




# **GROWTH AND MIGRATION SCENARIOS TURKEY-EU**

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- 
- Potential migration from Turkey to the EU as a result of EU membership and removal of restrictions on labor mobility
  - Turkish migration to the EU between 2004-2030 with different methods under various scenarios
- 

## Highly Speculative Scenarios

- Up to 25% of Turkish population!!!

## EU Commission 2004 impact study

- Between 0.5 million to 4.4 million until year 2030

# Survey (Opinion Poll) Based Studies

## Hacettepe-NIDI (1996)

- Based on surveys carried out by 1800 households
- Economic motives are the major determinants of migration
- Migrant profile: 25-30 years of age, need for employment, primary school education
- **85%** of migrants have a network before departure
- Most non-migrants do not intend to migrate abroad

## Hubert Krieger (2004)

- Analyzes the potential to migrate and the heterogeneity of migrants
- Based on Eurobarometer survey, spring 2002
- Multivariate, logistic regression of odds ratios
- Profile: 25-39 age group, student, unemployed, medium and higher education
- U-curve effect of income, opposite U-curve effect of deprivation

# Econometric Estimations

## Anna Maria Mayda (2003)

Investigates migration into 14 OECD countries between 1980 and 1996

Runs cross-country, time series and panel regressions

Pull factors significantly increase emigration rates

Push factors have a smaller effect

Distance is the most important cost factor that affects emigration rates

## Alecke, Huber, Untiedt (2001)

- Estimates East-West migration in Germany and migration within the EU.
- Country specific fixed effects are included in the model
- Uses panel data analysis
- Results: Income differentials drive migration flow within German states
- Country specific effects are important in explaining differences in the level of migration between states.

# Econometric Forecasts

## Hille, Straubhaar (2001)

Pooled time series of bilateral migration from Greece, Portugal and Spain to seven EU member countries

Predicts that **0.27- 0.34%** of the CEEC population p.a. (**270,000 - 340,000** migrants) will move to the EU

This accrues to **0.07- 0.09%** of the EU population

## Michael Fertig (2000)

- Estimates migration from CEEC-10 to Germany
- Uses maximum likelihood method
- Data includes net migration rates from 17 source countries to Germany between 1960-1994
- In the baseline scenario with free movement, the total change in migrant stock is **1.4** million by 2015
- Free movement effect turns out to be small

# Econometric Forecasts

## Boeri, Brücker (2001)

- Estimates potential migration from CEEC to the EU-15
- Applies SUR to an error correction model
- Data comprises of foreign population figures in Germany of 19 source countries between 1967-2001
- Predicts **3.8** million CEEC nationals in the EU-15 by 2030, assuming immediate free movement by an out-of-sample forecast
- A net increase of CEEC migrants by **2.7** million in 28 years

## Brücker, Alvarez-Plata, Siliverstovs (2003)

### (European Commission Report)

- Update of Boeri-Brücker (2001)
- Estimates potential migration from CEEC to the EU-15
- Two different samples are used
- Applies and compares various estimation methods on a dynamic panel. SUR estimator outperforms in the sample with large time dimension
- Predicts a net increase of **2.5** million in the migrant stock, implying **3.7** million migrants in 2030

# Econometric Forecasts and Simulations

## Harry Flam (2003)

- Estimates potential migration from Turkey
- Uses Boeri Brücker (2000) error correction model
- Predicts **3.5** million Turkish population in Germany by 2030, assuming no restrictions on migration
- A net increase of Turkish migrants by **1.2** million in 30 years

## Lejour, de Mooij, Capel (2004)

- Based on de Mooij and Tang (2003) migration elasticities
- Estimates long term migration of **2.7** million from Turkey to EU-15
- This equals **4%** of current Turkish population and **0.7%** of the EU's



# Methodology Adopted in this Study

Following the European Commission Report  
Brücker, Alvarez-Plata, Siliverstovs (2003)

$$m_{fht} = \alpha_h + \beta_1 m_{fh,t-1} + \beta_2 m_{fh,t-2} + \beta_3 \ln(w_{ft}/w_{ht}) \\ + \beta_4 \ln(w_{ht}) + \beta_5 \ln(e_{ft}) + \beta_6 \ln(e_{ht}) + u_{fht} \quad (1)$$

$m_{fht}$ : The share of migrants from country  $h$  residing in country  $f$  (*Germany*) as per cent of home population

$w$ : Wage (proxied by GDP-PPP per capita)

$e$ : Employment rate (1-unemployment rate)

$h, f, t$ : Home, foreign countries and year, respectively.

