

Labor Migration, Workers' Remittances and Economic Activity: New Instrumental Variables for the Effect of Remittances

Fayq Al Akayleh

*College of Business Administration, Al Yamamah University, P.O. Box 45180, Riyadh 11512,
Kingdom of Saudi Arabia*

Telephone: +966-01-2242222, Ext. 3659; Fax: +966 1 224 1111; E-mail: f_alakayleh@yu.edu.sa

KEYWORDS Economic Growth. Labor Market Regulation and Deregulation. Econometrics. Remittances. Consumption Pattern. Jordan

ABSTRACT The core of this work is that it suggests a new methodology to estimate the 'actual net effect' of remittances on economic activity. Applying this new methodology to a small and open economy, namely Jordan, the final results of the study showed that inward remittances have positive and significant effects on consumption, investment, government expenditure and a negative effect on net exports. Outward remittances have a negative impact on consumption, investment and government expenditure and a positive impact on net trade. The total effect of remittances on GDP, however, is positive. The results also suggest that Jordanian emigrants' remittances play a significant role in forming the very high consumption pattern.

1. INTRODUCTION

The debate on economic openness turned recently to focus more on labor migration and the subsequent effects on both source and host countries, though it is believed that labor is less mobile than both capital and goods. Motivations for migration vary among individuals and countries. People may migrate for different reasons that can be categorized as economic, political and social motivations. Differences in wages, income tax, living standards and education and health care are the main economic and social reasons for migration. Wars and lack of freedom are by far the key political factors behind migration.

Labor migration is an important aspect within the framework of economic globalization (or economic openness). The main economic dimensions that pertain to labor migration are brain drain and workers' remittances. This paper is confined to studying the effect of remittances on economic activity in a small and developing economy, namely Jordan. The reform policies under the supervision of the International Monetary Fund (IMF) and the World Bank focus on implementing free market policies in good market, capital market and labor market.

Nevertheless, migration is not always and completely free. Barriers to labor migration are not confined only to policies with respect to economic openness. There are several social, politi-

cal and cultural factors that can play a crucial role in determining the level of labor migration such as language differences, levels of education, health care, wars, and the lack of freedom. According to the Population Division of the United Nations, the number of international migrants in the world reached almost 191 million in 2005, which was 3 per cent of the world population. Between 1990 and 2005, the world gained 36 million international migrants, (International Organization for Migration 2006). The countries with the highest proportion of immigrants in total population are: United Arab Emirates (74%), Jordan (40%, the vast majority of which are Palestinian refugees), Israel (37%), Saudi Arabia and Switzerland (25%), Australia (24%) and Kazakhstan (19%).

Economic issues with respect to labor migration are mainly remittances and brain drain for both source and host countries. The main difficulty in the study of labor migration is the lack of reliable data on the actual number of migrants and flows of remittances. A considerable amount of remittances is transferred through unofficial channels. Migrant laborers may transfer money by hand, with their relatives, or through unofficial agents. On the other hand, some people emigrate illegally. Unavailability of reliable data on actual numbers of migrants and the size of remittances led interested researchers and policymakers to develop theoretical and empirical methodologies for the estimation of the labor migration-related variables such as actual numbers of migrants, wages and remittances on one hand

Fayq Al Akayleh

Head of the Quantitative Business Department and
Assistant Professor of Economics/BBA/EMBA Programs

and their effects on economic growth and development on the other.

The importance of this study lies in its focus on examining the following arguments: (i) under labor market regulation, rather than labor market deregulation, workers' remittances have a direct impact on economic activity and the current account, (ii) estimation of the 'net effect' of worker remittances' on national income can be performed without having the endogeneity problem in estimation, leading to a robust regression results, (iii) workers' remittances have a greater effect on consumption demand than on investment demand, depicted by the increasing imports of final goods, and (iv) This paper measures the effect of "outward remittances" on GDP separately.

In general, market deregulation in a number of developing economies has sent a clear sign of market failure (Ghosh and Chandrasekhar 2002). However, the association between labor market deregulation and the effect of workers' remittances on economic activity was not critically examined. This was globally addressed (Stiglitz 2002; Stiglitz 2006) without conducting advanced researches on this effect in individual countries particularly for a small size economy like Jordan. The trends of labor migration and the associated labor market policies had a space in literature (Philippe Fargues 2004) without examining the effects of these trends in Arab migration to Europe on economic growth in the labor exporting Arab countries. Therefore, in sections 1.1, 1.2, and 1.3 of this paper, the association between the trend of workers' remittances and market regulation was examined in a logical manner.

The empirical studies focused on econometric analysis of the effect of remittances on economic growth. Econometric methods employed in these studies were based on wrong models and biased estimates, resulting in spurious estimation results. Almost all the published work on this topic focused on adjusting for autocorrelation problem that may have arisen from time series regression analysis. Athamneh (2004) estimated the effect of remittances on growth using the GDP identity but his estimation was associated with endogeneity problem because while adjusting for autocorrelation and endogeneity problems through the two-stage Least Squares Estimates, Athamneh's regression suffers from multicollinearity problems. Karagoz (2009), a most recent

work on the effect of remittances on growth employs a regression model that suffers from both endogeneity and multicollinearity problems because Karagoz's explanatory variables are foreign direct investment, exports, imports, and capital accumulation where all these variables are highly correlated.

The recent literature measures the effect of "inward remittances" on economic activity without deducting the effect of "outward remittances" on economic activity (Roy 1989; Brown 1997; Talafhah 1998; Orozco 2002; Athamneh 2004; Karagoz 2010; Abu-Al Sondos and Abu-Kharmeh 2010).

Therefore, this paper will develop a new methodology to estimate the effect of remittances on growth by adjusting for all the possible econometric problems. In the first stage, the *net effect* of remittances on the GDP's four components (private consumption, investment, government expenditure, and net trade) is estimated for each indicator *separately*. In the second stage, these effects are added up together to explore the total effect on GDP. The results are robust and data are reliable, as discussed in section 2. The effect of remittances on consumption pattern is depicted within the regression results.

1.1 Government Policies towards Labor Market and Migration

In the light of relatively scarce skilled labor, developing countries face the puzzle of choice between exporting experts (or skilled labor) and combating brain drain. On one hand, exporting skilled labor improves the current account balance of the Balance of Payments (if remittances take place) and increases investment potential (if such remittances are directed to saving and investment and not to private consumption of imported final goods). On the other hand, exporting skilled labor and experts will surely result in brain drain that could reduce productivity and innovation at the domestic level. In addition, skilled labor migration may increase the export potential of the host country as a result of increasing production generated by increasing productivity due to incremental skilled-labor, while the source country may face decreasing productivity and hence increasing imports. Hence, the surplus of services balance that arises from remittances may be counterbalanced by the trade deficit arising from increasing imports.

