

The macroeconomic effects of migration and remittances

Timo Baas and Silvia Maja Melzer



Introduction

- ❖ Migration in Europe
 - ◆ Diminishing travel costs
 - ◆ Opening-up of labor markets
- ❖ Behavior of migrants
 - ◆ Decision to return depends on migration costs
 - Circular migration
 - Return migration
 - ◆ Closed labor markets and temporary contracts



Remittances

<i>US\$ millions</i>	2003	2004	2005	2006	2007	2008	2009	2010e
Inward remittance flows^a	5,783	6,581	6,933	7,567	9,898	10,908	10,879	11,559
<i>of which</i>								
Workers' remittances	–	–	–	–	–	–	–	–
Compensation of employees	5,744	6,510	6,867	7,481	9,775	10,711	10,728	–
Migrants' transfers	40	71	66	86	124	198	151	–
Outward remittance flows	11,190	12,069	12,499	12,546	13,882	14,951	15,924	–
<i>of which</i>								
Workers' remittances	3,766	3,951	3,646	3,676	4,106	4,530	4,172	–
Compensation of employees	7,098	7,715	8,414	8,489	9,337	9,954	11,352	–
Migrants' transfers	326	403	438	382	439	468	400	–

a. For comparison: net FDI inflows US\$21.2 bn, total international reserves US\$138.6 bn, exports of goods and services US\$1,724.2 bn in 2008.



Related literature: Migration and Remittances

- ❖ Main focus on microeconomic aspects
 - ◆ Familial arrangements
 - ◆ Risk diversion, consumption smoothing, inter-generational finance of investments
(Rapoport and Docquier, 2005)
- ❖ Some macro econometric studies
 - ◆ Remittances and labor supply (Fajnzylber and Lopez, 2008)
- ❖ Few macroeconomic models
 - ◆ Remittances and the business cycle (Durdu and Sayan, 2010)
 - ◆ Remittances and Dutch disease (Acosta et al., 2009)



In this study...

We are interested in the macroeconomic effects of migration and remittances

- ◆ Are there „Dutch disease“ like effects?
- ◆ Is there an outflow of purchasing power?

Therefore we:

- ◆ Estimate the amount of remittances
 - Individual characteristics of the migrant
 - Characteristics of the partner
- ◆ Calibrate a altruism coefficient



The Households

- ❖ Utility of households:

