

Do remittances affect inflation in the remitting country?

Ali Termos¹

Ismail Genc²

George Naufal³

Abstract

The strong economic ties between the GCC economies and the US are manifested in three ways: currency peg, coupling of monetary policy and the adoption of the US dollar as the trading currency for oil. This paper examines how these dynamics result in misalignment of the US monetary policy with the business cycles of the GCC economies. The study analyzes how the staggering amount of remittances from the GCC economies plays a stabilizing role as a tacit monetary policy tool. Incorporating remittances in the money demand equation results in a more robust model than otherwise. Inflation is shown to be reduced by 14%-30% due to remittances outflows.

Keywords: remittances, inflation, monetary policy, GCC

JEL Classifications: F24, N15

Ali Termos

*American University of Beirut, Olayan School of Business, Finance and Managerial Economics
P.O. Box 11 – 0236 Riad El Solh Beirut 1107 – 2020, Lebanon: Email: at36@aub.edu.lb*

Ismail Genc

*Department of Economics, School of Business and Management, American University of Sharjah
Do remittances affect inflation in the remitting country?
P.O. Box 26666, Sharjah, United Arab Emirates: Email: igenc@aus.edu*

George Naufal

*Department of Economics, School of Business and Management, American University of Sharjah
P.O. Box 26666, Sharjah, United Arab Emirates: Email: gnaufal@aus.edu*

1. Introduction

Studies on remittances have grown significantly in the last decade due to the increased interest in these monetary flows mainly because of their sheer size (De Haas, 2007). Recorded remittances are at least twice the value of official aid transfers and more than 10 times larger than net private capital transfers to least developed countries (De Haas, 2007). The economic consequences of remittances have been studied extensively in the past decade. For instance, remittances have been linked to exchange rates (Amuedo-Dorantes and Pozo, 2004), employment patterns (Amuedo-Dorantes and Pozo, 2006), moral hazard and economic growth (Chami et al, 2005; Giuliano and Ruiz-Arranz, 2009; and Gupta et al 2009), schooling decisions (Edwards and Ureta; 2003) and income inequality (Docquier and Rapoport, 2003).

Most of the research on remittances investigates the consequences of these transfers on the receiving countries. Little is known on the effects of remittances on the sending economies. The main reason behind this oversight is that the size of remittances was never significant in terms of absolute value or percentage of the Gross Domestic Product (GDP) for any remitting region or country. In this regard, the Gulf Cooperation Council (GCC) countries provide the first opportunity to study the effects of remittances on the remitting countries given that they include some of the top remitters in the world.¹ For instance, the official monetary transfers from Saudi Arabia surpassed 15 billion USD in 2006 placing it second to the United States (US) (Ratha and Xu, 2008). Furthermore, Bahrain, Oman and Kuwait rank among the first 30 countries in either absolute amount remitted or size of remittances relative to GDP (Ratha and Xu, 2008). The United Arab Emirates (UAE) alone recorded more than 8 billion USD of remittances outflows in 2007 (Arab Monetary Fund Statistics).² The significant amounts of remittances from the Gulf have been largely fuelled by a large influx of foreign workers. The mean proportion of the population as foreign workers in the Gulf is more than 50%, with Qatar and UAE reporting more than 70% of their population as expatriates.³ The large demand for foreign labor was a result of huge projects undertaken in the Arabian Gulf area and mostly funded by oil receipts.⁴

This paper aims to contribute to the remittances literature by examining the inflationary effects of remittances on the remitting country. We focus on one of the main migration areas in the world, namely, the GCC countries.⁵ The GCC countries present a unique and interesting case to study the effects of remittances on the remitting economy. They are not only among the strongest remitters in the world, primarily because of the high proportion of foreign labor to total population and the continuously decreasing cost of money transfer (Ratha, 2007), but also because of the legal restrictions on the expatriates' possession of land.

In order to assess the impact of this outflow of remittances on the GCC's monetary policy, one cannot ignore the strong economic ties between the GCC countries and the US.⁶ These ties are identified in three main channels: pegging of the GCC currencies to the US dollar, coupling of US monetary policy and that of the GCC countries, and the adoption of the US dollar as the official trading currency for oil in the international market.

In theory, the rise in energy prices, mainly the price of oil, results in economic downturn in the US but it boosts the GCC economies. The Federal Reserve Bank (Fed) therefore engages in interest rate cut to curb the expected recession. As the GCC economies are closely tied to the Fed's actions, they follow its policy by cutting interest rates at home. This interest rate cut would exacerbate inflation in the expanding Gulf economies and send it to a higher level than desired. Furthermore, while the Fed conducts open market purchase to pour money in the US economy to enhance economic activities, the GCC economies need to be engaged in open market sale to slow down their economies. However given the lack of an operational governmental bonds market in this regional economy and a less autonomous monetary policy, the staggering amount of remittances from the GCC economies during economic upturns seem to play a stabilizing role as a tacit monetary policy tool. We show evidently that these remittances are able to mitigate the inflationary pressure that is induced by the increase in the price of oil.

