A. Online Appendix

A.1. Descriptive Statistics

Figure A.1 about here

Table A.1 about here

A.2. Detailed SWB Estimates

Table A.2 reports the complete set of estimates of equation (1). We distinguish between personal determinants of SWB, individual characteristics related to the home countries and macroeconomic variables (here the log real GDP per capita, $GDP_{h,t}$). The specifications I and II relate to models 1 and 2 in Table 1: FE model with and without country-specific time trends. Specification 0 just checks what happens if we ignore home country GDP. All specifications control for time-varying characteristics, German states and year effects. Results are in line with standard findings in the literature (as surveyed in Clark, Frijters, and Shields 2008). Essentially, income, good health and being married are positively related to SWB while being unemployed is negatively correlated. The presence of children in Germany has strong positive effects. Migrants' refugee status affects SWB negatively. The level of remittances is negatively correlated (the loss of resources endured by the migrant dominates the gains from remitting: altruism, investment in social capital in home country, etc.) but insignificant.

Comparing models 0 and I shows that the signs and significance of individual characteristics are not affected much by the inclusion of $GDP_{h,t}$. In model I, we obtain an estimate of the GDP

effect of –0.303, which is significant at the 1 percent level. Model II controls for country-specific time trends to clean out the spurious correlation between macroeconomic indices and SWB. The magnitude of the effect is basically unchanged (–0.212) but the effect is less precisely estimated, even if still significant at the 10 percent level.

We have also run separate regressions for each country and find that life satisfaction estimates have a broadly common structure overall (detailed results are available from the authors). The impact of variables like income, health, marital status and children is very comparable and stable across countries of origin. This regularity suggests that SWB data contain reliable and potentially interesting information for welfare measurement (see also Di Tella, MacCulloch, and Oswald 2003).

Table A.2 about here

A.3. Estimations on Grouped Data

Grouped data estimation is an alternative to estimations on individual migrant observation. We use a sample of 556 country × year points,[32] taking the mean SWB over all migrants in a country × year cell as the dependent variable. The model becomes:

$$\overline{SWB}_{ht} = \overline{X}_{ht}\alpha + \gamma Macro_{ht} + \theta_t + t \times \delta_h + \delta_h + \overline{Z}_h + \overline{Age}_{ht} + \overline{YSM}_{ht} + \varepsilon_{ht}$$

where $\overline{SWB}_{ht}$ is the mean subjective well-being over all migrants of origin country h in year t,

$Macro_{ht}$ the home country macroeconomic variable (we focus on log real GDP per capita, $GDP_{h,t}$, and unemployment hereafter), $\overline{X}_{ht}$ a set of mean characteristics of migrants from country h observed in year t (the characteristics listed in Table A.2) and $\overline{Z}_h + \overline{Age}_{ht} + \overline{YSM}_{ht}$ the means of gender and cohorts, age, and years-since-migration. The composite error term includes time trends θ_t (for any global shocks that are common to all countries in each year), country-specific time trends $t \times \delta_h$ (cultural attitude toward changes in well-being or country-specific unobservable assimilation patterns of migrants of country h), home country fixed effects δ_h (for unchanging cultural influences of origin country on reported well-being), and a usual i.i.d. error term, ε_{ht}. Regressions are weighted by cell sizes to account for the larger representation of some migrant groups in the data and to make them more comparable to regressions on individual data. This grouped data estimation is similar to the micro data estimations when assuming that individual FE φ_i average up to $\delta_h + \overline{Z}_h + \overline{Age}_{ht} + \overline{YSM}_{ht}$ (or, compared to QFE estimations in which we explicitly include δ_h, Z, Age, YSM, that the QFE u_i is zero on average in each country × year cell). The likely departure from these assumptions will explain the difference with micro estimates.