$$V_H(.) = \beta_H U_H(.) + (1 - \beta_H) V_F(.),$$

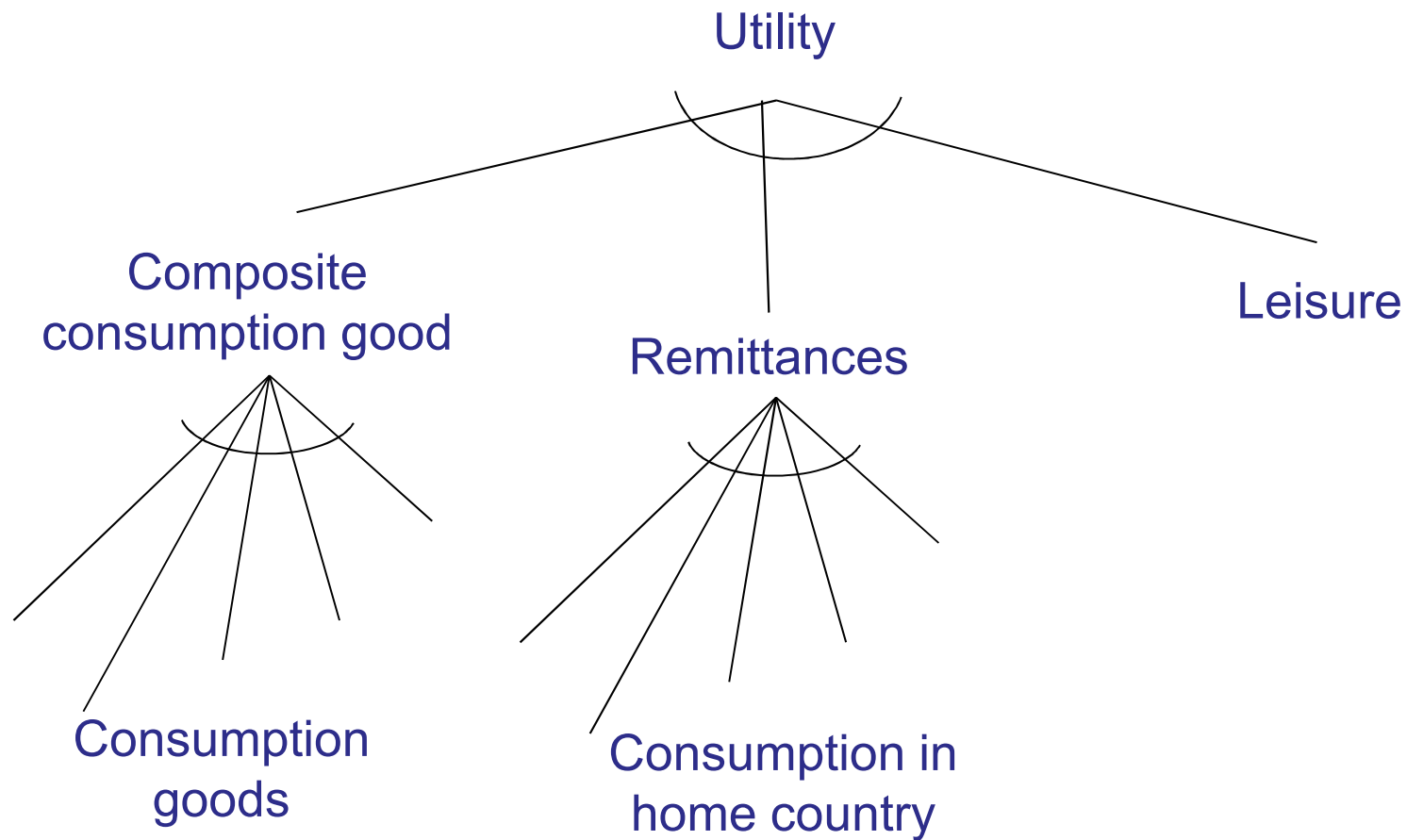
$$V_F(.) = \beta_F U_F(.) + (1 - \beta_F) V_H(.),$$

- ❖ Optimum amount of remittances

$$T = \alpha_H Y_H - (1 - \alpha_H) Y_H$$



Nested structure of consumption



Utility maximization

❖ Stone-Geary preferences

$$\max_{C_i, \gamma_i} U(C_i, \gamma_i) = \prod_{i=1}^n (C_i - \gamma_i)^{\alpha_i}$$

s.t.

