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What Affects the Remittances of Turkish Workers: Turkish or German Output?

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**Sule Akkoyunlu
Konstantin A. Kholodilin**

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What affects the remittances of Turkish workers: Turkish or German output?[§]

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Abstract

In this paper we examine the interactions between the remittances of the Turkish workers in Germany and the output both in Turkey and in Germany. In our analysis we use the new data set provided by the German monetary authorities, which was never before employed in the literature and which we consider as a more reliable source than the data sets used in the other studies. We show that the remittances positively respond to the changes in the German output and do not react at all to the changes in Turkish output. This finding is consistent with the “remittance maximization” and “inheritance” motives of the migrants’ behavior.

Keywords: Migration; remittances; Turkey; Germany.

JEL classification: F22; J61; E32

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1 Introduction

Turkish workers' remittances from Germany constitute a large share (80%) of total remittances to Turkey. During the 1970s and 1980s total remittances reached 4% of Turkish GDP and remittances from Germany were 3% of Turkish GDP — see the panel (b) of Figure 1 — making Turkey one of the ten largest remittance receiving countries.

The remittances can be very beneficial for the home country, although in some cases they can have an adverse impact on its economic activity. First of all, in Turkey they were not only one of the major sources of foreign exchange but also a relatively stable source of foreign exchange compared to foreign direct investment and other private capital flows. Thus, during the period 1964-2005 Turkish workers' remittances from Germany totaled to 47.5 billion euros, whereas the capital inflows and foreign direct investments from Germany only totaled to 17.8 billion euros and 4.2 billion euros, respectively. In general, Ratha (2003) shows that in contrast to capital flows, the remittances are significantly higher in countries that are characterized by high risk and have a high level of debt relative to GDP.

Secondly, Turkey has high levels of inequality and income volatility. The remittances help to buffer the consequences of the negative shocks, such as 1994 and 2001 economic crises, for the poor households. Kapur (2005) shows that a country that experiences a macroeconomic shock generally receives greater remittances. The financial and economic crises result in two simultaneous shocks that affect remittances: a positive income shocks to the remitter due to devaluation and a negative shock to the recipient due to the economic downturn. For a group of fourteen countries, including Turkey, Kapur (2005) examines the remittances relative to private consumption in the years preceding and following the crisis and finds that the share of remittances in private consumption increased in three years preceding and following the shock. Hence the remittances provide social protection to poor households, reducing their vulnerability to shocks.

Thirdly, the remittances are sent directly to the households, while other kinds of external financing, such as foreign aid, go through the public agencies in receiving countries and therefore their effectiveness may be hindered by the corruption of government officials, see Kapur (2005). Hence, the poverty alleviating impact of remittances can be bigger than that of traditional foreign aid.

Fourthly, the remittances are not only affected by the host and home

country incomes, but also contribute to the output growth of the home country. However, the short-run effects of remittances may differ from the long-run effects. For example, Lucas (1985) estimated that in five Sub-Saharan African countries the emigration of workers to the South African mines reduced labor supply and crop production in the short run, but enhanced crop productivity and cattle accumulation in the long run thanks to the investment of remittances. The short-run effects of remittances on output predicted by the macroeconomic models depend on the assumptions about the prices, wages, exchange rates, and capital markets. The long-run effects of remittances depend on how the remittances are allocated between the consumption and investment.

Fifthly, Glytsos (2005) using data for 1969–1998 for Egypt, Greece, Jordan, Morocco, and Portugal shows that the impact of remittances on output varies over time and across countries. For Egypt, Jordan, and Morocco — the countries that have similar socioeconomic characteristics as Turkey — the growth-generating capacity of rising remittances is smaller than the growth-destroying capacity of falling remittances. Thus, the good done by remittances when they rise is not as large as the bad done when they fall. Therefore the large fluctuations in the real value of remittances contribute to large fluctuations of output growth and cause instability in the economies concerned.

In this paper we examine the interactions between the remittances of the Turkish workers in Germany and the output both in Turkey and in Germany. The analysis of these interactions can be very useful for the policy makers, given the potential beneficial effects of the remittances.