Therefore, governmental policies should consider the total effect of labor migration on the economy. One possibility is that the government should be aware of which fields the country has abundance of skilled labor and which fields it has scarcity of skilled labor, so that it can allow outward-migration in abundant skilled-labor areas and prohibit that wherever the skilled labor is scarce, in turn compensating for earning differences between domestic and international wages. In other words, labor migration must not be totally free.

In Jordan, during the period 1961-1979, the annual population growth rate was 4.9 percent, it was 3.9 percent in 1979, indicating a high rate of birth where 53.2 percent of population were under 15-year old in 1979 compared to 45.6 percent in 1961. This has, side by side with low participation of women in labor force and increasing outflow of manpower, contributed to a low crude participation rate. During 1960-1979 the participation rate was 20 percent, on average. During 1970-1980, the unemployment rate was almost zero and the country even experienced shortages of certain skilled labor. As a result, the numbers of foreign workers were nearly seventy-thousand or about 15 percent of the total labor force in the country as of 1989.

During the period 1970-1980, the main problems pertaining to the labor market in Jordan were:

1. Qualitative and quantitative shortage in the labor force as the economy was growing in this period. At the same time, this was associated with a surplus in certain skills.
2. Dearth of information, statistical data and studies related to manpower planning, demand for and supply of labor, actual size of inward and outward remittances and the actual number of migrants to and from the country.
3. Inadequacy of labor legislation with respect to domestic labor conditions, outward and inward labor migration.
4. Inconsistency between the output of the educational and vocational education system and the labor market needs (mismatch between education output and market demand for labor).

The government took these shortcomings into account while preparing the 1981-1985 Economic and Social Development Plan. Yet the Plan goals were not achieved except for the decline

in dependency ratio. The population growth rate, which was 3.8 percent in 1979 (of which 3.3 percent can be attributed to natural increase), increased to 5.3 percent in 1991 (of which 2.8 percent can be attributed to natural growth). Population under 15 years fell from 51.6 percent in 1979 to 43 percent in 1991, which led to a drop in the dependency ratio from 1:5 to 1:4.2. The increasing crude participation rate (from 45 percent in 1979 to 54 percent in 1991) has resulted in an increase in labor force from 44000 in 1979 to 920000 in 1991 amongst which 14 percent was foreign laborers, a slight decline between 1979 and 1991.

In the 1993-1997 Plan the government recognized the existence of these problems once again. Thereafter non-Jordanian laborers increased from 14 percent (or 145.1 thousand workers) out of the total labor force (1.039 million workers) in 1994 to 23 percent and 25 percent in 1997 and 1998, respectively. In 1999-2003 and 2004-2006 Plans, again, the same problems continued to exist and the same strategies were taken in these plans.

The key policies of all economic and social development plans since 1993 with respect to labor migration have aimed at:

1. Regulating the labor market and replacing foreign labor by Jordanian labor.
2. Enhancing labor market efficiency and increasing labor productivity by providing efficient rehabilitation and training for human resources in fields that reflect market needs.
3. Building up a database on labor market and relevant information for job-seeking persons, policymakers and researchers.
4. Increasing the coverage of the social security system.
5. Setting a minimum wage.

Despite various policies undertaken to replace foreign workers by Jordanians, the number of foreign labor continued to increase and at the same time the number of migrant Jordanians increased too, as shown in the next section. This implies that the inward and outward labor migration is not a product of governmental policies. Labor movements reflect the domestic and international demand for and supply of labor particularly in Arab Gulf Countries.

There are certain conditions on labor immigration. First, foreign laborers can be employed if there are no Jordanians available for work¹.

Second, guest laborers are employed subject to the approval by the Ministry of Labor. Third, a registration fee is levied on foreign workers; Arab workers have to pay JD 10 for agricultural labor and JD 50 for non-agricultural labor, while non-Arab workers have to pay JD 100 and JD 300, respectively. Fourth, social security refundable charges are applied equally to Jordanian and non-Jordanian workers. Fifth, a health fitness certificate is required prior to joining the work.

1.2 The Characteristics of Labor Market

The main characteristics of the Jordanian labor market can be outlined as follows:

- 1) **Labor Force Participation is Improving, But it is Still Relatively Low:** The crude participation rate has increased from an annual average of 20 percent during 1960-1979 to 23.8 percent during 2000-2003. Yet it is still tiny in comparison with other countries (33 % in India and 41 % in U.S.). The low participation rate is related to:
 - a. The high proportion of population under 15 years old (51.1 % in 2003).
 - b. Out of the remaining 46.4 percent (considering the age group above 65+ that was 3.5 % in 2003), 10.2 percent (260 thousands) was the estimated portion of Jordanians working abroad.
- 2) **Emigration and Immigration:** The outflow of Jordanian workers experienced a continuous increase till 1986 and a continuous decrease thereafter; it has increased from 103.5 thousands in 1970 to 343.3 thousands in 1986 and declined to 260.6 thousands in 2001. In addition to political considerations, the oil market in the Gulf countries, where more than 80 percent of Jordanian migrants work, no longer demand the same numbers of expatriate labor as before. Besides, such host countries started to diversify the sources of their labor need. On the other hand, immigrant laborers to Jordan continued to increase till 1995 and fluctuated afterward. The number of guest workers has increased from 376 workers in 1973 to 285000 in 1995 exceeding the number of Jordanian emigrants abroad (275 thousands in 1995). Agriculture and services are the major fields of foreign workers. 40 percent of foreign labor are employed in agriculture and services during 1992-2001 which increased

to 49 percent in 2003. The main sources of foreign labor are Egypt (77 percent) and Syria (5 percent).

- 3) **The Jordanian Labor Force is Educated and Skilled.** As of 2002, almost 68 percent of total employees in the public sector hold a General Secondary Education Certificate or higher. As of 2006, the educational levels of the labor force (Actually employed) are distributed as shown in Table 1. Literacy percentage in total employed persons forms 98 per cent, distributed nearly equally between females and males.