In what follows we investigate the impact of these transfers on the monetary policy and inflation. Section (2) presents an overview of the dynamics of remittances in the Gulf region and their international relevance. Section (3) illustrates how this leakage of money proves to be an integral part in the money demand determinants and rise up to play the role of a tacit monetary policy instrument similar to open market sale of treasury bonds. Section (4) further investigates the validity of the proposition that remittances outflow helps mitigate inflationary pressure induced by spikes of oil price. Section (5) draws some concluding remarks and policy implications.

2. Background and motivation

In the last two decades and up until the 2008 financial crisis, remittances have been increasing tremendously (Ruiz and Vargas – Silva, 2010). For many least developed countries remittances have already outweighed foreign aid and Foreign Direct Investment (FDI) in dollar amount (Connell and Brown 2004; De Haas, 2006; Heilmann 2006; Chami et al. 2006). The increases in the stock of international migrants and the declining cost of transferring money have spurred a huge increase in the international flow of migrants' remittances (Ratha, 2007). The latest estimates from the World Bank value the remittance flows at more than 440 billion USD (Ratha and Xu, 2008).⁷ These large amounts of monetary transfers have raised interest among researchers and policy makers alike. However, the remittances literature has only focused on the economic consequences of remittances on the receiving end. A main reason for this oversight is that remittance outflows were never a substantial value or a significant portion of remitting countries' GDP (or other economic indicators) for any region or economy. The story of the GCC economies is different. While most remitting countries are among OECD countries where remittances constitute a small proportion of their respective GDP, remittances from the GCC countries are of significant size to several macroeconomic indicators. Table 1 presents an overview of the importance of remittance outflows from the GCC. In 2007 alone, more than 37 billion USD was remitted from the GCC with an average GDP share of 6% (highest is 9% in Oman). In Bahrain and the UAE remittance outflows per capita were close to 2,000 USD (1,800 and 1,900 USD respectively) while this value jumped to almost 5,000 USD for Bahrain and Oman when limiting the sample to foreign workers. The means for remittance outflows per capita are 1,400 USD and 3,000 USD for total population and only foreign population respectively. To put these figures in perspective and for the same year, the largest remittances per capita for receiving countries were for Luxembourg (3,300 USD) and Lebanon (1,407). The remittances per capita for all remaining countries are significantly less than 1,000 USD. For instance, remittances per capita for the US, the largest remitting country in the World, are 10 USD.⁸

[INSERT TABLE 1 ABOUT HERE]

Furthermore, remittance outflows constitute a large share of four main macroeconomic components for the GCC countries: exports, imports, consumption and investment. For instance, while the mean remittance outflows share of exports in the GCC is 8%, the averages for the remaining three components are all above 10% with an astonishing 26% share of investments. In Kuwait remittance outflows are around 17% of the size of total investments which sets the lowest share. In Oman the size of remittance outflows is half the size of investments.

The strong economic growth and relative political stability that the GCC economies have experienced in the last two decades lured a large number of workers. As seen in Table 1, the mean of the share of total population as expatriates in the GCC countries is more than 50%. For instance, in Qatar this share is more than 86%. Most of the foreign expatriates consider GCC countries as their work place destination due to promising opportunities. This remarkable influx of expatriates placed the Gulf region as one of the most important migration destinations (Adams, 2009).⁹

Three additional factors contribute to this dramatic surge in remittance outflows from the GCC countries. First, foreign workers cannot obtain the local citizenship in any of the GCC countries. Therefore, foreign workers usually cannot stay in the Arabian Gulf permanently. The naturalization restriction renders the Arabian Gulf as a transient destination pushing expatriates to remit more money to prepare for their evident return to their home countries. Second, foreigners are not allowed to own property in most GCC countries. This property ownership restriction crowds out expatriate savings and compels them to send money to buy residential or commercial real estate in their home countries. Finally, the majority of low skilled and blue-collar workers (for instance all construction workers) are not allowed to bring their families in. This restriction further drives them to send most of their income home to support their dependents.

To summarize, many factors make the GCC region one of the strongest remitters in the world. We take advantage of this unique case to empirically study the impact of remittance outflows on the sending economies. The following section examines the remittances channel and monetary policy in the GCC area.

3. Examining the remittance channel of monetary policy

Given the indisputable importance of remittances in the GCC economies and in an effort to examine whether the effect of remittances on this region's economic performance is not just transitory but rather structural, one needs to gauge the potential long-run effect of these monetary outflows on the whole economy. To this end, a cointegration technique is carried out for two different money-demand models, one that includes remittances and another that does not. The aim is to find the most suitable model for the region. It is shown that when remittances are included in a money-demand equation, the model renders a long-run cointegrating relationship among the variables of the model. Therefore, in anticipation of our results, one can say that remittance outflows cannot be ignored when examining monetary policy dynamics in the GCC economies.

