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MIGRANT WORKERS' REMITTANCES AND MACROECONOMIC POLICY IN JORDAN

Key Words

*Economic Policy;
Interest Differentials;
and Foreign Exchange
Misalignment.*

Abstract

The Migrant Workers' Remittances and Macroeconomic Policy in Jordan study aims at evaluating the impact of macroeconomic policy variables on the inflow of migrant workers' remittances to Jordan. Remittances are found to be the single most important source for foreign exchange in Jordan. They represented 110% of exports, 36.7% of imports, and 19% of GDP on average during the period of the study. This makes Jordan one of the world's most heavily remittance-dependent countries. Understanding the determinants of remittance flows is thus essential to policy. Results show that there is a significant positive relationship between the level of income in Jordan and remittance inflow. Deviations of exchange rates from their real levels, and interest rate differentials are found to have a significant negative impact on the inflow of remittances. The most interesting result of the study is that emigrants are found to be sensitive to macroeconomic policy failures. Interest rates, exchange rate, monetary and fiscal policies should be carefully designed to attract remittances to official channels in Jordan.

Introduction

Migrant remittances play an important role in many labor exporting countries in the world today. In some cases, remittances are the single most important source of for-

foreign exchange.⁽¹⁾ Because foreign exchange is a scant resource in many of the labor exporting countries, mobilizing remittances could ease foreign exchange bottlenecks, helping thus, to mitigate development finance, im-

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(1) See e.g., El-Sakka (2005), Glytsos (2002), Gammeltoft (2002), Taylor (1999), Nishat and Bilgrami (1991), Burney (1987), Russell (1986).

prove balance of payments and alleviate pressures on external borrowing. The inflow of remittances to the labor exporting countries is, however, affected by various macro and micro factors. The majority of the literature about remittances focuses on the micro determinants of the inflow of remittances.⁽²⁾ Though it has been frequently argued that migrant remittances may significantly be affected by economic policy failures, there is relatively little evidence about the macro-economic determinants of remittances.

This study aims at evaluating the impact of macroeconomic policy variables on the inflow of migrant workers' remittances to Jordan. In contrast to the previous literature, this study aims at directly testing the effect of macroeconomic policy on the inflow of remittances.

This paper is organized as follows; section two presents a brief background about the Jordanian economy. The role of emigrant workers' remittances in Jordan is presented in section three. The model of the study is outlined in section four. Results are presented in section five, and in section six some conclusions and policy recommendations are drawn.

A Brief Background about the Jordanian Economy

Jordan is a relatively small country with a very limited resource base. It is considered as one of the poorest countries by region standards. Though it is surrounded by world's largest reserves of crude oil, it has almost none. Imports of crude oil are a major drain on the economy and on its limited foreign exchange. The country has substantial deposits of phosphates and potash. But these products, as is the case for other raw materials, are subject to price fluctuations and unstable demand. Jordan also suffers from a chronic water shortage and is vulnerable to droughts, and much of its land is too arid for agriculture.

The Jordanian economy is overwhelmingly a service economy and is highly dependent on other Arab economies, especially on Iraq. This makes the country's foreign exchange pool very susceptible to external shocks, especially the tourism sector, remittance inflows, and official development assistance and aid from the neighboring oil rich countries.

Before the Iraqi invasion of Kuwait, the Jordanian economy faced many problems including high unemployment rates, escalating external debt and declining remittances. Fol-

(2) See e.g. Stark, 1991 and Stark and Lucas, Stark and Bloom, 1985).

lowing the economic collapse in 1988-89 in the wake of a severe debt crisis, Jordan embarked upon an austerity and restructuring program supported by the IMF. Pressures on the Jordanian Dinar mounted to the extent that the country had to devalue its currency by 50% in 1989. Other measures were taken in the context of an IMF's program of economic reform including government subsidies removal. Massive riots in April 1989 forced the government to keep subsidies for most basic products. By 1990, it was evident that economic performance had begun to improve and Jordan was recovering from the 1989 crisis. Unfortunately this came to a halt as a result of the decision by Iraq to invade Kuwait.

The second Gulf War divided the Arab world into two camps. As a supporter of Iraq, Jordan was among the few countries which were deeply affected by the invasion and its aftermath. The inflow of remittances from Jordanian expatriates as well as aid from its neighboring oil rich Gulf countries were disrupted as a result. Moreover, Jordan's position as the main trade partner of Iraq was complicated by the UN imposed trade sanctions against Iraq. Key Jordanian economic sectors including transportation, agriculture and industry, mainly serving Iraq, were severely affected by sanctions. Tourism was

disrupted as the number of tourists declined by almost 25%. Jordanian exports to Arab and other countries also declined. Kuwait and Saudi Arabia prohibited imports from Jordan because of its political position during the war. Jordanian agriculture, industry and trade sectors were thus shut-out of the most important Gulf countries' markets. The crisis affected almost all economic sectors and led to a mounting unemployment rate of nearly 30 percent and an increase in poverty rate to 33 percent.