Table 1: Educational level of the Jordanian employed persons (age 15+ years) by sex, 2006

Education Level	Female	Male	Total
Total Number	172559.0	453323.0	625882.0
Per Cent	100.0	100.0	100.0
Illiterate	0.7	1.4	1.2
Less than Secondary	12.8	35.5	29.2
Secondary	14.2	20.7	18.9
Intermediate Diploma	26.6	11.7	15.8
Bachelor and Above	43.5	26.2	31.0

Source: Department of Statistics/Employment and Unemployment Survey-Annual Report 2006

- 4) **Unemployment is of a Structural Type:** The unemployment rate has increased from almost zero during the 1970s to 3.5 percent in 1980, increased dramatically to 15.7 percent during the 1990s and decreased slightly to 14.6 percent during 2000-2006. The shift of growth rate from labor-intensive sectors (industry and agriculture) to capital biased sectors (particularly certain types of services such as telecommunication, IT, banking) has contributed to increasing unemployment in the country. Some studies such as World Bank Report No. 12645 JO (1994) and Athamneh (2004) attribute the decreasing domestic labor in some services and sectors to the fact that these are seen as undesirable jobs by Jordanians due to social considerations and longer working hours. This is an invalid argument because there are many sectors in which the jobs require hard work and workers have to work long hours such as in mining (Jordan Phosphate Mining Company and Arab Potash Company, the largest industrial employers of Jordanians) yet the total employment in this

sector is more or less Jordanian because of high wage rates and other incentives in this sector. Although the government has set a minimum wage level (it was JD 80 till 2000 increased to JD 85 in 2003 and JD 110 in 2006), yet these levels are far below the poverty line (more than JD 300 as of 2003).

- 5) Labor movement is subject to certain regulations.

1.3 Trends of Workers' Remittances

Trends of workers' remittances (both inward and outward) has shown an upward trend in recent years in almost all developing countries (Fargues 2004). The gross remittances of Jordanians working abroad were increasing continuously over time (except in three periods), regardless of economic reform and openness policies. Workers' annual average remittances in millions of Jordanian Dinars are shown as in Table 2. Before the 1991 Gulf War, Jordanian workers in Saudi Arabia and Kuwait constituted 71 per cent of total Jordanians working abroad¹. In 1989/90, Jordanian migrant workers to Saudi Arabia and Kuwait were estimated at 160 thousands and 80 thousands, respectively. In general, more than 90 per cent of Jordanians working abroad were based in the Arab Gulf Countries.

The economic recession during 1982-1987 in Gulf countries as a result of declining oil prices resulted in a decline in production and hence a decline in demand for labor and so employers in

Table 2: Average annual workers' remittances, JD million

Workers' remittances	1970-1979	1980-1989	1990-1999	2000-2006
Remittances' receipts	74.10	366.65	810.92	1430.6
Remittances' payments	6.58	68.18	84.50	163.9
Net workers' remittances	67.52	298.47	726.42	1266.8

Source: External Sector, Yearly Statistical Series (1964-2006), Central Bank of Jordan, Amman.

Gulf countries started to fire labor. Consequently, the number of Jordanians working abroad fell from 343.3 thousands in 1986 to 287.5 thousands in 1990. As a result, remittances inflow decreased continuously as income declined; it has declined from JD 475 million in 1984 to JD 306.3 million in 1989 (Fig. 1).

Net workers' remittances experienced another decline in 1991. The Iraqi invasion of Kuwait (late 1990) and the U.S. offensive against Iraq in 1991 resulted in the forced return of almost all Jordanians working in Kuwait and the consequence was the decline of remittances inflow from JD 358.3 million in 1989 to JD 306.3 million in 1991. Since then, except in 1998, inward remittances (and hence net remittances) increased dramatically and persistently.

Till 1975 outward remittances were zero when the unemployment rate was zero too. The conspicuous expansion of the economy during 1976-1984 needed more labor for the production process at the time when capital intensive activities was not prevailing as it is today. Labor-intensive

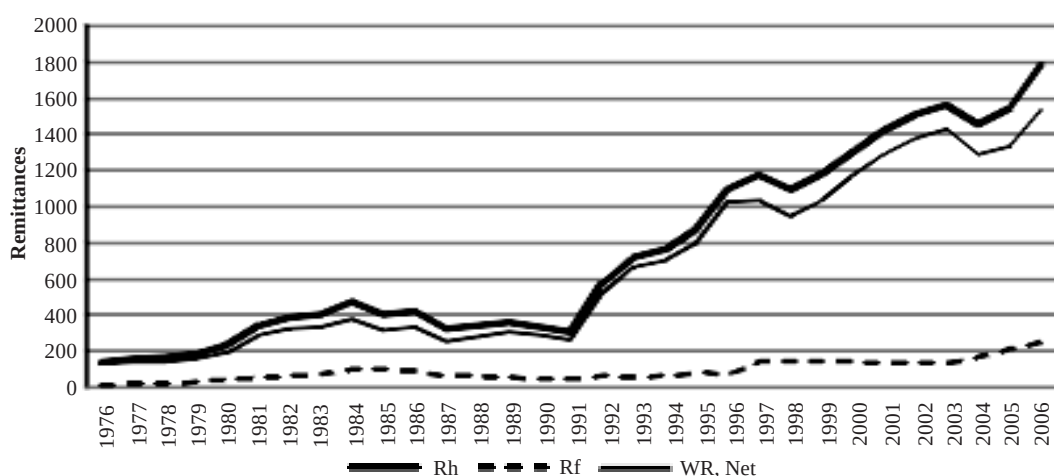


Fig. 1. Workers' remittances, JD millions

Source: External Sector, Yearly Statistical Series (1964 -2006), Central Bank of Jordan, Amman

agriculture and mining sectors were leading the economy. Wages in the mining sector were relatively high and a portion of Jordanian workers joined various jobs in this sector incentivized by high wages. The lack of unskilled labor resulted in importing foreign labor particularly from Egypt and Syria, and more recently from Pakistan, Malaysia and Bangladesh. Thus, during this expansion period money transfers of foreign laborers to their own countries started to increase as shown in Figure 1.

The stagflation that hit the country during 1987-1989 did not result in a decline in foreign laborers; instead it resulted in a decline in their transfers because of high inflation in Jordan that caused their savings to shrink to meet their daily expenses. As a result, foreign laborers' transfers declined continuously from JD 86.5 million in 1986 to JD 52 million and JD 41.6 million in 1989 and 1991, respectively, a decline of 52 per cent. However, the high value of outward workers' transfers during 1997-2006 is attributed to the increasing foreign labor in the Qualified Industrial Zones, since more than 60 per cent of labor in these zones is foreign. This scenario of the trend of workers' remittances is not a result of the devaluation of the Jordanian Dinar in 1989. To prove this, Figure 2 presents the workers' remittances in dollar value, which shows exactly the same picture of remittances as we have presented it in million JDs in Figure 1.

1.4. The Effect of Workers' Remittances on Current Account of the Balance of Payments

It is obvious that workers' remittances finance the current account but there could be reversals of this effect in case of internal and external shocks (Milesi-Ferretti et al. 1998).