# Data

Home income

captures the pecuniary costs of migrating

Employment rate

captures the probability of finding a job

Income differential

captures gains from migrating

# Data Sources 1967-2001

**Population** : World Development Indicators (2003)

**Migrant Stock** : German Federal Statistical Office\*

**GDP per capita\*\***: GDP-PPP per capita (1990 international Dollars) from Maddison (2002)

**Employment Rate**: OECD Economic Outlook in OECD databases

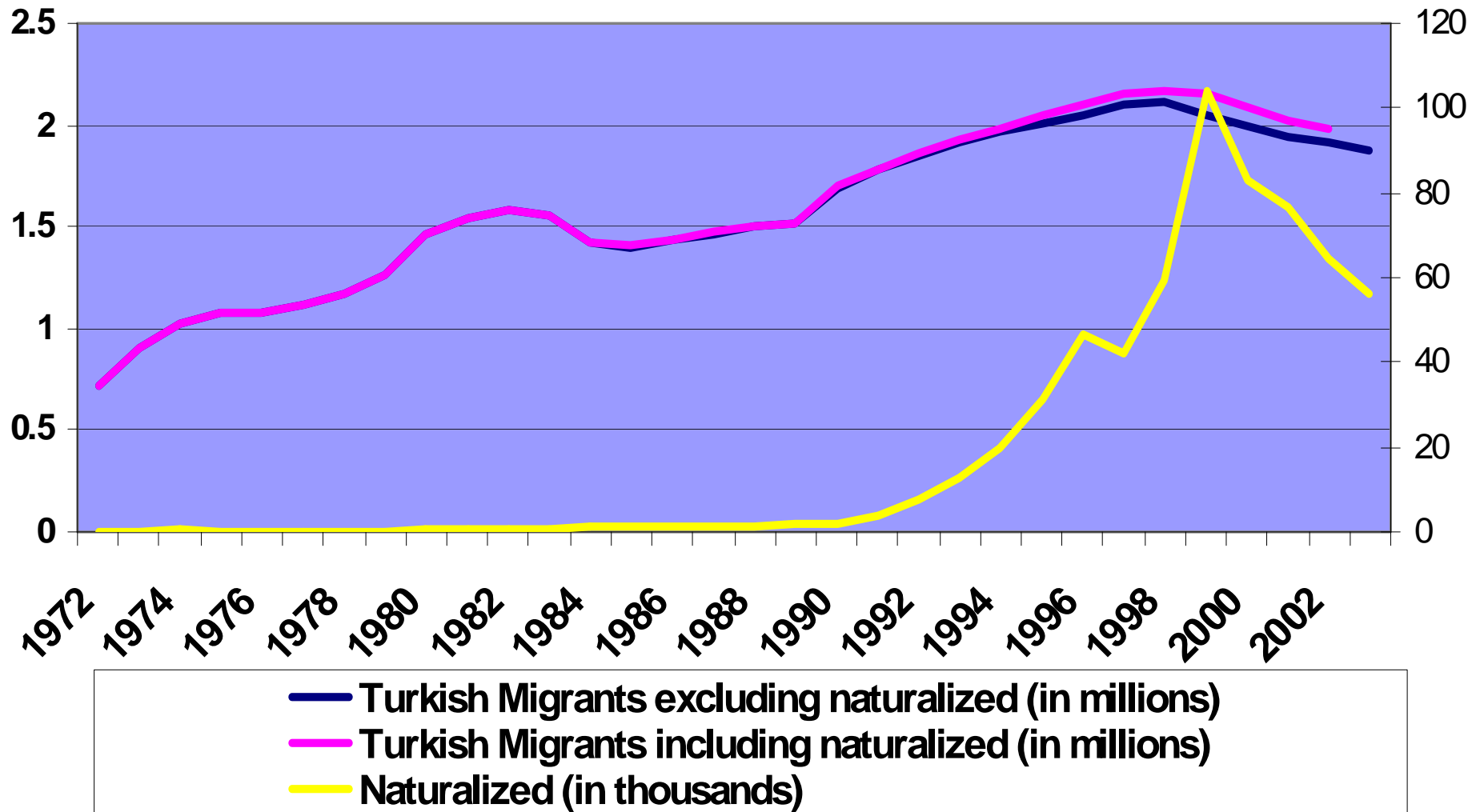
\* 1987 1988 1989 figures are adjusted by net immigration to Germany

