Dynamic Effects of Migrant Remittances on Growth: An Econometric Model with an Application to Mediterranean Countries

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Abstract

This paper builds a Keynesian type econometric model with a dynamic perspective and a sound theoretical basis, for investigating the impact of remittances on consumption, investment, imports and output. It estimates short and long-run multiplier effects of exogenous shocks of remittances, with data from five Mediterranean countries. The analysis reveals a uniform country performance of instability and uncertainty, with great temporal and inter-country fluctuations of remittance effects. The findings point to different inter-country priorities of remittance spending and to an asymmetric impact of remittance changes, in the sense that the good done to growth by rising remittances is not as great as the bad done by falling remittances.

Keywords: Migration, Remittances, Growth, Dynamic Model, Mediterranean Countries.

JEL-Code : F22, O11, O19

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1. Introduction

Migrant remittances are a significant and vital financial source for labor exporting countries, therefore the issue of their effects is of utmost importance. In many of the labor exporting countries, migrant remittances represent a very high proportion of their foreign exchange proceeds and an indispensable source for covering the balance of payments deficits[1]. In Egypt, remittances have been at times higher than the sum of foreign exchange from oil exports, the Suez Canal dues and tourism, and exceed considerably merchandise exports (by 45 per cent in 1993); in Morocco remittances ranged in the last decade between 5.5 - 8.0 per cent of GDP. As a proportion of merchandise exports, remittances reached in some countries high levels in recent years: Jordan 84.0 per cent; Morocco 41.0 per cent. In most of the labor exporting countries mentioned in this paper, the volume of remittances increased greatly over the last 20 or so years (Table 1).

The relevant literature discusses particularly the impact of remittances on poverty and income distribution (e.g. Lundahl, 1985; Djajic, 1986; Kirwan and Holden, 1986; Rivera - Batiz, 1986; Stark, Taylor and Yitzhaki, 1986; Stark, 1991). A large part of it is qualitative, assessing the situation in different countries, or presenting more general surveys (e.g. Richards and Martin, 1983; Russell, 1986, 1992; Keely and Tran, 1989; Glytsos, 1998; Farrag, 1996; Wahba, 1996). Systematic quantitative or econometric work on the macroeconomic effects of remittances is very limited (e.g. Oberai and Singh, 1980; Kandil and Metwally, 1990; Looney, 1990; Adams, 1991; Glytsos, 1993; Taylor and Wyatt, 1996).

Qualitative empirical discussions based on particular countries entertain often the thought that these voluminous funds flowing into a country in a more or less regular manner and for a long-time, cannot but contribute to development or, conversely dismiss rather easily any arguments of positive effects, denying that any good comes out of these financial flows. And the question is: to what extent could country differences be justified by different conditions, and to what extent could they result from the lack of

concrete empirical analysis, hiding perhaps some uniformities among countries and leaving enough room for speculation and judgmental propositions?

This paper will try to respond empirically to some of these questions and estimate the relative effects of remittances and the time distribution of these effects for different sectors of the economy or macroeconomic variables that have a bearing on development and growth. The tool of our analysis is a macroeconometric model, which will be applied to a number of countries on both sides of the Mediterranean basin, with the great majority of their migrants being either in the oil-rich Arab countries or in Europe.

2. Remittances and Development: Some preliminary observations.

In its various forms foreign exchange influences economic development and growth through demand and supply channels. Chenery and Bruno (1962) consider the lack of foreign exchange in LDC's as an "external strangulation" for development impeding the required capital imports. Given the chronic problems in the balance of trade of these countries as well as the ineffectiveness of foreign aid and the difficulties of borrowing, the often voluminous migrant remittances can substitute for the scarcity of the other sources of foreign exchange.

As private flows of foreign exchange remittances are spent partly on consumption and partly on investment and may have complex positive and negative affects on development and growth. Some contain that the significance of these flows risk generating a dependency on this source of finance which may in effect raise the need for more foreign exchange through increasing imports (Kritz et al, 1981). Remittances even in the cases that they are abundant may thus distort rather than promote growth and structural change, because they may misdirect government policies away from measures of improving structural changes and rendering competitive the remittance recipient countries. For instance, the inflation that remittance are able to generate by boosting excess demand or raising reservation wages may even cancel some of their beneficial effects (e.g. Feiler, 1987, Looney, 1990). The literature presents some strong arguments in favor of the contribution of remittances to development and growth, but equally also objections to that effect.

In countries of high emigration, remittances may induce structural transformation that has both economic and social implications on poverty, income distribution and economic welfare, which are impacting on consumption patterns and savings with ultimate effects on growth and trade.

A considerable part of the relevant literature argues that remittances are mostly spent on consumption, housing and land, and are not used for productive investment that

would contribute to long-run development. As we have argued elsewhere (Glytsos, 1998a), this view seems to ignore that, apart from the direct investment by migrants or recipients, the "productive use" of remittances may be served in a variety of other ways: management of remittances (e.g. by banks); extension of investment credit allowed by the increase in the liquidity of banks from remittance deposits; liberalization of other resources from consumption; investment in human capital in the form of spending on certain consumption items (e.g. education, health); purchase of more investment goods from abroad, made possible by remittances; growth of investment as a result of the multiplier effects of spending on consumption. Considering only some of these potentials is to underestimate, as the literature often does, the extent of the productive use of remittances.

If that is the case, the question is whether remittances are a stable and dependable source of funds for development. Evidence shows that those coming from migrants in the Arab Gulf oil-rich countries are more volatile because they are sensitive to oil price shocks, impacting on the host country economies and entailing massive movements of migrants between host and home countries. Such was, for instance, the case in the oil windfalls of 1973 and 1979, and during the price drops in 1982 and 1986, which generated very serious problems of adjustment in the labor exporting Middle East countries. The gradual switch of demand from the large numbers of unskilled labor to smaller numbers of skilled and well educated workers with easier family unification in the Gulf countries, is an additional dampening factor of remittances in the Middle East.

North African and Southern European labor exporting countries, with more permanent migrants in Western Europe, mostly France and Germany, have not been exposed to similar extreme experiences, because of the relative stability of the host country economies, suffering however from milder economic setbacks, which affected analogously the employment of migrants and often, but not always, their remitting capacity. In fact, there is some evidence that during the economic recession in France, Moroccans and Tunisians increased their remittances (Garson, 1994).

Developing economies are particularly concerned with growth and structural change. A major objective of labor exporting developing countries is to widen the basis of economic activity, raise competitiveness and reduce their dependence on injections of foreign resources. Changing remittance flows may have both short-run and long-run implications, which this paper will try to evaluate. Its objective is to estimate the effects of the demand from remittances on certain macroeconomic variables, that are related to short-run economic changes and to determine how these changes move the economy to long-run growth and development.

3. The Model

For our purposes in this paper, a very simple linear macroeconometric model would be appropriate, comprising four major features, that is, be demand oriented; be aggregate enough to have room for a number of different countries, offering comparable estimates and setting aside detailed individual or sectoral characteristics[2]; satisfy a certain minimum of accepted econometric standards; and, last but not least, make good theoretical sense, compatible with the kind of economies to which it will be applied. The model adopted, on these lines is of a Keynesian basis, but with a dynamic perspective[3], and consists of three behavioral equations, namely, a consumption function, an investment function and an imports function, and a national income identity. The focal point of the model is to determine first the short-run effects of an exogenous shock of remittances on these four endogenous variables and, second, to trace the long-run path, through which remittances move the economy ahead.

There are four phases in our analysis: the first is the construction and estimation of the econometric model; the second concerns the use of the estimates of the model to obtain short- and long-run remittance multipliers; the third phase is to apply these multipliers on the series of data for each country, in order to determine the magnitudes of the effects of remittances on the economies of these countries over time. Finally, in the fourth phase we try to estimate the relative significance of various factors that differentiate the induced effects of remittances on output growth among countries and over time.

3.1 Structure of the model

After experimenting with alternative forms of the consumption function, backed by different theoretical hypotheses[4], we apply equation (1) that performs best for almost all countries of our sample.

$$C_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 Ct_{-1} \qquad (1)$$

where C = Private Consumption, Y = GDP + Remittances, subscript t standing for time.

This is a dynamic long-run consumption equation and is backed by two different distributed-lag hypotheses, i.e. adaptive expectations and partial adjustment model[5], and may produce estimates of short- and long-run effects of income on consumption. This equation seems to satisfy our criterion for a model suitable for developing countries, where various uncertainties are present concerning income changes, with the component of remittances generating, as we noted, considerable income fluctuations. This is more

true for certain of the MENA countries that are under some kind of transition, given their efforts to move to privatization and the liberalization of their economies, having joined the World Trade Organization and signed agreements with the European Union for liberalizing trade.