During the Gulf Crisis in 1990-91, some 300,000 Jordanians and Palestinians involuntarily returned back to Jordan. This compounded the effects of the Gulf crisis on Jordan and exacerbated the country's already serious economic problems. However, it should be mentioned that some argue that the long run effects of those returnees are positive because this had eased the availability of skilled labor; the country has been already suffering from its shortage, and the large transfer of funds remitted by those returnees (Van Hear 1995).

Under the IMF proposed program, the economy initially recovered well with an average growth of over 9% per year between 1992 and 1995. Inflation, which had exceeded 25% in 1989 fell to only 2.4%. In 1995, Jordan signed a peace treaty with Israel which

intended, in principle, to establish an Israeli-Jordanian Free Trade Area, by which Jordan would enjoy tariff concessions from Israel. It was expected that this move would help the Jordanian economy to carry-out the necessary structural adjustment reforms in a gradual manner in order to minimize their economic and social costs. In reality, both sides agreed to lower tariffs on a limited list of goods only. Other indirect visible effects were export promotion to the Israeli market and possibly through it to international markets (Awartani & Kleiman 1997). The main advantage of the peace treaty was that it had encouraged tourism, which is now growing and would in the future play an important role in the Jordanian economy. In 1996, tight monetary policy discouraged investment and export-oriented manufacturing suffered from the halving of the Jordan-Iraq trade protocol, causing growth to slow down to 2.1% and inflation rise once again to 6.5%. Jordan's small domestic market and the dominant role of the public sector, coupled with concerns over regional stability and high lending rates have made it difficult to attract investment. High unemployment and poverty rates are the main problems facing Jordan. However, trade deficit is also high, representing about 25% of GDP. Finally, central government's heavy debt burden re-

mains one of the main challenges facing Jordan in the medium term.

Since 1999, under the new leadership of Jordan, economic reform has been placed high on the agenda. However, the USA's war against Iraq disrupted economic activity in Jordan, but these effects were short lived. By 2004, it was clear that economic activity had strengthened substantially helped by oil grants from the neighboring Arab countries and a standby agreement signed with the IMF. Economic reforms supported by IMF aimed at (i) stabilizing the economy so as to foster growth; (ii) liberalizing trade prices; (iii) reducing public debt; and (iv) privatizing state-owned enterprises. The government needs to implement a sizable package of fiscal measures to achieve the desired fiscal deficit targets (IMF 2004).

The Role of Remittances in the Jordanian Economy

In spite of its small indigenous population, Jordan plays a major role as one of the key labor exporting countries in the Middle East. Jordan used to export skilled labor on a massive scale in the early seventies of the last century. This had caused a serious domestic shortage of certain skills. Serageldin et al (1981) mention that the drain of Jordanian emigrants reached critical levels, such that skill

shortages adversely affected the implementation of Jordan's development plans. The Jordanian ex-Crown Prince Hassan called for the creation of an international fund to compensate Jordan and other labor-exporting nations for the negative effects of emigration (Bohning 1978). Domestic wages for unskilled labor were bid up as Jordanian employers competed for manual workers. In an attempt to replace emigrants to the Gulf, Jordan imported foreign labor from Egypt, Syria and South Asia. It has been claimed that remittance outflows of guest workers in Jordan neutralized much of the benefits of labor exportation.⁽³⁾

Table (1) shows the officially recorded remittances in Jordan. According to the table, Jordan received some \$ 30.6 billion from the inflow of emigrant remittances during the period 1970-2002. This makes Remittances

the prime earner of foreign exchange followed by tourism. El-Sakka (2004), found that Jordan is the third largest remittance receiving country in the Middle East after Egypt and Morocco. It should be mentioned, however, that these figures represent only officially recorded remittances and they do not include remittances in kind and unrecorded remittances. While sources of the first are relatively easy to estimate through the use of extensive surveys of emigrants, the latter is much harder to estimate. The scale of unrecorded remittances is unknown. Seccombe (1984) estimates the actual remittances flows to be about 60% higher of officially recorded remittances because of the inflow of remittances through unofficial channels and those in kind. Talfaha (1985) sets actual remittances to be two to three times the officially recorded remittances.⁽⁴⁾

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- (3) The net benefit of Jordan, under these conditions, depends on several factors, including the per-capita remittance of identical national and foreign workers, skills of imported relative to exported labor, consumption and saving behavior of the two sets of workers and other impacts on the national labor market. The policy target here would be dual; to minimize the outflow of immigrant labor remittances and maximize the inflow remittances of national labor working abroad. Fortunately, the set of variables aiming at attracting remittances of national labor is also conducive to minimizing the outflow of foreign labor remittances.
 - (4) The scale of unrecorded remittances poses some important questions about the possible link between recorded remittances through official channels, and unrecorded remittances through other means of remitting funds. Favorable macroeconomic environment would encourage emigrants to use official means of remittances, leading thus, to an intra-shift in total remittances, given a certain stock of labor emigrants abroad. Understanding this relationship is crucial for policies targeting emigrant remittances in the labor sending countries. Modeling this link and testing the direction and magnitude of causality between the two types of remittance flows within the model proposed in this paper is unfortunately impossible, given the lack of any reliable time series about unrecorded remittances. Intensive surveys of representative samples of returning emigrants could be a good alternative to understand this relationship. This is however, outside the scope of this paper.