The trade balance was experiencing a chronic and persistent deficit. This deficit of trade balance exacerbated since the early 1990s. During the entire period of study, it has recorded the highest deficit in 2005 and 2006 (JD 3659 million and JD 3545 million, respectively). The trade deficit was most often offset by service balance surplus boosted by workers' remittances. The current account side of the balance of payments without workers' remittances was always recording a deficit as shown in Figure 3.

Subsequent to the economic openness policies that were implemented in the economic and social development plans since 1993, the trade deficit started to increase. It is very important to notice that while trade of goods witnessed various measures toward openness, labor migration witnessed relatively more restricted policies from early nineties onwards by implementing a package of policies to regulate labor market in general and labor migration in particular, such as minimum wage rate, social security coverage, increasing the retirement age, foreign laborers'

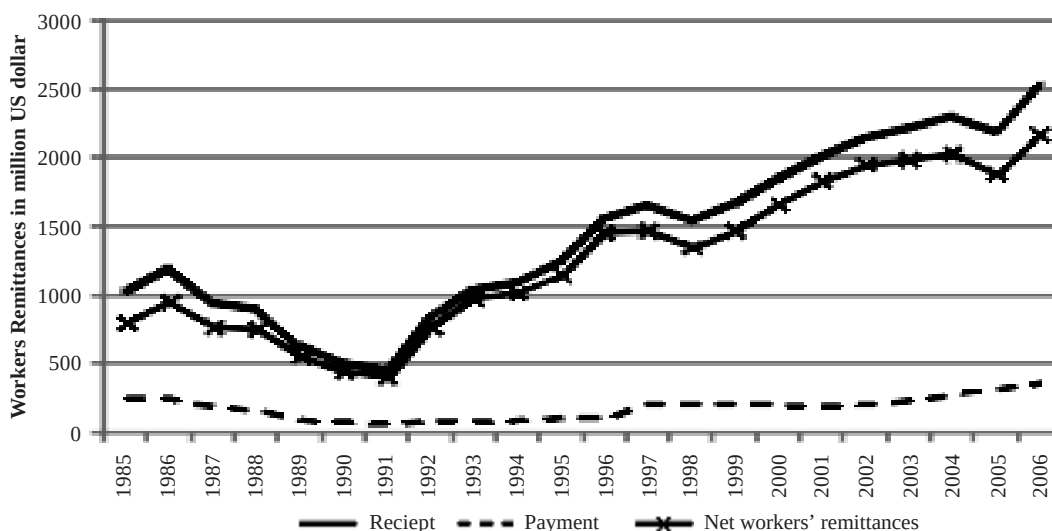


Fig. 2. Workers Remittances in million US dollar

Source: UNCTAD Handbook, various issues

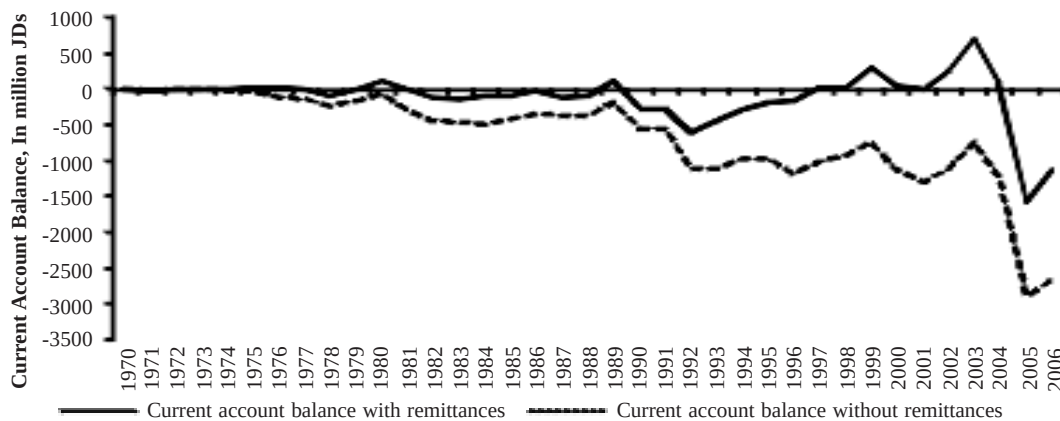


Fig. 3. Effect of workers' remittances (net) on current account balance

Source: Same as for Fig. 1.

registration fees and approval of the Ministry of Labor for foreign workers. To sum up: first, increasing emigrants' remittances were not due to economic liberalization, since regulations were tightened in the period when the remittances increased. Second, exacerbating trade deficit during economic reform period was reduced by the surplus of workers' remittances and hence reducing the current account deficit of the balance of payments.

2. REMITTANCES AND ECONOMIC ACTIVITY

In this section we focus on how workers' remittances have been able to spur economic activity. Jordan is one of the countries in the world with a long history of sending and receiving workers. In 2006, Jordan received JD 1.78 billion, almost 17 per cent of the country's GDP. In 2008, the country received JD 2242 million, or 14.2 percent of its GDP. Yet, there has been no governmental policy on how remittance inflows can be utilized for productivity growth. Therefore, it is very important for policymakers and researchers to realize the key channels through which remittances affect income² (or GDP). Undoubtedly, growth of consumption expenditure contributes to the overall economic growth but do such expenditures spur domestic investment and exports or reduce them in favour of import of final goods and services, thereby rendering the economy more reliant on external markets? In other words, what is the impact of workers' remittances on overall economic activ-

ity through each component of the gross domestic product?

Workers' remittances may boost economic activity through the private consumption channel. Workers may remit money to their households who in turn may increase their level of consumption of final goods and services. Assuming that households are rational in their consumption patterns, they would prefer to purchase domestically produced goods, had they found domestic products less expensive and better in terms of quality than imported ones. In a small developing country like Jordan a large number of final goods are imported rather than domestically produced such as cars, electrical and electronic machines, various food items etc. Typically, emigrants' households in the home country seek more luxurious goods with high quality since their income is higher than other households in the home country. Such goods are often imported from developed countries, particularly European countries, Japan and U.S. Thus, in this way net remittances were used to finance imports; the inflow of money in form of remittances was countered by outflow of money in form of imports, reducing net exports and hence national income.

The second possibility of remittances with respect to consumption is that emigrants' households in home country may spend more on domestically produced goods rather than on imported goods. In this case, domestic production will grow more and the quality of goods would be improved to meet consumers' tastes. Once the production capacity expands, in case of economies of scale which do not exist practically in

Jordan, it will be reflected in improving export potential.

Emigrants from a developing country to more developed one often settle with their families in the host country and their consumption expenditure is then paid in the host country. In this case, emigrants may not contribute to consumption expenditure in home country.