More specifically, we test the co-integration property between the US monetary policy and that of the GCC economies according to the following specification of aggregate money demand equations:

$$\ln\left(\frac{M}{P}\right) = \beta_0 + \beta_1 \ln\left(\frac{Y}{P}\right) + \beta_2 R + \varepsilon \quad (1)$$

$$\ln\left(\frac{M - R_{\text{remit}}}{P}\right) = \gamma_0 + \gamma_1 \ln\left(\frac{Y}{P}\right) + \gamma_2 R + \varepsilon \quad (2)$$

Equation (1) refers to the aggregate money demand for the GCC countries in the general sense. That is, real money $\left(\frac{M}{P}\right)$ is positively related to real GDP $\left(\frac{Y}{P}\right)$, ($\beta_1 > 0$), and negatively related to nominal interest rate (R), ($\beta_2 < 0$). Alternatively, as represented in Equation (2), real money in excess of remittances, which is the actual amount of money remaining in the remitting country once remittances are repatriated, is positively related to real GDP, ($\gamma_1 > 0$), and negatively related to nominal interest rate, ($\gamma_2 < 0$).

The data covers the period of 1975 – 2008 annually for the six GCC countries. The data on the macro values are obtained from the International Financial Statistics (IFS) of the IMF. Data on remittances come from the Arab Monetary Fund online database. Some descriptive statistics are presented in Table (2). We define the following variables: real money is generated as $\frac{M}{P}$ where M represents money, which is defined as “money plus quasi-money in USD million” and P stands for the GDP deflator. Also, the natural log of real GDP is given by $\log\left(\frac{Y}{P}\right)$ where Y is real GDP. The log of (real money - real remittances) is $\log\left(\frac{M}{P} - \frac{R_{\text{remit}}}{P}\right)$. The variable R is the federal fund rate (FFR). The variables are tested for the existence of unit root in levels and first differences via a number of conventional tests. In short, they are found to be non-stationary in levels and stationary in first differences.¹⁰

[INSERT TABLE 2 ABOUT HERE]

Next, we run a battery of cointegration tests via Pedroni (1994 and 2004), Kao (1999) and Fisher – pooled Johansen of Maddala and Wu (1999). We include a linear trend and an intercept in the data but we do not include a trend in the cointegration equation. We start by testing the cointegration among $\left\{ \log\left(\frac{M}{P}\right), \log\left(\frac{Y}{P}\right) \text{ and } R \right\}$. The results are shown in Tables 3 – 5.

[INSERT TABLE 3 ABOUT HERE]

[INSERT TABLE 4 ABOUT HERE]

[INSERT TABLE 5 ABOUT HERE]

The Pedroni Panel v - and ADF tests support the lack of cointegration among real money, real income and interest rate. Furthermore, the Fisher test accepts the null of no cointegration hypothesis. However, the Kao test rejects the null of no cointegration hypothesis. Thus, we conclude that the monetary policy dynamics in the GCC countries cannot be consistently described by this relationship.

Next, we carry out the cointegration tests among $\left\{ \log\left(\frac{M}{P} - \frac{R_{\text{remit}}}{P}\right), \log\left(\frac{Y}{P}\right) \text{ and } R \right\}$. The results are presented in Tables 6 – 8. Though there are a few exceptions, we can say that the Pedroni, Fisher and Kao tests

largely reject the lack of cointegration among (real money – real remittances), real income, and interest rate, supporting our initial proposition.

[INSERT TABLE 6 ABOUT HERE]

[INSERT TABLE 7 ABOUT HERE]

[INSERT TABLE 8 ABOUT HERE]

All of our findings so far point at an economic environment described by Equation (2) as opposed to Equation (1). In other words, the fit model of monetary relations in the Gulf should incorporate remittances into the definition of money. Money defined as such, can be analyzed as a function of real GDP and interest rate. Therefore, to estimate the coefficients of the long-run relationship among these variables, we use a panel data model with fixed effects.¹¹ The results are shown in Table 9.

[INSERT TABLE 9 ABOUT HERE]

Based on these results, we can produce the estimated monetary relationship for the Gulf as:

$$\ln \left(\frac{M}{P} - \frac{Remit}{P} \right) = -2.91 + 1.27 \ln \left(\frac{Y}{P} \right) - 0.13 (R) \quad (3)$$

All variables are statistically significant with a strong R^2 (0.95) value for the equation. The estimation states that the income elasticity of the revised monetary variable, i.e. (real money less real remittances) is larger than unity. Thus, a one-percent increase in real income would lead to more than one percent increase in money demand as defined this way. Likewise, an increase in the interest rate would negatively affect money demand. A 1% rise in interest rate leads to a 0.13% drop in money demand. Or in other words, it takes a 10% spike in interest rate to result in a 1.3% decline in money demand. While the results presented here suggest that the inclusion of remittances outflows in the monetary equation results in a more robust model, the next section discusses the impact of these monetary transfers on inflation in the remitting country.

4. Do remittance outflows affect inflation in the remitting country?

The objective of this section is to enhance our argument that remittances play an implicit role in mitigating the inflationary pressure that is induced by cutting interest rates in the GCC economies at times when these economies are expected to bid interest rates up to curb inflation.