Following some theoretical views (see Duesenberry, 1958; Christ, 1966; Pavlopoulos, 1966), we assume that private investment is correlated with business profits and that profits are positively related to national income and negatively related to the stock of capital, in the sense that there is some desired stock of capital toward which businessmen are orienting their investment activity (Christ, 1966, pp.582-583). Consequently, investment (I) is a positive function of income (Y) and a negative function of a lagged capital stock (K_{t-1}), allowing some time for investment to adjust to that stock[6].

$$I_t = \beta_0 + \beta_1 Y_t + \beta_2 K_{t-1} \qquad (2)$$

The import equation comes straight from the life-cycle hypothesis as developed for consumption by Ando and Modigliani and others (see Davidson, Hendry et al, 1978), incorporating the influence of income and wealth[7] and is of the form

$$M_t = \gamma_0 + \gamma_1 Y_t + \gamma_2 Y_{t-1} + \gamma_3 M_{t-1} \qquad (3)$$

For the countries investigated, imports make up a relatively high proportion of consumption, to which the life-cycle hypothesis may apply more than it does to domestically produced very basic goods. Variable M_{t-1} carries the effect of past incomes on current imports, indicating adaptive expectations. The coefficients of equation (3) may be expressed in terms of the theoretical parameters in note 7 as follows: $\gamma_1 = \lambda$, $\gamma_2 = (\delta - r) - \lambda$ and $\gamma_3 = 1 - (\delta - r)$, overidentifying the value of $(\delta - r)$.

By construction of the import function, $(\delta - r)>0$, therefore $\gamma_2 >< 0$, depending on $(\delta - r) >< \gamma_1$. In other words, lagged income will affect imports positively (negatively) if the marginal propensity to import with respect to current wealth $(\delta - r)$ is higher (lower) than the marginal propensity to import with respect to current income (γ_1). The lagged imports coefficient γ_3 will be positive, since $(\delta - r)<1$.

To summarize, our structural model consists of equations (1), (2) and (3), and an income identity, which also includes remittances[8], i.e.:

$$C_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 C_{t-1} \qquad (1)$$

$$I_t = \beta_0 + \beta_1 Y_t + \beta_2 K_{t-1} \qquad (2)$$

$$M_t = \gamma_0 + \gamma_1 Y_t + \gamma_2 Y_{t-1} + \gamma_3 M_{t-1} \qquad (3)$$

$$Y_t = C_t + I_t + G_t + X_t - M_t + R_t \qquad (4)$$

List of Variables :

Endogenous variables:

C = private consumption expenditure ; I = gross domestic investment (private and public), including change in stocks ; M = Imports of goods and non-factor services ; Y = a kind of national disposable income, made up of GDP and the volume of migrant remittances

Exogenous variables:

K = cumulative gross domestic investment $\sum_{1969}^{1998} I_t$ (as proxy of capital stock) ; G = general government consumption expenditure ; X = exports of goods and non-factor services ; R = migrant remittances deflated by the consumer price index ; t = stands for time.

3.2 Dynamic Features of the Model

The dynamic nature of the model emerges from the introduction of lagged endogenous variables into the system. The relationship between an endogenous variable and all the predetermined variables of our system of equations, i.e. the reduced form expression of the structural equations (1) - (4) is of the form:

$$X_{it} = \pi_0 + \pi_1 C_{t-1} + \pi_2 Y_{t-1} + \pi_3 M_{t-1} + \pi_4 K_{t-1} + \pi_5 G_t + \pi_6 X_t + \pi_7 R_t \qquad (5)$$

where X any of our endogenous variables C, I, M, Y.

The parameters π's are the partial derivatives of the endogenous variable X_i with respect to any predetermined variable Z, i.e. $\frac{\partial X_{it}}{\partial Z_{it}} = \pi_i$. Estimates of the π's may be obtained either directly by OLS from equation (5), or by solving the TSLS expressions of π's in terms of the estimated structural parameters (see Appendix). The former are unconstrained by the structure of the model and the interactions of the endogenous variables, which bind the solved TSLS coefficients.

In discrete variable notation, the partial derivatives of equation (5) are equivalent to $\Delta X = \pi \Delta Z$, which tells that π is a multiplier, called "impact multiplier", that represents the magnitudes of direct and indirect effects of a unit change in any predetermined variable Z on any endogenous variable X of the system, in the first year of the change in Z. Subsequent effects during the years 2, 3, ..., n come as a result of the

dynamic nature of the model, through the lagged dependent variables in the form of time distributed interim multipliers, moving the system forward towards long-term equilibrium if certain conditions of convergence exist. The sum of interim multipliers gives therefore the opportunity of evaluating the overall exogenous effects of remittances on the three endogenous variables of the model. More specifically, the dynamic nature of the model allows the possibility of estimating short- and long-run effects of changes in remittances and tracing the time path and the speed of these effects. (see, for instance, Pavlopoulos, 1966).

4. Estimation of the Model and Empirical Results

The model is estimated by two-stage least squares (TSLS) and is applied individually to 5 countries: Egypt, Greece, Jordan, Morocco and Portugal. Egypt and Jordan have generally temporary migrants in the oil-rich Arab States, Morocco has mostly permanent migrants in Europe, particularly in France and the Southern European relatively more advanced countries, Greece and Portugal, members of the European Union, have more or less permanent migrants in Germany and France but also in overseas territories. The data used are annual figures of the period 1969-1998. All figures are obtained from IMF, International Financial Statistics Yearbook, 1992, 1995, 1999, IMF, Balance of Payments Statistics Yearbook, 1975, 1982, 1990, 1995, 1999 and are expressed in local currencies at constant 1995 prices. The estimates of the model are presented in Table 2.

4.1 Structural Parameters

The model seems to fit rather well the data of all 5 countries, with all signs (except two) as theoretically expected, and with very significant coefficients in most of the cases. The lagged dependent variable in the consumption and imports equations, expressing the dynamic nature of the model, are all (except one) highly significant. These findings confirm the hypothesized permanent income behavior in all countries and the presence of time distribution effects of the demand for consumption and imports. More on this in the next section of the paper. We may therefore detect a remarkably uniform performance of these different in several respects countries, with their particularities reflected in the magnitude and not the nature and significance of the various structural responses of the model.

The short- and long-run marginal propensities to consume (MPC) are expressed respectively by $\frac{\partial C_t}{\partial Y_t}$ and $\frac{\partial \bar{C}_t}{\partial Y_t} = \frac{\partial C_t}{\partial Y_t}\left(\frac{1}{1-\frac{\partial C_t}{\partial C_{t-1}}}\right)$, $\bar{C}_t$ indicating the long-run

equilibrium of consumption ($C_t = C_{t-1}$). Analogously are expressed the corresponding marginal propensities to import (MPM). The findings show that the effect of an income change on consumption in the current year is almost identical in Egypt, Greece and Portugal, with a MPC = 0,3 roughly, much lower 0,2 for Jordan, and much higher 0,6 for Morocco, the latter being relatively more anxious to increase its current consumption, following any increase in income (Table 3).

Table 3 provides evidence of a remarkable uniformity as to the short-long run spending behavior out of an increase in income. At least the four countries demonstrate an almost identical short- / long-run MPC ratio, signalizing an almost equal speed in the course of their development in two opposite directions: higher spending in the current year generates a higher new demand that may induce more output (or more imports or inflation), but it also means a lower additional saving in the current period, with possible dampening effects on output on the supply side. Since remittances are part of disposable income, their influence on the economy is reflected in this behavior, as we will discuss extensively in a while. For the time being, we may conclude that all countries behave in a permanent income perspective and all but one adapt rather uniformly their consumer spending in the face of income increases.

Turning to imports, Egypt, Greece and Portugal with, as we saw, very similar moderate sized short-run marginal propensities to consume, experience low short-run marginal propensities to import, and Egypt and Greece high long-run marginal propensities to import. This suggests that the immediate concern of consumers in these countries is to raise their consumption (that naturally includes imported goods), but to increase imports relatively less impatiently. Jordan and Morocco occupy two extreme positions. The former with a relatively low short-run MPC=0,241 and a relatively higher short-run MPM=0,397, but also a high long-run MPM=1,481, and the latter with the reverse, a high short-run MPC=0,562 and a very low short-run MPM=0,071, but also a low long-run MPM=0,168. The relationship of short-/long-run MPM does not however demonstrate the roughly uniform spending behavior found for consumption. Thus, the priorities of these countries seem to be different with respect to the timing of spending remittances on consumption and imports.

The negative sign of lagged income in the import equation for Egypt, Greece and Jordan demonstrates, according to our theoretical hypothesis, a hesitation to liquidate assets for buying imports. In contrast, the corresponding positive sign for Morocco and Portugal would be an indication of asset liquidation, but such a possibility is negligible and statistically insignificant. The large positive and highly significant coefficient of

lagged imports in all five countries is an indication of a strong influence of adaptive expectations in the purchase of imports.

The estimated investment equation behaves uniformly and as expected in all countries but Egypt, with highly significant coefficients of the income variable, which reflects profits, demonstrating a prompt response in investing them. The investment restraining factor of the capital stock has the right behavior but has very low statistical significance.