Unlike Sayan (2004), we found no statistically significant relationship between the Turkish GDP and remittances of the Turkish workers employed in Germany. By contrast, the German GDP does positively affect the amount of remittances sent home by the Turkish workers staying in Germany. This finding is true both when annual growth rates and the cyclical components are considered.

In the next section the different theories describing the relationship between the host and home country's income, on the one hand, and remittances, on the other hand, are examined. The next two sections are devoted to the empirical analysis of the Turkish and German data. In section 3 the data set is introduced, whereas section 4 contains the econometric analysis of the data. Finally, section 5 concludes the paper. All the tables and graphs are presented in the appendix.

2 Literature Review

The size of the remittances depends on the decisions made by the workers. Therefore their motivation is of crucial importance for the analysis of the short- and long-run interactions between the income of host and home countries and the amount of remittances.

There is a number of theories trying to identify the principal incentives of the workers sending remittances home. Most of these theories were documented in Lucas and Stark (1985) and Rapoport and Docquier (2005). We summarized their predictions with regard to the effects of the income in host and home countries upon the remittances in Table 1. The different theories of the motivation of the guest workers are listed in the rows, while the explanatory variables affecting the remittances are reported in columns. “+” (“-”) means that the corresponding explanatory variable positively (negatively) affects the size of remittances, “ \pm ” means that the influence can be both positive and negative, whereas “0” means that no influence exists. Below we consider these theories in more detail.

The most common motivation to remit is that migrants care of those left behind. This “*altruistic*” transfer increases with the migrant’s income and decreases with the recipient’s income. One extreme version of the altruistic model is the so-called “remittance maximization” approach Bhattacharyya (1985), where migrants are assumed to send a maximum of remittances back to their family. In this model the level of income in the home country should not play any role in the remittance choice. The amount of remittances would depend almost entirely on the emigrants’ own income in the host country.

The remittances may be also used in exchange for a wide range of services provided by the migrant’s relatives living in the home country, such as taking care of migrant’s assets. In this case the migrant has an intention to return eventually home. This is the “*exchange*” motive to remit. Driven by this motive the migrant uses the remittances to repay the loans taken in order to finance his investment in human capital or the expenditure incurred during the migration. The central prediction of the exchange motive theory is that an increase in the recipient’s income leads to an increase in the remittances.

The “*strategic*” motive arises when migrants are heterogeneous in skills and individual productivity and that is not perfectly observable on the labor market of the host country. In this situation the employers apply statistical discrimination, so that migrant workers are paid the average wage of the minority group to which they belong. The skilled migrants bribe their unskilled

compatriots in order to keep them stay in the home country. In this way they can avoid the unnecessary competition that would drive their wages down. Hence, the remittances can be interpreted as side payments. As in the case of altruistic transfers, the level of remittances is expected to be positively related with the migrants' pre-transfer income and to be negatively related with the recipients' pre-transfer income. However, the strategic motive predicts a stronger response of the remittances to the pre-transfer income inequality measured as a difference between the migrants' and recipients' pre-transfer income. Hence, the response of remittances to changes in the pre-transfer incomes is higher than one.

Due to the environmental and technological characteristics of most developing countries the income volatility plays an important role in the rural regions. In addition to this, imperfect credit and insurance markets in most developing countries cause a range of informal inter- and intra-familial co-insurance arrangements. Hence, provided that incomes in home and home countries are not positively correlated, it is beneficial to send some members of family abroad. In this way the remaining members of the family will be insured against drops in rural incomes. In reciprocation they will provide assistance to the migrant in case of unemployment, with the terms of insurance contract depending on the relative bargaining power of both sides. If this Pareto-improving arrangements are not self-enforced by the altruism, then different retaliation strategies can be imposed, such as denying the migrant's rights to the future family solidarity, inheritance or return to the village for retirement. This is the "*insurance*" motive and it gives similar predictions as the altruistic motive with respect to the sign of the effect that the income in the home country exerts upon remittances. However, these two models predict the timing of remittances differently. The insurance model predicts that remittances are more likely to be sent when the income in the home country is more volatile and that they are sent on a relatively irregular basis, so that there is no decrease during a given period and a there is sharp decline after a while. By contrast, the altruistic model that takes into account time and distance separating the migrants from their relatives, implies a gradual decrease of the remittances over time, see Rapoport and Docquier (2005).

