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Labour Migration and Remittances: Some Implications of Turkish Workers in Germany

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Despite only recently completing the challenging fifth enlargement process, the EU has already embarked upon negotiations about Turkey’s possible accession to the EU; indeed in December 2004 agreement was reached between Turkey and the EU for entry talks to begin in October 2005. The possibility of Turkish accession to the EU has reignited fears in the ‘old’ EU about labour migration as a result of enlargement.

This paper reports an analysis of the economy wide effects of changes both in the flow of labour from Turkey to EU and the flow of labour remittances to Turkey by migrant workers. Due to the past migration patterns and volumes of Turkish *Gastarbeiter*, the analysis focuses on the economic implications of this process for Germany as well as Turkey.

The analyses are carried out by using a 22-sector, 6-factor and 15-region global computable general equilibrium model -Globe CGE- that is implemented in GAMS (see McDonald *et al*, 2005). For this study a method for augmenting the GTAP database using additional IMF data on remittance flows (McDonald and Sonmez, 2004) has been implemented as an extension to a global representation of the GTAP database (McDonald and Thierfelder, 2004). Since the data on inter regional transfers are not bilateral, an additional region, called “globe”, is defined as the recipient of all remittance expenditures and the source of all remittance incomes.

Keywords: Computable General Equilibrium, Migration and Labour Issues

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1. Introduction

There is little evidence to suggest that the expansion of membership of the European Union (EU) will soon stop. Despite only recently completing the (challenging) fifth enlargement process, which saw the EU grow to 25 members, the EU has already embarked upon negotiations about Turkey's possible accession to the EU; indeed in December 2004 agreement was reached between Turkey and the EU for entry talks to begin in October 2005. The possibility of Turkish accession to the EU has reignited fears in the 'old' EU about labour migration as a result of enlargement. But labour migration is already a significant phenomenon for both existing EU members and for Turkey with potential substantial implications for both partners.

This paper reports an analysis of the economy wide effects of changes in both labour migrations from Turkey to EU and labour remittances to Turkey by migrant workers. Due to the past migration patterns and volumes of Turkish *Gastarbeiter*, the analyses focus on labour migration to Germany and the economic implications for Turkey and Germany. The analyses reported here are part of a wider study into labour migration and EU expansion.

2. Turkish Labour Migration and Remittances

2.1. Migration Trends

Migration is a diverse and dynamic phenomenon that has become one of the top policy agenda items for many countries in the 21st century. It is a complex process which has gained attention globally as it touches every country of the world as every country participates in the migration process either as a point of origin, transit or destination for migrants. Migration is economically, socially and politically influential for both developed and developing countries (IOM, 2005). Developed countries are examining the ways in which their policies affect and are affected by international migration, while the developing countries are questioning the role of migration in the development process. It has gained even more importance with the eastern enlargement and became one of the controversial issues regarding the potential EU membership of Turkey.

According to the United Nations (UN) estimates, the upward trend in international migration continues as the total number of international migrants in the world has increased from 154 million in 1990 to 175 million in 2000 and is estimated to increase to a total of between 185 million and 192 million migrants by early 2005 (IOM, 2005). It has more than doubled since 1975 and had increased fivefold since 1910. International migrants had represented 2.1% of the

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world population in 1910 while they accounted for 2.9% in 2000 (UN, 2003; UN, 2004; World Bank, 2006).

International migrants are concentrated in a relatively small number of advanced industrialized countries, North America, being the major receiving country followed by Europe¹. Between 1970 and 2000, international migration as a percentage of population has increased from 4.1% to 6.4% in Europe. Among the European countries Germany has been the one which has the highest number of migrant stock with 7.3 millions as well as the highest percentage of the world's migrant stock with 4.2% (IOM, 2005). Since from 1999, the inflows of foreign workers into Germany have been on an upward trend (OECD, 2004).

The growth of large-scale emigration movement from Turkey to other parts of the world, especially to Europe, has been impressive as it has increased from about 195,000 to around 3 millions from 1960s to 2000s.

Table 1: Number of Turkish Citizens and Workers, 2003

	No. of citizens	No. of workers
Germany	2.053.600	732.189
France	311.356	76.122
Netherlands	299.909	51.000
Austria	134.229	57.098
Belgium	70.701	25.874
Sweden	38.844	5.800
UK	79.000	44.000
Denmark	35.232	15.596
Luxembourg	210	60
Switzerland	79.476	33.764
Norway	10.000	6.000
Total	3.127.691	1.047.842

Source: Turkish Ministry of Labour and Social Security, 2003

The first phase of Turkish labour migration to Western Europe, especially to Germany, started in the early 1960s when Turkish workers migrated to Western Europe as Gastarbeiter. This Turkish labour migration accelerated, following the workforce agreement with Germany and the Association Agreement with the EC. Together with the non-stopping family unification and the high birth rate among Turkish migrants, there were more than 3 million Turkish citizens in

¹ Whole Europe excluding the USSR

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Europe by 2003, over 1 millions being legally employed. The number of Turkish citizens and workers was the highest in Germany with around 2 millions citizens and 732,189 workers, accounting for the 66% of Turkish citizens and 70% of Turkish workers in Europe (TMLSS, 2003). By the early 2000s, expatriate Turks amounted to more than 3.5 millions which is almost 5% of the nation's total population and the emigration flow to Europe was almost entirely to Germany, based on a 1991 bilateral agreement (Icduygu, 2004; OECD, 2004).

The use of Turkish migrant workers was conceived by the German government as a temporary measure to deal with the chronic labour shortage by providing cheap and flexible labour. However, over time these temporary arrangements developed into permanent ones. The initial phase was followed by the second one, encompassing family reunification, politically motivated migration and (inevitably) illegal labour migration. Hence, the Gastarbeiter never went back and more followed; Gastarbeiter developed into the Inlander ausländischer Herkunft².