Immigrants, on the other hand, from a developing country to another developing country do not usually settle their families in the host country like the case of Jordan where most of immigrants are from Egypt and Syria. It is very rare to find immigrants living with their families in Jordan. This is, of course, because the income that immigrants receive in the host developing country is much lower than the income that immigrants to a more developed country receive, though it is higher than income in immigrants' home country. Therefore, immigrants' contribution to consumption expenditure in a host developing country could be very small relative to the effect of their remittances to their own countries.

The second channel through which remittances can affect economic activity is investment expenditure. Remittances can play a dual role in investment; one is direct and the other is indirect. The direct effect of workers' remittances occurs when they are used directly to finance various investment and business activities in the home country whether in direct productive investments, portfolio investments or as bank deposits. The indirect effect of remittances on investment takes place through consumption channel depending on the origin of consumer goods. If remittances are spent on domestically produced goods, domestic production will grow more, as a result of increasing domestic demand, which implies more investment growth and hence more national income and employment. But when remittances are directed to finance imported final goods, domestic production may decline, particularly when imported goods are more competitive in terms of prices and quality and as a result, domestic investment and net exports will fall.

Similar to the case of consumption, emigrants to a developed country may invest in that host country rather than in their home country, induced by high prices and high demand for goods and services in the host country. That is to say, it is not necessary that an increasing number of emigrants will result in more investment in the home country. To the contrary, emigration of experts

and skilled labor (brain drain) may result in disinvestment when either their remittances to source country are not used to finance investment (directly or indirectly) or they do not remit at all.

Immigrants to a small developing country are often discouraged to invest in the host country due to several reasons such as non-existence of economies of scale, low profitability and low savings out of their earnings. Eventually, they prefer to transfer their earnings to their households in their own country to meet their daily expenses or to invest. This is the case when immigrants may not contribute to investment in the host country.

The third channel via which remittances may contribute to economic growth is government expenditure. When remittances are directed to domestic savings and investments, income tax will increase. The portion of remittances of emigrant and immigrant workers that is used for final consumption of both domestically produced goods and imported goods will also positively affect the size of value-added taxes (or the general sales tax), income tax and collected tariffs. Besides, various kinds of fees have to be paid by immigrants as a registration fee, health certificate fee and, in some cases, entry fee. All these kinds of taxes and fees contribute to government revenues that are used to finance government expenditures on infrastructure, capital and current expenditures.

A fourth component through which workers' remittances may affect economic growth is *net exports* (or net trade). Emigrants' households may tend to spend more of their received remittances on consumption of domestically produced goods than on imported goods. If this is the case, then investment and production capacity will expand, resulting in a greater export potential and a greater net exports. If, on the other hand, emigrants' consumption in home country is absorbed by imported final consumption goods, domestic production tends to decline as imported goods are more competitive in home country boosting imports and causing exports to fall and hence trade surplus will decline or trade deficit will exacerbate.

It is very important to note that there is no direct impact of remittances on the nominal exchange rate of the Jordanian currency, namely the Jordanian Dinar. More than 98 percent of workers' remittances to Jordan are from Gulf

countries (mainly, from Saudi Arabia). These remittances are transferred through banks or transfer agencies and all the money transferred are received in Jordan currency itself. Since 1996, the Jordanian currency (Dinar) is pegged to US dollar at US \$ 1.408/ JOD. Therefore, the exchange rate of the Dinar will not substantially be affected by remittances, keeping in mind that the Saudi Riyal is also pegged to US dollar at SR 3.745/ US \$ since 1987.

2.1 Methodology

In the previous section we have discussed the four channels through which workers' remittances may affect economic growth. But how to measure each component's effect and the total effect of remittances on economic activity is our concern in this section. The above discussion is based on the familiar income identity with government expenditures and external sector:

$$Y_t = C_t + I_t + G_t + Xn_t \dots\dots\dots(1)$$

where, "Y" stands for income or gross domestic product (GDP),

"C" is the private consumption,

"I" stands for investment or gross capital formation,

"G" represents government or public expenditures,

"Xn" stands for net exports (i.e., exports minus imports) and, t for time period.

The basic idea is that, firstly, the impact of workers' remittances on private consumption, investment, government expenditure and net exports is examined separately for each of them. Second, the total impact on gross domestic product will be achieved by summing up the effects of remittances on all GDP's components. That is, there is a certain portion of C, I, G and Xn is attributed to workers' remittances and summing up these portions altogether will produce the total effect of remittances on GDP.

Econometrically, the above idea implies that a two-stage method is applied to the given data. In the first stage, the effect of remittances on C, I, G and Xn is examined by regressing each of these four dependent variables on emigrants' transfers to home country and immigrants' transfers to their source country after controlling for initial levels of each of the dependent variables. From the resulting coefficients, the predicted values will be extracted. These predicted values represent the value of each variable that comes

only from the effect of workers' remittances and can be called instrumental variables (IVs) for workers' remittances (Granger 1981; Gujarati 1995; Box et al. 2004). In the second stage, the resulting predicted values will be summed up in each time period to find the total effect of remittances on GDP.

To measure the impact of workers' remittances on gross domestic product, the impact of remittances on every source of gross domestic product must be examined. The relationship between workers' remittances and each source of the GDP is examined using OLS regression models. Let the emigrants' remittances to home country be R_h and immigrants' remittances to their source country be denoted by R_f . The initial levels of private and public consumption, investment and net exports are taken into consideration to control for the effect of other variables. These relationships can be written as:

$$C_t = \alpha_0 + \alpha_1 C_{t-1} + \alpha_2 R_{ht} + \alpha_3 R_{ft} + U_{1t} \dots\dots\dots(2)$$

$$I_t = \beta_0 + \beta_1 I_{t-1} + \beta_2 R_{ht} + \beta_3 R_{ft} + U_{2t} \dots\dots\dots(3)$$

$$G_t = \gamma_0 + \gamma_1 G_{t-1} + \gamma_2 R_{ht} + \gamma_3 R_{ft} + U_{3t} \dots\dots\dots(4)$$

$$Xn_t = \delta_0 + \delta_1 Xn_{t-1} + \delta_2 R_{ht} + \delta_3 R_{ft} + U_{4t} \dots\dots\dots(5)$$

where, α , β , γ and δ are regression coefficients for private consumption, investment, government expenditures and net exports, respectively. "U" is the disturbance (or stochastic) term. This is the first stage of measuring the effect of remittances on GDP, which also includes the extraction of predicted values out of the equations (2) till (5).

The total effect of workers' remittances on GDP is obtained by adding up the values of instrumental variables for workers' remittances in each year. If the predicted values of GDP's components that resulted from the equations (2), (3), ..., (5) are marked by asterisk sign, then

$$GDP^* = C_t^* + I_t^* + G_t^* + Xn_t^* \dots\dots\dots(6)$$

Where,

GDP* stands for that value of gross domestic product that results from the effect of workers' remittances only. For instance, C^* reflects the effect of workers' remittances on GDP through private consumption channel alone and so on.