The impact of oil price shock on the US output growth was examined by the seminal work of Bernanke, Gertler, and Watson (1997) and their response to critiques of their work in 2004. In a Sims-Zha experiment, BGW (2004) find that a 10% oil price shock leads to 0.7% decline in GDP if the federal funds rate increases endogenously and to 0.4% if the Fed rate was not allowed to increase. These figures are revised by Carlstrom and Fuesrt (2005) who show that a 10% oil price increase will push the nominal rate by only 0.5% instead of 1.5% as suggested by BGW (2004). It is worth noting that every recession in the US in the past 40 years was preceded by oil price shock and increase in the federal funds rate, perhaps with the exception of the recessions of 2001 and 2008. However, when we assume that the Federal Reserve Bank will engage in interest rate cut in response to oil price shock, it is after the economy is slid into a recession and not prior to the recession.

In the previous section we have demonstrated that incorporating remittances in the money demand equation yields a more robust model than otherwise. This robustness was exemplified in finding a long run cointegration relationship among the main policy variables of a money demand equation. To enhance the robustness of our proposition, we take the argument a step further by examining whether remittances do indeed help mitigate inflation in the remitting economies.¹² We explore various strategies to capture this effect. First we examine a reduced form model as suggested by Gerlach and Svensson (2003) that aims at capturing the determinants of the movement of inflation rates. The authors find that a stylized Philips curve equation with energy prices is the best fit for modeling inflation in the Euro area as shown in Equation (4):

$$\pi_t = \alpha + \alpha_\pi \pi_{t-1} + \alpha_M (M_t - \bar{M}_t) + \alpha_y (y_t - \bar{y}_t) + \sum_{s=0}^3 \gamma_s \Delta q_{t+1-s} + \vartheta_t \quad (4)$$

Where q is the price of oil, $M - \bar{M}$ = real money gap and $y - \bar{y}$ = real output gap. Real money gap (defined as the gap between the current real money stock and long-run equilibrium real money stock) contains considerable

information about the future path of inflation. Also the output gap is a crucial variable that indicates demand pressure and generates inflation. Here potential output is computed using the Hodrick – Prescott filter with a smoothing parameter. The inclusion of energy price inflation becomes particularly important for the GCC economies as major exporters of crude oil. Energy price movements typically account for a large fraction of the short term variability of Consumer Price Index (CPI) inflation. In addition, excluding energy price makes the variance of the residuals greater, which will lead to a wider confidence bands for out-of-sample forecasts. That in turn makes it more difficult to reject the hypothesis of parameter constancy. Therefore, controlling for energy – price movements by including the current and lagged energy – price inflation among the regressors becomes more desirable.

Gerlach and Svensson (2003) finds that the coefficient on the real money gap α_M is substantial and highly significant, indicating that the real money gap does indeed feed into the inflation process. The coefficient of the output gap α_y is also highly significant. Further, the changes of energy prices are highly significant implying that movements in energy prices play an important role in the inflation process. The authors also argue that since the contemporaneous change in energy prices is significant, it may be that the estimates are subject to simultaneity bias. To correct for this bias in our analysis, Hausman (1978) test is conducted for specification error and a p value of 0.918 is obtained. This suggests that the equation can be estimated without worrying about simultaneity effect.

In an attempt to model inflation in the Gulf region, we run several variations of the model suggested by Gerlach and Svensson (2003) for the GCC data. However, when the full model is estimated the outcome renders less significant results especially for money and output gaps. Since oil revenue is the largest component of the regional GDP, collinearity among the variables of interest becomes a serious concern and consequently entails the researcher to separate oil price from other variables. Oil price exhibits highly statistically significant coefficient in the reduced-form model. Therefore we use a two-stage model to evade the possibility of spurious correlation. In stage 1 the following model is estimated:¹³

$$\pi_t = \alpha + \alpha_\pi \pi_{t-1} + \sum_{s=0}^3 \gamma_s \Delta q_{t+1-s} + \vartheta_t \quad (5)$$

The variables are the same as defined earlier. Then in the second stage the error term is regressed on both the money gap and the output gap separately and in a later stage remittances gap is added to the model as indicated in the following system.

$$\vartheta_t = \alpha + \alpha_M (M_t - \bar{M}) + \omega_t \quad (6)$$

$$\vartheta_t = \alpha + \alpha_M (M_t - \bar{M}) + \alpha_c (c_t - \bar{c}) + \omega_t \quad (7)$$

$$\vartheta_t = \alpha + \alpha_M [(M_t - \bar{M}) - (c_t - \bar{c})] + \alpha_y (y_t - \bar{y}) + \omega_t \quad (8)$$

c stands for remittances in real terms. It is particularly important when modeling inflation in oil – dependent economies to distinguish between oil price and other variables in determining inflation rates. The results rendered by stage two regressions are solely driven by the variables examined. Further, the two – stage structure rules out the potential collinearity between oil price and money supply or GDP. The results of these equations are presented in Tables 10 and 11.