Table 2: Stock of Foreign Workers in Germany- top 5 nationalities (in 1000s)

	1999	2000	2001	2002
Turkey	1,008	996	1,004	974
Italy	386	395	403	407
Greece	219	207	210	213
Croatia	189	195	193	185
Poland	100	106	113	133
Total	3,545	3,546	3,616	3,634

Source: OECD, 2004

Even in early 2000s, Turkey is the top country with the highest stock of foreigners in Germany while it is in the second place regarding the inflow of migrants.

Table 3: Migration of Foreigners to Germany, Foreign Inflows-top 3 nationalities (in 1000s)

	1999	2000	2001	2002
Poland	72.2	74.1	79.7	81.6
Turkey	47.1	49.1	54.6	58.1
Russian Federation	27.8	32.1	36.6	36.5

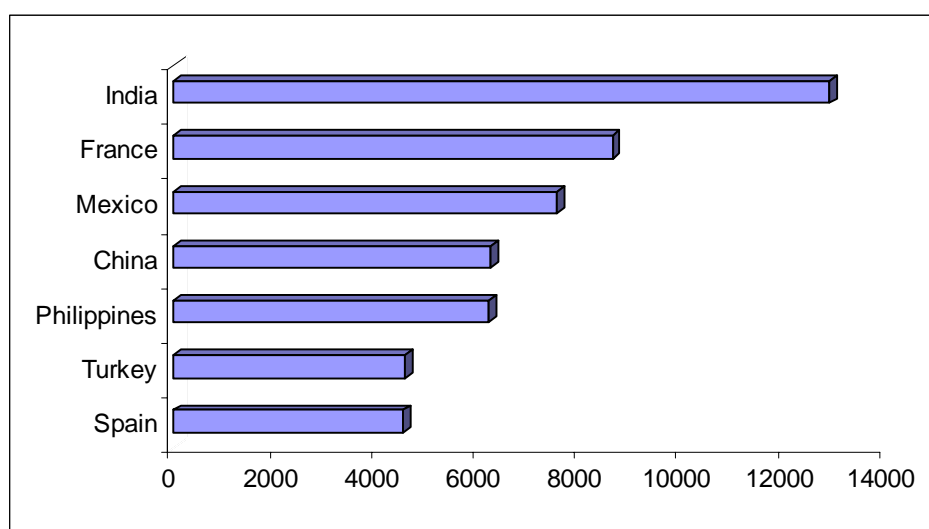
OECD, 2004

2.2. Remittances

Throughout the world, remittances which are the earnings generated and send back home by the migrant workers, have been an important source of revenue for developing countries, especially for the poor. After a dramatic rise especially after 2000, workers' remittances have emerged as an important source of foreign exchange earnings for the developing countries. They are the second largest source, behind FDI, of external funding for developing countries and the second largest source, behind ODA, for the poor countries of the world. In 2004, workers' remittance receipts of developing countries increased by 8%, reaching \$126 billions following an increase of \$17 billion (17%) in 2003 (World Bank, 2005b). According to the official World Bank Global Development Report 2005, remittances received by developing countries have more than doubled since 1995 and they are approximately four times the level of 1990's (World Bank, 2005b; OECD, 2004).

Towards the end of 1990s, India, Mexico, Turkey, Germany and Egypt were the top remittance receiving countries, Turkey being in the third place in 1998.

Figure 1: World's Top Remittance Receiving Countries, 2000

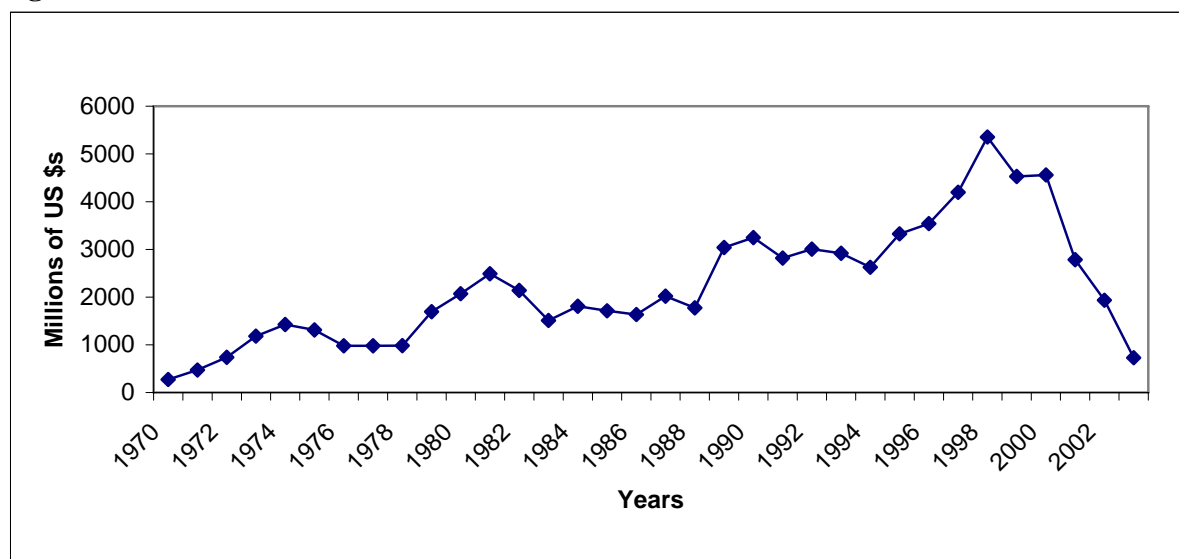


Source: *Global Economic Prospect (GEP)*, 2006

Since 1964 remittances by Turkish emigrants have grown so that by 2000 they formed 20% of total exports and 2% of Turkish GDP.

² Resident with foreign origin

Figure 2: Turkish Remittance flows



Source: IMF Balance of Payments Statistics, OECD, Rist(1978)

The process of labour migration and remittances was encouraged by successive Turkish governments as it was perceived to help ease an unemployment problem and to improve the balance of payments with higher inflows of workers remittances. A number of policies (such as special interest rates for foreign currency accounts, special exchange rates for remittances, etc.) have been implemented by the Turkish government in order to encourage migrants' remittances.