4.2 Remittance Multipliers

Based on best results (signs of coefficients and their long-run convergence towards zero), we choose for our calculations of impact and interim multipliers the solved TSLS estimates for all countries except Morocco , for which the reduced form estimates are used. Under the assumption of a change of remittances by one unit $\Delta R = 1$, sustained for subsequent years, that is, with no further increase ($\Delta R = 0$) in years 2, 3, ... , n, all other predetermined variables in the equation remaining unchanged for t = 1, 2, ..., n years, the calculated interim multipliers are for most cases declining towards zero 6 years after the flow of remittances(Table 4). Notice that the current year multiplier has in all cases the highest value than in any other single year. One may observe here wide fluctuations of short and long-run multipliers for all four variables among countries, and also different time patterns of the distributed effects of a change in remittances.

The impact on all variables (except investment in Egypt) is positive for both the short and the long-run and so are the distributed time effects, with only negative interim multipliers in Morocco for consumption and income, for which however the positive short-run multipliers prevail, giving a positive overall effect. In the Middle East countries, Egypt and Jordan, the effects on consumption are delayed more than in other countries, perhaps because of the greater uncertainty concerning the sustainability of remittance flows in these countries, as we noted earlier. In contrast, Greeks, Moroccans and Portuguese are more anxious to raise their consumption immediately probably because they have an experience of more stable flows of remittances from their migrants in Europe.

The immediate effect of remittances on investment (including housing) is rather high in Morocco (impact multiplier 1,23) and moderate in the other countries (very small negative in Egypt). In all of them the effect on investment and also on imports wears out in the first or second year. Finally, the short-run income multiplier as the sum of the multipliers of income components and the unit increase in remittances ranges

among countries between 0,95 for Egypt and 2,80 for Morocco. The corresponding long-run cumulative multiplier ranges between 1,50 in Egypt and 4,06 in Greece, which compared with the short-run values show a sparse time distribution for Jordan, Morocco and Portugal and a more dense distribution for the rest.

5. Estimated Macroeconomic Effects of Remittances

These multipliers naturally give the unit potential impact of remittances, but the magnitudes of overall effects on growth of our macroeconomic variables depend on the size of remittances and their annual changes. There are two possibilities -that serve two different purposes- of estimating the magnitudes of these effects: first, calculate the effects of current and past remittances on current year's value of the variables concerned, or second, calculate the overall impact of a current change of remittances on current and future variables, over a number of years. The former may be expressed by the formula:

$$\Delta X_t = \sum_{j=0}^{j=n} \frac{\partial X_t}{\partial R_{t-j}} * \Delta R_{t-j} \qquad (6)$$

and the latter by the formula:

$$\sum_{t=1}^{t=n} \Delta X_t = (\Delta R_t) \sum_{j=0}^{j=n} \frac{\partial X_t}{\partial R_{t-j}}, \qquad (6\alpha)$$

or setting $m_x = \sum_{j=0}^{j=n} \frac{\partial X_t}{\partial R_{t-j}}$,

the overall long-term effect is given by

$$\sum_{t=1}^{t=n} \Delta X_t = m_x (\Delta Rt) \qquad (6\beta)$$

where $\frac{\partial X_t}{\partial R_{t-j}} = \pi_j$ the multiplier of year j, ΔR_{t-j} = the actual change of remittances between year (t-j) and {(t-j)-1}, X_t = any of our four endogenous variables: C, I, M and Y, m_x = long-term (truncated) multiplier for each X, j= 0,1,2,…,n the number of years over which the effects of remittances are distributed, converging to zero, t stands for time and Δ means the difference over two consecutive years. Then, the proportional contribution of remittances in year t on any of the X's is calculated as $(\Delta X_t / X_t) * 100$.

When the long-term multiplier is positive, which is true for all cases except one, the increase of current remittances has positive long-term effects and the decrease of

current remittances negative long-term effects. But inversely, the current year's, induced growth rates, carrying past years' changes in remittances (positive or negative) may not have the same sign as the current remittance change. This is because of the dynamic effects of remittances , i.e., because their impact spans over a number of years in the future.

For calculating the distributed quantitative effects on consumption, investment, imports and output, we apply the estimated interim multipliers to the actual annual changes of remittances.

For our 6 year time distribution of remittance effects the following analytical expression is applied:

$$(X_t - X_{t-1}) = \Delta X_t = \frac{\partial X_t}{\partial R_t} * dR_t + \frac{\partial X_t}{\partial R_{t-1}} * dR_{t-1} + \frac{\partial X_t}{\partial R_{t-2}} * dR_{t-2} + \frac{\partial X_t}{\partial R_{t-3}} * dR_{t-3} + \\ + \frac{\partial X_t}{\partial R_{t-4}} * dR_{t-4} + \frac{\partial X_t}{\partial R_{t-5}} * dR_{t-5} \qquad (7)$$

The results of these calculations for output in each year of the period 1975-1997 - because of the lags we loose 5 years from our original period 1969-1997- together with the corresponding actual growth rates are presented in Table 5 and the more detailed results for each output component in the summary table A1 of the appendix. The alternative presentation of the results that refer to the impact of current remittances on current and future growth rates of output are contained in table 6, and the corresponding detailed results in the summary table A2 of the appendix.

Remittance changes may be considered to affect output in four different directions. Two of them are favorable to growth and two are unfavorable. Other things being equal, remittance changes do good by boosting growth (Case I), or moderating recession (Case II), and they are harmful by restraining growth (Case III), or intensifying recession (Case IV). Presenting the results of Table 5 in a more digestive form in Table 7, we may observe that during the period 1975-84 the favorable effects concentrate as indicated by the X's, on Case I for all countries but Greece. Remittances boost growth rates of output with a mostly strong impact (two stars) in Jordan and to a lesser extent (one star), around the middle of the period, in Portugal. During this period, remittance changes played an almost nil role as a moderating factor of recession. By contrast, there are quite a few occasions, where remittances, or the lack of them, put some slight break on growth, or intensified recession especially in Greece and Morocco.

In the more recent period 1985-97 the attachment of remittances to growth was more deployed, with X's scattering all over the table. Half of the time they lie at the area

of favorable cases for all countries together and the other half to the area of unfavorable cases, but with the stronger effects allocated to the promotion of growth or the restraint of recession. Countries that are relatively more favored in this respect are Jordan in the later part of the period, and to a lesser extent Morocco and Greece which are very weakly influenced. In the years 1985, 1989 and 1990, remittances seem to have intensified recession very strongly in Jordan, with induced negative growth rates over 10 per cent.

In Egypt, the 1990 invasion to Kuwait cost the deportation of half a million Egyptian workers, leaving behind their savings and their unpaid earnings, which by itself tended to reduce the flow of remittances (Farrag, 1996). Nevertheless, the flow actually increased greatly in 1991 and 1992, very probably as the result of the devaluation of the Egyptian pound by 25 per cent in these years, that attracted remittances from the black market. This, according to our findings, raised output after several years of being in the red, mostly through imports and consumption. On the other hand, Egypt has several spells, especially in mid and late 1990's, and Greece fewer spells of a weak restraint of growth.

In Morocco remittances imposed a strong restraint on growth (between 3 and 5 per cent induced negative growth rates) in 1988, 1991 and 1994, and in Portugal a weak restraint over several years. Other evidence for Morocco (Wahba, 1996,p.19) testifies to a negative impact of remittances on agricultural output, due to abandoned cultivation by recipients who can afford to live out of remittances, spending also high amounts on housing. In heavy migration regions about 75 to 80 per cent of new houses belong to migrants (Bencherifa, et al., 1992, p.99). Our findings seem to support this evidence. In several years induced output was negative and in others the positive rates were very low, whereas induced investment growth that includes housing and induced growth of imports, particularly in the 1970's and 1980's, were often higher than induced output rates. These developments very probably show that investment concerns mostly housing, imports concern mostly consumer goods and the low or negative GDP rates reflect the drop of agricultural production.

One conclusion in this context is that in reference to the whole period covered in this paper, with the exception of Jordan, and a few years of an extremely weak impact for Greece, recession has not been intensified by remittances, or the lack of them, in the rest of the countries concerned. There has been however a problem of remittances restraining growth which is generally slim except of Morocco in 1988,1991 and 1994, and Jordan in 1987, where the problem is more serious. One may wonder after the discussion in this section whether, as it is put by several authors and reiterated by

Adams (1991, p.12), remittances contribute to development in the Third World. Our findings cannot provide any concrete universal answer on this issue. However, for part of the time and for some of the countries the answer is in the affirmative. These findings may also put in question the argument that the literature for Middle East demonstrates that remittances have not contributed to development (Wabha, 1996, p.19). The finding of positive and often high impact of remittances on growth in the 1970's for Egypt and even the much stronger findings for most of the period concerned for Jordan supports the view that remittances are generally a contributing factor to development of these countries. But at the same time the very low or negative induced output growth in the 1980's in Egypt may partly justify the contention that the impact of remittances on development is marginal for this country (Looney, 1990).

