Intervening Opportunities and Competing Migrants in Turkish migration to Germany, 1969-2008

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Abstract

This study defines, specifies and empirically tests the concept of intervening opportunities proposed by Stouffer (1940) and the theory of competing migrants proposed again Stouffer (1960) in the context of international migration. An empirical model of Turkish migration to Germany is developed and tested for the 1969-2008 period, using the cointegration technique. We find strong evidence of intervening opportunities and competing migrants. Although, competing migrants are significant in the short as well as in the long-run, intervening opportunities are only significant in the short-run. The results have an important policy implication for the Turkey's accession to European Union. Thus, the migration pressure from Turkey with the accession can be managed by increasing intervening opportunities, hereby increasing foreign direct investments and altering the demand for competing migrants.

Keywords: Intervening opportunities, competing migrants, Turkish migration, cointegration.

Introduction

The labour market competition between migrants and natives has been investigated immensely, giving a rise to rich mosaic of theories and empirical analysis, as well as it has provoked public discussions, especially in the economics field.[1] The common question has been whether migrants compete or complement with natives in the labour markets given their skill levels. However, the labour market competition between migrants of different country of origins has been neglected in the literature. Migrants from one particular country is exposed also to a competition with groups of migrants from different country of origins, given their stocks, social and capital networks and skill compositions.

Very small literature investigated the impact of immigration on only different ethnic and racial groups' labour market outcomes. Card (1990) examined impact of the Marielitoson African-Americans and previous Cuban immigrants as well as on all US natives. Similarly, Enchautegui (1993) and Borjas et al. (2006) studied the impact of immigration on African Americans and

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[1] Altonji and Card (1991), Card (1990, 2001), Hunt (1992), Carrington and de Lima (1996), Friedberg and Hunt (1995), Borjas, Freeman, and Katz (1997), Friedberg, (2001), Angrist and Kugler (2003), Borjas (2003), Borjas and Katz (2005), Levine (2006), Manacorda, Manning and Wadsworth (2006), Murray, Batalova and Fix (2006), Orrenius and Zavodny (2007), Ottaviano and Peri (2006a, 2006b, 2008) and Ortega and Peri (2009).

Krugler and Yuksel (2011) examined whether the recent Latino immigrants are hurting the chances of earlier Latino immigrants and native Hispanics. However, to our knowledge there is no empirical study which investigates the competition of immigrants from different countries.

Likewise, the concept of intervening opportunities and the theory of competing migrants were explicitly introduced by Stouffer (1940, 1960), however, they have not been tested implicitly and empirically in the context of intentional migration.[2] Therefore, this study aims to contribute to the concept of intervening opportunities introduced by Stouffer (1940) and the theory of competing migrants again introduced by Stouffer (1960), by testing them empirically and defining them implicitly. This is to our knowledge the first attempt to define and specify both the concept and the theory by providing a criterion and test them simultaneously. The concept of intervening opportunities states that "*the number of persons going in a given distance is proportional to the number of opportunities at that distance and inversely proportional to the number of intervening opportunities"* or in other words *"the number of persons going in a given distance is directly proportional to the number of intervening opportunities"* (Stouffer 1940, pg. 846). The theory of competing migrants states that *"the attractiveness of City Y for migrants from City X will depend, at least to some extent, on how many potential migrants are closer to Y than the potential migrants in X are"*, (Stouffer, 1960: 7).

In this study, we test whether the slowdown in Turkish migration inflows to Germany which has taken place since 1991 can be explained by the concept of intervening opportunities and the theory competing migrants. For this purpose we utilize the data on total German foreign direct investments to abroad other than Turkey for *intervening opportunities* and migration flows to Germany from Eastern European countries and Soviet Union for *competing migrants*.[3] The total German foreign direct investments to abroad other than Turkey is a good criterion for intervening opportunities for the Turkish case, because although the total German direct investments over the period under the study increased, the German direct investments to Turkey did not change dramatically. This can be explained by fixed costs and high tax obligations for the foreign direct investments in Turkey.[4] Therefore, an increase in total

[2] Bright and Thomas (1941) and Strodtbeck (1949) test the concept of intervening opportunities for the interstate migration. However, they note that the intervening opportunities should be specified, better data should be utilised, and the empirical hypothesis and the definition of opportunity simultaneously should be tested. Most importantly, a criterion for a definition of opportunity is required.

[3] The migrants from the following countries represent *competing migrants* in this study: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan. We exclude the migrants from the Southern Europe as they are considered to be old migrants and exhibit different dynamic structures with respect to the migrants from Eastern Europe and the former Soviet Union.

[4] See Lucas (1990).

German direct investments to abroad other than Turkey will also increase the pressure for migration from Turkey as it will depress the opportunities for the workers in Turkey and will define our first hypothesis:

Hypothesis 1 (Intervening Opportunities): *Lack of opportunities (or availability or an increase in opportunities) for potential migrants (in their home country) increase (or intervene) migration to a destination with opportunities.*

Labour supply -workers - in this case migrants work with machines that demands for capital which generates cross-border flows of capital. Thus workers (or migrants) and capital complement each other as the productivity of capital is at least partially determined by the labour supply in a location, see Hatton and Williamson (1992), Clark and Martin (1995), Clark and Smith (1996), and Lange and Collin (2009).[5] Therefore, foreign direct investments to the source country help keep labour in the source country. In our case, total German foreign direct investments other than to Turkey will reduce migration from these countries, but decrease or might not change migration from Turkey.