3. Data and Model

3.1 GTAP data: aggregation and descriptive statistics

The data for this study are derived from the GTAP database version 6.0, which is benchmarked to the year 2001 (McDougall and Dimanaran, 2005). The form of the database used for this study is a Social Accounting Matrix (SAM) representation of the Global Trade Analysis Project (GTAP) database (McDonald and Thierfelder, 2004). The GTA project produces the most complete and widely available database for use in global computable general equilibrium (CGE) modelling; indeed the GTAP database has become generally accepted as the preferred database for global trade policy analysis and is used by nearly all the major international institutions and many national governments. Hertel (1997) provides an introduction to both the GTAP database and its companion CGE model. The precise version of the database used as the starting point for this study is a reduced form global SAM representation of the GTAP data.

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A method for augmenting the GTAP database using data on inter-regional transactions, which are readily available from published IMF sources, is developed and implemented. The data augmentation is implemented using a global social accounting matrix (SAM) representation of the GTAP database (McDonald and Thierfelder, 2004), under the maintained assumption that the GTAP database contains a full accounting of the ‘External account of goods and services’. The starting point for this extension to the GTAP database is the global SAM representation of the GTAP data developed by McDonald and Thierfelder (2004). In general terms the SAM structure follows the conventions of the System of National Accounts for 1993 (UN, 1993), with adjustments in light of the limited data on intra-institutional accounts.

The first stage of the process is the elimination of the regional household account for each region, which is shown to be straightforward if data on government borrowings/savings are available. The main advantages of this approach are the specification of only three institutional accounts for each region – private household, government and capital account – and the identification of transactions between these institutions, i.e., net ‘direct taxes’ paid by the private household, and private household and government savings. In the second stage IMF data on inter-regional transactions are added to the database; the identified transactions include payments for factor services, household remittances and official transfers. The maintained assumption that there is a full accounting for the ‘external account of goods and services’ means that for each region the balance on the capital account (implicit) in the GTAP database requires adjustment using the net value of these additional transactions for that region, subject to the condition that the sum of these regional net values is zero. The final stage of the process is the development of a reduced form of the global SAM that restores the regional household accounts and is therefore consistent with the structure of version 6 of the GTAP database (McDonald and Sonmez, 2004).

In addition to the data from IMF Balance of Payment (BOP) Statistics, IMF Government Finance Statistics and IMF Gross Domestic Product (GDP) Statistics for the years 1998 – 2003 were used. The income section of the current account in the IMF BOP statistics provides the data on “compensation of employees” and “investment income”, and “general government transfers”, “workers’ remittances” and “other current transfers” are from the current transfers section.

The data on “government surpluses/deficits” were collected in national currencies, which using the reported exchange rates, were converted into US dollars, although the actual estimates used in the SAM augmentation process were expressed as shares of the gross domestic product. The data in the IMF BOP Balance of Payments, on the other hand, were in US dollars so no modifications are necessary rather than scaling.

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The IMF data are reported for individual countries, which require aggregation to form estimates for the GTAP regions. Therefore, the BOP data on individual IMF countries are mapped onto the GTAP regions and aggregated using a simple GAMS aggregation programme. The aggregation used for this model is a 22-sector, 6-factor and 15-region CGE model detailed below in Table 1. The mappings are reported in Appendix.

Table 4: SAM and Model Accounts

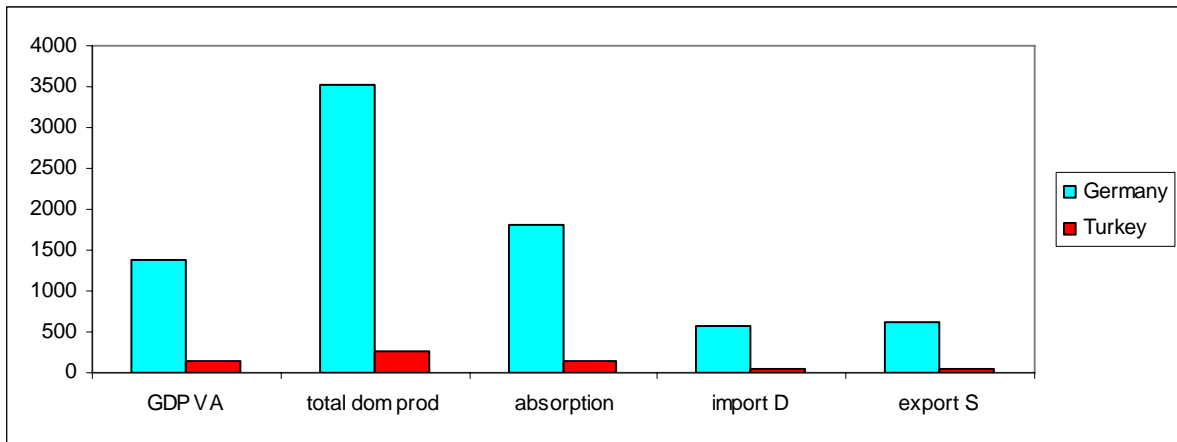
Sectors		Regions	
agr	agricultural products	aus	Australia
anm	animal products	aut	Austria
csn	Construction	bel	Belgium
crp	chemical rubber plastic products	che	Switzerland
ele	electronic equipment	deu	Germany
ely	Electricity	dnk	Denmark
i_s	ferrous metals	fra	france
min	minerals etc	gbr	united kingdom
mrg	Margins	ita	italy
mvh	motor vehicles and parts	nld	netherlands
obs	business services necessities	rest	rest of the world
ofi	financial services necessities	rus	russian federation
ome	machinery and equipment necessities	swe	sweden
osg	pubadm defense health education	tur	turkey
otp	transport necessities	usa	united states
oth	Other		
p_c	petroleum coal products	capital	capital
sgr	Sugar	foscap	foreign capital
tex	Textiles	foslab	foreign labour
trd	Trade	land	land
v_f	vegetables fruits nuts	natlres	natural resources
wap	wearing apparel	sklab	skilled labour
		unsklab	unskilled labour

Source: GTAP Database

3.1.2 Descriptive Statistics

In the Turkish economy, the GDP from value added is \$136bn and the GDP from expenditure is about 147\$bn. The total domestic production in the economy is around \$225bn. The absorption of the Turkish economy, on the other hand, is about \$145bn. The GDP from value added in the German economy, on the other hand, is \$1,373bn and the GDP from expenditure is about \$1,859bn. The total domestic production in the German economy is around \$3,532bn while the absorption of the economy is about \$1,803bn.