To illustrate the importance of remittances to Jordan, table (1) presents several indicators. The table

shows that remittances are essential for Jordan's balance of payments. Except for the period of the second

Table 1
Remittances in Jordan 1970-2002

Year	Remittances (\$ millions)	Remittances/ Exports (%)	Remittances/ Imports (%)	Remittances/ Consumption (%)	remittances/ GDP (%)	Remittances Per-Capita (\$)	GDP Per-Capita (\$)
1970	16	47.0	8.7	10.5	2.7	9.9	365.4
1971	14	43.7	6.5	8.7	2.2	8.2	371.6
1972	21	44.12	-8.9	11.8	3.0	11.8	397.6
1973	45	61.10	-15.4	24.6	5.6	24.6	440.3
1974	75	48.61	-17.4	37.5	7.9	39.8	506.2
1975	167	109.21	-25.8	63.8	14.5	86.2	593.2
1976	411	198.61	-45.3	126.3	26.6	206.6	777.8
1977	970	389.74	-79.2	235.0	48.9	475.4	971.7
1978	520	174.85	-38.8	100.5	19.8	248.3	1251.3
1979	601	149.42	-34.5	81.6	19.4	278.9	1438.5
1980	792	137.69	-37.1	92.3	21.2	355.9	1676.9
1981	1047	142.79	-37.2	97.4	24.9	453.7	1823.9
1982	1082	143.97	-37.6	74.2	22.4	450.6	2015.4
1983	1110	191.39	-41.1	70.3	22.5	443.5	1966.7
1984	1237	164.51	-50.0	75.0	25.3	474.7	1877.4
1985	1022	129.55	-42.1	56.9	18.6	377.6	2029.7
1986	1184	161.75	-54.9	68.9	18.8	422.6	2244.3
1987	938	100.52	-39.1	56.2	14.0	324.1	2319.6
1988	895	88.84	-37.0	55.0	18.9	299.1	1586.2
1989	627	56.52	-33.3	38.3	17.1	201.6	1177.0
1990	612	57.53	-26.6	31.0	15.3	188.1	1233.1
1991	1164	103.06	-50.6	57.1	27.5	339.5	1233.8
1992	843.3	69.18	-28.1	30.4	16.1	232.5	1442.5
1993	1040.1	83.45	-33.1	37.2	18.9	270.8	1436.3
1994	1093.9	76.79	-36.4	37.3	17.6	269.9	1534.2
1995	1244	70.30	-37.8	40.8	18.7	292.8	1565.1
1996	1544.1	84.98	-40.4	44.7	22.3	348.7	1564.8
1997	1655.1	90.17	-45.4	45.4	22.8	360.5	1578.6
1998	1542.7	85.59	-45.3	37.5	19.5	325.3	1668.6
1999	1664	90.84	-50.5	39.9	20.5	340.4	1663.9
2000	1660.6	87.43	-40.8	34.3	19.7	329.8	1677.6
2001	1810.2	78.90	-42.1	35.3	20.3	349.3	1717.2
2002	1921.4	69.37	-43.2	n.a.	n.a.	360.6	n.a.

Sources: Remittances: IMF "Balance of Payments Statistics Yearbook" Various issues

Other data: IMF "International Financial Statistics" Various issues

gulf crisis, one can observe a steady trend of increasing remittance flows. Talfaha (1985), mentions four factors responsible for the large increase in remittances: the increasing demand for Jordanian labor, huge development plans and rising wages in the host countries, economic and political stability in Jordan and stability of the Jordanian Currency. Starting from 1987, remittances had declined reaching their minimum in 1990 when Iraq invaded Kuwait. Level of remittances had recovered quickly in 1993. Since then, remittances has been growing reaching almost \$ 2 billions in 2002.

For a long period of time, remittances exceeded total proceeds of Jordan's exports of goods. In 1977 remittances represented almost four times the proceeds of exports. Currently remittances represent about 70% of Jordan's exports. About 45% of imports are recently covered by the inflow of emigrant remittances. The ratio of remittances to private consumption is a measure of the extent to which remittances can be used to finance private consumption of domestic inhabitants. Recently remittances represent more than 35% of private consumption in Jordan. Compared with GDP, remittances reached as high as 49% of GDP in 1977, and currently represent about 20% of GDP. According to El-Sakka (2004), these ratios are the highest by world

standards. Finally, the remittance per-capita indicator shows how many US \$ are remitted for each inhabitant in Jordan. To reflect growth in real terms, remittances must increase at annual rates exceeding both population growth and inflation rates. El-Sakka (2004) found that remittances per-capita in Jordan are the highest among the labor exporters in the Middle East. Data in table (1) also show that about 20% of GDP per-capita is generated from the inflow emigrant remittances.

The previous analysis shows the importance of remittances to Jordan's economy. Appropriate policies to encourage emigrants to remit their savings, in general, and use official channels of remittances in particular, are hence essential for the country's macroeconomic stability. The rest of the paper aims at investigating the macroeconomic determinants of remittances and possible impact of macroeconomic policy actions on their inflows.