1. Effect of GDP

In Table A.3, we simply report estimates for γ, which is the impact of the macroeconomic variables on SWB. Column I reports the coefficient on $GDP_{h,t}$. The parameter estimate is negative and highly significant, with a magnitude of –0.565. Hence, it is confirmed that an increase in the home country's GDP per capita is negatively correlated with migrants' well-being, conditional on country and year fixed effects. Column II departs from the assumption of common

linear time trends for all countries by adding $t \times \delta_h$.[33] As in micro estimates, the coefficient becomes a little bit smaller but the relationship between $GDP_{h,t}$ and SWB is hardly affected. The coefficient, –0.472, is significant and gives a 95 percent confidence interval of $[-0.99, 0.04]$. Corresponding regressions on individual migrant data (columns II and V of Table A.4) yield overlapping intervals of $[-0.457, 0.033]$ and $[-0.479, 0.031]$ in the case of FE and QFE respectively.

2. Effect of Unemployment

Our relative concerns/deprivation interpretation could apply to other macroeconomic variables and notably to unemployment. Market failures that constrain labor market and earnings opportunities in the homeland may increase the attractiveness of migration both as a potential avenue for effective gains in relative incomes and a source of satisfaction for those who have already migrated. Column III in Table A.3 presents the effect of the home-country unemployment rate. This effect is significantly positive, which is consistent with the interpretation above and the findings regarding GDP. This effect is robust to controlling for home country specific time trends (Column IV). When including $GDP_{h,t}$ in the same regression (unreported), both home country log GDP per capita and unemployment effects keep the sign and magnitude that they had in independent estimations.

Table A.3 about here

A.4. Estimations on Micro Data: Additional Results

Table A.4 about here

Table A.5 about here

A.5. Return Migration

We use the Heckman procedure adapted to panel data by simultaneously estimating selection into return migration and the SWB equation by Maximum Likelihood (for a more structural approach, see Bellemare 2007). Ideally, the selection equation should contain an instrument explaining variation in migrants' likelihood to return but uncorrelated with (conditional) migrants' SWB. There is no obvious variable of the kind, as virtually everything can potentially affect well-being. We use a first series of instruments based on the migrant's declared intention to stay in Germany (contemporaneous, lagged and time change of this intention). We also use the average intention to stay over all the migrant's household members (also as contemporaneous, lagged or time difference), which is expected to be more exogenous but possibly less relevant as an instrument. Column 2 in Table return reports the effect of the different instruments on the propensity to return. All instruments have a significant impact and the expected sign (F-tests pass the threshold of 10 commonly used for checking if instruments are weak). Column 3 reports the effect of $GDP_{h,t}$ on the probability of return: it is positive but insignificant. As discussed in the text, column 1 shows that SWB regressions controlling for selection into return migration yield very similar GDP effects as the baseline. The correlation ρ between the residuals of the two equations is significantly different from zero only when the instrument used is the contemporaneous

intention to stay (the migrant's intention or the mean answer for her family), which denotes the possible role of unobservable shocks simultaneously affecting well-being and the current intention to return.

Table A.6 about here

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[32] We do not have observations in the GSOEP for 1 year (5, 5, 6, and 10 years) in Iran (Portugal, Russia Ukraine and Kazakhstan respectively), which makes 27 country × year observations missing. We have checked that the conclusions of this study hold when excluding these countries completely. In addition, macroeconomic variables are not reported in World Bank indicators for 6 years in Poland, Slovenia, Macedonia, Croatia and the Czech Republic, 1 year for Russia and 10 years for Bosnia, leading to another 41 missing points. Again, we have verified that our results are consistently similar when using linear extrapolation or other sources to fill in the missing GDP or unemployment information. Our baseline nonetheless relies on the original sample. The total of 68 missing points corresponds to 10.9 percent of the $26 \times 24 = 624$ country × year sample used for grouped estimations below. This proportion is smaller in terms of individual × year observations (7.1 percent) due to the fact that missing points affect countries that are below the average country size.