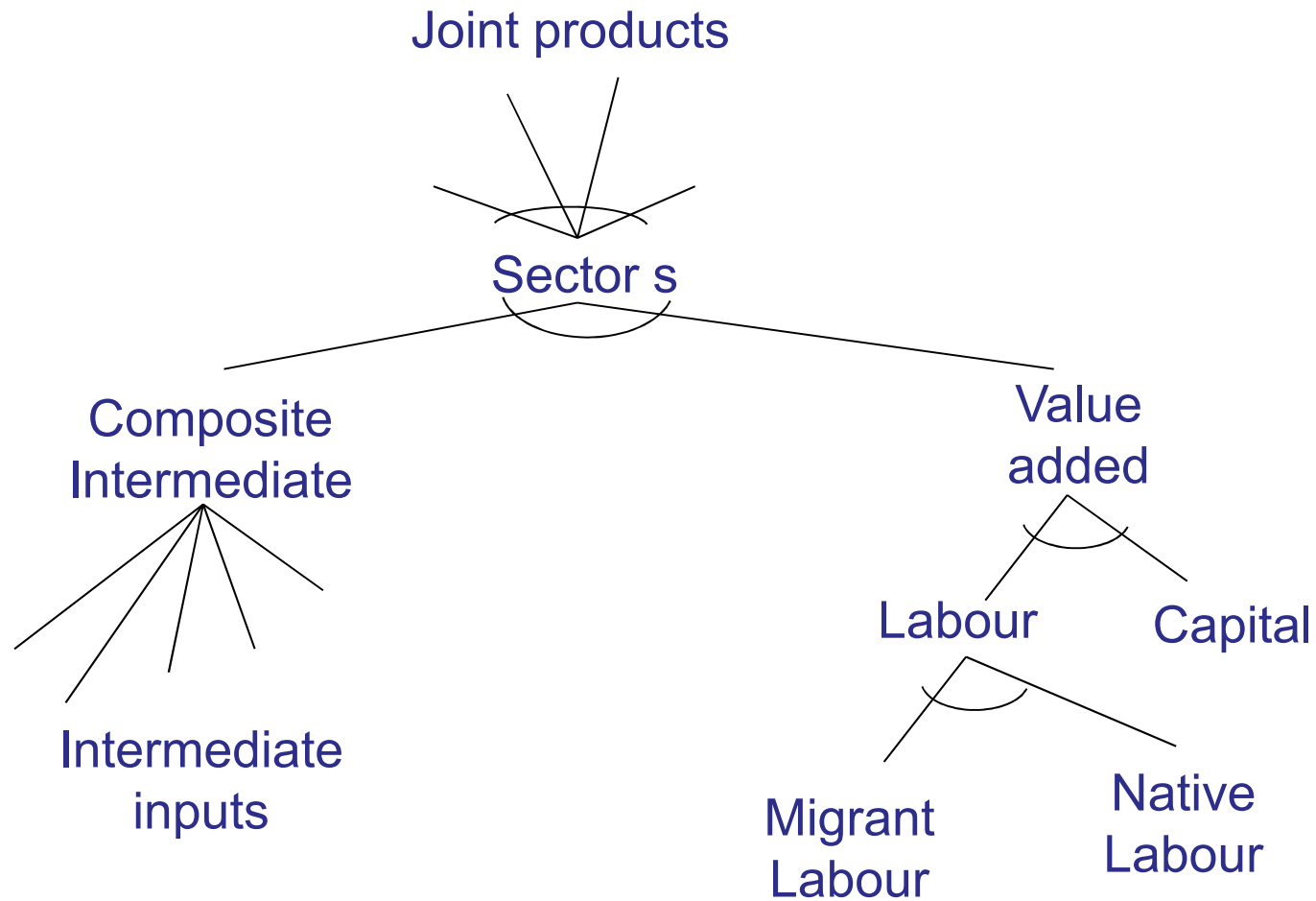
$$(1 - t_Y - s_H) Y_H - T_H \leq \sum_i (1 + t_{C_i}) p_i C_i$$

with $C_i > \gamma_i \geq 0$ and $\sum_{i=1}^n \alpha_i = 1$ for $i = 1, 2, \dots, n$ and

$$Y_H = \left(\sum_{j=1}^m (1 - t_{K_j}) r_j K_j + \sum_{j=1}^m (1 - t_{L_j}) w_j L_j + b \cdot \left(N - \sum_{j=1}^m L_j \right) \right)$$



Nested production structure



The firms

1. nest

$$\min_{V_i, I_i} \Gamma_{QDi} (V_i, I_i) = p_{V_i} V_i + p_{I_i} I_i$$

s.t.

$$Q_{Di} = (\mu_i V_i^{-\rho_i} + (1 - \mu_i) I_i^{-\rho_i})^{\frac{-1}{\rho_i}}$$

2. nest

$$\min_{K_i, L_i} \Gamma_{V_i} (K_i, L_i) = r_i K_i + w_i L_i$$

s.t.

$$V_i = A_i \mu_{V_i} \left(\mu_{V_i} K_i^{-\rho_{V_i}} + (1 - \mu_{V_i}) L_i^{-\rho_{V_i}} \right)^{\frac{-1}{\rho_{V_i}}}$$