Hoddinott (1994) argues that there is a minimum amount of money that each migrant is expected to remit. Parents can encourage transfers above this minimum level by offering a "reward" in form of land or any other inheritable asset. In this "*inheritance*" motive theory the remittances are seen as a pure strategy of investment in inheritance on the side of the migrant and as an

enforcement device to secure remittances on the side of the family. The main prediction of this model is that the amount of remittances increases with migrant's wealth and income but should be independent of the recipients' income.

Remittances are used as repayments of loans on investments in education and/or migration, according to the "*investment*" motive theory. If investments are the main familial motivation for sending migrants away, then the family will keep on sending migrants as long as family income is increasing. However, migration costs and liquidity constraints limit the number of migrants that can be sent by a given family and that richer but not too rich families are more likely to take advantage of the investment opportunities. Rapoport and Docquier (2005) find an inverse U-shaped relationship between remittances and family income. Poirine (1997) argues that if the investment motive dominates over the altruistic and the insurance motives, then the payments should be regular with no tendency to decay over time.

However, the literature finds that a combination of different motives explains the remitter's behavior better than a single motive. For example, Lucas and Stark (1985) explain the positive relationship between the level of remittances and the income in the home country by the mixture of exchange, investment, and inheritance motives. On the other hand, the response of the remittances to the short-run shocks to recipients' income is explained by either altruism or insurance motives. This complex mixture of motives can be described best of all by such concepts as the "*impure altruism*" (Andreoni (1989)) or "*enlightened selfishness*" (Lucas and Stark (1985)).

The "*macroeconomic*" model of remittances explains the amount of the remittances sent to the home country by the levels and fluctuations of economic activities in the host and home countries. The output per capita represents the general level of the development of a country. For a more developed country we expect a negative relationship between the remittances and output per capita in the home country and a positive relationship between the remittances and output per capita in the host country. When economic conditions in the home are favorable, the living standards of the migrant's relatives are improved and hence his willingness to send them remittances decreases. On the other hand, the improved economic well-being in the host country will increase the employment and earnings opportunities of the migrants and therefore encourage them to send more remittances. However, the short-run effect of the home country's income is ambiguous, as this variable captures the investment attractiveness of the country. High income

growth in the home country might reduce incentive to migrate and hence the remittances to the countries with high income growth will be smaller. At the same time the migrants might want to invest in their high-growth home country and hence the remittances to this country will be bigger.

Most of the studies on determinants of remittances find that the host country income has a positive effect on remittances, see Swamy (1981), Straubhaar (1986), Katseli and Glytsos (1989), Elbadawi and Rocha (1992), Faini (1994), Hoddinott (1994), Lianos (1997), El-Sakka and McNabb (1999) and Aydas et al. (2005). However, the regression of remittances on the home country's income delivers mixed results. While Lucas and Stark (1985), Ilahi and Jafarey (1999), Higgins et al. (2004) and Sayan (2004) favor the exchange and investment motives, Faini (1994), Katseli and Glytsos (1989), Glytsos (1997), Lianos (1997), Agarwal and Horowitz (2002) and Aydas et al. (2005) support the altruistic motive. In addition, some studies find the income in the host country to be statistically insignificant, see Lianos (1997) and El-Sakka and McNabb (1999). The most interesting results are obtained by Glytsos (1988) and Glytsos (1997): in Glytsos (1988) the domestic current and lagged per capita income in Greece have a positive sign for the 1960-1982 period supporting the self-interest motive. However, using a similar equation but with data for the period 1960-1993 Glytsos (1997) finds that the sign of Greek income per capita turns from positive to negative, suggesting an altruistic motive. He explains these results by the fact that after early 1980s many Greek temporary migrants in Germany turned into the permanent residents. Hence, the self-interest motive subsided and the altruistic motive became dominant. The migrants in Germany are behaving in the same way as their counterparts in the USA and Australia, whose remittances are negatively related to the Greek per capita income.

3 Data

We conduct our statistical analysis using the annual data, which cover the period 1962–2004. The data were taken from the databases of the Turkish Statistical Institute, Deutsche Bundesbank, OECD, and World Market Monitor and are listed in Table 2. The series of remittances to Turkey expressed in euros were computed from the available data as shown in Table 2 and depicted in Figure 1.