The Model and Theoretical Considerations

Two groups of factors affecting the inflow of remittances to the countries of origin can be distinguished; micro-factors and macro-factors. The majority of the literature on remittances dealt with the micro factors. Micro

approaches use a wide variety of variables to explain the flow of remittances including gender, age, marital status, wage levels, per capita consumption, number of households left at home, length of stay abroad, educational attainment of potential remitters, skill levels, occupation etc. (See e.g., Lucas and Stark (1985), Roriguez, (1996), Itzigsohn, (1995), Merkle and Zimmermann (1992).

Macro approaches attempt to identify either the impact of remittances on macroeconomic variables in the countries of origin or the impact of macroeconomic variables on the inflow of remittances. Talafha (1985) uses the Keynesian income determination model to estimate the effect of worker remittances consumption, investment and imports. Using relevant multipliers his results show that remittances have significant multiplier impacts on these variables. Burney (1987) attempts to analyze the effect of remittances on savings in Pakistan. Kandil, and Metwally (1990) address the impact of emigrant remittances on the Egyptian economy in the context of the standard Keynesian macroeconomic model. They aim at identifying the factors determining the magnitude of the remittances multiplier and the impact of remittances on the major components of the aggregate demand in Egypt. Looney (1990) examines the effect of remittances on macroeco-

nomic development patterns in the Arab world. Glytoso (1993) examines the multiplied income effects of remittances on macro variables in Greece.

Gedeshi (2002), uses surveys of emigrants to examine the role of emigration in the Albanian economy and their motivations for sending remittances back home. Lianos (1997) examines the flow of remittances and the factors determining their flow to Greece. In a study using data from Algeria, Morocco, Portugal, Tunisia, Turkey, and Yugoslavia, Elbadawi and Rocha (1992) found the main determinants of remittance inflows to be the level of income in the host country, the black market exchange rate premium, the domestic inflation rate, and the length of stay abroad. The authors did not find any evidence to support claims that levels of income in the country of origin or interest rate differentials affect remittance inflows.

In a panel study of remittances from Arab emigrants, El-Sakka (1998) found that remittances were positively related to economic growth in the host countries and inflation in the home country. It was also found that exchange rate differentials between official and black markets have a negative impact on the inflow of remittances through official channels.

El-Sakka and McNabb (1999), estimated a macro model for total inflow

of remittances through official channels in Egypt. They found that levels of income in both host and home countries have a positive impact on the inflow of remittance to the home country. They also found that remittance flows are highly responsive to black market premiums. The results also support the idea that interest differentials at home and abroad have a negative impact on the inflow of remittances through official channels. They also find that imports financed by remittances have higher income elasticity and a relatively lower price elasticity as compared to other imports.

The decision to remit is a fairly complicated one. A typical emigrant has several options; he has to decide on whether to remit his savings to his home country, or keep them at the host country, or perhaps to remit them to a third country, if there is a chance to do so. If he decided to remit to his home country, he may also have to decide on whether to remit his savings cash or in kind. If he decided to remit cash, he has to decide whether to use official channels of transfer (the banking system), or to use other unofficial channels, including black markets for foreign exchange. A complementary decision the remitter has to make is about the use of his remittances, i.e., whether to use his savings for consumption or investment. It is clear that

there are several factors that affect all these decisions including economic, social, cultural and even political conditions.

The model we propose to use for Jordan begins by assuming that a migrant has a target level of remittances to his home country R^* . This target depends on two sets of factors, F_1 ; the non-policy variables set related to both host and home countries and F_2 ; the policy variables set, such that;

$$R_t^* = f(F_1, F_2) \quad (1)$$

F_1 set could include income levels, interest rates and inflation in both host countries and Jordan. Income levels in host countries are expected to have positive impacts on the inflows of remittances, while interest and inflation rates are expected to have negative impacts on the inflows of remittances to the home country. On the other hand, the level of income in the home country could have either a positive or a negative impact on the inflows of remittances, depending on the purpose of remittances. If remittances are mainly transferred for family support, then income levels in the home country could have a negative impact on the inflows of remittances, while inflation would have a positive impact. If remittances are, however, for investment purposes, we would expect a positive relationship between

levels of income and inflows of remittances, and a negative impact of inflation in the home country.

The most relevant policy variables that could influence the inflow of remittances to the home country include at least the following three policies:

- Exchange rate misalignment, defined as deviations from purchasing power parity, which is assumed to negatively affect the inflow of remittances. As the degree of misalignment increases, migrants will remit less and adjust their targets. Since remittances are exchanged into domestic currency, migrants may hold their savings in foreign currencies or time their remittances with exchange rate corrections.
- Interest rate differential, which are defined as the difference between foreign and domestic interest rates. This is expected to negatively impact the inflow of remittances, since low domestic interest rates compared with interest rates in the host or other countries encourage remitters to withhold their savings in countries where interest rates are higher.
- General macroeconomic policies which include

- Inconsistent monetary policy, here defined as the money supply over trend GDP. This could result in excess supply of money and creates inflation. Excessive money supply will not only mean more inflation but it will also indicate a policy failure, which may discourage remittances.
- Inconsistent fiscal policy which could result in a continuous budget deficit and all the risks associated with it.