[INSERT TABLE 10 ABOUT HERE]

[INSERT TABLE 11 ABOUT HERE]

It is evident that the price of oil is a determinant factor that feeds into inflation rates in these economies. A 1% increase in oil price translates into an average of 8.2% rise in inflation rate. Next, we regress the residuals of Equation (5) on money gap, output gap, and remittances gap in varying specifications as shown above (Equations 6-8). The coefficient on money gap is expected to be positive as inflation rate rises in response to a positive shock of growth in money stock. Also the coefficient on output gap is expected to be positive reflecting a higher inflation that is driven by increasing aggregate demand and spending. However, the remittances gap is expected to relate negatively to inflation if remittances are to attenuate inflation rate. The results are reported in Panels (A) – (C) of Table 11. The money gap has the anticipated positive sign and remittances have a negative sign, indicating an inverse relationship between remittances and inflation. This finding conforms to the expected dynamics presented earlier in the previous section. Without remittances, a 1% positive shock to money growth leads to 2.8% rise in

inflation. Once remittances are introduced into the model the net effect on inflation is reduced to 2.44% (0.0420316 – 0.0175354), a reduction of 14.28%.

In a different setting, when output is introduced to the model as in Equation (8), the effect becomes a 1.93% rise in inflation due to 1% increase in money growth. Therefore, when counting for remittances the monetary policy effect on inflation is weakened. The rise in money supply increases inflation by a decreased rate compared to the case where remittances are not controlled for. The impact of remittances has reduced the exacerbation of inflation by a range of 14% – 30%.¹⁴

Therefore, while remittances play a favorable role as a monetary policy catalyst through mitigating inflationary pressures in the GCC area, they play an adverse role in running fiscal policy of these economies through weakening their spending multipliers. These economies have to increase their spending for the lost dollars fleeing GCC zone. However, while the effect of remittances on monetary policy was measurable, the effect on fiscal policy is hard to quantify because of the identification problem associated with the inherited economic dynamics of these remittances as mentioned above.

5. Concluding remarks

Remittance outflows from the GCC economies represent a significant share of their GDP and other macroeconomic variables. On average, recorded remittance outflows are valued at around 26% of the total investments in the GCC area. The root cause of these outflows is mainly the high proportion of foreign labor force to total population, but also the high economic growth and unprecedented spikes in oil revenue in the last decade. Unlike most studies on remittances, we investigate the impact of these monetary outflows on the remitting rather than on the receiving economies. The strong economic ties of the GCC region with the United States compel the former to closely follow the monetary policy stances of the latter. However, the two policies are not always aligned and remittances prove to attenuate the effect of interest rates variations in the US on the GCC economies. The study examines how the staggering amount of remittances from the GCC economies during economic upturns seems to play a stabilizing role as a tacit monetary policy tool. It is shown that incorporating remittances in the money demand equation yields a more robust model than otherwise. This robustness was exemplified in finding a long run cointegration relationship among the main policy variables of the model.

We further examine the proposition that remittance outflows do indeed affect monetary policy in the GCC zone mitigating the inflationary pressures in these economies. In fact, inflation is shown to be reduced by 14% – 30% due to remittance outflows from this region. How far one can generalize the claim that remittances mitigate inflation in the remitting country depends on various factors that distinguish the GCC economies. First, remittance outflow in this region is of significant proportion of its GDP and other main macro variables. It is plausible to say that the efficacy of this mitigating effect is positively related to the proportion of remittances to the main variables of the economy. Second, the high percentage of expatriate population to the general population is a unique feature of the GCC area that contributes to the mounting significance of remittance outflows. Third, the pegging of the local currencies to the US dollar provides an interesting scenario where remittances seem to play an implicit favorable role for the monetary policy efficacy in the GCC countries but present a difficult challenge to their fiscal policy.

References

- Adams, R. (2009) "The Determinants of International Remittances in Developing Countries" *World Development*, 37 (1), 93 – 103
- Amuedo-Dorantes, C. and Pozo, S. 2004. Worker's Remittances and the Real Exchange Rate: A Paradox of Gifts. *World Development*, 32, 1407-1417.
- Amuedo-Dorantes, C. and S. Pozo 2006 "Migration, remittances and male and female employment patterns," *American Economic Review*, 96 (2), 222 – 226
- Ann Colton, N. (2010) The International Political Economy of Gulf Migration, Viewpoints Special Edition Migration and the Gulf *Middle East Institute Viewpoints*, February 2010, 34 – 36
- Arab Monetary Fund. Arab Monetary Fund Online Database www.amf.org.ae
- Bernanke, B.S., M. Gertler, and M. Watson (1997). Systematic Monetary Policy and the Effects of Oil Price Shocks, *Brookings Papers on Economic Activity* 1, 91-142.
- Bernanke, B.S., M. Gertler, and M. Watson (2004). Oil Shocks and Aggregate Macroeconomic Behavior: The Role of Monetary Policy A Reply, *Journal of Money, Credit, and Banking*, Vol. 36, no. 2 (April), 287-91.
- Carlstrom C.T. and T. S. Fuerst (2005), Oil Prices, Monetary Policy, and the Macroeconomy, Federal Reserve Bank of Cleveland, Policy Discussion Papers no.10, April.
- Chami, R., Fullenkamp, C., Jahjah, S. (2005). Are Immigrant Remittance Flows a Source of Capital for Development? IMF-Working Paper, 52(1), 55-81
- Chami, R., Cosimano, T., Gapen, M. (2006). Beware of Emigrants Bearing Gifts: Optimal Fiscal and Monetary Policy in the Presence of Remittances. *IMF-Working Paper* WP/06/61
- Connell, J., Brown, R. (2004). The remittances of migrant Tongan and Samoan nurses from Australia. *Human Resources for Health* 2(2)
- De Haas, H. (2006). Migration, remittances and regional development in Southern Morocco. *Geoforum* 37(4), 565-580
- De Haas, H. (2007) "Remittances, Migration and Social Development: A Conceptual Review of the Literature," *Social Policy and Development Programme Paper* Number 34.
- Docquier, F. and Rapoport, H. (2003) Remittances and Inequality: A Dynamic Migration Model" IZA Discussion Paper 808
- Edwards, A., Ureta, M., 2003. International Migration, Remittances, and Schooling: Evidence from El Salvador. *Journal of Development Economics* 7, 429-461.
- Genç, I. H., A. Jubain and A. Al-Mutairi "Economic vs. Financial integration or decoupling between the US and the GCC" Forthcoming in *Applied Financial Economics*. (DOI: 10.1080/09603107.2010.508713).
- Gerlach, S. and L. E. O. Svensson (2003) " Money and Inflation in the Euro Area: A Case for Monetary Indicators?", *Journal of Monetary Economics* 50.8, pp. 1649–1672.
- Giuliano, P., Ruiz-Arranz, M., 2009. Remittances, financial development, and growth. *Journal*