Although the data on workers' remittances are very difficult to measure,

given the variety of legal and illegal transmission channels, we believe that the data we use do reflect the main tendencies. It is worth stressing that, unlike in Sayan (2004) and Aydas et al. (2005), our data are not constructed based on some authors' assumptions but are directly measured and come from the official source such as the Deutsche Bundesbank. As far as we know, these data are employed for the first time in the literature. Previous studies used either constructed data¹ or the data supplied by the Turkish sources, which are biased, since the latter do not include the remittances from the Turkish workers going to Germany with tourist visas but with an objective to earn money.

The official German indicator of the remittances, or transfers, by the workers to their country of origin — here Turkey — is calculated according to the balance of payments statistics. For this purpose guest workers are regarded as residents — they stay in Germany more than one year and are economically active. For the individual transfers the amount should be below 12,500 euros. Remittances to countries of origin are estimated using various statistical sources. For example, monthly collective reports on bank transfers are available for individual countries of origin, some of which also include payments below the reporting threshold. In addition, the Federal Employment Agency provides up-to-date data on the number and origin of employed and unemployed foreigners living in Germany who are subject to social security contributions. Furthermore, until 2002 the MARPLAN research society's annual report provided an indication of transfers to five of the most important countries of origin: Turkey, Italy, Spain, Greece, and the former Yugoslavia. The institute questioned 2000 foreigners living in Germany about transfers to their countries of origin. Additional estimates, complementing the bank transfers actually reported, are based on the information about the cash taken to those countries and about the amounts below the reporting threshold, which are not covered in the collective reports. In individual cases the amount of remittances that appears in the collective reports can be reduced, if there are indications that these payments were made for other purposes.

The different transformations of the remittances from Turkish workers in Germany to Turkey are presented in Figure 1. The nominal remittances in

¹For example, Sayan (2004) obtained the remittances series by multiplying the total amount of remittances to Turkey by the share of Turkish workers residing in Germany in the total stock of migrant workers from Turkey. This is quite a strong assumption implying that the remittances per Turkish worker abroad are identical in all host countries.

euros shown in panel (a) attained their peak in 1984 and since then have been slowly declining. The decline is much more pronounced when the share of nominal remittances in the nominal Turkish GDP (panel (b)) is considered. The share achieved its maximum of 3.4% in 1973 and by 2004 it decreased almost tenfold. The real remittances declined sharply after the peak of 1973 (see panel (c)), whereas the real remittances per migrant have been constantly decreasing since the beginning of 1960s with short interruption in the first half of 1970s (see panel (d) of Figure 1).

Figure 2 shows the evolution of the logarithms of German and Turkish GDP in levels (panel (a)) and per capita (panel (b)). The solid line corresponds to the German GDP series, while the dotted line with square boxes corresponds to the Turkish GDP.

So, we can see that the remittances, on the one hand, and income both in host and in home country, on the other hand, move in the opposite directions. Therefore it appears that the secular shift in remittances cannot be attributed to the long-run development of the income in home and host country. However, the short-term or business cycle fluctuations of remittances can be affected by the cyclical fluctuations of income.

4 Econometric Analysis

The possible relationships between the real GDP of the host and home countries and real remittances sent to the home countries by the Turkish workers in Germany are analyzed in a twofold way. First, the cross-correlations between the German real GDP and the Turkish real GDP, on the one hand, and real remittances expressed in euros, on the other hand, at different lags and leads were estimated. These cross-correlations are shown in Figure 3 and Figure 4. Secondly, the bivariate VARs were used in order to investigate the hypothesis of Granger causality between the GDP and remittances. The results of the Granger-causality tests are summarized in Table 3 for Germany and Table 4 for Turkey.

The analysis is undertaken using both the annual growth rates and the cyclical components. The annual growth rates were computed as the first differences of the logarithms of the original data. The cyclical components both of GDP and of remittances were approximated, as in Sayan (2004), by the Hodrick-Prescott filter with smoothing parameter $\lambda = 100$ applied to the logged series. We have also tried other values of this parameter suggested

in the literature, namely: 6.25 as in Ravn and Uhlig (2002) and 400 as in Cooley and Ohanian (1991). However, the qualitative conclusions turned out to be the same regardless of the λ 's value. Therefore we report only the results obtained for $\lambda = 100$.