2.2 Regression Results for the Effect of Remittances on Economic Activity¹

The regression results of equations (2), (3), (4) and (5) are shown as in appendix 1. Table 3 represents the results' summary and the interpretation of these results is outlined as follow:

Table 3: Results' summary of the regression of the components of income identity on workers' remittances

Dependent variables	Value, sign and significance level of the coefficients of the explanatory variables	
	Emigrants' remittances	Immigrants' remittances
Private consumption (C)	0.70**	-0.51
Investment (I)	0.41**	-3.3***
Government expenditure (G)	0.15**	-0.81**
Net exports (Xn)	-0.71***	1.7

Source: Outlined from appendix 1

Asterisk signs:

'*' denotes that the coefficient is significant at 90 % confidence level,

'**' reflects a 95 % confidence level and,

'***' the coefficient is significant at 99 % confidence level.

2.2.1 Remittances Effect on Private Consumption

Emigrants' remittances to home country (Jordan) have a positive and significant impact on private consumption. This result supports the finding of Al Sondos and Abo Kharma (2010) and Karagoz (2010). If a Jordanian worker working abroad remits JD 1000 per year, his household will spend on their private consumption JD 700 per annum out of the JD 1000 he remitted. In contrast to emigrants' remittances, the more the foreign workers working in Jordan remit to their source countries, the less their estimated contribution to private consumption in Jordan will be and vice versa. Yet, the expected negative sign of the coefficient of immigrants' remittances (-0.51) is statistically insignificant.

To find out the effect of remittances on gross domestic product through private consumption channel, the coefficient of emigrants' remittances (R_e) in equation (2) is multiplied by emigrants' remittances in each year and the product is added to the product of the coefficient of immigrants' remittances (R_i) and immigrants' remittances to their source countries in that year. That is, if we denote the effect of remittances on GDP through private consumption by C^* (the first instrumental variable for remittances), then:

$$C_t^* = 0.70 * R_{et} - 0.51 * R_{it} \dots\dots\dots (7)$$

According to equation (7), the value of private consumption that is generated from remittances alone in each year is shown as in column (1), appendix 2. As emigrants' remittances increase, propensity of households to consume increases accordingly. On the other hand, as im-

migrants' remittances to their source country increase, their consumption level in Jordan decreases. The total effect of remittances (net workers' remittances) on consumption, however, is positive and increasing during the study period.

2.2.2 Remittances Effect on Investment

High values of emigrants' remittances were associated with high values of gross capital formation and vice versa. Yet, the propensity to consume is much higher than the propensity to save and, hence, to invest as a result of growing remittances. An increase of inward remittances of JD 100 million per annum may result in an increase of JD 41 million in investment. This result is more robust than that of Athamneh (2004) and Karagoz (2010). Emigrants' remittances positively affect investment, whereas immigrants' transfers to their source countries have a negative impact on investment. The regression results of the effect of remittances on investment are shown as in appendix 1.

From the regression results on the relationship between remittances and investment, we extract the value of investment that is resulted from remittances alone for each year. The extracted values out of the investment regression equation are computed based on equation (8). The impact of workers' remittances on gross domestic product through investment channel (the second instrumental variable for workers' remittances) is denoted by I^* , where:

$$I_t^* = 0.41 * R_{et} - 3.3 * R_{it} \dots\dots\dots (8)$$

The negative effect of immigrants' remittances is much higher than the positive effect of emigrants' remittances on investment; the coefficient of immigrants' remittances (R_i) is -3.3 and highly significant whereas the coefficient of the remittances of Jordanians working abroad (R_e) was only 0.41 and highly significant too, yet the net effect is positive due to very high values of inward remittances in comparison with the outward remittances. The estimations of investment that could have been the result of remittances are shown as in column (2) of appendix 2.

2.2.3 Remittances Effect on Government Expenditures

We have found that as emigrants' remittances grow, private consumption and investment grow too. And these two components of GDP have an

effect on government expenditures (a third component of GDP). Based on the empirical results we found, the higher the value of inward remittances, the higher the value of private consumption and investment will be. Private consumption includes consumption of final goods and services, which will boost income and sales tax (value-added tax), adding to government revenues and hence enabling more government expenditures. The increment in investment that arises from emigrants' remittances will also result in an increment in government's ability to spend as a result of growing income and corporate taxes. Also we found a negative association between immigrants' remittances on one hand and private consumption and investment on the other. If this is the case, the impact of immigrants' outward transfers must be associated negatively with government expenditure.

The above argument is supported by the empirical results, appendix 1. If a Jordanian worker working abroad remits JD 100 thousands per year, the estimated contribution of this remittance to the government's ability to spend will be JD 15 thousands per year through direct taxes and other payments. On the relationship between remittances and government expenditures, the coefficient of emigrants' remittances is positive and statistically significant. In contrast to inward remittances, the outward remittances by foreign workers working in the country will reduce the government's ability to spend by 81 per cent proportionally to the amount transferred out as their estimated contribution to private consumption and investment in Jordan declines. Denoted by 'G', government expenditures that may be generated by workers' remittances alone are extracted as follow:

$$G_t = 0.15 * R_{it} - 0.81 * R_{it} \dots\dots\dots(9)$$

However, equation (9) is used to find out an instrumental variable for the effect of remittances on GDP through government expenditures. The results are shown as in column (3), appendix 2. The result is more robust than that of Al Sondos and Abu-Kharmeh (2010) where their data are less stable and less stationary (Durbin-Watson is 1.7) than the result of this paper (Durbin-Watson Statistic is 2.0).

2.2.4 Remittances Effect on Net Exports

The effect of remittances on net exports is found to be negative. The highest and the most

significant negative effects of inward remittances were on net exports, amongst GDP's components; remittances' coefficient in export equation is -0.71 and significant at 99 % confidence level, appendix 1. This finding supports the notion that the largest portion of the increase in private consumption that arises from remittances was directed to the imported final goods rather than to the domestically produced goods. The terminated export and production subsidies, declining tariffs and the very low competitiveness in domestic and international markets have resulted in an increasing tendency towards imports, directing a large portion of inward remittances to consume imported rather than domestically produced goods and hence reducing net exports, or exacerbating the trade deficit. Immigrants' remittances to their source countries have a positive but insignificant impact on net trade.