\*\* Luxembourg, Switzerland from Groningen Growth and Development

- 
- Stock of foreign population of 19 source countries (Austria, Belgium, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, former Yugoslavia) in Germany
  - Germany is the host (foreign) country
    - Long time-series available
    - Germany has the largest share of migrants in the EU
- 

# Naturalization of Turkish Migrants in Germany

## Turkish Migrants in Germany



## Estimation method : Seemingly Unrelated Regression (SUR) or Equations (SURE)

- The European Commission Report (2003) has shown that for data sets having large time dimension and small cross-section SUR estimator outperforms the others (ie GMM, OLS, WITHIN)
- Two lags of the dependent variable is included
- Slope Coefficients are restricted to be equal for all countries  
Intercepts (constant terms) are estimated separately for each country to cover the country specific factors
- GUEST and FREE dummies are also included to capture the periods of guest worker agreements and free labor mobility
- WAR (former Yugoslavia), INTERVENTION and INSURGENCY (Turkey) dummies are also included

# Regression Results

| <u>Independent Variables</u>        | <u>Coefficients</u> | <u>S.E.</u> | <u>P-value</u> |
|-------------------------------------|---------------------|-------------|----------------|
| M(-1)                               | 1.23                | 0.019       | 0.000          |
| M(-2)                               | -0.37               | 0.018       | 0.000          |
| Ln(W <sub>f</sub> /W <sub>h</sub> ) | 0.05                | 0.006       | 0.000          |
| Ln(W <sub>h</sub> )                 | 0.07                | 0.006       | 0.000          |
| Ln(e <sub>f</sub> )                 | 0.34                | 0.033       | 0.000          |
| Ln(e <sub>h</sub> )                 | -0.10               | 0.008       | 0.000          |
| FREE                                | 0.01                | 0.001       | 0.000          |
| GUEST                               | 0.11                | 0.003       | 0.000          |
| INTERVENTION                        | 0.15                | 0.033       | 0.000          |
| INSURGENCY                          | 0.10                | 0.019       | 0.000          |
| Adjusted R <sup>2</sup> = 0.99      |                     |             |                |

# Test Statistics

LM test statistic

950.78

( $H_0$ :Homoskedasticity vs.  $H_1$ :  
Heteroskedasticity)

