase their purchases of non-tradables, appreciating the real exchange rate. Overall, these results confirm anecdotal evidence that remittances are a key variable to consider when evaluating economic conditions in the MENA and South Asia.

Up to 27.8% of the forecast error variance in remittances can be explained by variations in GDP growth in the home country. This result confirms earlier work on the macroeconomic determinants of remittances (Elbadawi and Rocha, 1992; Coulibaly 2009). Remittances may rise as home country GDP growth increases if migrants are self interested and seeking to take advantage of high returns on home country investment. Alternatively, remittances may rise as GDP growth decreases if migrants are acting altruistically and supporting family back home. Interestingly, trade and real exchange rates explain comparatively little of the variation in remit-

tances (5.4% together), suggesting that remittances across the sample are relatively unaffected by the documented positive correlation between trade and migration (c.f. Rauch, 2001). Furthermore, migrants in the sample do not appear to be responding to exchange rate changes when making decisions on how much to remit.

Table 3: Variance Decomposition after 10 periods

Variables	Percentage of Variance Explained by			
	$gdp_{i,t}$	$trade_{i,t}$	$rer_{i,t}$	$remit_{i,t}$
$gdp_{i,t}$	76.0%	4.5%	8.8%	10.7%
$trade_{i,t}$	24.1%	58.1%	6.7%	11.1%
$rer_{i,t}$	36.1%	1.3%	43.7%	18.9%
$remit_{i,t}$	27.8%	1.2%	4.2%	66.8%

Forecast Error Variance Decomposition from pannel VAR model relating annual changes in GDP, trade, real exchange rates, and remittance inflows.

The VDC's underscore the need to get a better understanding of how remittances affect and are affected by the other variables in the system. To do this, I examine IRF's from the PVAR model. Figure 5 displays the response of a 1 standard deviation shock to GDP growth on GDP growth, annual growth in trade, real exchange rates, and remittances over eight years. A positive growth shock leads to a persistent increase in the economic growth rate over three periods and a one period depreciation in the real exchange rate. Remittances initially drop in response to a one standard deviation increase in GDP growth, then increase in the following year. The initial drop in remittances may be explained by altruism on the part of migrants. If growth in the home country increases, there is less of a need for migrants to support their families back home. Over time however, migrants will send more money back home as strong economic growth may reflect profitable investment opportunities.

Figure 5: Impulse Response to a One Standard Deviation Shock to GDP Growth

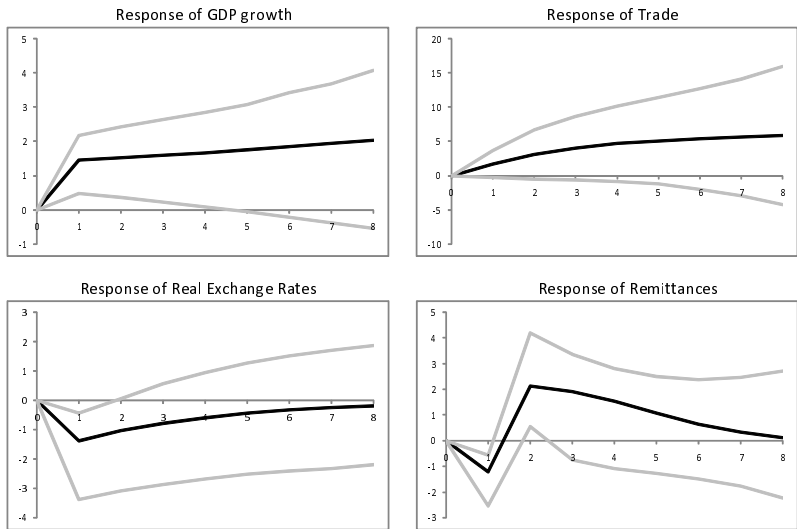
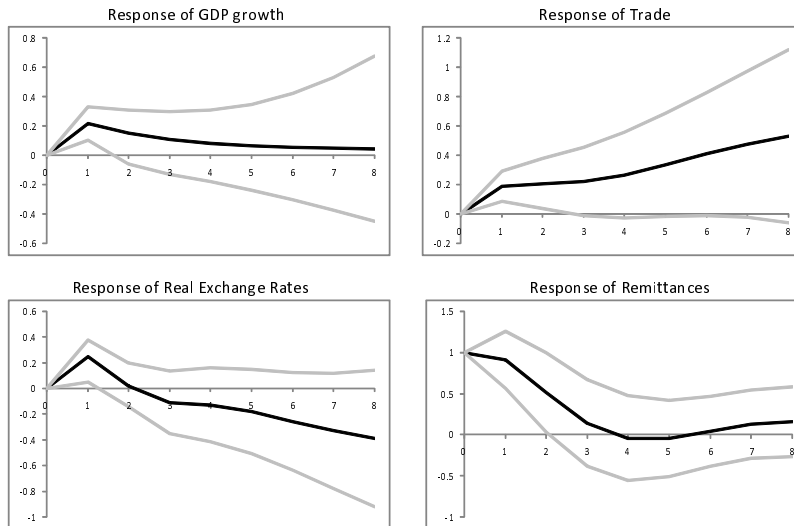