This study assumes that emigrants monitor macroeconomic policies in their home countries and respond to them by adjusting their remittance target levels. Because of the spread of Jordanian emigrants over the entire Gulf area, it is difficult to find a good proxy for variables related to the host countries without some costs in terms of result bias. For this reason, those variables related to host countries will be ignored. Inflation in Jordan also was not included in the model due to the assumption that the effect of inflation will be captured by money supply growth. Based on the analysis presented above, target remittances is modeled as a log linear function of the following macro factors with expected signs shown above the different variables;

$$\log R_t^* = a_0 + a_1 \overset{(\pm)}{\log y_t} + a_2 \overset{(-)}{\log \theta_t} + a_3 \overset{(-)}{\log (i_{wt} - i_t)} + a_4 \overset{(-)}{\log \dot{m}_t} + a_5 \overset{(-)}{\log B_t} + \varepsilon_t \quad (2)$$

where

y_t = real income in the home country

θ_t = exchange rate misalignment

(i_{wt}, i_t) = host countries and home interest rates, respectively

$\dot{m}_t$ = growth of money supply as a proxy for fiscal policy discipline.

B_t = budget deficit as a proxy for fiscal policy discipline.

ε_t = an error term

It should be noted that the model is built on the assumption that each migrant has his own target remittances level R^* in real terms. Since remitted savings will be kept at home, the study assumes that this target is denominated in domestic currency⁽⁵⁾, e.g., suppose the target of a migrant is 1000 Jordanian Dinars (JD), the migrant will continue to remit until the target (1000 JD) is achieved. If during the current period there is a change in the variables affecting the counter value in domestic currency, the real value of the target may be different from the actual (nominal) value of the achieved target. In this case, a migrant is assumed to take some actions next period to adjust for these differences. For this reason the study assumes that

actual levels of remittances R_t are adjusted to their target levels R^* according to the following partial adjustment scheme:

$$\Delta R_t = \lambda (R_t^* - R_{t-1}) \quad (3)$$

where λ is the coefficient of adjustment which takes a value between 0 and 1 and a mean value equals $(\lambda/1 - \lambda)$. The mean value of adjustment coefficient reflects the speed of adjustment. It is assumed that emigrants will partially react to the deviations between their actual and desired targets. If last year's actual remittances are higher than targeted levels, migrants will reduce their remittances for this year and vice versa. Therefore, it is expected that there would be a negative relationship between this year's remittances and lagged levels, since more remittances over this year's target would mean less transfer on the next year and vice versa.

By substituting (2) into (3) we get the following remittances equation with lagged remittances being among the regressors:

$$\log R_t = \beta_0 + \beta_1 \log y_t + \beta_2 \log \theta_t + \beta_3 \log (i_{wt} - i_t) + \beta_4 \log \dot{m}_t + \beta_5 \log B_t + \beta_6 \log R_{t-1} + \varepsilon_t \quad (4)$$

The inclusion of lagged remittances could be defended on the fol-

(5) It does not mean however, that all remittances will be kept in domestic currency. In countries where deposits of foreign currency denominations are allowed, under inflationary conditions emigrants may prefer to keep their savings in foreign currency.

lowing grounds: inconsistency of policy, lack of information and inertia may not allow migrants to remit the desired levels of remittances. In many cases changes in policies affecting remittances may occur without a notice. The flow of information to the host country may not allow migrants to correctly assess the effect of changes in policies on their level of remittance targets, and thus there could be differences between desired and actual remittances of migrants.

Estimation Results

It is now well known that performing a regression with non-stationary series leads to a spurious regression. In many cases series need to be transformed to induce stationarity; differencing is one method, and removing a deterministic trend is another.⁽⁶⁾ While the spurious regression is a serious issue, the practice of differencing integrated series to achieve stationarity and treating the resulting series as the proper objects of econometric analysis is not without costs.

Prior to estimation, a test of unit roots is applied to the series to check for stationarity of the variables.⁽⁷⁾ If a variable is found to be non-stationary, a sequence of differencing is applied to

the variable until stationarity is achieved. We used Dicky Fuller, Augmented Dickey Fuller and Phillips-Parron tests of unit root. Results are shown in table (2). The null hypothesis tested is that the variable under investigation has a unit root against the alternative that it does not. The three tests show that most of the variables are non-stationary in levels. The null hypothesis that each variable has a unit root could not be rejected. Taking the first difference of the variables renders all the variables to be stationary by all the three tests as shown in table (2). Hence the variables are integrated of order 1; $I(1)$. Therefore, estimation of equation (4) should be based on the first difference of the variables. Since the data appear to be stationary in first differences, no further tests are performed. We, therefore, maintain the null hypothesis that each variable is integrated of order one.