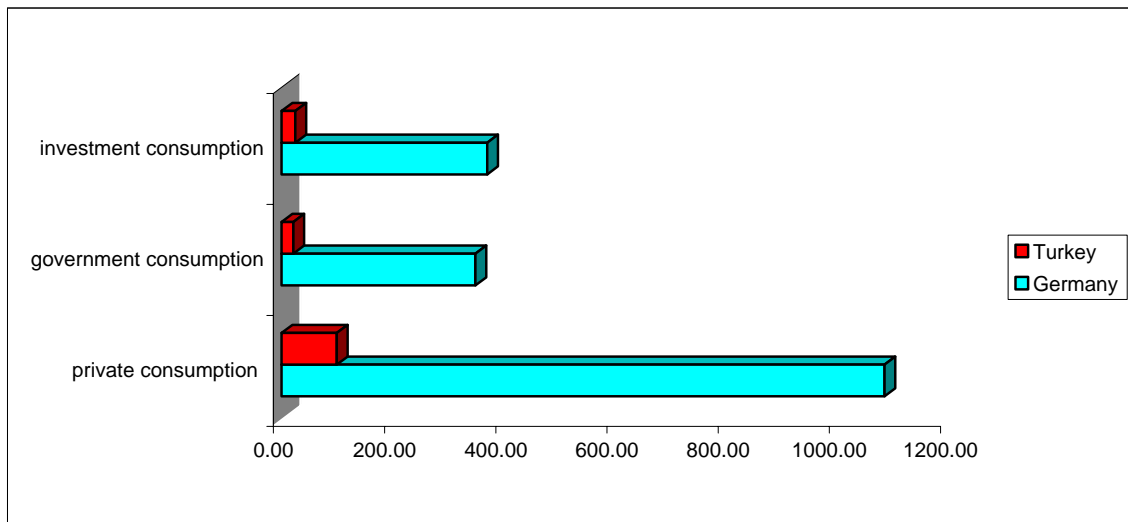
Figure 3: Macroeconomic Totals: Turkey vs Germany



Source: GTAP Database

Import demand in the Turkish economy is only \$45bn while it is around \$574bn in Germany. At the same time, export supply of the Turkish economy is around \$47bn while it is \$631bn in Germany.

Figure 4: Consumption: Turkey vs Germany



Source: GTAP Database

There are big differences between the private consumption values of Germany and Turkey. The private consumption in Germany is around \$1,084bn whereas it is only \$99bn in Turkey and investment and government consumption in Turkey are \$25bn and \$22bn respectively while they are \$370bn and \$349bn in Germany.

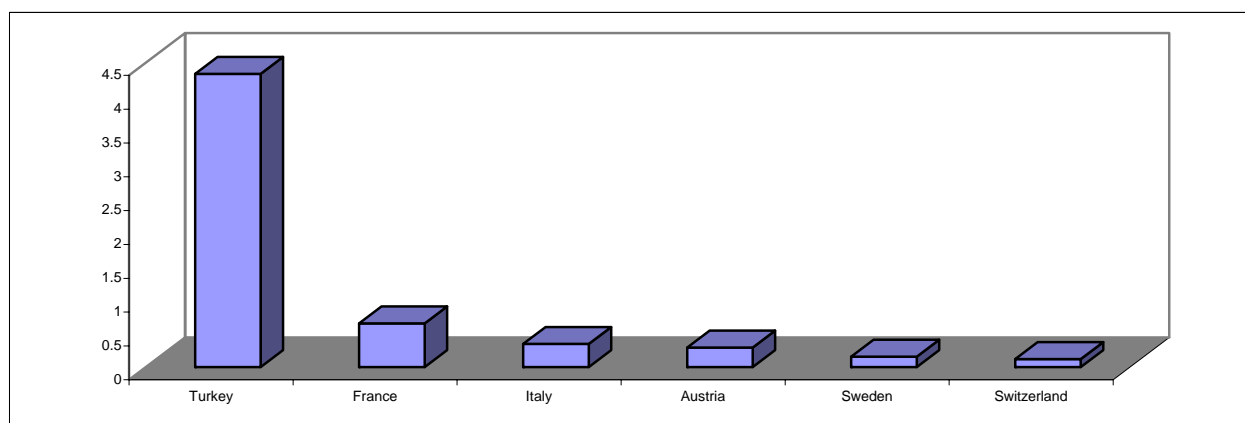
Table 5: Income to Factors in Turkey and Germany

unskilled labour	Germany	383.3
unskilled labour	Turkey	47.3
skilled labour	Germany	248.2
skilled labour	Turkey	17.2
capital	Germany	721.7
capital	Turkey	59.4
land	Germany	7.3
land	Turkey	1.7

Source: GTAP Database

Income to factors is much lower -as expected- in Turkey when compared with the income to factors in Germany. In Turkey, income to unskilled labour is \$47bn while it is \$383bn in Germany. This big difference is the major driving force of the labour migration from Turkey to Germany. Although it is still a significant difference, the gap is smaller in case of the skilled labour with \$248bn in Germany and \$17bn in Turkey.