The effect of net remittances alone on net exports can be computed based on the following equation:

$$X_{nt}^* = -0.71 * R_{it} + 1.7 * R_{it} \dots\dots\dots(10)$$

Applying the data on net exports, inward and outward remittances to equation (10) produces an instrumental variable for the effect of remittances on gross domestic product through external sector channel (net exports) and is shown as in column (4), appendix 2. These results supports the findings of Abu-Al Sondos and Abu-Kharmeh (2010) in the fact that exports are negatively affected by inward remittances but the result of this paper is more robust and more reliable because: (i) data of this paper are more stable and stationary and, (ii) This paper considers the effect of outward remittances and not only the effect of inward remittances. Trade deficit in millions JDs that could arise from inward remittances has increased from 34.0 in 1976 to 345.2, 323.3 and 989.1 in 1985, 1995 and 2006, respectively.

2.2.5 The Total Effect of Remittances on GDP

Finally, the net effect of workers' remittances on economic activity can be estimated by the addition of remittances' effects on the above four discussed components of gross domestic product. In other words, the four instrumental variables that we have built will be added altogether to get the total effect of remittances on GDP. If the effect of remittances alone on GDP is denoted by GDP*, then:

$$GDP^* = \sum_{i=1}^n (ER_{it} - ER_{it}^*) = C_t^* + I_t^* + G_t^* + n_t^* \dots \dots \dots (11)$$

where, $n = 4$; the number of instrumental variables, ER_{it} and ER_{it}^* are the effects of emigrants' and immigrants' remittances, respectively, on GDP through the four channels, namely private consumption, investment, government expenditures and net exports. The total values of gross domestic product that are generated from net effect of remittances and computed according to equation (11) are shown as in column 5, appendix 2.

In contrast to trade liberalization policies that took place since early 1990s and their negative effects on the economy^v, the positive effect of remittances occurred during the same period but in a situation with which labor market in general and labor migration particularly are more regulated and controlled by government.

3. CONCLUSION

To sum up, more than external trade policies and commodity market regulation, labor market and labor migration in recent years witnessed intensive governmental intervention in Jordan relative to the 1970s and 1980s. This has been associated with higher values of inward remittances from Jordanians working abroad and decreasing outward transfers from foreign workers to their source countries, particularly since 1996. The growing net remittances have mitigated the current account deficit of the balance of payments. Excluding the year 2001, the current account balance experienced a surplus during the period 1997-2006, thanks to net workers remittances without which the current account would have been in substantial deficit.

Net workers' remittances were directed to private consumption more than to saving and investment. The pattern of private consumption is characterized by consuming imported goods more than domestically produced goods. This, along with the dismantled tariffs on imported goods and terminated export and production subsidies, have rendered Jordanian products uncompetitive domestically and internationally in terms of price and quality. As a result, net remittances were used to finance imports. Production and export potentials would have improved have the remittances directed to savings, investment and consumption of domestically produced goods and services. While inward remittances

have enhanced the government's ability to spend on various fields through income and sales tax, outward remittances reduced it. However, there was a positive relationship between net remittances and economic activity through private consumption, investment and government expenditures altogether. The negative effect of remittances on net exports was much higher than the positive effect of remittances on investment and government expenditures together, yet less than the positive effect on private consumption. Thus, the total impact of remittances on GDP has occurred to a large extent through the private consumption channel. In short, the ratio of GDP that is generated by workers' remittances through the four channels to total GDP during the study period was, on average, 3.2 per cent.

Nevertheless, these inward remittances have been remitted by Jordanians working abroad who generally represent a highly skilled labor force. The negative effect of such a brain drain may be more than the positive effect of their remittances to Jordan, considering the unskilled and uneducated foreign labor in Jordan, which has a lower productivity rate than that of the Jordanian laborers (Talafha 1989). In spite of few but not empirical studies (Mountford 1997; Hemmi 2005), the future research on this topic should focus on measuring the effect of brain drain on economic activity so as to assess the total effect of labor migration on the economy.

4. RECOMMENDATIONS

The above discussions and results of analysis reveal that there are many policy recommendations which should be put before the policy-makers in the area of labor migration. First, the government should set up a project to build up a database pertaining to labor migration, including the actual numbers of emigrants and immigrants, their experiences, skills and qualifications, and their actual remittances to home and source countries. This can be achieved by cooperation agreements between the country on one side and both the source and host countries of immigrants and emigrants on the other. Second, it is obvious that after the country invests its scarce budget in education of its own people, the developed (or high income) countries, though not deliberately, but all the same, through an attractive work environment, try to skim off their best and brightest. Therefore, Jordan and all other source coun-

tries (almost all low-income countries) should work together so as to get compensations from host countries to offset the negative effects of the brain drain. This may be done with the help of the International Labor Organization (ILO) and the Organization for Labor Migration (OLM). Third, Jordan Government should interestingly consider the role of remittances in increasing the consumption pattern in the country. In this context, incentives should be given to those emigrants who transfer their money for the purpose of investment and saving.

NOTES

- ¹ Article (a / 12) of the Labor Law No. (8) of 1996, Ministry of Labor-Jordan.
- ² Report No. 12645 JO, World Bank, "Consolidating Economic Adjustment and Establishing the Base for Sustainable Growth", August 24, 1994.
- ³ Workers' remittances have an obvious and direct effect on GNP because they are a component of GNP, but are they so for GDP? Therefore, in this section the effect of remittances on GDP will be estimated.
- ⁴ Based on data availability, particularly on consumption and investment, the regression analysis includes the period from 1976 to 2006.
- ⁵ For more details on the negative effects of trade liberalization policies on the Jordanian economy see: Al Akayleh (2008). Economic Openness and its Implications for Growth and Employment-A Case Study of Jordan (1970-2003). Unpublished PhD thesis. New Delhi: Jawaharlal Nehru University.