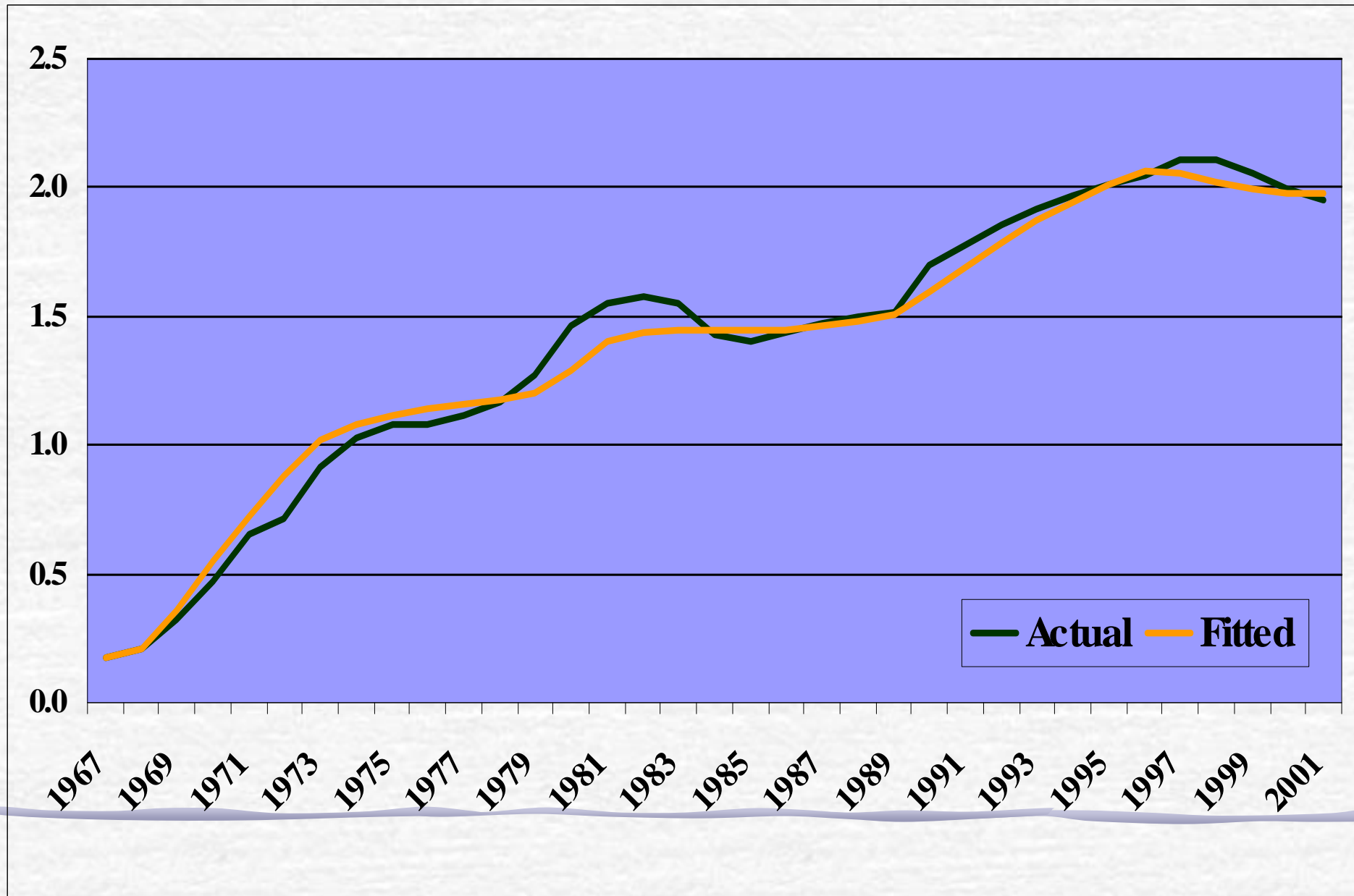
LR test statistic

773.82

( $H_0$ :Heteroskedasticity vs.  $H_1$ :  
Heteroskedasticity + Countrywise correlation)



## Actual vs. Fitted (SUR estimation) Turkish Migrant Stock in Germany (in millions)



# Forecast Scenarios Based on SUR

## Assumptions for Germany :

GDP per capita : Assumed to grow %2 per an

Employment rate : 1991-2001 average is taken as constant throughout the projection interval

## Assumptions for Turkey :

Population : Natural rate of growth projections based on World Bank (2002) (ie zero net migration is assumed)

Then, migration adjusted population calculated iteratively throughout the projections

GDP per capita and Employment rate : Based on naive growth and employment scenarios (own calculations)



# International Migration Scenarios Sensitive to Growth?



# Growth and Unemployment Scenarios for Turkey

## *Estimation of internal migration*

- $m = \alpha + \beta$  (rural-urban income difference)  
+  $\gamma$  (rural-urban unemployment difference)
- $m$  : rural-urban migration flow as a percentage of rural population
- **Data:** 1981-2000 (Source: SIS)
- **Estimation Method:** Ordinary Least Squares
- **Simulation Period:** 2003-2030

## *Assumptions of the Growth Simulation*

- Urban production function  $\Rightarrow$  Urban GDP=AF(L)
- Technology is exogenous
- Capital is slack variable
- Constant returns to scale
- Wages in the urban sector are endogenous and equal to marginal productivity of labor in the urban sector

## *Assumptions of the Growth Simulation*

- Growth of rural GDP is exogenous
- Employment creation in the urban sector is based on Harris-Todaro assumption
- The rate of urban GDP growth in excess of the productivity increase in the urban sector creates employment

## *Assumptions of the Simulation*

- UNDP medium variant population projection is used
- Working age fraction is assumed to grow exponentially starting from 63% in 2003 and reaching 68% in 2030 (based on UNDP projection and other studies on population)
- Migrants are assumed to adopt urban labor force participation rate