The fall of the iron curtain eased the travel from the Eastern European countries and also from the countries that belonged to the former Soviet Union as well as from the former Soviet Union. This changed the composition of immigrant inflows to German after 1990s. We argue that this change in the composition of other migrants might have had deterrent effect from inflows from Turkey. The criterion for the competing migrants in our case is that *the attractiveness of Germany for migrants from Turkey will depend, at least to some extent, on how many migrants from the Eastern European countries, the countries that belonged to the former Soviet Union and Russia have an access to Germany*. Therefore, our second hypothesis is that:

Hypothesis 2 (Competing Migrants): *Ease of immigration access to a destination for particular nationality groups discourages immigration of others to that destination.*

In this study, the empirical model for Turkish migration is based on Akkoyunlu (2009, 2010),[6] with two additional variables on *competing migrants* and *intervening opportunities* and with a longer time series data. These two additional variables represent *intervening opportunities* and *competing migrants*, namely total German foreign direct investment in abroad other than to Turkey and the proportion of migrants from Eastern Europe, the former Soviet Union and Russia in total migrants.

The paper structured as follows. In the second section, the empirical model is introduced. Section 3 provides the econometrics results. The final section concludes the paper.

[5] See also Coale and Hoover (1958), Collins (1991), Taylor and Williamson (1994), Higgins and Williamson (1996), Higgins (1998), Mason (1998), Wilson (2003) and Helliwell (2004).

[6] Akkoyunlu (2009, 2010) define and explain the core variables in this model in details.

An empirical model

We model Turkish migration to Germany as follows:

$$\ln M_t = \alpha_0 + \alpha_1 \ln(Y_{ft}/Y_{ht}) + \alpha_2 U_{ft} + \alpha_3 U_{ht} + \alpha_4 \ln\left(\frac{A_t}{GNI_t}\right) + \alpha_4 \ln T_t$$
$$+ \alpha_5 \ln\left(\frac{MXG_t}{TXG_t}\right) + \alpha_6 \ln\left(\frac{R_t}{Y_{ht}}\right) + \alpha_7 \ln\left(\frac{OM_t}{TINF_t}\right) + \alpha_8 \ln\left(\frac{OFDI_t}{TFDI_t}\right) + \varepsilon_t \quad (1)$$

In (1), $\ln M_t$ denotes the log of the gross inflow of Turkish migrants to Germany, expressed as a share of the population in Turkey.

$\ln(Y_{ft} / Y_{ht})$ is the log of the income in the host country divided by the income in the home country, measured as per capita GDP in purchasing power parity terms.

U_{ft} is the unemployment rate in Germany.

The U_{ht} term is the unemployment rate in Turkey.

$\ln\left(\frac{A_t}{GNI_t}\right)$ is the overseas development aid to GNI ratio.

$\ln T_t$ is a proxy for the intensity of economic cooperation between Turkey and Germany, calculated as the log of the share of the trade volume (sum of exports and imports) between the two countries in the total trade volume of Turkey with all its trading partners. The volume of trade between two economies could measure a variety of links between the economies. The higher the volume, the more intensive are the links.

$\ln\left(\frac{MXG_t}{TXG_t}\right)$ is the share of Turkish manufacturing exports with Germany in total Turkish exports with Germany. This variable captures the effects of the expansion of manufacturing exports where Turkey has a comparative advantage on decision to migrate. In other words, with this variable we test whether trade and migration are substitutes or complements.

$\ln\left(\frac{R_t}{Y_{ht}}\right)$ is the log of the ratio between workers' remittances from Germany and Turkish GDP.

$\ln\left(\frac{OM_t}{TNF_t}\right)$ represents *other* or *competing migrants* which is the share of immigrant inflows from Eastern European countries, the former Soviet Union and Russia as a share of total immigrant inflows to Germany. As it is shown in Figure 1 this share has increased since 1991.

Finally, $\ln\left(\frac{OFDI_t}{TFDI_t}\right)$ is the share of total German foreign direct investments other than to Turkey in total German foreign direct investments which represent the *intervening opportunities*.

The data on workers' remittances and on foreign direct investments were obtained from the balance sheets of the Bundesbank, while the data on the per capita GDP of Germany and of Turkey were obtained from the OECD. Data on Turkish unemployment, population, and trade were gathered from the Turkish Institute of Statistics. Data on Turkish and competing migrants and on German unemployment were obtained from the Federal Statistical Office in Germany. Data on aid is obtained from the World Bank's World Development Indicators.

The annual data covers the period from 1969-2008 (see Figure 1, for the basic properties of the data), as some data is not available for the previous period.