of *Development Economics* 90, 144-152.

Gupta, S., Pattillo, C., and Wagh, S. (2009) "Effect of Remittances on Poverty and Financial Development in Sub – Saharan Africa" *World Development* 37 (1), 104 – 115

Haderi, S. H. Papapanagos, P. Sanfey and M. Talka, (1999), "Inflation and stabilisation in Albania," *Post-Communist Economies*, 11(1), pp. 127-141.

Hausman, J.A., (1978), "Specification tests in econometrics", *Econometrica* 46, 1251-1272.

Heilmann, C. (2006). Remittances and the migration-development nexus-Challenges for the sustainable governance of migration. *Ecological Economics* 59, 231-236

Kao, C. (1999), "Spurious Regression and Residual-Based Tests for Cointegration in Panel Data," *Journal of Econometrics*, 90, 1-44.

Ratha, D. (2007) "Leveraging Remittances for Development," MPI Policy Brief, June 2007.
www.worldbank.org/mena.nsf

Ratha, D. and Xu, Z. (2008) *Migration and Remittances Factbook*. Washington, D.C.: The World Bank.

Ruiz, I., and Vargas – Silva, C. (2009) "To send or Not Send. That is the Question: A Review of the Literature on Remittances" *Journal of Business Strategies*, 26 (1), 73 – 98

Maddala, G.S. and Wu, S., (1999) " A comparative study of unit root tests with panel data and a new simple test", *Oxford Bulletin of Economics and Statistics* 61, pp. 631–652.

Naufal, G. and Termos. A (2009) "The Responsiveness of Remittances to the Oil Price: The Case of the GCC" *OPEC Energy Review* 33(3/4), 184 – 197

Naufal, G. and Vargas – Silva, C. (2010) "Migrant transfer in the MENA region: A two way street in which traffic is changing" *Migration Letters*, 7(2), 168 – 178

Organization of the Petroleum Exporting Countries (OPEC) Annual Statistics Bulletin 2009
http://www.opec.org/opec_web/en/publications/202.htm

Pedroni, P.L., (1999), "Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors," *Oxford Bulletin of Economics and Statistics*, 61, 4, 653-670

Pedroni, P.L., (2004), "Panel Cointegration; Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the Purchasing Power Parity Hypothesis," *Econometric Theory*, 20, 597-625

Table 1: Recorded Remittances Outflows from the GCC (2007)

Countries	Remittances Outflows USD Billions	Remittances as a Percent of GDP ¹	Population (Million)	Percent of Population as Migrants ²	Remittances per Capita USD	Remittances per Migrant USD
Bahrain	1.5	8.1%	0.8	39.1%	1,875.0	4,795.4
Kuwait	3.8	3.4%	3.3	68.8%	1,151.5	1,673.7
Oman	3.7	9.2%	2.7	28.4%	1,370.4	4,825.2
Qatar ³	3.7	6.5%	2.6	86.5%	1,423.1	1,645.2
Saudi Arabia	16.1	4.3%	24.3	27.8%	662.6	2,383.3
UAE	8.7	4.5%	4.5	70.0%	1,933.3	2,761.9
Total	37.5	–	38.2	–	–	–
Mean	6.3	6.0%	6.4	53.4%	1,402.6	3,014.1

Countries	Remittances as a Percent of Exports	Remittances as a Percent of Imports	Remittances as a Percent of Consumption	Remittances as a Percent of Investment
Bahrain	9%	13%	16%	30%
Kuwait	5%	11%	8%	17%
Oman	14%	24%	17%	51%
Qatar ³	10%	17%	19%	18%
Saudi Arabia	7%	12%	9%	19%
UAE	5%	7%	8%	22%
Mean	8%	14%	13%	26%

Notes: 1. Table is based on calculations by authors using data from Arab Monetary Fund. 2. Source is United Nations International Migrant Stock. Data is for 2010. 3. Data is for 2006.