## *Assumptions of the Simulation*

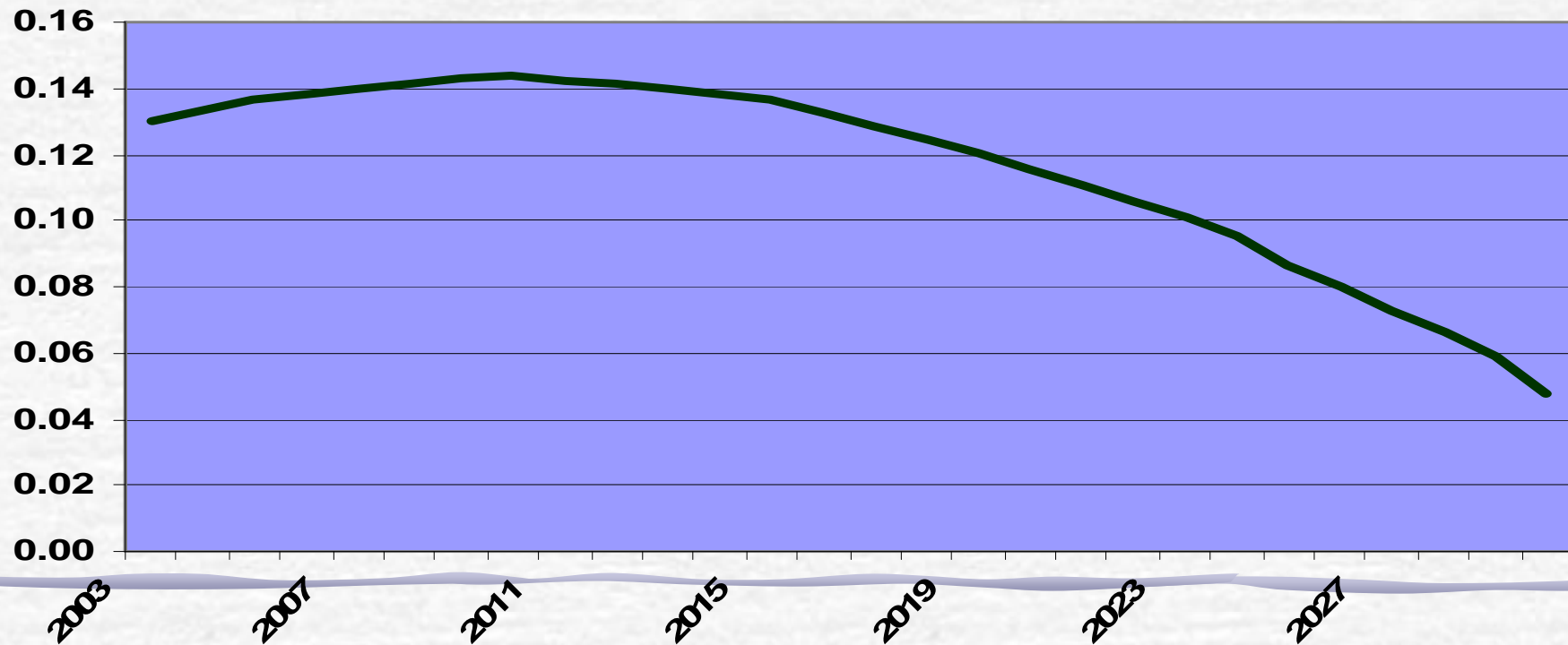
- Urban labor participation rate grows exponentially starting from 43% in 2003 and reaching 60% in 2030 (converges to EU average)
- Full employment assumption in the rural sector