Concerning the rest of the endogenous variables in our model, for which the annual estimates are compressed in Table A1, in Greece all induced growth rates, positive or negative, are below 1 per cent, demonstrating very weak effects in either direction. In Egypt, the impact of remittances on all three variables is generally weak, but whenever it is strong is on the side of favorable effects as for consumption in 1979 and 1992 and for imports in 1978, 1979, 1990 and 1992. In Jordan, the induced positive growth rates prevail and are mostly strong and simultaneous for all variables, as in the years 1975, 1976, 1981, 1982, 1984 and 1995. But negative and simultaneous effects are also present, as in 1990, for all three variables, and for investment and imports in 1985, 1987 and 1989. Our results for Jordanian investment and imports are compatible with Keely and Saket (1984) finding that in certain periods of the 1970's and 1980's remittances contributed to imports of this country, and by implication they are beneficial and not harmful to the economy, through the imported production goods (Russell, 1992, p.274). Remittance induced effects are generally small for Portugal, most of the time are positive for investment, but not for consumption or imports, with many years of negative induced growth rates. Strong effects, positive or negative, are rather few and simultaneous in sign and direction for all three variables. Positive for 1978, 1979 and 1980 and negative for 1985 and 1994. For the rest of the years, remittances affect our macroeconomic variables weakly and in both directions.

The paper sheds some light on the debate of whether remittances contribute to investment, with most literature taking a negative stand. Our findings demonstrate positive and very often high rates of induced investment during a considerable part of the period investigated for Jordan and Morocco, and for a few years in the late 1970's for Portugal, but also several years of negative spells of induced investment. Egypt's negative induced investment growth rates for most of the period corroborates Feiler's (1987) contention that remittances influence Egyptian investment negatively and

Farrag's (1996) claim that investment financed by remittances is limited in Egypt. Jordan's investment, and output, was most favored during the period 1980-1984, in which a very high proportion of Jordan's labor force was working outside the country (40% in 1984) (Samha, 1992). We may also note that this strong boost to growth took place in a period where 70 to 80 per cent of remittances were spent on consumption (Samha, 1992). This suggests, as it has often been argued, that spending remittances even in consumption may be productive through its diffused effects on the economy.

One conclusion of this discussion is that, as a rule, there is quite a uniformity, but with different timing in the way in which remittances affect the variables of our model for the different countries investigated. This is even more the case when the induced growth rates, positive or negative, are relatively high.

6. Analyzing Further the Growth Generating Capacity of Remittances

For our purposes in this paper, the growth generating capacity of remittances is demonstrated by the elasticity of long-term induced growth rates of output with respect to the growth rates of remittances. Table 6 shows that for each country these elasticities are generally changing over time within very narrow limits, and they range on the average narrowly among countries. Dividing the whole period in three sub-periods, we may observe for most of the countries very close values in each time period (Table 8). For Egypt, Greece and Morocco, the average values for the whole period are correspondingly 0.10 and 0.12, for Portugal 0.20 and for Jordan 0.33. In other words, in Jordan the growth generating capacity of remittances is three times higher than that of Egypt, Greece and Morocco, with Portugal occupying an intermediate place. The elasticity is rising considerably over time in Egypt and Morocco, slightly in Jordan, is falling drastically in Greece, rising and subsequently falling in Portugal, but, as table 6 shows, with wide annual fluctuations above zero in the 1980's and below zero in the 1990's.

It is interesting to observe in Table 6 that there appears to be an asymmetry in the positive or negative response of output to remittance changes, which is particularly marked for Egypt, Jordan and Morocco. For these countries, the growth generating capacity of rising remittances is much smaller than the growth destroying capacity of falling remittances. This is indicated by the finding that the elasticities of induced negative growth rates of output with respect to falling remittances are much higher compared to the corresponding elasticities with respect to rising remittances (Table 9). They are about three times higher for Egypt and Morocco, and almost 1,5 times higher for Jordan. On the other hand, Greece and Portugal experience each just about the same

elasticities in the years of rising and the years of falling remittances. Thus, at least for the less developed non-European countries in our sample, the good done by remittances when they rise is not as great as the bad done when they fall. Among countries, this diversification of elasticities is wider in the years of rising remittances and, except for Jordan, more convergent, during the years of falling remittances. In other words, countries are on the average more uniformly affected during the downturn, than during the upturn of remittance flows.

Concluding, the wide fluctuations in the real value of remittances contribute often to wide fluctuation of output growth and add a strong element of instability in the economies concerned. These economies seem to be weakly sheltered against the damaging impact of falling remittances which is, in effect, a reflection of the Dutch disease problem that is generated by the euphoria and the comfort brought about by sustained periods of large flows of remittances.

These diverging findings call for an explanation concerning the factors that differentiate the inter-country and inter-temporal responses of the economies to remittance changes. Such factors could be the relative weight of remittances in the economy, expressed by the ratio of remittances over GDP (RGDP); the growth rates of remittances (GREM), standing for the relative liquidity and demand that they generate, and the growth rate of GDP (GGDP) indicating the phase of the business cycle. We experiment by regressing against these variables alternatively the estimated cross-country time series induced growth rates of output, or the estimated elasticity of output with respect to remittances, adding also four dummies for capturing country specific conditions, attitudes or policies that, one way or another, may contribute to this differentiation. In an effort to document the asymmetry observed, apart from running regressions with the whole sample we also run regressions for the elasticity variable, by using separately the sub-sample of rising remittances and the sub-sample of falling remittances.

The estimated regressions are presented in Table 10. In all four equations the relative weight of remittances in the economy (RGDP) has, as should be expected, a strong and highly significant impact on both induced output and long-term elasticity. The liquidity generated by remittance changes (GREM) is also a positive and highly significant factor for induced output, and a negative, as it should be, and highly significant factor for the elasticity. GDP growth rates exert a procyclical impact on both dependent variables. The country dummies are in almost all cases significant, suggesting that particular attitudes, conditions and policies in each country contribute to the differentiation of the two dependent variables. Finally, the above detected asymmetry in

the sensitivity of output with respect to remittances is supported by these findings. This support is manifested in the relatively higher coefficients of all variables in the equations with the negative growth rates of remittances, compared with the equations with positive rates. The coefficients of the weight of remittances in the economy and of the rate of decline of remittances are considerably higher relatively to the corresponding coefficients in the equations of the sub-sample with rising remittances.

Concluding, the inter-country and inter-temporal induced output differentiation is generated by the relative weight of remittances in the economy and the speed of change in the volume of remittances, whereas the impact of economic growth or recession is procyclical. Rising remittances are relatively less powerful to generate output as falling remittance are powerful to reduce output.

7. Concluding Remarks

This paper is motivated by the uncertainties surrounding the role of remittances in growth and development of labor exporting countries. Experimenting with a model of simultaneous equations, separately with five developing countries, having different migratory characteristics and migrant destinations, could possibly run the risk of troublesome econometric misfits and nonsensical results. Fortunately, this does not seem to be the case. The estimated model offers some common ground for discussion but also the opportunity of assessing the particularities of the countries involved. It is a dynamic demand oriented model, with a sound theoretical basis, suitable, in our view, for the issue at hand, and appropriate for pinpointing short- and long-run structural characteristics and effects. The distributed-lag feature of the model is able to determine the time distribution of the effects of remittances on the endogenous macroeconomic variables and to trace their growth path over time.

The estimated model demonstrates a great structural uniformity in the experiences of different countries, but it also exhibits the relative significance of country specific conditions through which the effects of remittances are differentiated in size but not in nature. The short-/long-run distinction of remittance effects reveals different inter-country priorities in the urgency of remittance spending on consumption, investment or imports. The model through its consecutive phases culminates with the estimation of the growth generating capacity of remittance flows for each country over time and reveals a rather unstable situation in all countries, with fluctuating positive and negative effects of remittances. There are good cases where remittances boost growth, or moderate recession, and bad cases where remittances restraint growth or accentuate recession, but the good cases are generally more than the bad cases.

The diversification of output effects of remittances is explained by their relative weight in the economy, the liquidity generated by them and the phase of the business cycle, as well as conditions, attitudes and policies in individual countries. An asymmetry is detected in the way the economy responds to positive or negative growth of remittance flows. The response is stronger to falling than to rising remittances. Furthermore, countries are more uniformly affected by the fall than by the rise of remittances, witnessing the often discussed vulnerability of the economies that depend heavily on remittances and a common inability of protecting themselves against the bad turn of remittance flows.