Positive and significant cross-correlation between the German real GDP and the real remittances expressed in euros is found at lag 1 — see Figure 3 (black bars correspond to the cross-correlation when GDP is leading, while the grey bars correspond to the situation when the remittances are leading). It implies that the German real GDP leads the remittances to Turkey by one year. This finding is robust to two types of transformations used in this paper: first-order differencing and Hodrick-Prescott filtering. By contrast, the cross-correlations between the growth rate of the German real GDP and the growth rates of the real remittances per migrant are never significant implying no relationship between these two series.

No significant correlation between the annual growth rates of Turkish real GDP and annual growth rates of the real remittances expressed in euros was detected — see Figure 4. There is significantly positive correlation between the cyclical component of the remittances and the cyclical component of the Turkish GDP at lags 3 and 4 implying that the remittances lead the real GDP of Turkey. But this seems rather an artefact. Again, no significant correlation was found between the growth rate of the Turkish real GDP and the growth rates of the real remittances per migrant.

The unrestricted bivariate VAR² estimated for the growth rates and cyclical components of the German GDP and remittances in euros confirm the results of the cross-correlation analysis. The impulse-response analysis, conducted for the VARs based both on the growth rates and cyclical components, shows that after a positive impulse in German GDP the real remittances increase and their response remains positive and significant for about four years before converging to zero. These results do not change when the German unification dummy, which is equal to 1 in 1991 and to zero otherwise, is introduced in the estimation.

Neither the unrestricted bivariate VAR, including the growth rates of the real remittances per Turkish migrant in Germany and the growth rates of the German real GDP, nor the VAR, including the real remittances per Turkish migrant in Germany and the growth rates of the German real GDP per capita, show any Granger causality between these two variables.

²The lag order for each VAR was determined based on the standard information criteria.

The unrestricted bivariate VARs estimated for the growth rates and cyclical components of the Turkish real GDP and real remittances to Turkey expressed in euros also lead to a rejection of Granger causality between the Turkish GDP and the remittances.

Likewise, no Granger causality is found, when the unrestricted bivariate VAR, which includes the growth rates of the real remittances per Turkish migrant in Germany and the growth rates of the Turkish real GDP, and the VAR, which includes the growth rates of the real remittances per Turkish migrant in Germany and the growth rates of the Turkish real GDP per capita, are estimated.

All this stands in a remarkable contrast to the findings of Sayan (2004) who found a positive relationship between the remittances and the Turkish GDP but no relationship between the remittances and the German GDP.

In order to test for possible long-run relationship between the remittances and GDP in host and home country, the unit-root and cointegration tests were conducted. According to the augmented Dickey-Fuller (ADF) test, the null of unit root in the model including only intercept can be rejected at 5% significance level for the real remittances series but is accepted for the real remittances per migrant. As was mentioned above, the latter series possibly contains a negative trend. This is confirmed by the results of the ADF test, when both intercept and trend are included in the model: the null hypothesis of unit root is rejected at 10% significance level. So, the real remittances per migrant are trend stationary.

For the German and Turkish GDP in levels and per capita the ADF leads to the acceptance of the null hypothesis of the unit root non-stationarity.

In order to check for cointegration two tests were employed: the trace test and maximum eigenvalue test. Since the real remittances appear to be trend stationary, the cointegration was tested only for the series of real remittances per migrant. The presence of cointegration between the real remittances per migrant, on the one hand, and real GDP in levels and per capita (both for Germany and for Turkey), on the other hand, was rejected at 5% significance level. Therefore we conclude that no long-run relationship between the real remittances of Turkish workers and the real GDP in Germany and Turkey exists.

5 Conclusions

The aim of this paper was to identify whether the host or the home country's income determines remittances or whether the host and home country's economic activities are affected by remittances. The results show that remittances respond more to changes in the economic activity in the host country than to changes in the economic activity in the home country. Thus, Turkish migrants focus more on the economic situation in Germany when deciding how much to remit, as an upturn in the host country increases the income earned by migrant workers and attracts more migrants looking for better income. Ratha (2003) notes that remittance payments from the United States surged in tandem with the strong economic growth in the second half of the 1990s. Initiated by the information-technology sector, the economic boom caused the United States to revise its immigration policies to hire more IT specialists from abroad. Likewise, remittance payments from Saudi Arabia rose during the oil boom years of the 1970s and early 1980s, but declined in the mid 1980s as oil prices fell, the budget deficit increased, and the government put limits on hiring foreign workers.