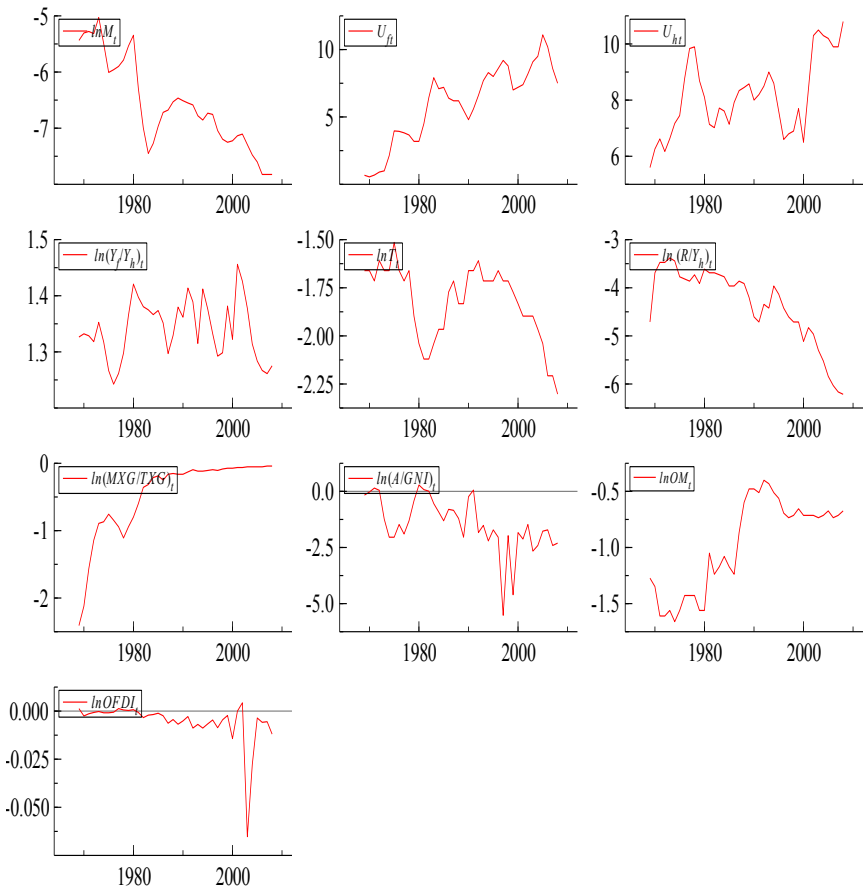
The general to specific approach and econometrics results

Modelling based on the general-to-specific modelling approach that aims to build empirical models that economically sensible and statistically satisfactory, see Hendry (1995), Campos and Ericsson (1999) and Hoover and Perez (1999).

Therefore, we start with *a general model* which is probably over-parameterised with two lags for the gross inflows of Turkish migrants to Germany, expressed as the share of the home population, $\ln M_t$ and a broad set of explanatory variables[7] (income differential (the ratio of German GDP to Turkish GDP in PPPs, $\ln\left(\frac{Y_{ft}}{Y_{ht}}\right)$), the German unemployment rate, U_{ft}, the Turkish unemployment rate, U_{ht}, aid (aid to GNI ratio, $\ln\left(\frac{A_t}{GNI_t}\right)$), trade intensity (the share of total trade with Germany in total Turkish trade, $\ln T_t$), the share of Turkish manufacturing exports with Germany in total

[7] All the variables apart from the unemployment rates are expressed in logs.

Figure 1: The basic properties of data: 1969-2008



Turkish exports with Germany, $\ln\left(\frac{MXG_t}{TXG_t}\right)$, Turkish remittances from Germany, expressed as a ratio to Turkish GDP, $\ln\left(\frac{R_t}{Y_{ht}}\right)$, the *competing immigrant* inflows to Germany as a share of total immigrant inflows to Germany, $\ln\left(\frac{OM_t}{TINF_t}\right)$ and total German foreign direct investments other than to Turkey as a share of total German foreign direct investments, $\ln\left(\frac{OFDI_t}{TFDI_t}\right)$. Thus, we allow for these variables at the outset that might be significant and then investigate whether and how this initial general model can be reduced

without significant loss of information about the parameters of interests. We aim to have a theory consistent model so that there is not a conflict between the empirical model and the theory interpretation. Therefore, we aim to conclude with a parsimonious model which has orthogonal regressors as well as satisfying the necessary conditions for both congruence and encompassing.

Although, the general-to-specific modelling *still* suffers from allegations, such as *repeated testing, data interdependence, corroboration* and *over-parameterization*; during the building process of the empirical model, we show that these allegations can be refuted easily.

Our *first step* to obtain a parsimonious unrestricted model is quite challenging given the relatively small number of observations (T=40) compared to the number of explanatory variables (k=9). The results of the unrestricted general model are given in Table 1. Table 1 in the appendix shows that the unrestricted model can adequately describe the data, since the misspecification tests show no serious departures from the underlying model assumptions.