[33] This is a necessary check, as argued by Di Tella, MacCulloch, and Oswald (2003). Indeed, as macroeconomic indices such as GDP are time-trended while SWB is usually untrended (Easterlin, 1995), regressing the latter on the former generates concerns of costationarity. In our sample of migrants, we have observed a small downward trend in life satisfaction. We

nonetheless account for time trends θ_t in the estimation to reduce this concern. Including country $\times$ year effects – and hence accounting for possible differences in slope across source countries – should eliminate it. Note also that the GDP effect could be spurious if country-specific time effects, and in particular the effect of YSM, were misspecified and picked up by the GDP trend. While country-specific time trends eliminate this, we have checked that our results are not sensitive to using flexible specifications of YSM in a model without country-specific time effects.

Table A.1

Statistics

Migrants from	(Log) Real GDP	(Log) Nominal GDP	Real GDP: Country/ Germany	Real GDP: Country/ Germany First Wave	Real GDP: Country/ Germany Last Wave	Unemployment rate (%)	SWB (0-10)	Correlation SWB & GDP	Correlation SWB & unemployment	# Obs. (individual-year)
Turkey	9.0	9.5	0.31	0.30	0.35	8.6	6.7	-0.90	-0.40	16,924
	(0.2)	(0.2)	(0.02)			(1.5)	(2.0)			
Greece	9.8	9.9	0.70	0.68	0.80	8.6	7.0	-0.64	-0.34	5,123
	(0.1)	(0.1)	(0.05)			(1.3)	(2.0)			
Italy	10.1	10.1	0.91	0.93	0.83	10.1	7.1	-0.85	0.34	7,474
	(0.1)	(0.1)	(0.02)			(1.4)	(1.8)			
Poland	9.4	9.5	0.40	0.32	0.49	14.5	7.0	-0.55	0.04	4,082
	(0.2)	(0.1)	(0.06)			(3.9)	(1.8)			
Spain	9.9	9.9	0.76	0.77	0.84	18.4	7.4	-0.86	0.56	3,139
	(0.2)	(0.1)	(0.04)			(3.6)	(2.0)			
Russia	9.2	9.5	0.34	0.49	0.44	8.7	7.3	-0.63	0.47	2,636
	(0.2)	(0.3)	(0.06)			(2.0)	(1.7)			
Kazakhstan	8.8	9.1	0.23	0.18	0.31	9.7	7.3	-0.79	0.68	2,321
	(0.3)	(0.4)	(0.06)			(2.3)	(1.6)			
Croatia	9.4	9.8	0.43	0.52	0.51	13.3	6.8	0.00	0.59	1,920
	(0.2)	(0.6)	(0.06)			(2.9)	(1.7)			
Romania	9.0	9.3	0.28	0.31	0.35	6.9	7.2	-0.14	0.09	1,754
	(0.2)	(0.2)	(0.04)			(0.9)	(1.7)			
Bosnia-Herzegovina	8.5	8.6	0.17	0.11	0.22	29.7	6.8	-0.61	-0.28	1,023
	(0.4)	(0.3)	(0.04)			(3.5)	(1.8)			