Table 2: Descriptive Statistics

	Monies	GDP	Remittances	Deflator	Interest Rate
Mean	26134.71	53361.08	3407.70	71.44	0.06
Median	9412.99	20230.49	1256.00	70.01	0.06
Max	250041.60	468800.00	18078.00	133.60	0.16
Min	341.59	1076.85	208.00	28.22	0.01
Standard Deviation	39816.80	79307.73	4921.14	21.02	0.03
Observations	136	136	136	136	136

Notes: Data for Remittances is from the Arab Monetary Fund online databases. The remaining variables are from International Financial Statistics (IFS).

Table 3: Pedroni Cointegration Results for Equation1

WITHIN	Stat.	p – value	Cointegration	Weighted Stat.	p – value	Cointegration
Panel v-Stat	-0.899332	0.2662	Accept	-0.65772	0.3213	Accept
Panel rho-Stat	2.431469	0.0208	Reject	2.424577	0.0211	Reject
Panel PP-Stat	-2.242738	0.0323	Reject	-2.066359	0.0472	Reject
Panel ADF-Stat	-2.038279	0.05	Accept	-1.959795	0.0585	Accept
BETWEEN						
Group rho-Stat	3.493872	0.0009	Reject			
Group PP-Stat	-2.788449	0.0082	Reject			
Group ADF-Stat	-2.650956	0.0119	Reject			

Notes: 1. The null hypothesis is the absence of cointegration while the alternative for within (panel) dimension is common AR coefficients, i.e. $\rho_i = \rho < 1$ and for between (group) dimension is individual AR coefficients, i.e. $\rho_i < 1$. 2. We assume no deterministic trend. Lags are automatically selected via SIC a maximum of 5 lags. 3. We incorporate a Newey-West bandwidth selection with Bartlett kernel. 4. The acceptance or rejection of the null hypothesis is mentioned by Accept or Reject respectively under the Cointegration column.

Table 4: Kao Cointegration Results for Equation1

	Stat.	p – value	Cointegration
ADF	-3.334726	0	Reject

Notes: 1. The null hypothesis is the absence of cointegration, i.e. $\rho_i = \rho = 1$ while the alternative is $\rho_i = \rho < 1$. 2. We assume no deterministic trend. Lags are automatically selected via SIC a maximum of 5 lags. 3. We incorporate a Newey-West bandwidth selection with Bartlett kernel. 4. The acceptance or rejection of the null hypothesis is mentioned by Accept or Reject respectively under the Cointegration column.

Table 5: Fisher Cointegration Results for Equation1

No. of CV	Trace test Stat.	p – value	Cointegration	Max-Eigen test Stat.	p – value	Cointegration
None	51.43	0	Reject	50.36	0	Reject
At most 1	12.35	0.1362	Accept	13.36	0.1	Accept
At most 2	4.226	0.8362	Accept	4.226	0.8362	Accept

Notes: 1. The null hypothesis is the absence of cointegration while the alternative is the opposite. 2. We assume linear deterministic trend. The first lags in first differences are employed in the test. 3. The acceptance or rejection of the null hypothesis is mentioned by Accept or Reject respectively under the Cointegration column.

Table 6: Pedroni Cointegration Results for Equation 2

WITHIN	Stat.	p – value	Cointegration	Weighted Stat.	p – value	Cointegration
Panel v-Stat	-0.519927	0.3485	Accept	-0.269703	0.3847	Accept H0: No Cointegration
Panel rho-Stat	2.412065	0.0218	Reject	2.391311	0.0229	Reject
Panel PP-Stat	-2.536804	0.016	Reject	-3.094549	0.0033	Reject
Panel ADF-Stat	-2.686292	0.0108	Reject	-3.204721	0.0023	Reject
BETWEEN						
Group rho-Stat	3.462221	0.001	Reject			
Group PP-Stat	-3.746151	0.0004	Reject			
Group ADF-Stat	-3.707326	0.0004	Reject			

Notes: 1. The null hypothesis is the absence of cointegration while the alternative for within (panel) dimension is common AR coefficients, i.e. $\rho_i = \rho < 1$ and for between (group) dimension is individual AR coefficients, i.e. $\rho_i < 1$. 2. We assume no deterministic trend. Lags are automatically selected via SIC a maximum of 5 lags. 3. We incorporate a Newey-West bandwidth selection with Bartlett kernel. 4. The acceptance or rejection of the null hypothesis is mentioned by Accept or Reject respectively under the Cointegration column.