The next step (second step) is to find the cointegrating relationship (the long-run relationship) between variables. The solved long-run equation, as well as the error correction mechanism (ECM) is given below. The test on the significance of the lag length suggests that the model should have two lags. [8]

$$\ln M_t = -7.347 + 3.192 \ln\left(\frac{Y_{ft}}{Y_{ht}}\right) - 0.025\, U_{ft} + 0.258\, U_{ht}$$

(SE) (2.598) (1.824) (0.054) (0.055)

[t] [-2.83] [1.75] [-0.46] [4.68]

$$+ 0.095 \ln\left(\frac{A_t}{GNI_t}\right) + 2.884 \ln T_t - 0.369 \ln\left(\frac{MXG_t}{TXG_t}\right) \qquad (2)$$

(SE) (0.091) (0.567) (0.241)

[t] [1.05] [5.08] [-1.53]

$$+ 0.209 \ln\left(\frac{R_t}{Y_{ht}}\right) - 0.582 \ln\left(\frac{OM_t}{TINF_t}\right) + 2.675 \ln\left(\frac{OFDI_t}{TFDI_t}\right)$$

(SE) (0.127) (0.242) (7.022)

[t] [1.65] [-2.40] [0.381]

$$\text{ECM} = \ln M_t + 7.347 - 3.192 * \ln\left(\frac{Y_{ft}}{Y_{ht}}\right) + 0.025 * U_{ft} - 0.258 * U_{ht}$$

[8] The graphics, regression output and residual diagnostic tests were all calculated using GiveWin 2.2, Pc-Give 10.2 and Pc-Gets 1.2, see Doornik and Hendry (2001a, b, c).

$$- 0.095^{*} \ln\left(\frac{A_t}{GNI_t}\right) - 2.884^{*} \ln T_t + 0.369^{*} \ln\left(\frac{MXG_t}{TXG_t}\right) \quad (3)$$

$$- 0.209^{*} \ln\left(\frac{R_t}{Y_{ht}}\right) + 0.582^{*} \ln\left(\frac{OM_t}{TINF_t}\right) - 2.675^{*} \ln\left(\frac{OFDI_t}{TFDI_t}\right)$$

WALD test χ^2 (9) = 1139.08 [0.00] **

Tests on the significance of each lag

Lag	
1	F(10,8) = 7.36 [0.00] **
2	F(10,8) = 5.21 [0.01] *

Tests on the significance of all lags up to 2

Lag	
1- 2	F(10,8) = 7.36 [0.00] **
2- 2	F(20,8) = 12.56 [0.00] **

It is immediately clear that this set cointegrates.[9] The solved long-run equation represents the cointegrating vector that enters in the conditional model as the error correction term.

In the long run equation, relative income, the unemployment rate in Turkey, the trade intensity, and workers' remittances contribute positively to migration from Turkey, while unemployment in Germany, aid and *competing migrants* contribute negatively to migration from Turkey to Germany. The unemployment rate in Germany, aid, manufacturing exports, and *other foreign direct investments* (with a correct sign) are not significant in the long-run equation, but we keep them for further analysis as there are strong theoretical arguments for their presence in the migration equation such as unemployment rate in Germany. Moreover, aid might be more significant in the short-run compared to the long-run due its structure, type and magnitude.[10]

Other foreign direct investments are not significant in the long-run, and this can be explained by two factors with have opposite effects. On the one hand, an increase in other foreign direct investments decreases the demand for low-skilled workers in Germany (the demand for Turkish workers also decrease),

[9] Cointegration states that these series have a common stochastic trend, see Engle and Granger (1987).

[10] Akkoyunlu (2009, 2010) explains in details the impacts and interpretations of the core variables in a Turkish migration model.

on the other hand, an increase in other foreign direct investments decrease the supply of low-skilled workers from other countries (the demand for Turkish workers increase). Therefore, the net effect in the long-run is insignificant.

In the long-run, income differential, trade intensity and *competing migrants* are the most significant variables in explaining migration flows from Turkey to Germany. Thus, a 10 per cent increase in income differential increases the gross migration inflows by 31.92 percentage points, a very significant effect. Especially compared to the finding reported in other studies (Hatton (1995), Hatton and Williamson (2005), Mitchell and Pain (2003), Pedersen *et al.* (2006), Péridy (2006), Clark *et al.* (2007), Arce and Mahia (2008), Mayda (2010) and Yashiv and Levy (2009)). Likewise, a 10 per cent increase in trade intensity increases the gross migration inflows by 28.84 percentage points. This is a large effect, especially when compared to the finding reported in other studies (Mitchell and Pain, 2003, Pedersen *et al.*, 2006, and Péridy, 2006). The result may be related to the fact that Germany is Turkey's biggest trading partner. The third important factor in explaining the determinants of Turkish migration in the long-run is *competing migrants*: a 10 per cent increase in flows of competing migrants increases the gross migration inflows by 5.82 percentage points.

There are a few steps in the reduction of the final (conditional) model from the general specification in Table 1 in the appendix and these reductions are done automatically with Pc-Gets[11] (the corresponding standard errors and *t*-ratios reported in parentheses below the coefficient estimates).

$$\Delta \ln M_t = 0.015 + 0.089\,\Delta \ln M_{t-1} + 1.818\,\Delta \ln\left(\frac{Y_{ft}}{Y_{ht}}\right) - 0.122\;\Delta U_{ft}$$

(SE) (0.012) (0.055) (0.336) (0.014)
[t] [1.20] [1.63] [5.42] [-8.67]

$$- 0.108\,\Delta U_{ft-1} - 0.108\,\Delta \ln\left(\frac{A_t}{GNI_t}\right)_{-1} + 0.451\,\Delta \ln\left(\frac{MXG_t}{TXG_t}\right)$$