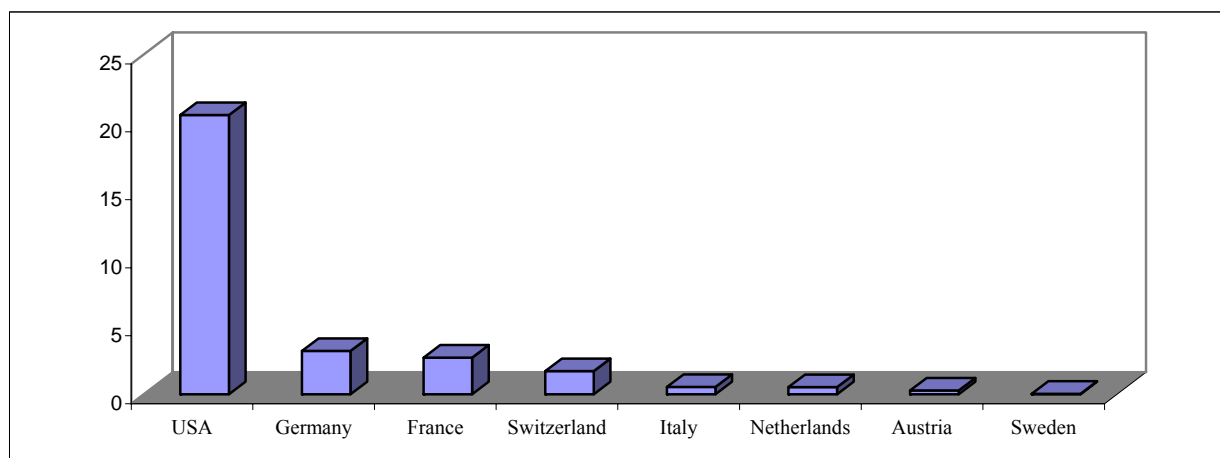
Figure 5: Income to Regions from Remittances



Source: IMF BOP Database

Among the countries chosen, Turkey is the one with the highest volume of remittances with \$4.3 billions. On the other hand, USA is the one with the highest expenditure by regions on remittances, followed by Germany.

Figure 6: Expenditure by Regions on Remittances



Source: IMF BOP Database

Table 6: YHGLOSH and YHWORSH

tur	0.07511257
deu	0.00294535

Source: Own Calculations and Simulations

In the base data, the share of remittance payments to Turkey from the globe is 0.07511257 and the share of remittance expenditure from Germany to globe is 0.00294535.

3.2 Globe CGE Model

This model is a member of the class of computable general equilibrium (CGE) models that are descendants of the approach to CGE modelling described by Dervis *et al.*, (1982). The implementation of this model, using the GAMS (General Algebraic Modeling System) software, is a direct descendant and development of the single country models devised in the late 1980s and early 1990s, particularly the model reported by Robinson *et al.*, (1990), and the multi-country model developed to analyse NAFTA (see Lewis *et al.*, 1995, for a later application).

The model is a SAM based CGE model, wherein the SAM serves to identify the agents in the economy and provides the database with which the model is calibrated. Since the model is SAM based it contains the important assumption of the law of one price, i.e., prices are common across the rows of the SAM. The SAM also serves an important organisational role since the groups of agents identified by the SAM structure are also used to define sub-matrices of the SAM for which behavioural relationships need to be defined. As such the modelling approach has been influenced by Pyatt's 'SAM Approach to Modeling' (Pyatt, 1987).

3.2.1. Trade

Trade is modelled using a treatment derived from the Armington ‘insight’; namely domestically produced and consumed commodities are assumed to be imperfect substitutes for both imports and exports. Import demand is modelled via a series of nested constant elasticity of substitution (CES) functions; imported commodities from different source regions are assumed to be imperfect substitutes for each other and are aggregated to form composite import commodities that are assumed to be imperfect substitutes for their counterpart domestic commodities. The composite imported commodities and their counterpart domestic commodities are then combined to produce composite consumption commodities. These are the commodities demanded by domestic agents as intermediate inputs and for final demand by households, the government, and for investment.

Export supply is modelled via a series of nested constant elasticity of transformation (CET) functions; the composite export commodities are assumed to be imperfect ‘substitutes’ for domestically consumed commodities, while the exported commodities from a source region to different destination regions are assumed to be imperfect ‘substitutes’ for each other. The composite exported commodities and their counterpart domestic commodities are then combined to produce composite production commodities. The properties of models using the Armington ‘insight’ are well known (see de Melo and Robinson, 1989; Deverajan *et al.*, 1990), but it is worth noting here that this model differs from the GTAP model through the use of CET functions for export supply; this ensures that domestic producers adjust their export supply decision in response to changes in the relative prices of exports and domestic commodities, which help to moderate the magnitude of the terms of trade effects in this class of model. Homogeneity can be imposed for all or any subset of commodities and regions.

3.2.2. Production

The production structure is a two stage nest. Intermediate inputs are used in fixed proportions per unit of output – Leontief technology. Primary inputs are combined as imperfect substitutes, according to a CES function, to produce value added.

3.2.3. Final Consumption

Final demand by the government and for investment is modelled under the assumption that the relative quantities of each commodity demanded by these two institutions are fixed – this reflects the absence of a clear theory that defines an appropriate behavioural response by these agents to changes in relative prices. For the household there is however a well developed behavioural

theory; hence the model contains the assumption that households are utility maximisers who respond to changes in relative prices and their incomes. In this version of the model the utility functions for the private households are assumed to be Stone-Geary, which yields linear expenditure systems that allow for subsistence consumption, and reduce to Cobb-Douglas utility functions where minimum levels of consumption are not specified.

3.3 *Modelling Remittances in the Globe CGE Model*

Because full bilateral details on inter-regional remittance flows are not reported in the IMF balance of payments statistics, the solution adopted in the GTAP database for trade and transport margin services was adapted to the allocation of remittance flows; a new region – called GLOBE – was added to the model as a construct to accommodate all data where details on bilateral transactions are absent. Globe is defined as the recipient of all remittance outflows from each region and the source of all remittance inflows to each region, which means that Globe's balance would be zero by definition.