Table 7: Kao Cointegration Results for Equation2

	Stat.	p – value	Cointegration
ADF	-3.035928	0.0012	Reject

Notes: 1. The null hypothesis is the absence of cointegration, i.e. $\rho_i = \rho = 1$ while the alternative is $\rho_i = \rho < 1$. 2. We assume no deterministic trend. Lags are automatically selected via SIC a maximum of 5 lags. 3. We incorporate a Newey-West bandwidth selection with Bartlett kernel. 4. The acceptance or rejection of the null hypothesis is mentioned by Accept or Reject respectively under the Cointegration column.

Table 8: Fisher Cointegration Results for Equation2

No. of CV	Trace test Stat.	p – value	Cointegration	Max-Eigen test Stat.	p – value	Cointegration
None	58.46	0	Reject	52.07	0	Reject
At most 1	17.13	0.0287	Reject	18.42	0.0183	Reject
At most 2	5.271	0.7283	Accept	5.271	0.7283	Accept

Notes: 1. The null hypothesis is the absence of cointegration while the alternative is the opposite. 2. We assume linear deterministic trend. The first lags in first differences are employed in the test. 3. The acceptance or rejection of the null hypothesis is mentioned by Accept or Reject respectively under the Cointegration column.

Table 9: Fixed Effects estimation of long run relationship

Variables	Coefficients
Real GDP (logarithm)	1.269*** (0.3770)
Interest Rate	-0.127** (0.0612)
Constant	-2.911*** (0.3770)
Adjusted R2	0.951
F – Stat	534.4
Sample	136

Notes: 1. The dependent variable is the logarithm of (real money - real remittances). 2. The sample covers the period

1975 to 2008. 3. Standard errors are in parentheses. 4. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Regression Results of Equation 7

Variables	Coefficients
π_{t-1}	- 0.109* (0.0607)
Oil Price	0.082*** (0.0786)

Notes: 1. Standard errors are in parentheses. 2. *** p<0.01, ** p<0.05, * p<0.1. 2. This is the outcome of stage-1 regression of inflation rate against self-lag and the price of oil (q). It is GLS fixed effect panel regression. Oil price proves to be highly significant in determining inflation rates in the GCC economies. 3. To avoid spurious correlation among the variables in question, the error terms produced by this equation are regressed against Money Gap and Output Gap in a separate regression as reported in Table (11).

Table 11: Regression Results of Equations 8, 9 and 10

Panel A – Equation 8		Coefficients
Variables		
$M_t - \bar{M}_t$		0.028*** (0.0026)
Constant		0.022*** (0.0015)
Panel B – Equation 9		Coefficients
Variables		
$M_t - \bar{M}_t$		0.042*** (0.0050)
$c_t - \bar{c}$		- 0.017*** (0.0052)
Constant		0.022*** (0.0017)
Panel C – Equation 10		Coefficients
Variables		
$(M_t - \bar{M}_t) - (c_t - \bar{c})$		0.019*** (0.0046)
$y_t - \bar{y}$		0.031*** (0.0033)
Constant		0.021*** (0.0015)

Notes: 1. Standard errors are in parentheses. 2. *** p<0.01, ** p<0.05, * p<0.1. 2. The regressions are fixed-effect panel GLS. 3. Dependent variable is the error term obtained from Equation (7). Independent variables are: Money Gap (Equation 8), Money Gap and Remittances Gap (Equation 9), and Money Gap net of Remittances Gap and Output Gap (Equation 10). It is shown that remittances help mitigate inflationary pressures in the GCC region by about 14%-30%.

¹ GCC countries are Bahrain, Qatar, Oman, Kuwait, Saudi Arabia, and the United Arab Emirates (UAE).

² Moreover, the average remittances outflows for the 1970 – 2008 period surpassed the 1 billion USD mark in all GCC countries except for Bahrain (Naufal and Vargas – Silva, 2010).

³ The proportion of foreign workers to the total population is even higher when only looking at the labor force (See Ann Colton (2010) for more details).

⁴ The six GCC countries produced around 21% of the world's crude oil in 2009 (The share was calculated by the authors from the Organization of the Petroleum Exporting Countries (OPEC) Annual Statistics Bulletin 2009).

⁵ Adams (2009) refers to this region as the third most important labor – receiving region in the world only behind North America and Europe.

⁶ Genc et al (2010) studies the financial and real integration between the US and GCC.

⁷ World Bank staff estimates based on the International Monetary Fund's Balance of Payments Statistics Yearbook 2008 (Remittances and Migration Factbook, 2008).

⁸ Source is the Human Development Report (2009) at <http://hdrstats.undp.org/fr/indicators/55.html>

⁹ The pool of expatriates in the GCC is also unique in terms of its diversity. For more details refer to Naufal and Termos (2009).

¹⁰ The results are not reported here but available from the authors.

¹¹ A Hausman test for random vs. fixed effects is conducted, yielding a value of 0 for the χ^2 with 2 degrees of freedom. Its p-value is unity. Thus, as the null hypothesis of “individual effects are correlated with the independent variables” could not be rejected, we confirm the usage of the fixed effects model.

¹² In a study on Albania, remittances were found to mitigate inflationary drive in the receiving country as well (Haderi et al, 1999).

¹³ The results of the one-stage model are not reported here but are available from the authors.

¹⁴ The percentage decline is from 2.8 to 2.44 and 1.93.