(SE) (0.018) (0.013) (0.136)
[t] [-6.04] [-8.38] [3.31] (4)

$$+ 0.385\,\Delta \ln\left(\frac{MXG_t}{TXG_t}\right)_{-1} + 0.164\,\Delta\Delta U_{ht} + 0.118\,\Delta\Delta \ln\left(\frac{R_t}{Y_{ht}}\right)$$

(SE) (0.119) (0.019) (0.051)
[t] [3.23] [8.64] [2.30]

[11]The corresponding standard errors reported in parentheses below the coefficient estimates.

$$- 0.178\,\Delta\Delta \ln\left(\frac{OM_t}{TINF_t}\right) + 2.815\,\Delta \ln\left(\frac{OFDI_t}{TFDI_t}\right)_{-1} + 0.569\,\Delta\Delta \ln T_t$$

(SE) (0.061) (0.806) (0.110)

[t] [-2.93] [3.49] [5.17]

$$- 0.769\, ecm_{t-1}$$

(SE) (0.047)

[t] [-16.4]

R^2 = 0.962 F(13,24) = 46.34 [0.00] $\hat{\sigma}$ = 0.065 DW = 1.72

RSS = 0.1015 for 14 variables and 38 observations

$F_{ar}(2,22)$ = 2.005 [0.16] $F_{arch}(1,22)$ = 0.273 [0.61]

χ^2_{nd} (2)= 1.89 [0.39] $\chi^2_{hetero}(26)$ = 0.33 [0.96]

$F_{reset}(1,23)$ = 0.39 [0.54] T = 38 (1971-2008)

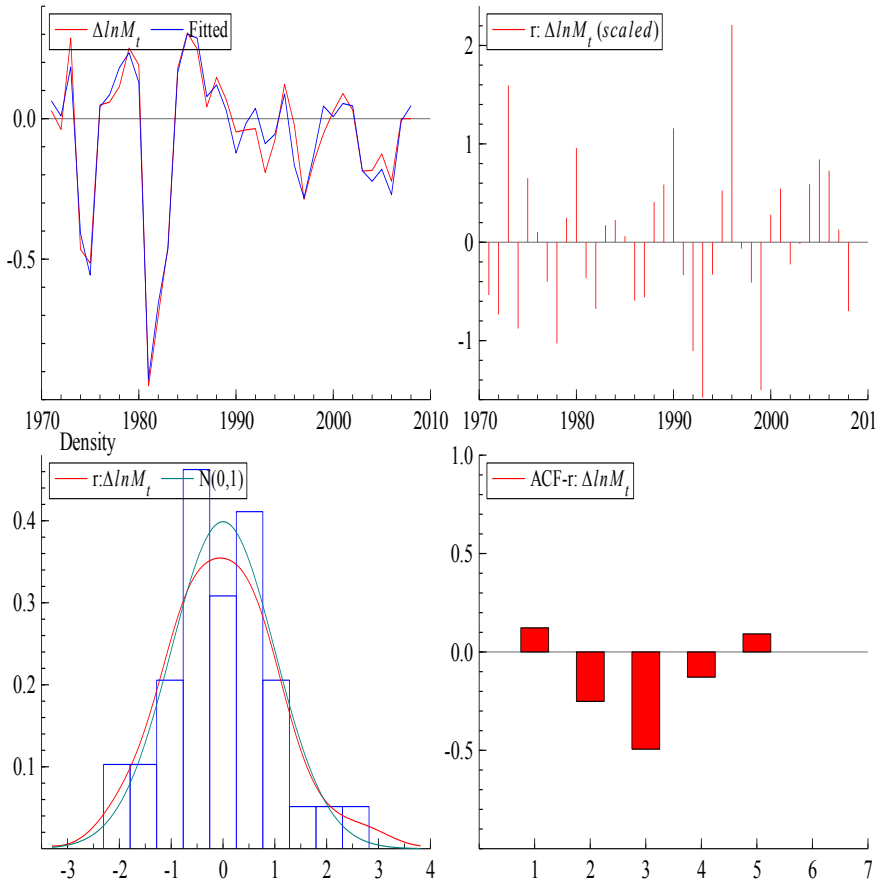
The conditional model (equation (4)) is parsiomonious. The diagnostic tests are satisfactory, hence, the conditional model satisfies the *design criteria*. The data generating process (DGP) as a model satisfies the design criteria suggesting that the general-to-specific modelling is successful in creating a model that mimics the properties of the DGP. The error-correction term is highly significant and has the expected sign. Figure 2 shows the actual and fitted values of the final model. The graphs show how well the final model explains the data and the residuals uncorrelated and normally distributed.

Other foreign direct investments and the income differential are the most important determinants of migration flows in the short-run also: a 10 per cent increase in the change in *other foreign direct investments* will increase the change in migration inflows by 28 per cent and a 10 per cent increase in the change in income differential will increase the change in migration inflows almost by 18 per cent.[12] The results suggest that the increase in German foreign direct investments to other countries increase Turkish migration inflows. This could be explained by reduced opportunities in Turkey and therefore, an increase of the migration potential to Germany. Importantly, income differential is the most important factor in the long-run as well as in the short-run, suggesting that until the income gap is reduced, the pressure to migrate will remain.[13]

[12]Mitchell and Pain (2003) also find a strong short-run effect of relative income.