# High Growth Scenario

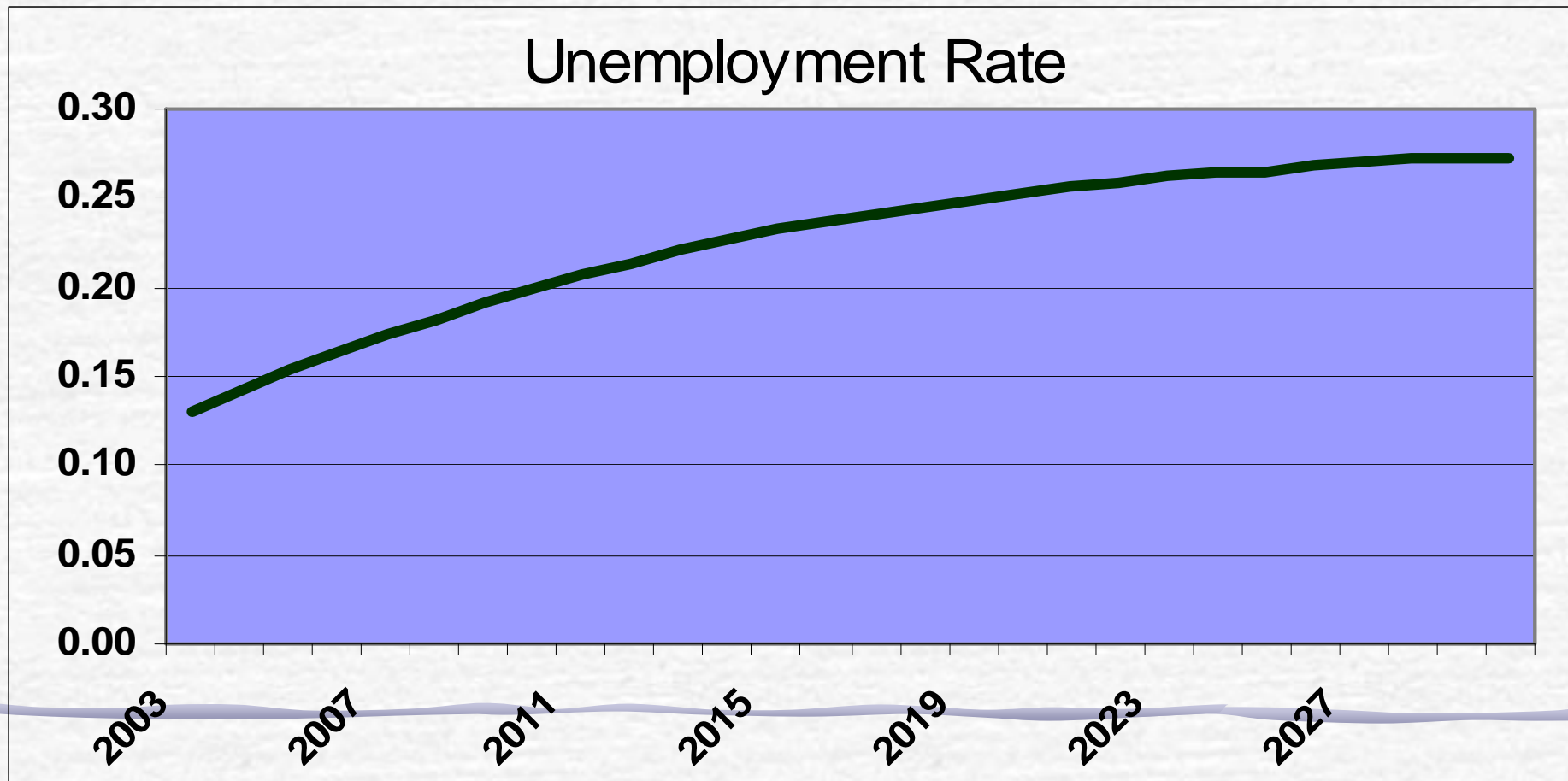
|                     |       | <u>YEAR</u> | <u>UNEMPLOYMENT RATE</u> |
|---------------------|-------|-------------|--------------------------|
| GDP (NA) GROWTH     | 0.065 | 2005        | 0.14                     |
| GDP (A) GROWTH      | 0.02  | 2015        | 0.13                     |
| PRODUCTIVITY GROWTH | 0.03  | 2030        | 0.05                     |