Furthermore, the results support the "remittance maximization" and "inheritance" motives. These motives suggest that the remittances are positively affected by the host country's income and are not related with the home country's income at all.

These results have important policy implications.

First, if Turkey wants to increase the amount of remittances received, it should focus on individual and demographic variables as remittances are not responsive to the home country's economic activity.

Second, when planning the future growth of remittances, Turkey should take into consideration the future economic prospects of Germany, as any economic shock in Germany will be transmitted to Turkey through remittances, given that major remittances are received from Germany. This is consistent with the finding of Swamy (1981) that the economic situation in the host country is the main determinant of the size of remittance flows to developing countries. Further, Straubhaar (1986) similarly argues that international migration flows depend upon the economic situation in the host country but at the same time they are checked through the restrictive immigration control systems and hence, it is not surprising to find that remittances respond positively to economic activity in the host country.

In addition, Akkoyunlu and Siliverstovs (2006) argue that remittances

are one of the most important factors in making the decision to migrate from Turkey to Germany. Hence, more liberal immigration policies, especially greater levels of temporary migration or facilitating labor mobility between the source and destination countries will enhance more remittances.

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Appendix

Table 1: The effects of host and home country's income on workers' remittances

Motives	Explanatory variables		
	Migrants' Income	Recipients' Long-Run Income	Recipients' Short-Run Income
Individual			
Altruism	+	-	+
Maximization	+	0	0
Exchange	+	±	±
Inheritance	+	0	0
Strategic	+	-	+
Familial			
Insurance	0	0	+
Investment	+	±	+
Macroeconomic			
	+	-	±

Source: Rapoport and Docquier (2005) and the authors of this paper.

Table 2: List of variables

Description of variable	Code
German real GDP, 2000=100, 10^9 euros	$RGDP^{Ger}$
German consumer price index, 2000=100, points	CPI^{Ger}
Turkish real GDP, 10^9 Turkish liras	$RGDP^{Tur}$
Turkish consumer price index, 2000=100, points	CPI^{Tur}
Exchange rate, Turkish liras per euro	$Ex^{TL/EUR}$
Nominal remittances, 10^6 euros	$Remitt^{EUR}$
Turkish migrants in Germany, persons	NM
Real remittances, 10^6 euros	$RRemitt^{EUR} =$ $Remitt^{EUR}/CPI^{Ger}$
Real remittances per migrant, 10^6 euros	$RRemitt_{PM}^{EUR} =$ $RRemitt^{EUR}/NM$

Sources: Turkish Statistical Institute, Deutsche Bundesbank, OECD, and World Market Monitor.

Table 3: Causal relationship between the real remittances and German real GDP, 1962–2004

Dependent variable	Regressor		
	Real GDP		Real GDP per capita
	growth rate	cyclical component	growth rate
Real remittances: <ul style="list-style-type: none"> • growth rate • cyclical component 	←	←	×
Real remittances per migrant: <ul style="list-style-type: none"> • growth rate 	×		×

Note: × means no Granger causality, ← means that the regressor is Granger-causing the dependent variable.

Table 4: Causal relationship between the real remittances and Turkish real GDP, 1962–2004

Dependent variable	Regressor		
	Real GDP		Real GDP per capita
	growth rate	cyclical component	growth rate
Real remittances: <ul style="list-style-type: none"> • growth rate • cyclical component 	×	×	×
Real remittances per migrant: <ul style="list-style-type: none"> • growth rate 	×		×

Note: × means no Granger causality.