Household Block Equations:

Households acquire income from two sources; the sale of factor services and from the remittances from Globe (yh_{glo}). Therefore, household income (YH) is defined as the sum of factor incomes available for distribution and the remittances from the rest of the regions which are pooled in the Globe and adjusted for the exchange rates (eqn 1).

$$YH_{h,r} = (\sum_f hvash_{h,f,r} * YFDIST_{f,r}) + (yhglo_{h,r} * YH_{h,"glo"} / ER_r)$$

YHWOR is the remittances to households in globe from the regions. Remittances by households consist of worker remittances that are paid to the household account (h) in the Globe's trade account (wwglo) for all regions (r) except the Globe.

$$YHWOR_{w,r,h} = yhworsh_{w,r,h} * (YH_{h,r} * (1 - TYH_{h,r}) * (1 - SHH_{h,r}))$$

Therefore, it is the main source of household income for Globe.

$$YH_{h,"glo"} = (\sum_r YHWOR_{w,glo",r,h} * ER_r)$$

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Household consumption expenditure (HEXP) (for SAM regions except globe) is defined as the total income of the household after household income tax, savings and the remittance payments to the globe (YHWOR).

$$\text{HEXP}_{h,r} = (\text{YH}_{h,r} * (1 - \text{TYH}_{h,r})) * (1 - (\text{SHH}_{h,r})) - \text{YHWOR}_{\text{w glo},r,h}$$

A set of distribution parameters (*hslash*) are defined as the shares of each factor demanded in the economy that is supplied by each household and as the shares of household remittances in the economy that is supplied by each region and accrued in globe according to (*yhworsh*) and is distributed back to the regions according to (*yhglosh*) are also included in the model; $\text{yhworsh}_{w,r,h}$ is the shares of household income transferred to region w from region r and $\text{yhglosh}_{h,r}$ is the shares of household remittances going to region r.

Given this transaction between the Globe account and the households in each region it is straightforward to compute the remittance balance, with Globe (GLOBEQUILH), as the difference between outflows and inflows, which will be zero, i.e.,

$$\sum_{(h,r)} (\text{YHWOR}_{\text{"glo"},r,h}) = \sum_{(hp,r)} (\text{yhglosh}_{hp,rp} * \text{YH}_{hp,\text{"glo"}})$$

4. Policy Experiments and Model Closure

The policy experiments are designed to analyze the economy wide effects of changes in the flow of labour from Turkey to EU and the flow of migrants' remittances from EU to Turkey. Due to the past migration patterns and volumes of Turkish worker flows, the analyses focus on labour migration to Germany and the outflow of migrants' remittances from Germany to Turkey together with the implications of both at the same time, on the Turkish. The analyses reported here are part of a wider study into labour migration and EU expansion.

Simulations are carried out by using the Globe general equilibrium model calibrated on data for 2001. The macroeconomic implications of the experiments are analyzed by comparing the three policy experiments below with the baseline scenario of no accession.

4.1. Policy Experiments

The policy experiments examine the economy-wide impacts of the three key scenarios below on the Turkey and Germany:

- Migration of the 1% of the Turkish labour force from Turkey to Germany;

- a change in the share YH after tax and savings, remitted to Globe by Germany; and
- a change in the share of Global remittance to Turkey
- all of above simultaneously

Table 7: YHGLOSH and YHWORSH

tur	0.07511257	0.07511263
deu	0.00294535	0.00330804

Source: Own Calculations and Simulations

As a result of the movement of 1% of the Turkish labour force from Turkey to Germany, the share of remittance expenditure by Germany to Globe increases from 0.00294535 to 0.00330804 and the share of remittance payments to Turkey from the globe increases from 0.07511257 to 0.07511263.

4.2 Model Closure

The model closures adopted for this study are simple. The basic closure is unemployed labour closure in regions wherein:

- the exchanges rates are flexible;
- the shares of investment expenditures in final demand are fixed;
- the tax rate adjusters are fixed except the uniform adjustment to direct tax on households, shares of final demand is fixed, internal balance is fixed;
- all factors are fully employed and mobile except the unemployed unskilled labour in Turkey; and
- the regional numéraires are the region specific consumer price indices and the regions in the global numéraire are separately identified OECD countries³.

One variant on the closure rules were run for purposes of identifying the impact of key assumptions:

- to assess the effect of assuming full employment, a balanced macroeconomic closure has also been run.

³ Japan, the USA, France, Germany, the UK, Italy

5. Results

Under the unemployed labour closure, the Turkish GDP from value added is decreased by 0.15% when unadjusted for the transfer of the 1% of Turkish labour force to Germany. When it is adjusted for population, the effect is a 0.85% increase in the value added measure of GDP. Absorption also seems to decrease by 0.09% but when adjusted for population, the real change is a 0.91% increase. Private, government and investment consumptions all appear to decrease unless adjusted for the population change but the real effect is a 0.94%, 0.70% and 0.97% increase respectively.

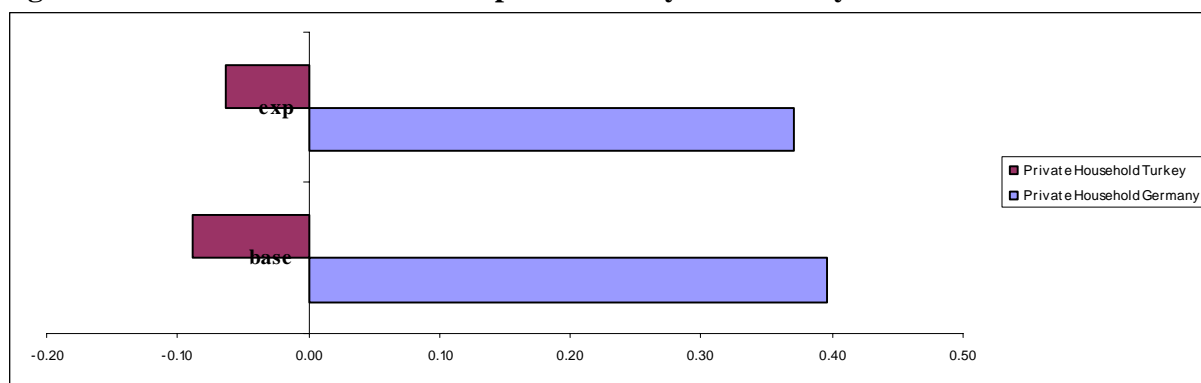
Table 8: Percentage Changes in Real Macro Totals of Turkey