The firms

3. nest

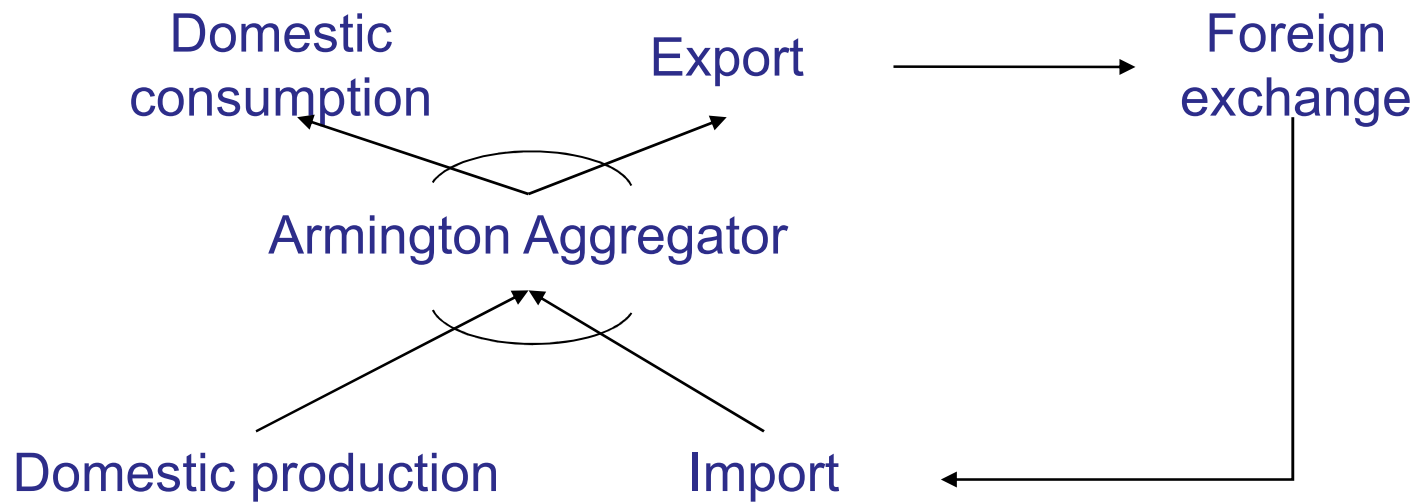
$$\min_{L_{ij}} \Gamma_{Lij} (L_{ij}) = \sum_{j=1}^m w_{ij} L_{ij} \quad \min_{K_{ij}} \Gamma_{Kij} (K_{ij}) = \sum_{j=1}^m r_{ij} K_{ij}$$

s.t.

$$L_i = \left(\sum_{j=1}^m \mu_{Lij} L_{ij}^{-\rho_{Li}} \right)^{\frac{-1}{\rho_{Li}}} \quad K_i = \left(\sum_{j=1}^m \mu_{Kij} K_{ij}^{-\rho_{Ki}} \right)^{\frac{-1}{\rho_{Ki}}}$$



Trade structure



The world economy

❖ Supply of exports and domestic production

$$Q_{DDi} = (1 - \gamma_{Di})^{\sigma_{Ti}} P_{Di}^{-\sigma_{Ti}} \left[\gamma_{Ti}^{\sigma_{Ti}} P_{Ei}^{1 - \sigma_{Ti}} + (1 - \gamma_{Ti})^{\sigma_{Ti}} P_{Di}^{1 - \sigma_{Ti}} \right]^{\frac{\sigma_{Di}}{1 - \sigma_{Di}}} Q_{Di} / a_{Di}$$

$$E_i = \gamma_{Di}^{\sigma_{Di}} P_i^{E - \sigma_{Di}} \left[\gamma_{Di}^{\sigma_{Di}} P_{Ei}^{1 - \sigma_{Di}} + (1 - \gamma_{Di})^{\sigma_{Di}} P_{Di}^{1 - \sigma_{Di}} \right]^{\frac{\sigma_{Di}}{1 - \sigma_{Di}}} Q_{Di} / a_{Di} \quad (24)$$

❖ Demand for imports and domestic production

$$Q_{Di} = (1 - \gamma_{Ti})^{\sigma_{Ai}} P_{Di}^{-\sigma_{Ai}} \left[\gamma_{Ai}^{\sigma_{Ai}} P_{Mi}^{1 - \sigma_{Ai}} + (1 - \gamma_{Ai})^{\sigma_{Ai}} P_{Di}^{1 - \sigma_{Ai}} \right]^{\frac{\sigma_{Ai}}{1 - \sigma_{Ai}}} Q_i / a_{Ai}$$

$$M_i = \gamma_{Ai}^{\sigma_{Ai}} P_{Mi}^{-\sigma_{Ai}} \left[\gamma_{Ai}^{\sigma_{Ai}} P_{Mi}^{1 - \sigma_{Ai}} + (1 - \gamma_{Ai})^{\sigma_{Ai}} P_{Di}^{1 - \sigma_{Ai}} \right]^{\frac{\sigma_{Ai}}{1 - \sigma_{Ai}}} Q_i / a_{Ai} \quad (30)$$