Figure 1: Remittances of Turkish workers living in Germany



(a) Nominal remittances



(b) Nominal remittances as a share of Turkish nominal GDP (%)

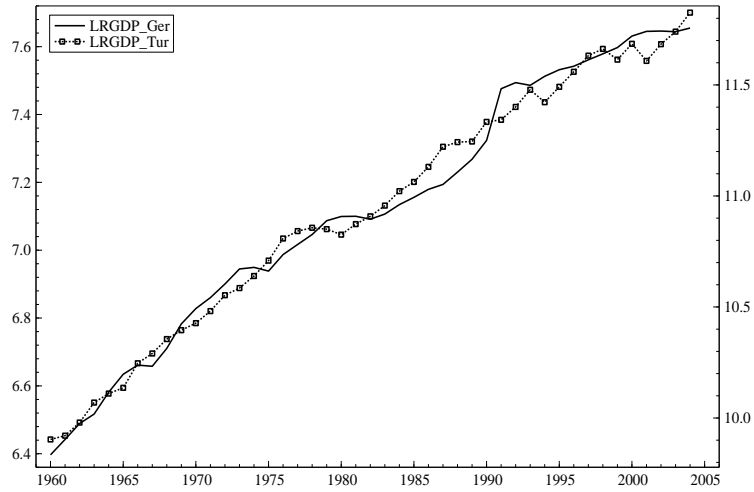


(c) Real remittances

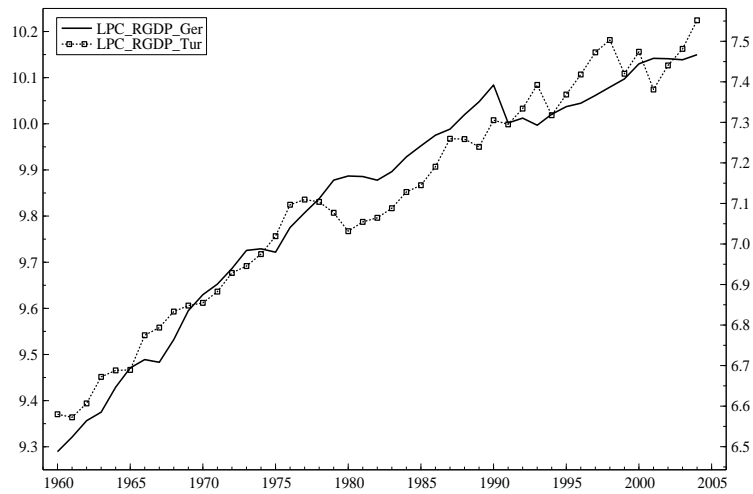


(d) Real remittances per migrant

Figure 2: German and Turkish real GDP, 1962–2004

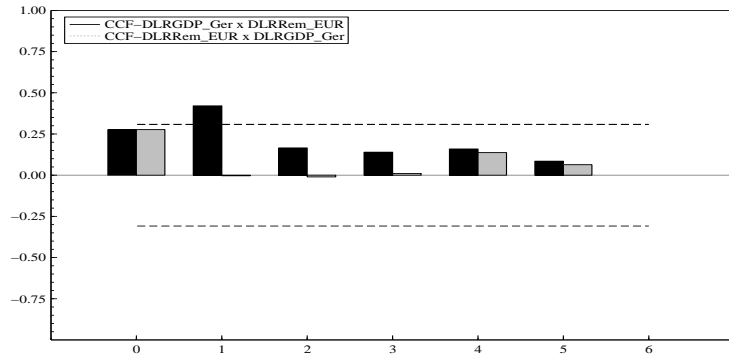


(a) Log of real GDP

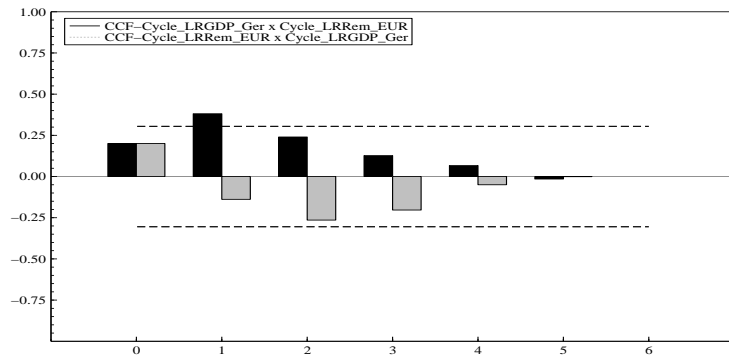


(b) Log of real GDP per capita (%)