Austria	10.3	10.3	1.03	1.00	1.07	4.4	7.4	0.42	0.48	768
	(0.1)	(0.1)	(0.03)			(0.7)	(1.7)			
Czech Republic	9.8	9.9	0.61	0.64	0.69	6.5	6.9	0.12	-0.46	541
	(0.1)	(0.1)	(0.05)			(2.0)	(1.9)			
Ukraine	8.5	8.7	0.16	0.31	0.20	8.9	6.9	-0.35	0.28	515
	(0.2)	(0.4)	(0.03)			(1.9)	(1.8)			
USA	10.6	10.6	1.29	1.24	1.28	5.6	7.5	0.12	-0.21	381
	(0.1)	(0.1)	(0.04)			(1.3)	(1.6)			
France	10.2	10.2	0.93	0.95	0.90	9.7	7.0	0.09	-0.37	379
	(0.1)	(0.1)	(0.02)			(1.5)	(1.7)			
Netherlands	10.4	10.4	1.09	1.02	1.13	5.0	7.6	-0.17	-0.01	363
	(0.1)	(0.1)	(0.04)			(2.5)	(1.3)			
Hungary	9.6	9.7	0.49	0.48	0.53	6.8	6.9	0.20	0.54	320
	(0.2)	(0.1)	(0.05)			(2.6)	(2.2)			
Great Britain	10.3	10.3	0.99	0.92	1.01	6.2	7.2	-0.62	0.45	311
	(0.1)	(0.1)	(0.05)			(1.9)	(1.8)			
Macedonia	8.9	9.1	0.24	0.32	0.26	34.1	6.5	-0.12	-0.29	264
	(0.1)	(0.5)	(0.02)			(2.3)	(2.0)			
Slovenia	9.8	10.0	0.65	0.64	0.81	6.9	7.3	-0.51	0.26	248
	(0.2)	(0.2)	(0.08)			(1.2)	(1.5)			
Iran	9.1	9.2	0.28	0.24	0.31	12.3	5.8	-0.06	0.22	200
	(0.1)	(0.1)	(0.03)			(2.2)	(2.3)			
Philippines	7.9	8.0	0.09	0.09	0.10	8.6	7.3	-0.52	0.39	187
	(0.1)	(0.1)	(0.01)			(1.4)	(1.7)			
Portugal	9.9	10.0	0.67	0.63	0.65	6.2	7.5	-0.69	-0.23	170
	(0.1)	(0.1)	(0.03)			(1.7)	(1.5)			
Bulgaria	8.9	9.3	0.28	0.29	0.36	12.0	7.3	-0.07	-0.21	128
	(0.2)	(0.5)	(0.04)			(5.9)	(1.7)			

Mean / total *	9.5 (0.2)	9.6 (0.2)	0.55 (0.0)	0.56	0.60	10.9 (2.2)	7.1 (1.8)	-0.34 [0.46]	0.11 [-0.40]	51,171
Germany	10.28 (0.1)	10.29 (0.1)				8.50 (1.4)	6.99 (1.8)			334,308

Notes: GDP, unemployment and subjective well-being (SWB) figures are country averages over 1984-2009. GDP (2005 PPP international dollars) and unemployment rate (annual) taken from World Bank Indicators, SWB from the German Socio-Economic Panel. Standard deviations are reported in parentheses. Correlation between SWB and GDP (or unemployment rate) are calculated over the 26 years using mean SWB for each country-year. The correlations in square brackets in the Mean/total row reflect both time and country variation (24×26 country-year cells).

Table A.2

Subjective Well-Being Regressions with Alternative Specifications

Dependent variable: Subjective Well-Being	0		I		II	
Personal characteristics						
Log of household income	0.376	***	0.380	***	0.384	***
	(0.034)		(0.034)		(0.023)	
Non-employed	-0.001		0.014		0.011	
	(0.046)		(0.047)		(0.042)	
Unemployed	-0.419	***	-0.401	***	-0.402	***
	(0.057)		(0.058)		(0.047)	
Old age/retired	0.043		0.035		0.042	
	(0.076)		(0.076)		(0.060)	
In training/education	0.119	*	0.110		0.102	
	(0.074)		(0.076)		(0.067)	
Self-employed	0.033		0.033		0.027	
	(0.071)		(0.072)		(0.060)	
Log of working hours	0.041	***	0.044	***	0.044	***
	(0.012)		(0.012)		(0.011)	
Separated (1)	-0.394	***	-0.407	***	-0.410	***
	(0.098)		(0.100)		(0.065)	
Single (1)	-0.216	***	-0.237	***	-0.224	***
	(0.065)		(0.066)		(0.046)	
Divorced (1)	-0.208	**	-0.219	**	-0.231	***
	(0.101)		(0.103)		(0.070)	