REFERENCES

- Al-Akayleh Fayq 2008. *Economic Openness and Its Implications for Growth and Employment- A Case Study of Jordan- 1970-2003*. PhD Thesis, Unpublished. Delhi: Jawaharlal Nehru University.
- Athamneh Abdel Baset 2004. The effect of labor migration on economic growth- The case of Jordan 1970-2001. *Mu'tah Lil-Buhuth Wad-Dirasat*, 19(5): 41-49.
- Box George EP, Jenkins, Reinsel Gwilym M Gregory C 2004. *Time Series Analysis*. 3rd Edition. Singapore: Pearson Education.
- Brown Richard PC 1997. Estimating remittance functions for Pacific island migrants. *World Development*, 25 (4): 613-626.
- Chandrasekhar CP, Ghosh Jayati 2002. *The Market That Failed*. New Delhi: LeftWorld Books.
- Department of Statistics, *National Accounts* (1976-2006), Amman, Jordan.
- Department of Statistics, *Statistical Yearbook*, Various Issues GIVE YEARS, Amman-Jordan.
- Fargues Philippe 2004. Arab migration to Europe- trends and policies. *International Migration Review*, 38 (4): 1348-71.
- Granger CWJ 1981. Some properties of time series data and their use in econometric model specification. *Journal of Econometrics*, 16(1): 121-30.
- Gujarati Damodar N 1995. *Basic Econometrics*. Singapore: McGraw-Hill, Inc.
- Hemmi Noriyoshi 2005. Brain drain and economic growth- Theory and evidence- A comment. *Journal of Development Economics*, 77: 251-256.
- International Monetary Fund: May 1996. *Jordan Strategy for Adjustment and Growth*, Washington DC: IMF.
- Karagoz Kadir 2009. Workers' remittances and economic growth: Evidence from Turkey. *Journal of Yasar University*, 4(13): 1891-1908.
- Milesi-Ferretti, Maria Gian, Assaf Razin 1998. Current account reversals and currency crises- empirical regularities. National Bureau of Economic Research, *Working Paper No.6620*.
- Ministry of Planning and International Cooperation: *Economic and Social Development Plan-(1981-85), (1993-97), (1999-2003), and (2004-2006)*. Amman, Jordan.
- Mountford Andrew 1997. Can a brain drain be good for growth in the source economy? *Journal of Development Economics*, 53: 287-303.
- Orozco Manuel 2002. Globalization and migration- The impact of family remittances in Latin America. *Latin American Politics and Society*, 44(2): 41-66.
- Research Department, Central Bank of Jordan: *Yearly Statistical Series 1964-2006*. Amman, Jordan.
- Roy Delwin A 1989. Development policy and labor migration in Sudan. *Middle Eastern Studies*, 2 (3): 301-22.
- Sondos Jihad Abu-Al, Abu-Khurmeh Suleiman 2010. The Jordanian workers' remittances Impact on the main macroeconomic variables. *International Research Journal of Finance and Economics*, 41: 121-135.
- Stiglitz Joseph E 2002. *Globalization and Its Discontents*. London: Penguin Group.
- Stiglitz Joseph E 2006. *Making Globalization Work*. London: Penguin Group.
- Talafha Hussain 1989. The role of guest workers in the economy of Jordan. *Abhath Al-Yarmouk-Humanities and Social Sciences Series*, 5(1): 67-92.
- United Nations Conference on Trade and Development (UNCTAD), UNCTAD Handbook of Statistics. From< <http://www.unctad.org>> (Retrieved May January 03, 2010).
- World Bank, Report No.12645JO, 1994. *Jordan Consolidating Economic Adjustment and Establishing the Base for Sustainable Growth*. Volume 1, Main Report. World Bank.

APPENDIX

Appendix 1: Regression results for the effect of workers' remittances on private consumption, investment, government expenditures and net exports

Dependent Variables	Coefficients of explanatory variables				R^2	DW statistic
	Constant	Lagged levels of dependent variables	R_{ht}	R_{ft}		
C_t	145.9 (1.8)*	C_{t-1} : 0.84 (7.9)***	0.70 (2.0)**	-0.51(-0.3)	0.99	2.0
I_t	208.1 (3.1)***	I_{t-1} : 0.79 (6.4)***	0.41 (2.3)**	-3.3 (-2.6)***	0.93	2.0
G_t	58.6 (3.0)***	G_{t-1} : 0.95(12.3)***	0.15 (2.0)**	-0.81(-2.2)**	0.99	2.0
Xn_t	-369.4(-3.9)***	Xn_{t-1} : 0.22 (1.10)	-0.71(-3.8)***	1.7 (1.10)	0.83	2.0

Source: Author's estimations. Values in parenthesis represent t-value.

Asterisk signs:

'*' denotes that the coefficient is significant at 90 % confidence level,

'***' reflects a 95 % confidence level and,

'****' the coefficient is significant at 99 % confidence level.

Appendix 2: Instrumental variables for the effect of remittances on GDP

Year	Cp^*	I^*	G^*	Xn^*	GDP^*	$(GDP^*/GDP)^*$ 100
1976	-4.4	3.3	46.7	-34.0	11.5	2.0
1977	9.7	12.9	60.9	-63.1	20.4	3.0
1978	19.1	19.1	67.6	-80.2	25.6	3.2
1979	24.4	23.3	78.0	-95.4	30.3	3.1
1980	61.2	48.9	118.1	-173.8	54.4	4.7
1981	59.4	52.4	154.6	-202.5	64.0	4.4
1982	74.9	64.0	177.7	-240.8	75.8	4.6
1983	93.0	76.3	195.0	-277.4	87.0	4.9
1984	133.2	104.7	242.6	-366.2	114.3	6.0
1985	133.7	101.8	217.0	-345.2	107.3	5.4
1986	119.1	93.2	213.3	-324.3	101.2	4.5
1987	83.4	66.5	159.2	-235.5	73.6	3.2
1988	70.6	59.2	158.8	-219.5	69.0	2.9
1989	57.1	51.8	159.6	-203.9	64.5	2.7
1990	50.2	46.2	146.3	-184.3	58.4	2.1
1991	43.1	40.6	133.4	-164.8	52.3	1.8
1992	41.7	51.6	228.5	-243.4	78.4	2.2
1993	13.3	40.3	266.2	-240.8	79.1	2.0
1994	29.5	52.4	290.4	-280.9	91.5	2.1
1995	35.3	60.8	332.4	-323.3	105.2	2.2
1996	-2.7	46.9	392.0	-327.6	108.6	2.2
1997	129.7	133.5	491.8	-572.3	182.7	3.6
1998	150.3	142.9	474.3	-582.5	185.0	3.3
1999	134.5	136.8	496.7	-582.2	185.8	3.2
2000	108.2	126.0	528.6	-577.3	185.5	3.1
2001	86.6	117.6	559.3	-576.9	186.5	2.9
2002	76.0	114.8	585.1	-585.8	190.0	2.8
2003	67.3	111.5	597.3	-585.7	190.4	2.6
2004	148.7	158.1	604.9	-690.8	221.0	2.7
2005	234.6	215.9	681.9	-859.8	272.5	3.0
2006	268.8	247.9	785.9	-989.1	313.5	3.0

Source: Calculated based on the regression results in appendix 1.

C^* : stands for an instrumental variable for the effect of workers' remittances on private consumption.

I^* : is an instrumental variable for the effect of workers' remittances on investment.

G^* : represents an instrumental variable for the effect of workers' remittances on government expenditures.

Xn^* : is an instrumental variable for the impact of workers' remittances on net exports.

Data on GDP, C, I, G, Exports and Imports are from Jordan Department of Statistics (DOS). Data on workers' remittances were obtained from the Yearly Statistical Series (1964-2006), Central Bank of Jordan.