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Appendix

Presenting our simultaneous equations in matrix form, that is, $BX + \Gamma Z = 0$, shifting terms and premultiplying by B^{-1}, gives $X = (-B^{-1} \Gamma) Z$, where X is a vector of endogenous variables, Z a vector of predetermined variables, and B and Γ respective matrices of endogenous and predetermined variables parameters. This is the reduced form expression of the system of equations, with matrix: $\Pi = -B^{-1} \Gamma$ containing the reduced form coefficients π's as non-linear functions of the structural parameters estimated by TSLS. A typical row of such coefficients is the π_1, π_2, π_3, π_4, ... π_7, in the above reduced form equation (5) (see for instance the textbooks Christ, 1966 and Johnston, 1972 and empirical applications by Goldberger, 1959 and Pavlopoulos, 1966).

The interim multipliers for the 2nd, 3rd, 4th, ... and nth years are calculated by partioning matrix Π, into three submatrices: Π_1 with the current exogenous variables; Π_2 with the lagged exogenous variables and Π_3 with the lagged endogenous variables. The interim multipliers are obtained as follows:

second year multipliers = $(\Pi_2 + \Pi_3\Pi_1)$

third year multipliers = $\Pi_3(\Pi_2 + \Pi_3\Pi_1)$

fourth year multipliers = $\Pi_3^2(\Pi_2 + \Pi_3\Pi_1)$

.....

n^{th} year multipliers = $\Pi_3^{n-2}(\Pi_2 + \Pi_3\Pi_1)$

The total multipliers are given by the matrix $\Pi_1 + \sum_{t=2}^{t=n} \Pi_3^{t-2}(\Pi_2 + \Pi_3\Pi_1)$

Table 1. Remittances as a proportion (%) of GDP and of Merchandise Exports (X) in selected Mediterranean Countries and Selected Years

Countries	(Remittances / GDP) *100 (at constant 1995 prices in local currencies)							(Remittances / X) *100 (at current US Dollars)							Volume of Remittances (In million of current US Dollars)		
	1974	**1978**	**1982**	**1986**	**1990**	**1994**	**1997**	**1974**	**1978**	**1982**	**1986**	**1990**	**1994**	**1997**	**1980**	**1990**	**1997**
Egypt	2. 9	7.3	7.5	4.1	8.94	7.1	4. 9	22.3	117.8	60.7	95.2	118.9	97.7	74.1	2791	4284	3697
Jordan	10. 4	23.3	22.4	18.8	11.2	20. 7	21.9	63.6	197.6	144.0	161.7	42.1	87.3	84.1	666.5	447.9	1542.7
Greece	3.4	3.0	2. 9	2.4	2.2	2.6	2.4	43.5	41.1	24.5	20.9	28.6	49.4	52.4	1087	1817	2816
Morocco	3.7	4.9	5.7	7.9	8.0	5.6	5.6	21.1	59.0	41. 6	58.0	47.8	46.2	40.7	1004	2012	1893
Portugal	8.0	9. 6	12.5	7.4	6.1	4.0	3.3	58.3	74.7	63.1	35.3	27.6	20.0	13.2	2999	4504	3231

Sources: IMF, International Financial Statistics Yearbook, 1992, 1995, 1999.

IMF, Balance of Payments Statistics Yearbook, 1975, 1982, 1990, 1995, 1999.

Table 2: Structural Regression Coefficients (TSLS estimates)

COUNTRIES	CONSUMPTION (C)					INVESTMENT (I)					IMPORTS (M)					
	Const	Yt	Ct-1	$\bar{R}^2$	DW	Const	Yt	K t-1	$\bar{R}^2$	DW	Const	Yt	M t-1	Y t-1	$\bar{R}^2$	DW
EGYPT	-3334.4	0.334	0.546	0.975	2.116	24766.9	-0.139	0.174	0.707	0.387	3977.4	0.242	0.746	-0.195	0.868	1.884
	(-0.843)	(3.311)	(3.839)			(2.818)	(-1.106)	(2.864)			(1.103)	(2.047)	(5.090)	(-1.706)		
GREECE	-1323224	0.383	0.548	0.966	1.815	2398278	0.134	-0.018	0.339	0.966	299949	0.141	0.837	-0.110	0.952	1.935
	(-1.250)	(2.036)	(2.468)			(3.769)	(2.364)	(-0.583)			(1.063)	(2.044)	(9.016)	(-1.549)		
JORDAN	224.1	0.241	0.546	0.937	1.525	-106.8	0.356	-0.040	0.733	0.713	212.3	0.397	0.732	-0.271	0.910	2.368
	(1.930)	(2.836)	(3.614)			(-0.745)	(4.684)	(-1.544)			(1.493)	(1.809)	(3.816)	(-1.565)		
MOROCCO[1/]	9473.4	0.562	0.075	0.988	1.235	-19460.2	0.386	-0.057	0.761	0.810	1449.3	0.071	0.578	0.044	0.916	1.643
	(2.902)	(8.726)	(0.715)			(-1.159)	(2.967)	(-1.478)			(0.324)	(0.436)	(3.646)	(0.299)		
PORTUGAL	-37874.9	0.325	0.513	0.990	1.717	903.5	0.293	-0.029	0.793	0.750	-227006	0.156	0.420	0.072	0.951	1.267
	(-0.257)	(5.069)	(5.004)			(0.002)	(4.251)	(-1.040)			(-1.105)	(1.467)	(2.425)	(0.526)		
Expected Signs		+	+				+	-				+	+	±		

t-values in parentheses

1/ OLS estimates. for consumption and investment. the TSLS coefficients being unacceptable.

Source: Estimates of the paper

Table 3. Estimated Short- and Long-run Marginal Propensities to Consume (MPC) and Marginal propensities to Import (MPM) for Selected Mediterranean Countries

Countries	Short-run(1)		Long-run (2)		Proportion (%) of the total effects of an increase in income in the first year (3)=(1):(2)*100	
	MPC[1]	MPM[1]	MPC[2]	MPM[2]	On consumption	On Imports
Egypt	0.334	0.242	0.735	0.953	45.4	25.4
Greece	0.383	0.141	0.847	0.865	45.2	16.3
Jordan	0.241	0.397	0.531	1.481	45.4	26.8
Morocco	0.562	0.071	0.607	0.168	92.6	42.3
Portugal	0.325	0.156	0.667	0.269	48.7	58.0

Source: Estimates of the paper

1/ Short-run MPC $= \frac{\partial C_t}{\partial Y_t}$, MPM$= \frac{\partial M_t}{\partial Y_t}$

2/ Long-run MPC $= \frac{\partial \bar{C}_t}{\partial Y_t} = \frac{\partial C_t}{\partial Y_t} * \frac{1}{1 - \frac{\partial C_t}{\partial C_{t-1}}}$, MPM$= \frac{\partial \bar{M}_t}{\partial Y_t} = \frac{\partial M_t}{\partial Y_t} * \frac{1}{1 - \frac{\partial M_t}{\partial M_{t-1}}}$

where C = consumption. $\bar{C}$, $\bar{M}$ =consumption, imports under the condition that $C_t = C_{t-1}$, $M_t = M_{t-1}$ and Y = income

Table 4. Time Distribution of the Effects of a Unit Change in Remittances (ΔR=1) on Certain Macroeconomic Variables (impact and dynamic multipliers)

(ΔR=1. sustained over the years)

Countries and Variables	Impact multipliers (short-run effect)	Interim (dynamic) multipliers					Truncated total multipliers (long-run effects) (sum of the 6 years)
		Years					
	Year 1	2	3	4	5	6	
EGYPT							
Consumption	0.3184	0.2339	0.1727	0.1282	0.0956	0.0717	1.0205
Investment	-0.1326	-0.0250	-0.0187	-0.0141	-0.0107	-0.0081	-0.2091
Imports	0.2310	0.0293	0.0193	0.0126	0.0082	0.0052	0.3056
Income	0.9549	0.1797	0.1347	0.1014	0.0768	0.0584	1.5058
GREECE							
Consumption	0.6576	0.5882	0.5235	0.4637	0.4089	0.3590	3.0009
Investment	0.3029	0.1050	0.0927	0.0815	0.0713	0.0622	0.7155
Imports	0.2415	0.0974	0.0901	0.0827	0.0754	0.0683	0.6555
Income	1.7189	0.5957	0.5260	0.4625	0.4048	0.3529	4.0609
JORDAN							
Consumption	0.3018	0.2070	0.1406	0.0945	0.0628	0.0411	0.8479
Investment	0.4451	0.0625	0.0408	0.0263	0.0165	0.0102	0.6013
Imports	0.4963	0.0940	0.0667	0.0470	0.0329	0.0228	0.7596
Income	1.2506	0.1755	0.1147	0.0738	0.04647	0.0285	1.6896
MOROCCO							
Consumption	1.1682	-0.6270	-0.0432	-0.0045	-0.0058	-0.0024	0.4853
Investment	1.2303	0.2434	0.0083	0.0176	0.0080	0.0028	1.5104
Imports	0.6005	0.3040	0.0784	0.0309	0.0128	0.0050	1.0316
Income	2.7980	-0.6880	-0.1133	-0.0178	-0.0107	-0.0045	1.9638
PORTUGAL							
Consumption	0.6029	0.3411	0.2073	0.1314	0.0852	0.0559	1.4238
Investment	0.5441	0.0289	0.0293	0.0227	0.0161	0.0110	0.6520
Imports	0.2891	0.2714	0.1367	0.0767	0.0464	0.0293	0.8495
Income	1.8579	0.0986	0.0999	0.0774	0.0549	0.0376	2.2263