In addition, if these variables have unit roots, then we can exploit the idea that there may exist a co-movement in their behavior and possibilities that they will trend together towards a long-run equilibrium state. Having established the degree of integration of the variables, we proceed to test for

(6) Detrending can either be made by including a function of time as a regressor or by subtracting a function of time from all series used. (Banerjee et al (1993).

(7) A series is said to be stationary if its mean, variance, and covariance are all unchangeable with respect to time.

Table 2
Test Results for Unit Roots

Levels			
Variable	Dicky-Fuller	Augmented Dicky-Fuller	Phillips-Parron
R_t	-4.270	-3.347	-4.486
y_t	-1.420	-2.243	-1.677
θ_t	-3.102	-2.666	-3.187
$\dot{m}_t$	-1.685	-1.358	-1.536
$(i_{wt} - i_t)$	-0.933	-1.926	-1.048
B_t	-0.835	-0.609	-0.777
First difference			
Variable	Dicky-Fuller	Augmented Dicky-Fuller	Phillips-Parron
R_t	-4.029	-3.073	-4.264
y_t	-3.748	-3.344	-3.974
θ_t	-7.276	-8.204	-7.870
$\dot{m}_t$	-7.497	-5.428	-9.141
$(i_{wt} - i_t)$	-4.412	-4.344	-4.688
B_t	-7.901	-3.465	-8.204

The 5% significance level is -2.93.

cointegration among the variables. Cointegration is a test for equilibrium between non-stationary time series that are integrated at the same order. The concept of cointegration allows us to describe the existence of an equilibrium, or stationary relationship among two or more time series each of which is individually non-stationary.

The test for the null hypothesis that there are r cointegrating vectors can be based on the maximum likelihood procedure proposed by Johansen (1998). We applied the methodology advanced by Johansen (1988) and Johansen and Juselius (1991, 1994). The Johansen-Juselius procedure tests the existence

of more than one cointegrating vector.

The existence of many cointegrating vectors may indicate that the system is stationary in more than one direction and thus more stable. Dickey *et al.* (1994) argue that the more cointegrating vectors there are, the more stable is the system; and it is desirable of the system to be stationary in as many directions as possible. Since the Johansen's cointegration procedure is sensitive to the choice of the lag length, the appropriate lag length needs to be specified. Using Akaike's final prediction error and Schwarz' criterion, the appropriate lag length was found to be equal to two.

The maximum eigenvalue statistics $\lambda_{\max}$ are used to determine the number of cointegrating vectors r . The null hypothesis tested is that there could be r cointegrating vectors among the variables of the model. Results of the Johansen-Juselius procedure for determining the number of cointegrating vectors are presented in table (3).⁽⁸⁾ The maximum eigenvalues, the trace statistics, and the 90% critical values and the corresponding eigenvalues are also presented in table (3).

According to the results, the hypothesis that there are 4 unit roots can be rejected in favor of 3 unit roots and hence 3 cointegration vectors at the 10% level using both maximum eigen-

value and trace statistics. The hypothesis that there is at least one unit root can not be rejected against the maintained hypothesis of no unit roots. A cointegration rank $r = 4$ is thus selected. The results confirm the existence of a stable, long-run equilibrium relationship.

Having established the cointegrating vectors for variables of the model we proceed to estimate the model using OLS. Results are presented in table (4). Looking first at the diagnostic statistics, the reported coefficient of determination ($\bar{R}^2$) is reasonably high. Most of the variations in remittances are explained by the variables included in the model. The F-statistic

Table 3
Johansen-Juselius Cointegration rank analysis I(1)⁽⁹⁾

Eigen- value	Trace Statistic				Maximum Eigenvalue $\lambda_{\max}$			
	H_0	H_1	Trace	Critical values 90%	H_0	H_1	$\lambda_{\max}$	Critical values 90%
0.8298	$r = 0$	$r \geq 1$	126.47	89.37	$r = 0$	$r = 1$	42.49	24.63
0.8053	$r \leq 1$	$r \geq 2$	83.98	64.74	$r \leq 1$	$r = 2$	39.27	20.90
0.6100	$r \leq 2$	$r \geq 3$	44.71	43.84	$r \leq 2$	$r = 3$	22.60	17.14
0.4073	$r \leq 3$	$r \geq 4$	22.11	26.70	$r \leq 3$	$r = 4$	12.55	13.39
0.3055	$r \leq 4$	$r \geq 5$	9.55	13.31	$r \leq 4$	$r = 5$	8.75	10.60
0.0328	$r \leq 5$	$r \geq 6$	0.80	2.71	$r \leq 5$	$r = 6$	0.80	2.71

(8) The analysis of cointegration is performed using the CATS Program by “Hansen, H. and Juselius, K. (2002) in RATS”

(9) Tests of the hypothesis that there are at most r cointegrating vectors $0 \leq r < n$ and thus $n-r$ unit roots, are based on: $\eta_t = -T \sum_{i=r+1}^n \log(1 - \lambda_i)$, $r = 0, 1, 2, \dots, n-0, n-1$. This is the trace statistic which is derived under the hypothesis that there are r cointegrating vectors. The eigenvalues λ_i are given by solving the eigenvalue problem: $|\lambda S_{kk} - S_{k0} S_{00}^{-1} S_{0k}| = 0$, where S_{ij} are the second moment matrices of residuals and their cross products.