The government

❖ Demand for factors

$$K_{Gi} = \mu_{GVi} \left(\frac{r_{Gi}}{p_{GVi}} \right)^{\rho_{GVi}} \mu_{GVi} \left(\frac{p_{vi}}{p_i} \right)^{\rho_{Gi}} Q_{Gi}$$

$$L_{Gi} = (1 - \mu_{GVi}) \left(\frac{w_{Gi}}{p_{GVi}} \right)^{\rho_{GVi}} \mu_{GVi} \left(\frac{p_{GVi}}{p_{Gi}} \right)^{\rho_{Gi}} Q_{Gi}$$

$$I_{Gi} = (1 - \mu_{Gi}) \left(\frac{p_{GIi}}{p_{Gi}} \right)^{\rho_{Gi}} Q_{Gi}$$



Equilibrium

❖ Goods markets

$$P_i C_{Gi} + (1 + t_{Ci}) P_i C_i + P_i I_i = P_{Di} Q_{DDi} + \sum_{l=1}^o (P_{Mli} M_{li}) - \sum_{l=1}^o (P_{Eli} E_{li})$$

❖ Factor markets

$$\sum_{i=1}^n (K_i + K_{Gi}) = K_S$$

$$w = \bar{h} \left(N - \sum_{i=1}^n \sum_{j=1}^m (L_{ij} + L_{Gij}) \right)$$



Equilibrium

❖ Balance of payments

$$\sum_{l=1}^o \sum_{i=1}^n P_{Mli} M_{li} = \sum_{l=1}^o \sum_{i=1}^n P_{Eli} E_{li} + \sum_{l=1}^o S_l$$



Empirical Results

- ❖ Temporary migrants
 - ◆ Have a higher probability to remit
 - ◆ Remit a higher amount of money
- ❖ Personal characteristics
 - ◆ Female migrants remit a smaller amount of money
 - ◆ Partners migration plan influences remittances
 - ◆ With rising years since migration remittances diminish



Estimates

	(1)	(2)	(1)	(2)
	Transfers	Transfers	Pay_All_Ln	Pay_All_Ln
Individual Characteristics				
Female	0.0075 (-0.0237)	-0.1118 (0.0283)	-0.1138*** (0.0329)	-0.1931*** (0.0370)
Age By Immigration	0.0091*** (0.0010)	0.0119*** (0.0011)	0.0101*** (0.0013)	0.0128*** (0.0014)
Years Since Migration	-0.0014 (0.0045)	0.0119* (0.0054)	-0.0064* (0.0060)	-0.0115° (0.0068)
Years Since Migration Square	-0.0002° (0.0000)	-0.0003* (0.0001)	-0.0001* (0.0001)	-0.0003* (0.0001)
Years Of Education	0.0148*** (0.0032)	0.0233*** (0.0042)	0.0112** (0.0043)	0.0162*** (0.0050)
Foreign Nationality	-0.0548* (0.0375)	-0.0626 (0.0423)	-0.0626 (0.0375)	0.0049 (0.0541)
Stay In Germany Temporary	0.2193*** (0.0248)	0.1878*** (0.0372)	0.2992*** (0.0351)	0.2098*** (0.0492)
Part Time Employed	-0.0317* (0.0591)	-0.1146° (0.0633)	-0.0502* (0.0851)	-0.778** (0.0916)
Full Time Employed	0.1156* (0.0568)	0.0689 (0.1238)	0.1931** (0.0812)	0.1138 (0.0865)
Individual Income	0.0607*** (0.0077)	0.0702*** (0.0086)	0.0811*** (0.0107)	0.0904*** (0.1148)
Lives With A Partner In Germany	0.2985*** (0.0313)	0.1087 (0.0680)	0.3976*** (0.0407)	0.0216 (0.0899)
Number Of Children In Host Country	-0.0881*** (0.0107)	-0.0431*** (0.0117)	-0.1332*** (0.0139)	-0.0788*** (0.0147)