[13]Akkoyunlu (2009, 2010) interpret in details the short and long-run effects of the core variables in a Turkish migration model.

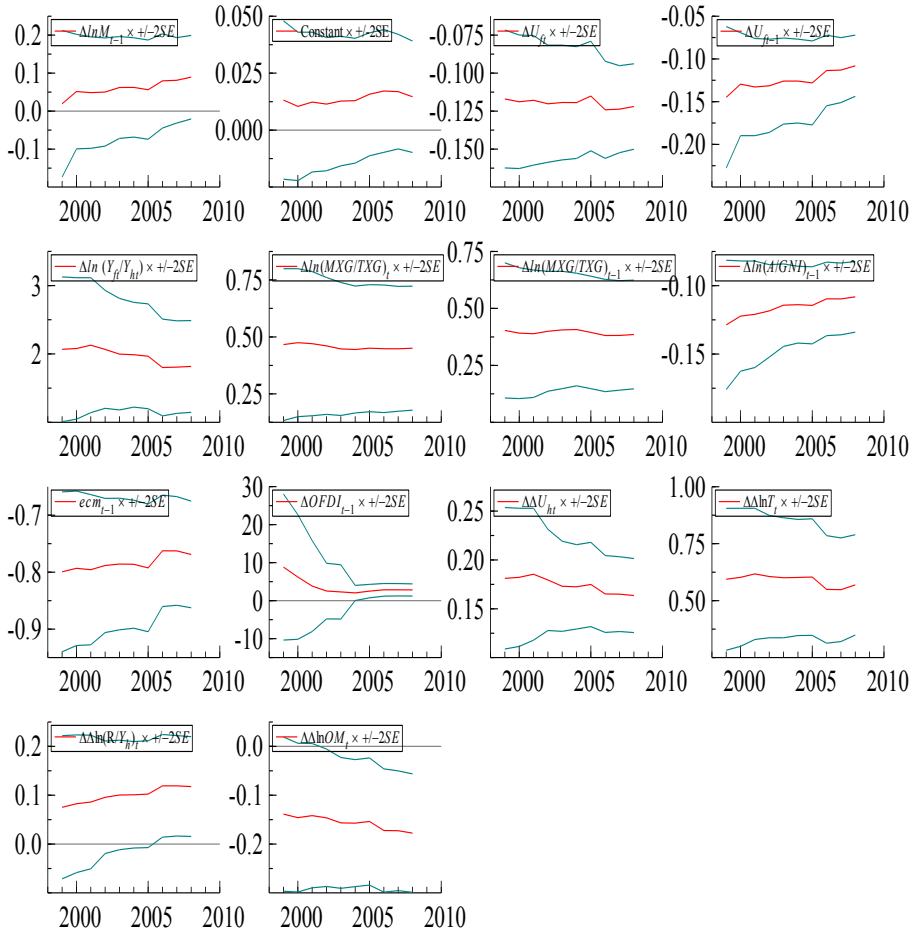
Figure 2: Actual and fitted values of migration model from Equation (4), residuals, their correlogram, the histogram and estimated density of the residuals.



Competing migrants are significant also in the short-run suggesting that the increase in migration from the Eastern European countries, the former Soviet Union countries and Russia decreased the Turkish migration inflows. Thus, migrants from these countries compete with the Turkish migrants.

Remittances are found to significantly explain migration in the short-run as well as in the long-run. The results support the hypothesis that remittances fuel migration. Liquidity constraints, signalling, portfolio revision, and other considerations raise the possibility that an economy that receives more remittances will generate more migration.

Figure 3: Recursive coefficients of consumption model (Equation 4) with (± SE) 95 per cent confidence band.



The results of this study show that both push and pull factors matter in determining Turkish migration inflows to Germany.

Figures 3, 4 and 5 plot the recursive estimates for the coefficients on the constant term, $\Delta \ln M_{t-1}$, $\Delta \ln\left(\frac{Y_{ft}}{Y_{ht}}\right)$, ΔU_{ft}, ΔU_{ft-1}, $\Delta \ln\left(\frac{A_t}{GNI_t}\right)_{-1}$, $\Delta \ln\left(\frac{MXG_t}{TXG_t}\right)$, $\Delta \ln\left(\frac{MXG_t}{TXG_t}\right)_{-1}$, $\Delta\Delta U_{ht}$, $\Delta\Delta \ln\left(\frac{R_t}{Y_{ht}}\right)$, $\Delta\Delta \ln T_t$,

$\Delta\Delta \ln\left(\frac{OM_t}{TINF_t}\right)$, $\Delta \ln\left(\frac{OFDI_t}{TFDI_t}\right)_{-1}$ and ecm_{t-1}; their respective *t*-ratios; and the recursive residual sum of squares, one-step residuals, one-step Chow statistics, and break–point Chow statistics, respectively.

Figure 4: Recursive *t*-ratios.