Widowed (1)	-0.571	***		-0.578	***		-0.596	***
	(0.130)			(0.135)			(0.094)	
Health: poor (2)	0.709	***		0.705	***		0.702	***
	(0.054)			(0.054)			(0.037)	
Health: average (2)	1.290	***		1.287	***		1.283	***
	(0.056)			(0.056)			(0.036)	
Health: good (2)	1.776	***		1.779	***		1.773	***
	(0.058)			(0.058)			(0.037)	
Health: very good (2)	2.255	***		2.257	***		2.253	***
	(0.062)			(0.062)			(0.039)	
Log of household size	-0.292	***		-0.313	***		-0.308	***
	(0.053)			(0.053)			(0.037)	
Years of education	-0.010			-0.010			-0.008	
	(0.012)			(0.012)			(0.009)	
Personal characteristics related to origin country								
One children with the migrant	0.096	***		0.093	***		0.092	***
	(0.033)			(0.034)			(0.027)	
Two children with the migrant	0.125	***		0.129	***		0.127	***
	(0.042)			(0.043)			(0.033)	
More than two children	0.208	***		0.223	***		0.218	***
	(0.057)			(0.057)			(0.042)	
Spouse in home country	-0.435	***		-0.496	***		-0.486	***
	(0.140)			(0.144)			(0.092)	
Other relative in home country	0.001			-0.011			0.009	
	(0.090)			(0.089)			(0.087)	
Migrant is a refugee	-0.184	**		-0.143	*		-0.141	*
	(0.082)			(0.083)			(0.084)	

Log of remittances	-0.006	-0.005	-0.005
	(0.010)	(0.010)	(0.008)
Macroeconomic conditions			
GDP		-0.303 ***	-0.212 *
		(0.107)	(0.125)
Individual effects	FE	FE	FE
State effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Home country linear time trends	No	No	Yes
R-Squared	0.141	0.140	0.141
#Observations	47,557	47,557	47,557

Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Estimations performed on migrants from 24 countries over 26 years, standard errors clustered at the individual level. GDP refers to log of real GDP per capita, taken from World Bank indicators. Subjective well-being (SWB) taken from the German Socio-Economic Panel. (1) Omitted category is ‘married’. (2) Omitted category is ‘very poor health'. Unobserved individual effects are taken into account using fixed effects (FE). State effect denotes the 16 federal states of Germany.

Table A.3

Effect of Home Country Macroeconomics on Migrant's SWB: Grouped Estimations

SWB grouped estimations	I	II	III	IV
GDP	-0.565 ***	-0.472 *		
	(0.202)	(0.263)		
Unemployment rate			0.040 ***	0.030 ***
			(0.010)	(0.011)
Year effects	Yes	Yes	Yes	Yes
Home country fixed effects	Yes	Yes	Yes	Yes
Home country linear time trends	No	Yes	No	Yes
GDP (equivalent income)	-1.45	-1.21		
R-squared	0.637	0.685	0.587	0.673
#Observations	556	556	556	556

Notes: *, ** and *** indicate significance levels at 10%, 5% and 1% respectively. GDP refers to log of real GDP per capita. GDP and unemployment rates taken from World Bank indicators. Subjective well-being (SWB) averaged per country of origin × year, taken from the German Socio-Economic Panel. Linear estimations performed on migrants from 24 countries over 26 years, weighted by country × year cell size. All models include the mean value (for each country × year) of characteristics reported in Appendix Table A.2 (including mean cohort and state effects).