## Unemployment Rate



# Low Growth Scenario

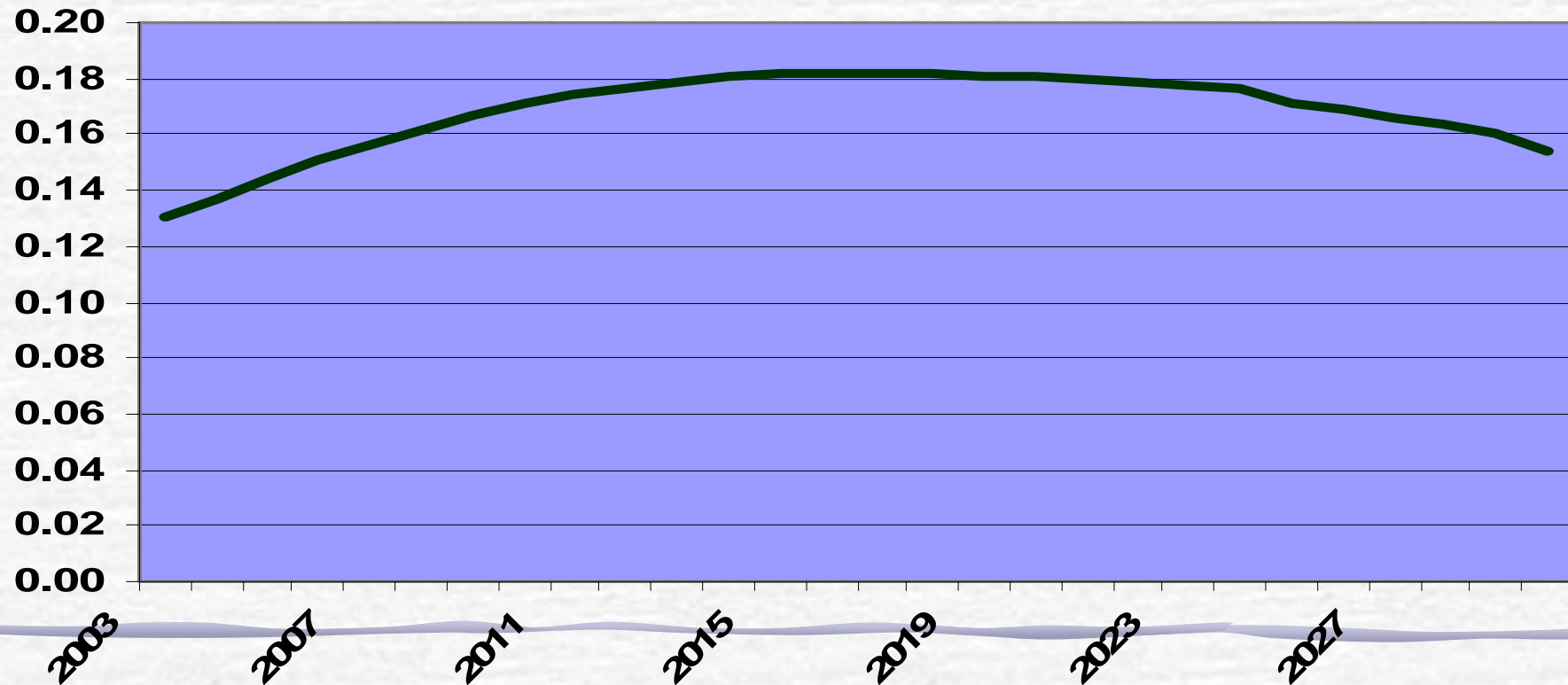
| <b>GDP (NA) GROWTH</b>     | <b>0.04</b>  | <b><u>YEAR</u></b> | <b><u>UNEMPLOYMENT RATE</u></b> |
|----------------------------|--------------|--------------------|---------------------------------|
| <b>GDP (A) GROWTH</b>      | <b>0</b>     | <b>2005</b>        | <b>0.15</b>                     |
| <b>PRODUCTIVITY GROWTH</b> | <b>0.015</b> | <b>2015</b>        | <b>0.23</b>                     |
|                            |              | <b>2030</b>        | <b>0.27</b>                     |



# Intermediate Scenario

|                     |      | <u>YEAR</u> | <u>UNEMPLOYMENT RATE</u> |
|---------------------|------|-------------|--------------------------|
| GDP (NA) GROWTH     | 0.05 |             |                          |
| GDP (A) GROWTH      | 0.02 | 2005        | 0.14                     |
| PRODUCTIVITY GROWTH | 0.02 | 2015        | 0.18                     |
|                     |      | 2030        | 0.15                     |

## Unemployment Rate



# International Migration Scenarios Based on Large Country Sample

- Two scenarios are simulated

## Common Assumptions

- ✓ **Free Movement** between EU and Turkey will come into force in **2015**
- ✓ Growth rate in the urban sector % 6.5
- ✓ Growth rate in the rural sector % 2
- ✓ Productivity growth in the urban sector % 3