Table 4
Estimation Results

Variable	Coefficient	T-Statistic	Diagnostic Statistics
Constant	0.213	3.442**	SEE = 0.137
y_t	1.040	2.427**	SSR = 0.281
y_{t-1}	1.565	2.865**	$\bar{R}^2 = 0.843$
θ_t	-1.482	-2.863**	F = 6.181**
$(i_{wt} - i_t)$	-0.034	-2.514**	DW = 2.089
$\dot{m}_t$	-1.672	-3.813**	D(h) = 0.987
B_t	-0.795	-2.104*	
R_{t-1}	-0.299	-2.134*	

** = significant at the 1% level.

* = significant at the 5% level.

is significant at 1% level which indicates that the regression as a whole is significant. Given that the Durbin-Watson test is biased towards finding no serial correlation when the model contains a lagged dependent variable, the alternative Durbin (h) statistic is calculated. Results indicate that the estimated model is free from serial correlation.

Since remittances to the home country can depend not only on current income at home, but also on last year's income levels, a lagged income variable is included in the list of explanatory variables. Concerning the level of income in Jordan, the results show that there is a significant positive relationship between the level of income at home and the inflow of remittances. As income levels in Jordan rise, the inflow of remittances

increases, and vice versa. This indicates, as mentioned earlier, that the majority of remittance flows to Jordan are for investment and not for family support purposes.⁽¹⁰⁾ Rising income levels in the home country reflect rising economic activity levels and hence, higher rates of return on investments at home. Under conditions of booming economic activity in the countries of origin, emigrants will send more remittances for investment purposes. This indicates that economic growth is a very important determinant of the inflow of remittances to the countries of origin. Though it has been claimed that different incentives in terms of exchange and interest rates, as well as other incentives, are necessary for the inflow of remittances to the countries of origin, sustained economic growth will not only mobilize

(10) Similar results were reached by El-Sakka, M. & McNabb R. (1999) for Egypt.

domestic resources to investment but also will mobilize different forms of foreign capital including remittances. This result is of great importance to the labor sending countries. As the rate of growth increases, the domestic resource gap will be narrowed as more emigrants will be willing to officially transfer more savings for investment. The benefits of growth will be more obvious for countries which have a substantial stock of emigrants abroad.

Deviations of exchange rates from their real levels, proxied by purchasing power parity, which reflects the degree of misalignment, have a significant negative relationship with the inflow of remittances. The more the deviation of exchange rates from their purchasing power parity levels, the less the inflow of recorded remittances to the country of origin, and the more the inflow of remittances to informal channels will be. This result is consistent with evidence reached by previous studies about the effect of exchange rates on the inflow of remittances. Previous empirical studies about remittances show that emigrants are very sensitive to exchange rate overvaluation, e.g., in a study about Egypt, El-Sakka (1999) found that exchange rate overvaluation, measured as the difference between official and black market rates, is very critical to the decision by emigrants to remit funds through official channels.

Results indicate that there is a significant negative relationship between differences in interest rates at home and abroad and the inflow of remittances. The greater the differentials between domestic and foreign interest rates, the less likely that emigrants remit their savings. This reflects the decisions taken by emigrants to maximize the rate of return on their financial asset portfolio. If the rate of interest is higher outside Jordan, emigrants would be likely to keep their savings abroad until the interest rates in the home country are adjusted to be in line with foreign rates of interest. Glytsos (1996) claims that target emigrants, though being risk seekers when considering the decision to work abroad, they are risk averters when considering decisions to invest their savings. That is why they retain most of their savings abroad and only remit the necessary amount needed for their families' maintenance.

The most interesting results of the study are those related to money supply growth over GDP trend and the budget deficit. Both coefficients are found to be negative. This implies that money supply growth and budget deficit have a negative impact on the inflow of remittances to Jordan. If money supply exceeds trend GDP levels, disequilibrium in the money and goods market will occur creating thus inflationary pressures. Inflation

creates an unattractive environment for all forms of foreign capital, including remittances.

Likewise, continuous budget deficit are found to have an important direct effect on inflation. The public finance approach to inflation assumes that the roots of inflation can be found in large fiscal imbalances. Insufficient revenue collection and limited access to domestic or international financial markets tend to increase governments' reliance on printing money as a primary source to finance the budget deficit. This will cause prices to increase. Moreover, it has been argued that the adverse effect of inflation on the real value of fiscal deficit reinforces the link between fiscal deficits and inflation. Continuous budget deficit is thus complicating the problem of price stability. Large budget deficits mean that more inflationary pressures are fed by the deficit which in turn puts more pressures on the deficit due to the needs for more funds to maintain the real value of public expenditures which, in turn causes deficit to grow and hence money supply and so on. Controlling the budget deficit is thus, very important for inflation and remittance inflows.

These results show that emigrants are sensitive to macroeconomic policy failures. Target remittance levels of emigrants are adjusted to macroeconomic policy actions. Consistent macro economic policies are thus very

essential for the inflow of remittances to labor sending countries.