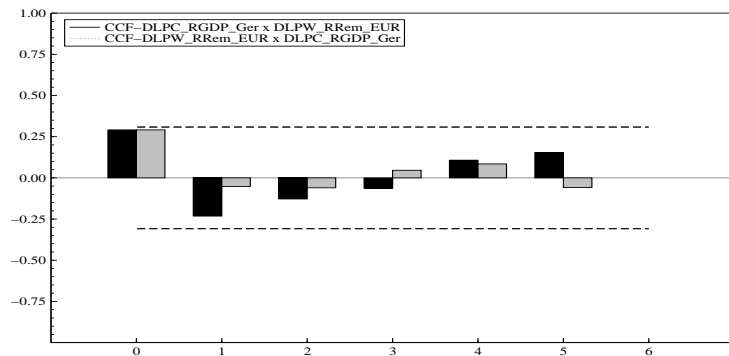
Figure 3: Cross-correlations between the German real GDP and real remittances in euros, 1962–2004



(a) Growth rate of GDP vs. growth rate of remittances

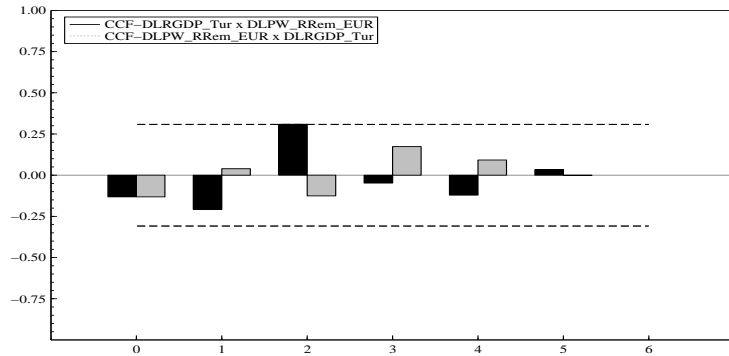


(b) Cycle of GDP vs. cycle of remittances

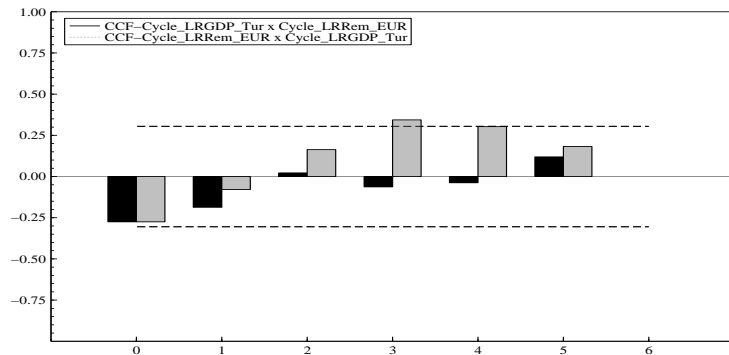


(c) Growth rate of GDP per capita vs. growth rate of remittances per migrant

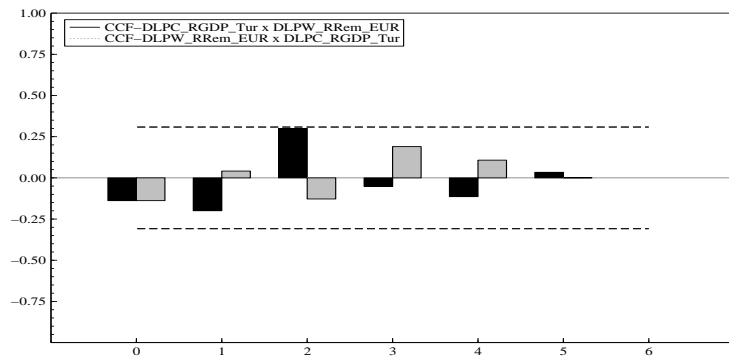
Figure 4: Cross-correlations between the Turkish real GDP and real remittances in euros, 1962–2004



(a) Growth rate of GDP vs. growth rate of remittances



(b) Cycle of GDP vs. cycle of remittances



(c) Growth rate of GDP per capita vs. growth rate of remittances per migrant