Estimates

Partner Characteristics					
Partner Is Employed At Full-Time			0. 2294***		0.3477***
			(0.0298)		(0.0413)
Partner's Years In Education			0.0053		0.0144*
			(0. 0048)		(0.0065)
Partner Has A Foreign Nationality			-0.0792°		-0.0508
			(0.0765)		(0.0632)
Partner Stays In Germany Temporary			0.0911*		0.1513**
			(0.0411)		(0.0555)
N		24345	20450	24345	20450
R Square/ Pseudo R Square	25	0.0775	0.0889	0.0544	0.0599
Log Likelihood		-8827.61	-7077.91		

Notes: Dependent variable: Logarithm (amount remitted +1) column 3 and 3;
 Dependent variable: household sent remittances to family (=1 Yes, =0 No) column
 1 and 2; Standard errors in parenthesis; ° $\rho < 0.1$, * $\rho < 0.05$, ** $\rho < 0.01$, ***
 $\rho < 0.001$; all specifications include time and country dummies; standard errors are
 clustered by household



Calibration

- ❖ Altruism coefficient is calibrated
 - ◆ For every generation of migrants
 - ◆ For temporary and permanent migration plans
 - ◆ For preferences as natives
- ❖ Calibration of other model parameters
 - ◆ Consumption from the German microcensus
 - ◆ Social Accounting matrix from Eurostat I-O tables
- ❖ Some parameters from the literature
 - ◆ Armington, wage curve, substitution elasticities



Scenarios

- ❖ The three scenarios rely on
 - ◆ Migration estimates from Baas/Brücker 2010
 - ◆ Remittances worth 380 million USD
- ❖ Scenarios
 - ◆ 1) Migrants act like natives
 - ◆ 2) Temporary migration plan
 - ◆ 3) Permanent migration plan



Simulation results

- ❖ Remittances foster trade
 - ◆ Exports are rising by 0.09 per cent (Intra-EU)
 - ◆ Imports are rising by 0.09 per cent (RoW)
- ❖ Remittances increase GDP slightly
- ❖ Remittances foster redistribution of production
 - ◆ Manufacturing production is rising
 - ◆ Services production is shrinking



Simulation results

	Scenario 1	Scenario 2	Scenario 3
	change in per cent		
GDP	0.45	0.48	0.46
Private Consumption	0.46	0.46	0.46
Government Consumption	0.63	0.62	0.62
Tax	0.47	0.49	0.48
Investment	0.48	0.50	0.49
Exports EU	0.43	0.52	0.47
Exports RdW	0.48	0.56	0.52
Imports EU	0.57	0.61	0.59
Imports RdW	0.53	0.62	0.57
Capital income	0.58	0.61	0.59
Wages	-0.55	-0.52	-0.54
labor supply	1.15	1.15	1.15
	change in percentage points		
Unemployment rate	6.83	6.82	6.83



Simulation results

	Scenario 1	Scenario 2	Scenario 3
	change in per cent		
Agriculture, hunting and forestry	0.26	0.23	0.25
Mining and quarrying	0.53	0.45	0.50
Manufacturing	0.50	0.55	0.52
Electricity, gas and water supply	0.39	0.39	0.39
Construction	0.47	0.49	0.48
Wholesale and retail trade	0.49	0.50	0.49
Hotels and restaurants	0.50	0.48	0.49
Transport, storage and communication	0.42	0.39	0.41
Financial intermediation	0.45	0.43	0.44
Real estate, renting and business activities	0.36	0.35	0.36
Public administration	0.61	0.60	0.61
Education	0.61	0.60	0.60
Health and social work	0.59	0.59	0.59
Other community, social and personal service activities	0.46	0.45	0.45
Activities of households	0.74	0.74	0.74

Note: Households can change occupation but bear a loss in reduced productivity

Conclusions

- ❖ Opening-up of labor markets
 - ◆ Could increase temporary migration
- ❖ Temporary migrants
 - ◆ Are more likely to remit and send a higher amount of money back home
- ❖ Remittances from Germany
 - ◆ Foster trade and improve the trade balance
 - ◆ Increase GDP slightly
 - ◆ Induce a redistribution of production