	Experiment 1	1% change in popln
GDP value added	-0.15	0.85
Absorption	-0.09	0.91
Private consumption	-0.06	0.94
Government consumption	-0.30	0.70
Investment consumption	-0.03	0.97
Import demand	0.03	1.03
Export supply	-0.14	0.86

Source: Own Simulations

Import demand in Turkey, on the other hand, increases even without the population adjustment. The increase in the demand for imports is due to the increase in the flow of remittances to the Turkish economy, increasing the foreign exchange reserves and appreciating the Turkish Lira.

Figure 7: Private Household Consumption: Turkey vs Germany



Source: Own Simulations

Private household consumption expenditure has increased by 0.37% in Germany and decreased by 0.06% in Turkey when unadjusted for population and increased by 0.94% when adjusted.

Table 9: Changes in Income to Factors in Turkey

	experiment 1	1 % change in popln
Unskilled labour	-0.04	0.96
Skilled labour	-0.27	0.73
Capital	-0.05	0.95
Land	-0.05	0.95

Source: Own Simulations

When unadjusted for population, the income to unskilled and skilled labour seems to decline in Turkey. However, as soon as it is adjusted for population, a 0.96% increase in the income to unskilled labour and a 0.72% increase to skilled labour are observed.

Table 8: Price of Factors in Turkey

	experiment 1
skilled labour	0.73
capital	-0.05
land	-0.05

Source: Own Simulations

As expected, there is a 0.73% increase in the price of skilled labour in Turkey. Due to the increase in K/L ratio, the marginal productivity of labour in the Turkish economy increases.

6. Concluding Comments

A migration of 1% of the Turkish labour force from Turkey to Germany, causes a change in the share of household income after tax and savings remitted to Globe by Germany and also a change in the share of Global remittance to Turkey. Under the unemployed labor closure, this scenario yields a 0.85% increase in the Turkish GDP from value added when adjusted for population. The real change in absorption is a 0.91% increase, while the real effect on private, government and investment consumption is a 0.94%, 0.70% and 0.97% increase respectively.

Import demand in Turkey, on the other hand, increases even without the population adjustment. The increase in the demand for imports is due to the increase in the flow of remittances to the Turkish economy, increasing the foreign exchange reserves and appreciating the Turkish Lira.

K/L ratio increases, thus the marginal productivity of labour in the Turkish economy increases. Employment of unskilled labour in Turkey increases as a 0.96% of unskilled L is absorbed from the pool of the unskilled labour in Turkey. There is an increase of 0.73% in the income to skilled labour in Turkey since 1% of the skilled labour has been transferred to Germany.

Household income from domestic sources seems virtually unchanged whereas there is approximately a 1% increase in household income from remittances to Turkey from Germany which is not as high as expected.

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8. Technical Appendix

Table : Aggregation: Commodities

Category	Name	Descr	Mapping	Description
int_c	pdr	Paddy rice	agr	agricultural products
int_c	wht	Wheat	agr	agricultural products
int_c	gro	Cereal grains nec	agr	agricultural products
int_c	osd	Oil seeds	agr	agricultural products
int_c	c_b	Sugar cane sugar beet	agr	agricultural products
int_c	pfb	Plant-based fibers	agr	agricultural products
int_c	ocr	Crops nec	agr	agricultural products
int_c	vol	Vegetable oils and fats	agr	agricultural products
int_c	ctl	Cattle sheep goats horses	anm	animal products
int_c	oap	Animal products nec	anm	animal products
int_c	rmk	Raw milk	anm	animal products
int_c	wol	Wool silk-worm cocoons	anm	animal products
int_c	cmt	Meat: cattle sheep goats horse	anm	animal products
int_c	omt	Meat products nec	anm	animal products
int_c	mil	Dairy products	anm	animal products
int_c	pcr	Processed rice	anm	animal products
int_c	ofd	Food products nec	anm	animal products
int_c	cns	Construction	cns	construction
int_c	crp	Chemical rubber plastic prods	crp	chemical rubber plastic products
int_c	ele	Electronic equipment	ele	electronic equipment
int_c	ely	Electricity	ely	electricity
int_c	i_s	Ferrous metals	i_s	ferrous metals
int_c	coa	Coal	min	minerals etc

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int_c	oil	Oil	min	minerals etc
int_c	gas	Gas	min	minerals etc
int_c	omn	Minerals nec	min	minerals etc
int_c	nmm	Mineral products nec	min	minerals etc
int_c	wtr	Water	mrg	margins
int_c	wtp	Sea transport	mrg	margins
int_c	atp	Air transport	mrg	margins
int_c	mvh	Motor vehicles and parts	mvh	motor vehicles and parts
int_c	obs	Business services nec	obs	business services nec
int_c	ofi	Financial services nec	ofi	financial services nec
int_c	ome	Machinery and equipment nec	ome	machinery and equipment nec
int_c	osg	PubAdmin Defence Health Educat	osg	pubadm defense health education
int_c	otp	Transport nec	otp	transport nec
int_c	frs	Forestry	oth	Other
int_c	fsh	Fishing	oth	Other
int_c	b_t	Beverages and tobacco products	oth	Other
int_c	lea	Leather products	oth	Other
int_c	lum	Wood products	oth	Other
int_c	ppp	Paper products publishing	oth	Other
int_c	gdt	Gas manufacture distribution	oth	Other
int_c	nfm	Metals nec	oth	Other
int_c	fmp	Metal products	oth	Other
int_c	otn	Transport equipment nec	oth	Other
int_c	omf	Manufactures nec	oth	Other
int_c	cmn	Communication	oth	Other
int_c	isr	Insurance	oth	Other
int_c	ros	Recreation and other services	oth	Other
int_c	dwe	Dwellings	oth	Other
int_c	p_c	Petroleum coal products	p_c	petroleum coal products
int_c	sgr	Sugar	sgr	Sugar
int_c	tex	Textiles	tex	Textiles
int_c	trd	Trade	trd	Trade
int_c	v_f	Vegetables fruit nuts	v_f	Vegetables fruits nuts
int_c	wap	Wearing apparel	wap	Wearing apparel