Source: Estimates of the paper

Table 5: Effects of Current and Past Changes in Remittances on Current Output

(values are in local currencies at constant 1995 prices)

Years	Egypt			Greece			Jordan			Morocco			Portugal		
	Rate of growth of remittances	Rate of growth of output		Rate of growth of remittances	Rate of growth of output		Rate of growth of remittances	Rate of growth of output		Rate of growth of remittances	Rate of growth of output		Rate of growth of remittances	Rate of growth of output	
		Induced	Actual		Induced	Actual		Induced	Actual		Induced	Actual		Induced	Actual
1975	34.5	1.3	6.7	19.9	1.4	3.6	96.1	13.6	0.5	50.5	4.7	0.4	-11.9	-1.2	-9.0
1976	68.2	2.8	16.8	-0.5	0.4	6.8	109.9	30.4	29.2	2.2	-1.0	3.7	-12.4	-1.5	5.0
1977	3.3	0.8	15.1	-1.4	-0.0	5.1	-12.8	-1.0	4.0	-6.3	-1.3	7.6	17.7	2.2	5.8
1978	66.8	3.4	7.7	-4.3	-0.4	8.9	-3.4	0.7	15.2	5.5	0.9	1.6	35.1	4.5	2.1
1979	103.0	8.0	16.3	5.7	-0.0	3.4	-4.1	-0.4	14.0	12.7	1.6	3.5	32.1	5.8	2.2
1980	1.8	1.9	4.9	-8.8	-0.3	-1.7	23.3	6.0	35.1	19.3	2.5	9.0	11.5	3.2	8.8
1981	-27.4	-2.0	-1.4	-1.1	-0.2	-3.2	41.1	9.8	15.1	7.7	0.6	-5.1	-1.0	0.4	-0.4
1982	-4.8	-0.2	15.5	-4.5	-0.4	-4.1	13.3	5.0	11.0	-8.7	-2.1	6.4	-0.3	0.4	0.3
1983	29.0	2.2	-16.5	4.3	0.0	0.1	3.0	2.1	2.2	30.5	5.2	0.4	-4.1	-0.6	-0.7
1984	-7.3	-0.4	22.1	8.0	0.4	2.9	17.2	5.8	4.5	0.3	-1.1	0.8	1.3	0.4	-5.3
1985	-27.7	-2.4	5.2	-16.8	-0.9	1.3	-27.2	-7.4	-1.2	3.8	0.6	7.0	-24.3	-5.8	4.8
1986	-37.1	-2.6	-7.9	-7.2	-0.5	-0.4	8.4	1.5	7.1	20.3	3.9	9.9	0.9	-0.2	28.4
1987	20.5	0.1	1.3	10.5	0.2	-1.0	-24.1	-5.8	2.3	-1.0	-1.2	-1.4	3.7	0.3	7.2
1988	-11.2	-0.9	1.5	29.9	1.3	30.0	29.9	4.3	-3.7	-15.6	-3.6	13.6	6.9	0.8	9.1
1989	13.1	0.1	2.7	-22.7	-0.8	5.3	-24.3	-5.6	-16.7	-0.1	0.7	3.2	0.4	0.0	4.9
1990	102.7	4.4	7.2	9.1	0.2	-0.5	-36.9	-8.8	-3.2	37.5	6.1	-2.1	-5.0	-0.6	3.7
1991	31.8	3.5	-3.3	8.5	0.4	2.2	76.8	9.1	-1.0	-7.2	-3.1	10.5	-9.5	-1.1	3.1
1992	32.7	5.0	10.0	18.2	1.0	2.1	21.2	5.7	17.5	14.5	2.9	-1.4	3.4	0.3	3.6
1993	-16.4	-0.8	0.9	1.2	0.5	-2.7	3.7	1.9	5.4	-8.4	-2.5	-2.6	1.4	0.1	-1.2
1994	-39.7	-3.9	2.9	-5.2	-0.1	1.8	9.4	3.0	7.2	-17.6	-3.3	6.7	-24.7	-2.6	3.6
1995	-24.1	-2.0	1.2	4.9	0.5	3.3	22.7	6.6	7.0	-4.0	0.3	-5.8	-6.8	-0.7	3.8
1996	-10.2	-1.3	3.9	-6.5	-0.1	2.2	0.6	1.5	-3.2	10.9	2.1	10.9	0.0	-0.2	3.0
1997	13.8	-0.1	7.3	5.5	0.3	4.4	-9.5	-2.1	1.9	-4.3	-1.0	-1.4	-0.8	-0.2	4.3
1998	-12.5	-1.1	5.0							3.3	0.1		-1.0	-0.1	

Source: IMF, International Financial Statistics Yearbook, 1992, 1995, 1999, IMF, Balance of Payments Statistics Yearbook, 1975, 1982, 1990, 1995, 1999.

Estimates of the paper

Table 6: Long-term Effects of Current Changes in Remittances on Output

(Values are in local currencies at constant 1995 prices)

Years	Egypt			Greece			Jordan			Morocco			Portugal		
	Rate of growth of remittances	Induced change in output	Elasticity	Rate of growth of remittances	Induced change in output	Elasticity	Rate of growth of remittances	Induced change in output	Elasticity	Rate of growth of remittances	Induced change in output	Elasticity	Rate of growth of remittances	Induced change in output	Elasticity
1970	294.2	0.6	0.002	25.1	3.2	0.127				41.2	0.6	0.015			
1971	12.6	0.1	0.008	30.9	4.3	0.139				86.6	1.6	0.018			
1972	183.3	1.4	0.008	17.3	3	0.173		8.2		36.9	1.2	0.033		24.5	
1973	5.1	0.1	0.020	9.8	1.8	0.184	69.3	5.5	0.079	73.4	3.2	0.044	9	2	0.222
1974	106.2	2.3	0.022	-30.1	-5.5	0.183	18.4	2.6	0.141	16.9	1.2	0.071	-25.1	-5.6	0.223
1975	34.5	1.5	0.043	19.9	2.7	0.136	96.1	17	0.177	50.5	3.7	0.073	-11.9	-2.1	0.176
1976	68.2	3.7	0.054	-0.5	-0.1	0.200	109.9	37.8	0.344	2.2	0.2	0.091	-12.4	-2.1	0.169
1977	3.3	0.3	0.091	-1.4	-0.2	0.143	-12.8	-7.2	0.563	-6.3	-0.7	0.111	17.7	2.6	0.147
1978	66.8	4.7	0.070	-4.3	-0.6	0.140	-3.4	-1.6	0.471	5.5	0.5	0.091	35.1	5.6	0.160
1979	103	11.3	0.110	5.7	0.7	0.123	-4.1	-1.6	0.390	12.7	1.2	0.094	32.1	6.8	0.212
1980	1.8	0.3	0.167	-8.8	-1.1	0.125	23.3	7.7	0.330	19.3	2	0.104	11.5	3.2	0.278
1981	-27.4	-5.1	0.186	-1.1	-0.1	0.091	41.1	12.4	0.302	7.7	0.9	0.117	-1	-0.3	0.300
1982	-4.8	-0.7	0.146	-4.5	-0.5	0.111	13.3	4.9	0.368	-8.7	-1.1	0.126	-0.3	-0.1	0.333
1983	29	3.3	0.114	4.3	0.5	0.116	3	1.1	0.367	30.5	3.4	0.111	-4.1	-1.1	0.268
1984	-7.3	-1.3	0.178	8	1	0.125	17.2	6.5	0.378	0.3	0	0.000	1.3	0.4	0.308
1985	-27.7	-3.7	0.134	-16.8	-2.2	0.131	-27.2	-11.6	0.426	3.8	0.6	0.158	-24.3	-7	0.288
1986	-37.1	-3.4	0.092	-7.2	-0.8	0.111	8.4	2.6	0.310	20.3	2.9	0.143	0.9	0.2	0.222
1987	20.5	1.3	0.063	10.5	1	0.095	-24.1	-7.7	0.320	-1	-0.2	0.200	3.7	0.6	0.162
1988	-11.2	-0.8	0.071	29.9	3.3	0.110	29.9	7.1	0.237	-15.6	-2.4	0.154	6.9	1.1	0.159
1989	13.1	0.8	0.061	-22.7	-2.5	0.110	-24.3	-7.7	0.317	-0.1	0	0.000	0.4	0.1	0.250
1990	102.7	7.3	0.071	9.1	0.7	0.077	-36.9	-10.7	0.290	37.5	4.2	0.112	-5	-0.7	0.140
1991	31.8	4.3	0.135	8.5	0.7	0.082	76.8	14.5	0.189	-7.2	-1.1	0.153	-9.5	-1.3	0.137
1992	32.7	6	0.183	18.2	1.7	0.093	21.2	7.2	0.340	14.5	1.9	0.131	3.4	0.4	0.118
1993	-16.4	-3.6	0.220	1.2	0.1	0.083	3.7	1.3	0.351	-8.4	-1.3	0.155	1.4	0.2	0.143
1994	-39.7	-7.3	0.184	-5.2	-0.6	0.115	9.4	3.2	0.340	-17.6	-2.5	0.142	-24.7	-3	0.121
1995	-24.1	-2.6	0.108	4.9	0.5	0.102	22.7	7.9	0.348	-4	-0.4	0.100	-6.8	-0.6	0.088
1996	-10.2	-0.8	0.078	-6.5	-0.7	0.108	0.6	0.3	0.500	10.9	1.2	0.110	0		0.000
1997	13.8	1	0.072	5.5	0.5	0.091	-9.5	-4	0.421	-4.3	-0.5	0.116	-0.8	-0.1	0.125
1998	-12.5	-0.9	0.072												