Table A.4

Effect of Home Country GDP on Migrant SWB: Micro Data

SWB micro estimations	I	II	III	IV	V	VI	VII
GDP (coefficient)	-0.303 ***	-0.212 *	-0.490 ***	-0.281 ***	-0.224 *	-0.321 ***	-0.215 ***
	(0.107)	(0.125)	(0.181)	(0.104)	(0.130)	(0.122)	(0.057)
Individual effects (a)	FE	FE	FE	QFE	QFE	QFE#	QFE
Cohort fixed effects (b)	n.a.	n.a.	n.a.	Yes	Yes	Yes	Yes
State effects (c)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Home country fixed effects	n.a.	n.a.	n.a.	Yes	Yes	Yes	Yes
Home country linear time trends	No	Yes	No	No	Yes	No	No
Estimation method	linear	linear	ologit	linear	linear	linear	oprobit
GDP (equivalent income)	-0.797	-0.553	-0.972	-0.714	-0.562	-0.860	-0.689
R2 or pseudo-R2	0.140	0.141	0.103	0.284	0.285	0.305	0.085
# Observations	47,557	47,557	47,557	47,557	47,557	25,306	47,557

Notes: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Estimations performed on migrants from 24 countries over 26 years, standard errors clustered at the individual level. GDP refers to log of real GDP per capita, taken from World Bank indicators. Subjective well-being (SWB) taken from the German Socio-Economic Panel. All models include the full set of observed characteristics as reported in

Appendix Table A.2 (time-invariant characteristics, age and years-since-migration not used with fixed effects). (a) Unobserved individual effects are taken into account using fixed effects (FE), quasi-fixed effects (QFE) or QFE and big-five personality traits (QFE#). Other individual effects are: (b) 10 arrival cohort effects (used with QFE only) and (c) 16 federal states of Germany.

Table A.5

Effect of Home Country Unemployment on Migrants SWB: Micro Data

SWB micro estimations	A		B		C	D	E		F	G
Unemployment rates	0.011	***	0.009	**	0.006	0.005	0.002		0.007	0.009
	(0.004)		(0.004)		(0.004)	(0.004)	(0.005)		(0.006)	(0.007)
Unemployment rate (t-1)									-0.002	0.005
									(0.006)	(0.009)
Unemployment rate (t-2)										-0.011
										(0.007)
GDP			-0.374	***			-0.417	***		
			(0.115)				(0.148)			
Individual effects (a)	No		No		QFE	FE	FE		FE	FE
Cohort fixed effects (b)	Yes		Yes		Yes	n.a.	n.a.		n.a.	n.a.
State fixed effects (c)	Yes		Yes		Yes	Yes	Yes		Yes	Yes
Year fixed effects	Yes		Yes		Yes	Yes	Yes		Yes	Yes
Home country fixed effects	Yes		Yes		Yes	n.a.	n.a.		n.a.	n.a.
R-squared	0.289		0.289		0.284	0.139	0.139		0.140	0.139
#Observations	47,557		47,557		47,557	47,557	47,557		47,398	47,231

Notes: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Linear estimations performed on migrants from 24 countries over 26 years. All models include the full set of observed characteristics as reported in Appendix Table A.2. Unemployment rates and GDP (referring to log of real GDP per capita) are taken from World Bank indicators. Subjective well-being (SWB) taken from the German Socio-Economic

Panel. Other controls include: (a) Unobserved individual effects modeled as quasi-fixed effects (QFE) or fixed effects (FE), (b) 10 arrival cohort effects, (c) 16 federal states of Germany.