Constant coefficients in Figure 3 in the presence of the large variations in the marginal process such as unemployment rates imply super exogenous variables that counter the second sense of data mining – *data interdependence*. Further, the recursive *t*-ratios in Figure 4, increase in absolute value as the sample size increases countering the first sense of data mining – *repeated testing*. Hence, the nominal critical levels of test statistics are not affected. Even with thirty-eight observations and fourteen variables in the final model *t*-ratios are

greater than three in magnitude suggesting that over-parameterisation is not a concern given information content in the data and refuting the fourth sense of data mining – *over-parameterization*.

Figure 5: The residual sum of squares (RSS), one-step residuals and $0 \pm 2\hat{\sigma}_t$ one-step Chow statistics and breakpoint Chow statistics.

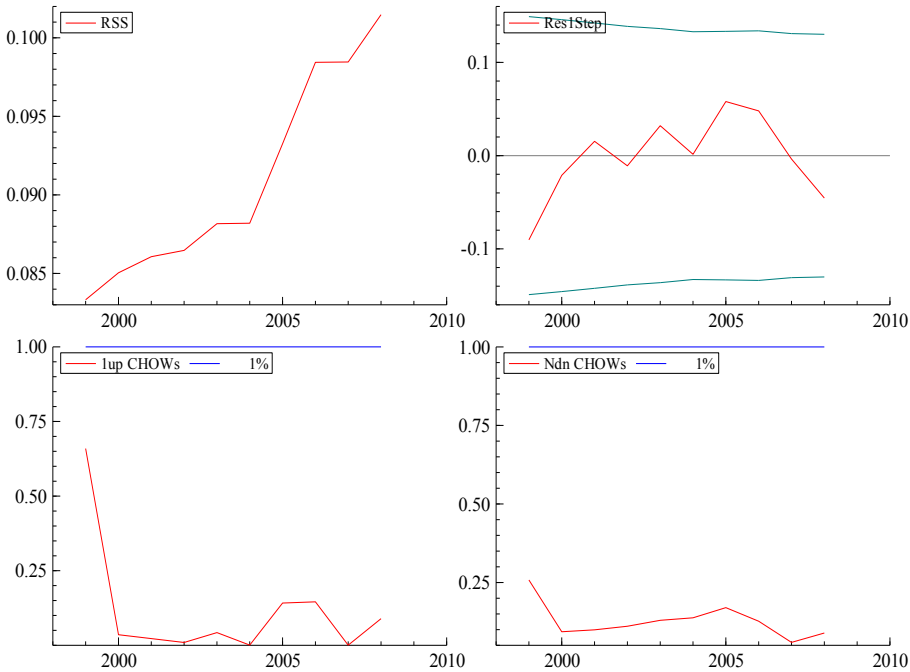
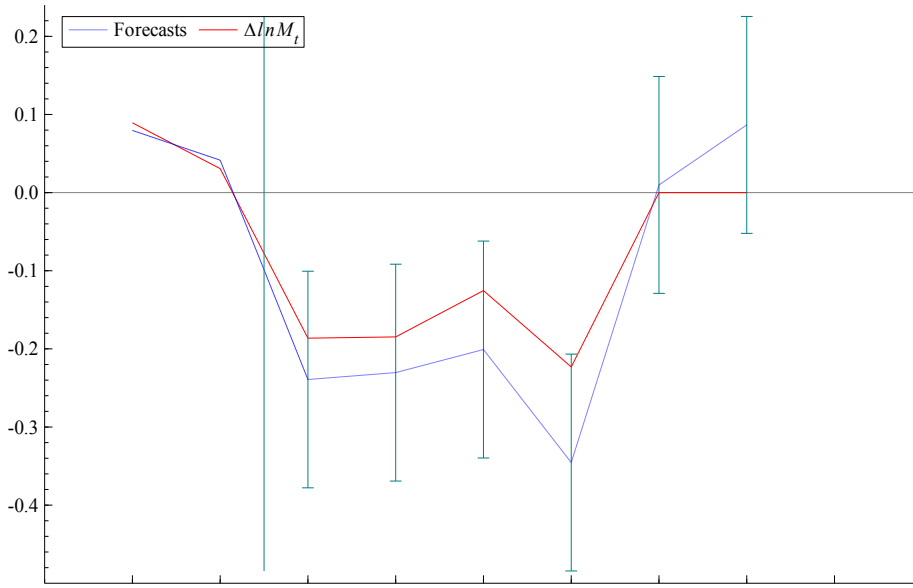


Figure 5 shows that the recursive residual sum of squares increase over time and the recursive estimate of standard error $\hat{\sigma}_t$ declines over time rather than increase, hence countering the first and third sense of data mining - *repeated testing* and *corroboration*. Furthermore, insignificant one-step and breakpoint Chow statistics support this refutation. Finally, the conditional model is able to forecast Turkish remittances from Germany over the 2003-2008 period (see Figure 6 for the one-step ahead forecasts) and this aspect is supported by the forecast test ($\chi^2_{forecast}$ (6) = 607 (0.36)) , Kiviet (1986) and the parameter constancy test over *kth* periods (F_{Chow} = 0.52 (0.79)), Chow (1960). The forecast results refute the first and second sense of data mining –*repeated testing* and *data interdependence*.[14]

[14] See also Bijak (2010), Cooke (2011), Elffers et al. (2008), and Özgen et al. (2010) for modelling and forecasting in a similar context.