Source: IMF, International Financial Statistics Yearbook, 1992, 1995, 1999, IMF, Balance of Payments Statistics Yearbook, 1975, 1982, 1990, 1995, 1999

Estimates of the paper.

Table 7: Effects of Remittance Changes on Growth of Output: Cells of Combinations of Induced and Actual Growth Rates

Years	**Favorable Effects**										**Unfavorable Effects**									
	Case I: Contribution to growth (positive induced – positive actual rates)					Case II: Moderation of recession (positive induced – negative actual rates)					Case III: Restraint of growth (negative induced – positive actual rates)					Case IV: Intensification of recession (negative induced – negative actual rates)				
	Egypt	Greece	Jordan	Morocco	Portugal	Egypt	Greece	Jordan	Morocco	Portugal	Egypt	Greece	Jordan	Morocco	Portugal	Egypt	Greece	Jordan	Morocco	Portugal
1975	X	X	X**	X*																X
1976	X	X	X**											X	X					
1977	X				X							X	X	X						
1978	X*		X	X	X*							X								
1979	X**			X	X**							X	X							
1980	X		X**	X	X*												X			
1981			X**						X	X						X	X			
1982			X*		X						X			X			X			
1983		X	X	X**		X														X
1984		X	X**							X	X			X						
1985				X							X	X			X			X**		
1986			X	X*											X	X	X			
1987	X				X		X						X**						X	
1988		X			X			X*			X			X*						
1989	X				X				X			X						X**		
1990	X*						X		X**						X			X**		
1991		X				X		X**						X*	X					
1992	X*	X	X**		X				X											
1993			X				X			X	X								X	
1994			X*								X	X		X*	X					
1995		X	X**						X		X				X					
1996				X				X			X	X			X					
1997		X									X		X		X				X	

X* : induced growth rate 3-5 per cent

X** : induced growth rate over 5 per cent

Source: Table 5

Table 8: Estimated Elasticities of Long-term Induced Output with Respect to Remittances

Countries					
Periods	Egypt	Greece	Jordan	Morocco	Portugal
1971-1980	0.059	0.154	0.312[/1]	0.073	0.198[/3]
1981-1990	0.112	0.108	0.331	0.112	0.243
1991-1997	0.140	0.096	0.356	0.130	0.122
1971-1997	0.100	0.122	0.332[/2]	0.102	0.198[/4]

Source: Table 6

[1/] 1973-1980. [2/] 1973-1997. [3/] 1972-1980. [4/] 1972-1997

Table 9: Long-term Elasticities of Induced Output Growth with Respect to Positive and Negative Growth Rates of Remittances

Countries	Number of Years		Mean Growth Rates of remittances		Mean Growth Rates of Induced Output		Elasticities with respect to:	
	With rising remittances (1)	With falling remittances (2)	Positive (3)	Negative (4)	Positive (5)	Negative (6)	rising remittances (7)=(5):(3)	falling remittances (8)=(6):(4)
Egypt	18	11	62.4	-19.8	2.8	-2.7	0.045	0.138
Greece	16	12	13.0	-9.1	1.6	-1.2	0.123	0.137
Jordan	17	8	33.2	-17. 8	8.2	-6.5	0.247	0.366
Morocco	18	10	26.2	-8.1	1.7	-1.1	0.065	0.140
Portugal	12	12	10.3	-10.5	1.9	-2.0	0.188	0.191

Source: Table 6

Table 10: Regressions of Estimated Current Induced Output and of Estimated Long-term Elasticity of Induced Output with Respect to Remittances on Selected Exogenous Variables

Independent Variables	Dependent Variables			
	Induced Growth Rate of Output (IGGDP) All Sample	Long-term Elasticity of Induced Output with Respect to Remittances (ELA)		
		All Sample	Positive Growth Rates of Remittances	Negative Growth Rates of Remittances
Constant (C)	-0.043	0.021	0.009	-0.053
	(-6.001)	(1.818)	(0.593)	(-2.896)
Ratio of Remittances to GDP (RGDP)	0.416	1.408	1.279	2.133
	(5.630)	(12.193)	(9.735)	(14.951)
Growth Rate of GDP (GGDP)	0.072	0.073	0.109	0.149
	(2.718)	(1.453)	(1.864)	(2.430)
Growth Rate of Remittances (GREM)	0.104	-0.064	-0.039	-0.190
	(11.718)	(-6.544)	(-3.298)	(-4.240)
Dummy for Greece (D_G)	0.028	0.058	0.066	0.104
	(3.990)	(4.618)	(4.071)	(7.050)
Dummy for Jordan (D_J)	-0.033	-0.034	0.033	0.007
	(-2.813)	(1.749)	(1.433)	(0.340)
Dummy for Morocco (D_M)	0.012	0.004	0.012	0.030
	(1.981)	(0.384)	(0.803)	(2.204)
Dummy for Portugal (D_P)	0.008	0.054	0.066	0.067
	(1.269)	(4.392)	(4.016)	(5.370)
$\bar{R}^2$	0.759	0.849	0.853	0.946
DW	1.71	1.65	1.59	1.97
Number of Observations	110	134	82	52

Source: Estimates with figures from Tables 5 and 6

t values in parentheses

Table A1: Effects of Current and Past Years' Changes of Remittances on Current year's Consumption, Investment, Imports and Output $\frac{\Delta X_t}{X_t} = \sum_{j=0}^{j=n} \frac{\partial X_t}{\partial R_{t-j}} \Delta R_{t-j} / X_t$

(Average rates for each period)

Countries and Years	Basic Data (local currencies, 1995 prices)		Estimates							
			Rates of Growth induced by remittances (per cent)							
	Remittances as % of GDP	Rate of growth of remittances (%)	Consumption		Investment		Imports		Output	
			Induced	Actual	Induced	Actual	Induced	Actual	Induced	Actual
Egypt										
1975-80	7.7	46.3	2.7	11.7	-1.5	21.9	2.0	16.4	3.0	11.3
1981-85	8.6	-7.6	0.2	3.9	0.3	5.3	-0.5	-2.9	-0.6	5.0
1986-90	5.4	17.6	-0.5	2.5	-0.1	2.3	0.2	6.6	0.2	1.0
1991-97	8.7	-1.7	0.4	4.0	0.2	-2.3	-0.2	-0.5	0.1	3.3
Greece										
1975-80	3.3	1.8	0.2	3.1	0.1	3.7	0.1	4.3	0.2	4.4
1981-85	2.9	-2.0	-0.3	1.4	-0.2	-4.3	-0.1	5.8	-0.2	-0.6
1986-90	2.4	3.9	0.0	8.0	0.1	9.4	0.0	2.1	0.1	6.7
1991-97	2.5	3.8	0.4	1.9	0.3	0.3	0.2	-0.3	0.4	1.9
Jordan										
1975-80	23.7	34.8	4.3	14.3	9.6	25.4	3.7	17.2	8.2	16.3
1981-85	22.1	9.5	2.3	10.4	2.3	-4.7	1.6	4.8	3.1	6.3
1986-90	16.0	-9.4	-1.6	-6.3	-4.5	6.9	-1.8	2.1	-2.9	-2.8
1991-97	21.7	17.8	1.9	4.2	4.2	5.3	1.9	1.9	3.7	5.0
Morocco										
1975-80	5.3	14.0	0.5	4.9	3.8	8.8	2.1	4.5	1.2	4.3
1981-85	6.9	6.7	0.1	2.0	2.3	4.7	1.6	6.5	0.6	1.9
1986-90	7.1	8.2	0.7	4.3	2.2	4.5	1.1	4.3	1.2	4.6
1991-97	6.4	-2.3	-0.5	2.1	-0.9	-1.7	-0.3	2.2	-0.7	2.4
Portugal										
1975-80	9.4	12.0	1.6	1.2	2.0	8.0	1.7	3.3	2.2	2.5
1981-85	11.9	-5.7	0.2	0.6	-1.4	-8.8	0.3	-0.5	-1.0	-0.3
1986-90	6.9	1.4	-0.4	9.3	0.1	18.9	-0.5	10.6	0.1	10.7
1991-97	4.4	-5.3	-0.5	2.6	-0.7	1.5	-0.6	2.4	-0.6	2.9

Sources: IMF, International Financial Statistics Yearbook, 1992, 1995, 1999.
IMF, Balance of Payments Statistics Yearbook, 1975, 1982, 1990, 1995, 1999.
Estimates of the paper

Note: Corresponding annual figures are available but they are compressed to save space.