Table A.6

SWB Estimations Corrected for Selection into Return Migration

SWB estimation with Heckman correction for return migration	SWB equation		Propensity to return equation		Rho		#Observations
	Coefficient on GDP		Coefficient on instrument		Coefficient on GDP		
Instrument: migrant's intention to stay							
Intention (t)	-0.245	***	-0.395	***	0.065	0.085 **	47,568
	(0.095)		(0.019)		(0.134)	(0.036)	
Intention (t-1)	-0.314	***	-0.336	***	0.116	0.007	40,961
	(0.099)		(0.021)		(0.146)	(0.036)	
Intention (t) - Intention (t-1)	-0.316	***	-0.064	***	0.094	-0.005	40,961
	(0.099)		(0.021)		(0.145)	(0.038)	
Intention (t-1) - Intention (t-2)	-0.254	**	-0.052	**	0.100	-0.021	35,664
	(0.105)		(0.022)		(0.157)	(0.043)	
Instrument: mean intention to stay of migrant's household							
Intention (t)	-0.249	***	-0.460	***	0.071	0.062 *	47,568
	(0.095)		(0.021)		(0.135)	(0.034)	
Intention (t-1)	-0.316	***	-0.397	***	0.123	-0.008	40,961
	(0.099)		(0.023)		(0.146)	(0.035)	
Intention (t) - Intention (t-1)	-0.316	***	-0.086	***	0.092	-0.005	40,961
	(0.099)		(0.024)		(0.145)	(0,038)	
Intention (t-1) - Intention (t-2)	-0.254	**	-0.066	***	0.099	-0.021	35,664
	(0.105)		(0.026)		(0.157)	(0.043)	

Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. SWB equation estimated linearly on microdata using baseline specification and additionally accounting for Heckman correction for non-random selection into return migration (ML estimation). Selection based on a dummy variable for return migration. Different rows report results for alternative instruments in the selection equation. Instruments are based on the migrant's intention to stay or her household mean intention to stay. Rho is the correlation between the two equations.

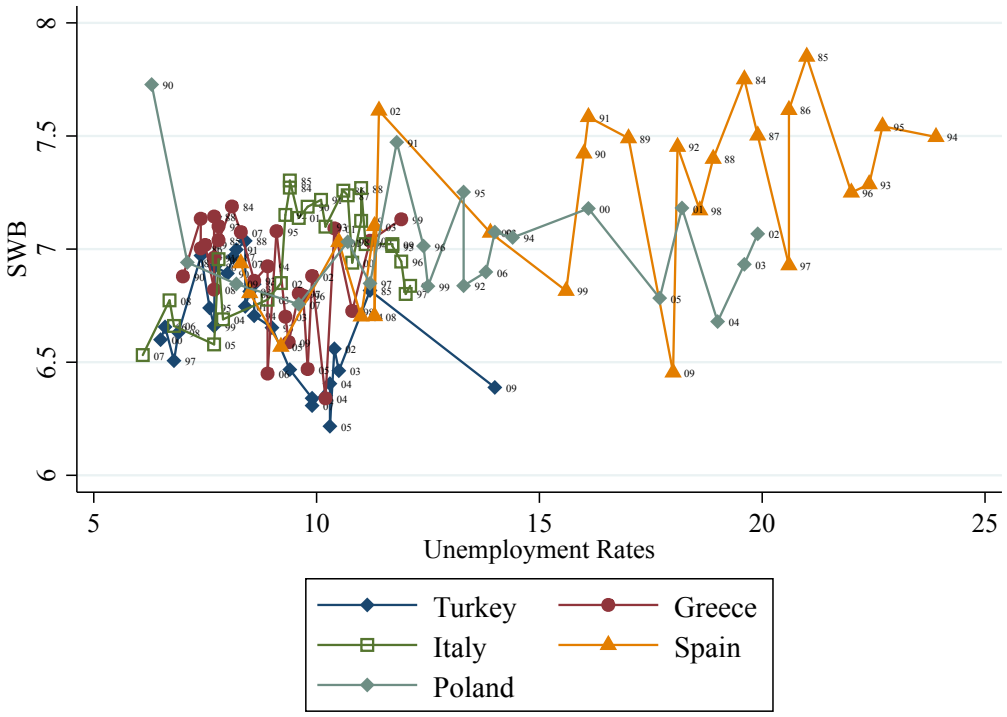

Figure A.1

SWB versus Unemployment Rates Across Time for Selected Ethnic Groups

Notes: Figures indicate years. Unemployment rates are taken from the World Bank Indicators and SWB (Subjective well-being) from the German Socio-Economic Panel (life satisfaction question). In the legend, we report for each country the intertemporal correlation between migrants' SWB and their home country unemployment rates