Table : Aggregation: Regions

Category	Name	Descr	Mapping	Description
int_k	aus	Australia	aus	Australia
int_k	aut	Austria	aut	Austria
int_k	bel	Belgium	bel	Belgium
int_k	che	Switzerland	che	Switzerland
int_k	deu	Germany	deu	Germany
int_k	dnk	Denmark	dnk	Denmark
int_k	fra	France	fra	France

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int_k	gbr	United Kingdom	gbr	United Kingdom
int_k	ita	Italy	ita	Italy
int_k	nld	Netherlands	nld	Netherlands
int_k	nzl	New Zealand	rest	Rest of the World
int_k	xoc	Rest of Oceania	rest	Rest of the World
int_k	chn	China	rest	Rest of the World
int_k	hkg	Hong Kong	rest	Rest of the World
int_k	jpn	Japan	rest	Rest of the World
int_k	kor	Korea	rest	Rest of the World
int_k	twn	Taiwan	rest	Rest of the World
int_k	xea	Rest of East Asia	rest	Rest of the World
int_k	idn	Indonesia	rest	Rest of the World
int_k	mys	Malaysia	rest	Rest of the World
int_k	phl	Philippines	rest	Rest of the World
int_k	sgp	Singapore	rest	Rest of the World
int_k	tha	Thailand	rest	Rest of the World
int_k	vnm	Vietnam	rest	Rest of the World
int_k	xse	Rest of Southeast Asia	rest	Rest of the World
int_k	bgd	Bangladesh	rest	Rest of the World
int_k	ind	India	rest	Rest of the World
int_k	lka	Sri Lanka	rest	Rest of the World
int_k	xsa	Rest of South Asia	rest	Rest of the World
int_k	can	Canada	rest	Rest of the World
int_k	mex	Mexico	rest	Rest of the World
int_k	xna	Rest of North America	rest	Rest of the World
int_k	col	Colombia	rest	Rest of the World
int_k	per	Peru	rest	Rest of the World
int_k	ven	Venezuela	rest	Rest of the World
int_k	xap	Rest of Andean Pact	rest	Rest of the World
int_k	arg	Argentina	rest	Rest of the World
int_k	bra	Brazil	rest	Rest of the World
int_k	chl	Chile	rest	Rest of the World
int_k	ury	Uruguay	rest	Rest of the World
int_k	xsm	Rest of South America	rest	Rest of the World
int_k	xca	Central America	rest	Rest of the World
int_k	xfa	Rest of FTAA	rest	Rest of the World
int_k	xcb	Rest of the Caribbean	rest	Rest of the World
int_k	fin	Finland	rest	Rest of the World
int_k	grc	Greece	rest	Rest of the World
int_k	irl	Ireland	rest	Rest of the World
int_k	lux	Luxembourg	rest	Rest of the World
int_k	prt	Portugal	rest	Rest of the World
int_k	esp	Spain	rest	Rest of the World
int_k	xef	Rest of EFTA	rest	Rest of the World
int_k	xer	Rest of Europe	rest	Rest of the World
int_k	alb	Albania	rest	Rest of the World
int_k	bgr	Bulgaria	rest	Rest of the World

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int_k	hrv	Croatia	rest	Rest of the World
int_k	cyp	Cyprus	rest	Rest of the World
int_k	cze	Czech Republic	rest	Rest of the World
int_k	hun	Hungary	rest	Rest of the World
int_k	mlt	Malta	rest	Rest of the World
int_k	pol	Poland	rest	Rest of the World
int_k	rom	Romania	rest	Rest of the World
int_k	svk	Slovakia	rest	Rest of the World
int_k	svn	Slovenia	rest	Rest of the World
int_k	est	Estonia	rest	Rest of the World
int_k	lva	Latvia	rest	Rest of the World
int_k	ltu	Lithuania	rest	Rest of the World
int_k	xsu	Rest of Former Soviet Union	rest	Rest of the World
int_k	xme	Rest of Middle East	rest	Rest of the World
int_k	mar	Morocco	rest	Rest of the World
int_k	tun	Tunisia	rest	Rest of the World
int_k	xnf	Rest of North Africa	rest	Rest of the World
int_k	bwa	Botswana	rest	Rest of the World
int_k	zaf	South Africa	rest	Rest of the World
int_k	xsc	Rest of South African CU	rest	Rest of the World
int_k	mwi	Malawi	rest	Rest of the World
int_k	moz	Mozambique	rest	Rest of the World
int_k	tza	Tanzania	rest	Rest of the World
int_k	zmb	Zambia	rest	Rest of the World
int_k	zwe	Zimbabwe	rest	Rest of the World
int_k	xsd	Rest of SADC	rest	Rest of the World
int_k	mdg	Madagascar	rest	Rest of the World
int_k	uga	Uganda	rest	Rest of the World
int_k	xss	Rest of Sub-Saharan Africa	rest	Rest of the World
int_k	rus	Russian Federation	rus	Russian Federation
int_k	swe	Sweden	swe	Sweden
int_k	tur	Turkey	tur	Turkey
int_k	usa	United States	usa	United States
int_k	glo	Globe	glo	Globe