Table A2: Current and Long-term Effects (next 5 years) of Remittance Changes on Consumption, Investment, Imports, and Output ($\sum_{t=1}^{t=n} \frac{\Delta X_t}{X_t} = \frac{m_t \Delta R_t}{X_t}$)

(m_s, m_e corresponding current and long-term multipliers)

(Average rates of each period)

Countries and Years	Remittances		Consumption		Investment		Imports		Output	
	As a proportion of GDP (1995 prices)	Rate of growth of remittances (%)	Current year effect %	Long term effects %	Current year effect %	Long term effects %	Current year effect %	Long term effects %	Current year effect %	Long term effects %
Egypt			(ms=0.3184)	(ml=1.0205)	(ms=-0.1326)	(ml=-0.2091)	(ms=0.2310)	(ml=0.3056)	(ms=0.9548)	(ml=1.5058)
1970-74	1,3	120,3	0,3	1,0	-0,6	-1,0	0,7	1,0	0,6	0,9
1975-80	7,7	46,3	1,2	3,9	-1,1	-1,8	1,7	2,3	2,3	3,6
1981-85	8.6	-7.6	-0.4	-1.4	0.4	0.7	-0.6	-0.8	-0.9	-1.5
1986-90	5.4	17.6	0.3	1.0	-0.3	-0.4	0.5	0.6	0.7	1.0
1991-97	8.7	-1.7	-0.1	-0.4	0.3	0.5	-0.3	-0.4	-0.3	-0.4
Greece			(ms=0.6576)	(ml=3.0009)	(ms=0.3029)	(ml=0.7155)	(ms=0.2415)	(ml=0.6555)	(ms=1.7189)	(ml=4.0609)
1970-74	4,0	10,6	0,3	1,4	0,4	1,0	0,5	1,4	0,6	1,4
1975-80	3,3	1,8	0,1	0,3	0,1	0,2	0,1	0,2	0,1	0,2
1981-85	2.9	-2.0	-0.1	-0.3	-0.1	-0.2	0.0	-0.1	-0.1	-0.3
1986-90	2.4	3.9	0.1	0.4	0.2	0.4	0.1	0.1	0.1	0.3
1991-97	2.5	3.8	0.1	0.3	0.1	0.3	0.1	0.2	0.1	0.3
Jordan			(ms=0.3018)	(ml=0.8479)	(ms=0.4451)	(ml=0.6013)	(ms=0.4963)	(ml=0.7596)	(ms=1.2506)	(ml=1.6896)
1972-74	7,8	43,9	0,7	1,9	4,5	6,0	1,8	2,8	2,4	3,3
1975-80	23,7	34,8	1,7	4,8	7,8	10,5	2,6	4,0	6,4	8,7
1981-85	22.1	9.5	0.7	1.8	1.2	1.7	0.8	1.3	2.0	2.7
1986-90	16.0	-9.4	-0.8	-2.4	-3.8	-5.1	-1.4	-2.2	-2.4	-3.3
1991-97	21.7	17.8	1.1	3.0	3.7	4.9	1.5	2.3	3.2	4.3
Morocco			(ms=1.1682)	(ml=0.4853)	(ms=1.2303)	(ml=1.5104)	(ms=0.6005)	(ml=1.0316)	(ms=2.798)	(ml=1.9638)
1970-74	2,4	51,0	1,2	0,5	7,0	8,6	2,3	4,0	2,2	1,6
1975-80	5,3	14,0	1,1	0,5	3,2	4,0	1,3	2,2	1,7	1,2
1981-85	6.9	6.7	0.7	0.3	1.7	2.1	0.7	1.3	1.1	0.8
1986-90	7.1	8.2	0.8	0.3	2.0	2.5	0.9	1.6	1.3	0.9
1991-97	6.4	-2.3	-0.4	-0.2	-1.1	-1.3	-0.4	-0.8	-0.6	-0.4
Portugal			(ms=0.6029)	(ml=1.4238)	(ms=0.5441)	(ml=0.6520)	(ms=0.2891)	(ml=0.8495)	(ms=1.8579)	(ml=2.2263)
1972-74	9,4	-8,1	2,9	6,9	6,2	7,5	3,1	9,1	5,8	7,0
1975-80	9,3	12,0	0,9	2,2	1,8	2,1	1,0	2,8	1,9	2,3
1981-85	11.9	-5.7	-0.6	-1.5	-1.7	-2.0	-0.5	-1.4	-1.3	-1.6
1986-90	6.8	1.4	0.1	0.2	0.3	0.3	0.1	0.3	0.2	0.3
1991-97	4.4	-5.3	-0.2	-0.6	-0.6	-0.8	-0.2	-0.7	-0.5	-0.6

Sources: IMF, International Financial Statistics Yearbook, 1992, 1995, 1999.
IMF, Balance of Payments Statistics Yearbook, 1975, 1982, 1990, 1995, 1999.
Estimates of the paper

Note: Corresponding annual figures are available but they are compressed to save space.

Notes:

1 It should be noted that particularly in the MENA countries very large amounts of remittances do not go through official channels, because the black market premium in foreign exchange is very profitable. When such a premium is reduced, as for instance in Egypt after the exchange rate unification in the early 1990's, considerable funds were attracted to official transferring channels. A cross-section econometric analysis including Algeria, Morocco, Portugal, Turkey and former Yugoslavia found a minus 0,3 elasticity of official remittances with respect to black market exchange rate premium (Elbadawi and Rocha, 1992).

2 Data restrictions would in any case not permit any disaggregated analysis of major consumption or investment items such as durables, residential housing, etc that would have made for a more refined model, but at the risk of perhaps loosing the forest for the trees.

3 The reason for extending the basic Keynesian consumption function was to deal with the usually low short-run MPC which is reflected in many earlier theoretical works (Davidson, Hendy et al. 1978, pp. 693-706).

4 Three major hypotheses with some variant expressions in each case have been tested, i.e. the permanent income hypothesis, the life-cycle hypothesis, -both having a sound theoretical basis (see Friedman, 1957; Ando and Modigliani, 1963)- and the error correction model, whose structure is empirical rather than theoretical (Davidson, Hendry, Srba and Yeo, 1978; and Davis, 1984).

5 Adaptive expectations of income or partial adjustment of consumption are expressed correspondingly by . $C_t = \beta_1 + \beta_2 Y_t^* + u_t$ and $C_t^* = \gamma_1 + \gamma_2 Y_t + u_t$, where C_t = current consumption, Y_t^*=permanent income, C_t^*= long-run desired consumption and u_t is the error term. These two hypotheses give the same estimable equation which includes lagged consumption. The two equations differ, however, with respect to the statistical issues of efficiency and reliability. Coefficient β_2 is the MPC on permanent income and γ_2 the long-run MPC. It is therefore an empirical matter how to interpret the estimated coefficients in different countries. In case that "habit persistence or inertia" in the behavior of consumers prevails, the partial adjustment model is involved. But if consumption is "forward looking", adaptive expectations are involved (see among others Duesenberry, 1958, p.87; Brown, 1952; Davis, 1984, p.800; and Gujarati, 1988 p. 532). One deviation of our empirical consumption function from the theoretical postulates of the model is that the income variable is not the private disposable income as it should be, but a kind of a national disposable income summing GDP and remittances.

6 Capital stock is approximated by cumulative investment, that in linear models as ours, does not have any bearing on the capital coefficient (Pavlopoulos, 1966, p. 63).

7 Assume that imports, as others (see Davidson et al., 1978) assumed for consumption, are a function of current income and current wealth (A), i.e. $M_t = \lambda Y_t + (\delta - r)A_t$, where r = rate of return on assets, and $A_t = A_{t-1} + Y_{t-1} - M_{t-1}$. With a proper manipulation, these two expressions give our import equation (3).

8 An effort to introduce directly remittances as an exogenous variable in equations (1)-(3) along with GDP gave economically and statistically unjustified results. Therefore, we choose to estimate the influence of remittances on these variables through a kind of national disposable income made up of GDP plus remittances. As it appears remittances may affect consumption, investment and imports after they are filtered through the income of recipients.