Figure 6: 1-step (ex-post) forecasts (dashed) for conditional model (Equation 4)



Conclusions

This study defined, specified and empirically tested the concept of intervening opportunities and the theory of competing theory in the context of international migration. The results of the study can be summarized as follows: first, an empirical model of Turkish migration to Germany has been developed and tested for the 1969-2008 period, using the cointegration technique. A single cointegrating vector is found among the gross migration inflows and the following explanatory variables: the relative income ratio between Germany and Turkey, the unemployment rates in Germany and Turkey, aid, the trade intensity variable, the ratio of manufacturing exports with Germany to total exports with Germany, remittances as a ratio of Turkish GDP, *other foreign direct investments* and *competing migrants*.

Based on the results of the cointegration analysis, a parsimonious single equation conditional error-correction model is developed. That is both congruent and parsimoniously encompasses the general model. The residuals are also innovations against the available information. The results further support the argument that a constructive data mining *qua* general-to-specific modelling approach is productive as it has a high probability of locating the Data Generating Process. Second, we found that *competing migrants* can explain the slowdown of the Turkish migration in the short-run as well as in the long-run. Mi-

grants from the Eastern European countries, the former Soviet Union and Russia compete with the Turkish migrants. Third, there is strong short-run evidence on intervening opportunities, suggesting that the increase in foreign direct investments to Turkey can have an important role in managing Turkish migration to Germany. Low capital-labour ratios and low productivity in Turkey encourages foreign direct investments, but high bureaucratic procedures and high tax rates for the foreign companies deter foreign direct investments. Thus, fourth, this study has important policy implications. Both Turkish and German governments can have an active and a central role by having a policy to encourage German foreign direct investments to Turkey, by giving incentives to invest in Turkey and by reducing tax rates. In this way an increase in capital flows will match with an increase in domestic demand for labour in Turkey which will lead to productivity-led wage increases that will decrease migration incentives. Therefore, with the right government policies, migration from Turkey can be managed during and after accession of Turkey to the European Union.

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Appendix:

Table 1: Least squares estimates of the unrestricted gross inflows of Turkish migrants to Germany, $\ln M_t$ (Equation 1):

Lag j	0	1	2
Variables	[t]	[t]	[t]
Constant	-6.282		
	(2.298) [-2.73]		
$\ln M_{t-j}$	———	0.268	-0.124
		(0.137) [1.97]	(0.142) [-0.871]
$\ln\left(\frac{Y_f}{Y_h}\right)_{t-j}$	2.153	0.536	0.039
	(0.891) [2.42]	(0.732) [0.732]	(1.105) [0.036]
U_{ft-j}	-0.120	-0.002	0.101
	(0.053) [-2.28]	(0.039) [-0.05]	(0.045) [2.22]
U_{ht-j}	0.172	-0.155	0.204
	(0.044) [3.93]	(0.056) [-2.78]	(0.044) [4.62]
$\ln\left(\frac{A}{GNI}\right)_{t-j}$	0.004	-0.039	0.112
	(0.028) [0.135]	(0.034) [-1.17]	(0.034) [3.40]
$\ln T_{t-j}$	0.637	1.065	0.764
	(0.350) [1.83]	(0.254) [4.19]	(0.302) [2.53]
$\ln\left(\frac{MXG}{TXG}\right)_{t-j}$	0.612	-0.494	-0.433
	(0.399) [1.53]	(0.256) [-1.69]	(0.173) [-0.75]
$\ln\left(\frac{R}{Y_h}\right)_{t-j}$	-0.041	0.036	0.184
	(0.135) [-0.31]	(0.162) [0.223]	(0.140) [1.32]
$\ln\left(\frac{OM}{TINF}\right)_{t-j}$	-0.130	-0.186	-0.182
	(0.173) [-0.75]	(0.194) [-0.958]	(0.202) [-0.898]
$\ln\left(\frac{OFDI}{TFDI}\right)_{t-j}$	0.081	5.183	-2.976
	(3.15) [0.026]	(2.264) [2.29]	(2.531) [-1.18]

R^2 = 0.998 F(29,8) = 118.5 [0.00]** $\hat{\sigma}$ = 0.079 DW = 2.28
RSS = 0.05119 for 30 variables and 38 observations
F_{ar} (1,7) = 0.30 [0.60] F_{arch}(1,6) = 0.11 [0.75]
χ^2_{nd} (2) = 2.41 [0.30] F_{reset} (1,7) = 4.68 [0.07] T = 38 (1971-2004)

R^2 is the coefficient of determination, $\hat{\sigma}$ is the residual standard deviation. The diagnostic tests are the form $F_j(k, T-1)$ which denotes an approximate *F*-test against the alternative hypothesis *j* for: k^{th} - order serial correlation F_{ar} , Goldfrey (1978), k^{th} -order autoregressive conditional heteroscedasticity F_{arch}, Engle (1982), heteroscedasticity F_{hetero}, White (1980), the functional form RESET test F_{reset}, Ramsey (1969) and a chi-square test for normality χ^2_{nd} (2), Doornik and Hansen (1994).

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