Figure 6 displays the response of a 1 standard deviation shock to remittance growth on all variables in the system. First and foremost, there an increase in remittance growth causes GDP

growth to significantly increase. However, this effect is temporary and dies off after one year. Thus, a decrease in remittance inflows as seen during the Gulf War for countries like Jordan, the Sudan, or Yemen is predicted to induce temporary decreases in the growth rates of GDP. Given the results of the VDC presented above, it is clear that the drop in remittances experienced by these countries is a significant determinant of the economic downturns these countries experienced during this period. Trade growth increases following a positive remittance shock, suggesting that remittances help fund the purchases of imports. This result is supported by real exchange rate appreciation induced by a positive shock to remittance inflows. As remittance inflows increase, consumers in the home country purchase more non-tradables. The increase in non-tradables increases prices at home, leading to a real exchange rate appreciation. However, this Dutch Disease effect does not appear to be permanent, as the real exchange rate returns to its initial level after one period. Finally, there is persistence in remittances, with a shock taking at least two years to dissipate.

Figure 6: Impulse Response to a One Standard Deviation Shock to Remittance Inflow Growth



6 Conclusion

The Gulf War of 1990-1991 had deep effects not only on the principal combatants, but also on neighboring countries involved in the interconnected regional economy. Countries poor in natural resources but abundant in labor had for years exported workers to the oil rich states of the GCC and become increasingly dependent on the remittances sent home by these workers. These remittances were over 10% of GDP and 100% of exports in several cases. The Gulf War led to a massive disruption in these remittance flows as migrant workers were forced to leave not only Iraq and Kuwait, but also neighboring GCC nations as migration policies tightened. Most severely affected were Jordan, the Sudan, and Yemen, three countries who initially supported Iraq in the Gulf War. The political stances of these nations adversely affected their expatriate workers in the GCC. For example, Saudi Arabia revoked the special status Yemeni migrants enjoyed before the war, leading to over 800,000 Yemenis returning home at the end of 1990. Following the war, migration policies in Kuwait and other GCC countries were altered to favor temporary migration. Increasingly immigration from South and Southeast Asia was favored over that from the MENA as these migrants were not only willing to work for less money, but

also seen as less likely to overstay their visas and viewed as more politically tractable. The shift toward Asian migrants and away from those from the labor exporting Arab nations is a lasting legacy of the Gulf War.

Many of these labor exporting nations experienced economic downturns during the years of the Gulf War (1990-1991). The results of the panel VAR model used in this study suggest that the drop in remittance inflows over this period were was a significant determinant of the recessions in these nations. Shocks to remittances are estimated to have significant, albeit temporary impacts on real GDP growth, trade, and real exchange rates. This result is relevant not only from a historical perspective in assessing the calculus of losses incurred during the Gulf War but also to forecast the potential losses from another migration shock to the region.

The global financial crisis that began in 2008 has had significant detrimental effects on the economies of several GCC nations. Recessions in these countries has greatly decreased their demand for labor and resulted in falling remittances to the countries that supply them with this labor. Table 4 shows annual remittances flows for labor exporters to the region since 2006. For many countries, remittance inflows dropped significantly between 2008 and 2009, reflecting the global economic downturn. For example, Morocco suffered a 17% drop in remittance inflows while Egypt and India experienced 10% and 9% drops respectively. The results in this study suggest that this drop in remittances has significantly affected economic conditions in these labor exporting countries.

Table 4: Remittance Inflows, 2006-2009 (\$millions)

	2006	2007	2008	2009
Algeria	1,610	2,120 (31.7%)	2,202 (3.9%)	2,193 (-0.4%)
Bangladesh	5,428	6,592 (20.9%)	8,995 (37.1%)	10,431 (16.0%)
Egypt	5,330	7,656 (43.6%)	8,694 (13.6%)	7,800 (-10.3%)
India	28,334	37,217 (31.4%)	51,581 (38.6%)	47,000 (-8.9%)
Iran	1,032	1,115 (8.0%)	1,115 (0.0%)	1072 (-3.9%)
Israel	944	1,042 (10.3%)	1,422 (36.5%)	1,363 (-4.2%)
Jordan	2,883	3,434 (19.1%)	3,794 (10.5%)	3,650 (-3.8%)
Lebanon	5,202	5,769 (10.9%)	7,180 (24.5%)	7,000 (-2.5%)
Morocco	5,451	6,730 (23.5%)	6,891 (2.4%)	5,720 (-17.0%)
Pakistan	5,121	5,998 (17.1%)	7,039 (17.4%)	8,619 (22.4%)
Philippines	15,251	16,302 (6.9%)	18,643 (14.4%)	19,411 (4.1%)
Sudan	1,179	1,769 (50.0%)	3,100 (75.3%)	3,059 (-1.3%)
Syria	795	824 (3.6%)	850 (3.2%)	827 (-2.7%)
Tunisia	1,510	1,716 (13.6%)	1,870 (9.0%)	1,860 (-0.5%)
Turkey	1,111	1,209 (8.8%)	1,360 (12.5%)	1,336 (-1.8%)
Yemen	1,283	1,322 (3.0%)	1,420 (7.5%)	1,413 (-0.5%)

Remittance inflows and percentage changes from 2006 through 2009. Remittance data is from the World Bank's Migration and Development Brief 11. Annual percentage changes are given in parentheses.

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