Finally, the coefficient of lagged remittances is found to be negative as expected. The mean adjustment lag is found to be 2.3 years. This means that actual remittances will be fully adjusted to target remittances in 2.3 years. This seems to be a reasonable time period given the structure of LDCs and the quality of information available to emigrants.

Conclusions and Policy Recommendations

The aim of this study is to examine the impact of macroeconomic policies on the inflow of emigrant remittances to Jordan. Different macroeconomic policy failures are modeled in this study by exchange rate misalignment, defined as the deviation from equilibrium long run purchasing power parity, interest rate differentials, inconsistent monetary policy, defined as the growth of money supply over trend GDP levels, and inconsistent fiscal policy proxied by budget deficit. The study found that Jordanian emigrants are sensitive to macroeconomic policy. Target remittance levels are negatively affected by inconsistent macroeconomic policies. The following conclusions and policy recommendations are drawn from the results above:

- Economic growth in the home country of emigrants is an important determinant of the inflow of remittances. Economic growth will help the country attract different types of capital and remittances. This in turn, helps to ease foreign exchange bottlenecks and improve the position of the balance of payments.
- Interest rates policy should be carefully designed to attract remittances to official channels, policy makers should not only look at nominal interest rate differentials, but also nominal interest rates should be adjusted to reflect inflationary pressures.
- Emigrants seem to be sensitive to exchange rate misalignment. Policy makers need to be careful about deviations of exchange rate levels from their equilibrium long run levels.
- Macroeconomic policy variables are found to be very important determinants of inflows of remittances through official channels in Jordan.
- The main findings of the paper seem to be in line with the IMF proposed package for stabilization of the Jordanian economy. Implementation of the package, by reducing the public debt and privatizing the state-owned enterprises, would help in downsizing the public sector and thus pave the way for a better fiscal discipline, which is expected to help in controlling the budget deficit and monetary expansion, as well as enhancing the domestic currency, all of which, according to the results of the paper, would help Jordan to maximize the inflow of emigrant remittances, notably through official channels.

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Data Sources and Variable Specification:

- 1- Remittances: Data on remittances are collected from the International Monetary Fund's Balance of Payments Yearbook (IMF BOPY). In aggregating data about emigrant remittances we followed the World Bank's approach (see Swamy, 1981). According to this approach, emigration remittances are defined as the sum of three headings:
 - Labor Income (item 27 of the IMF BOPY) is the factor income accruing to temporary workers, defined as those staying less than 12 months working abroad.
 - Worker's remittances (Item 35 of the IMF BOPY) are the value of private transfers from emigrants residing abroad for more than a year.
 - Migrant Transfers (Item 33 of the IMP BOPY) are the value of goods and changes in financial assets that arise from emigration.
 - These items were regrouped later under the heading "workers' remittances" (Item 391 of the IMF BOPY).
- 2- All data on other variables are collected from International Monetary Fund *International Financial Statistics Yearbook*.
- 3- The following is the specification of the variables used in estimation:

R = remittances to Jordan in Jordanian Dinars

y_t = real GDP in Jordanian Dinars.

θ_t = exchange rate misalignment calculated as the difference between nominal exchange rate (index of the Jordanian Dinar/US \$ rate) and the real exchange rate, calculated using an index of PPP.

(i_{wt}, i_t) = foreign interest rates are proxied by the LIBOR 12 month rate. The domestic interest rate is the 12 month deposit rate.

$\dot{m}_t$ = growth of money supply over trend GDP.

B_t = budget deficit as a percentage of GDP.

الملخص

تحويلات العمال المهاجرين وصناعة السياسة الاقتصادية الكلية في الأردن

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تهدف هذه الدراسة إلى تقييم أثر المتغيرات المرتبطة بالسياسة الاقتصادية الكلية على تدفق تحويلات المهاجرين إلى الأردن. وقد توصلت الدراسة إلى أن التحويلات تعد أهم مصادر النقد الأجنبي؛ إذ مثلت حوالي ١١٠٪ من الصادرات، و٣٦,٧٪ من الواردات، و١٩٪ من الناتج المحلي الإجمالي في المتوسط خلال فترة الدراسة، وهو ما يجعل الأردن أحد أكثر دول العالم اعتماداً على تدفقات التحويلات. وقد أشارت نتائج الدراسة إلى أن هناك أثراً معنوياً موجباً لمستويات الدخل في الأردن على تدفق التحويلات، بينما تبين وجود أثر معنوي سالب لفروق معدلات الفائدة بين الأردن والعالم الخارجي، وانحراف معدل صرف الدينار الأردني عن مستوياته الحقيقية على تدفق التحويلات. أما أهم نتائج الدراسة فهي أن العمال المهاجرين ترتفع درجة حساسيتهم لحالات سوء صناعة السياسة الاقتصادية في الأردن. وتتمثل أهم توصيات الدراسة في ضرورة الاهتمام بفروق معدلات الفائدة ومستويات معدل الصرف، وتصميم سياسات نقدية ومالية متسقة لكي تعظم تدفق التحويلات نحو القنوات الرسمية في الأردن.

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