### FREE Dummy taking over

### GUEST Dummy taking over

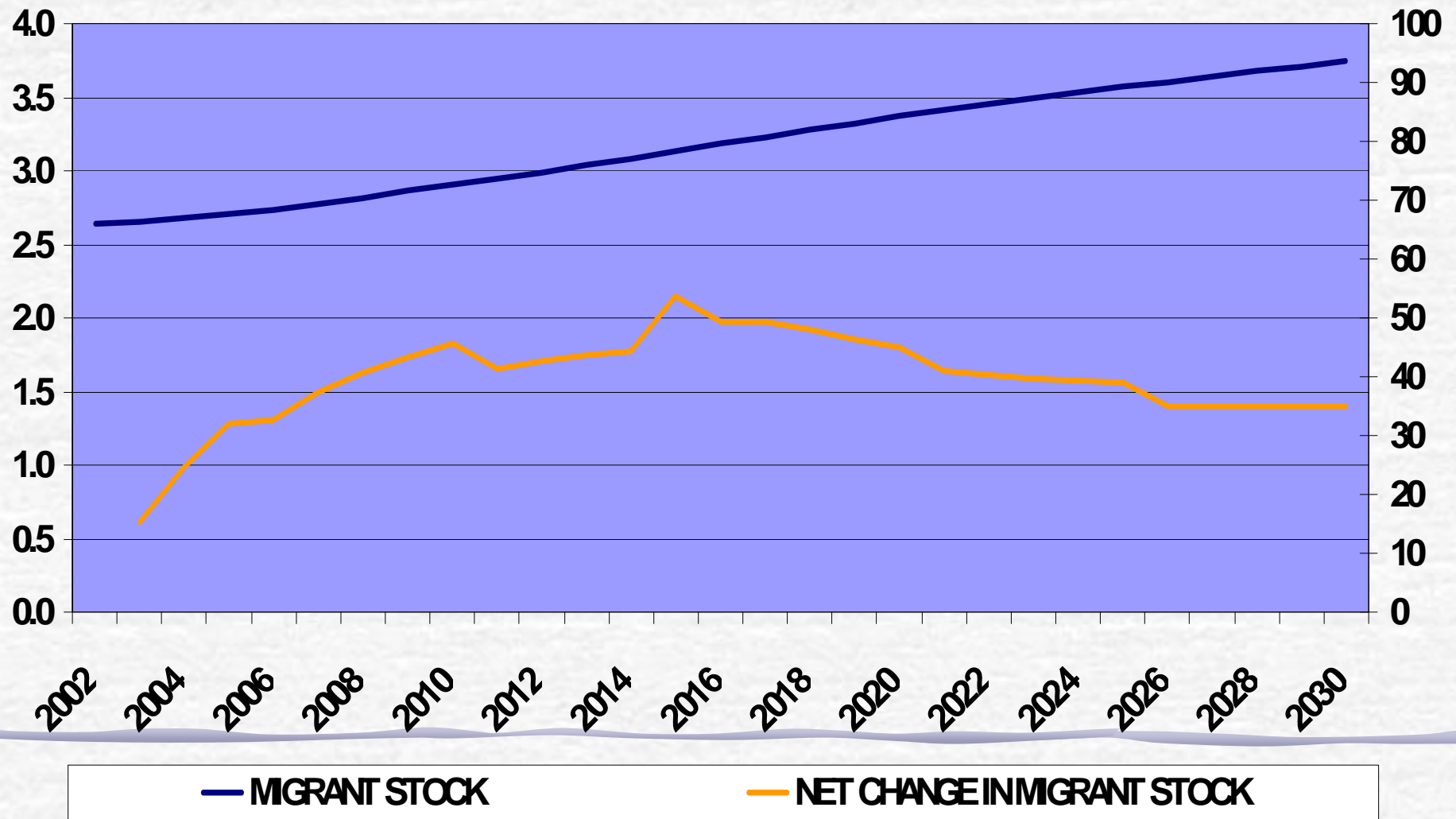
- Note: From the growth scenarios, total unemployment rate is calculated as a weighted average of urban and rural unemployment rates according to their shares in total population.

## Extrapolation of Results with Germany to the EU-15

- Based on the distribution of migrants in the EU-15 (OECD- SOPEMI 2000) the simulation results are extrapolated to the EU-15
- The number of Turkish migrants in Germany multiplied with 1.32 (Germany has 76% of the Turkish migrants in EU-15)
- To make growth and international migration simulations compatible, outflow of Turkish migrants deducted from the population projections iteratively

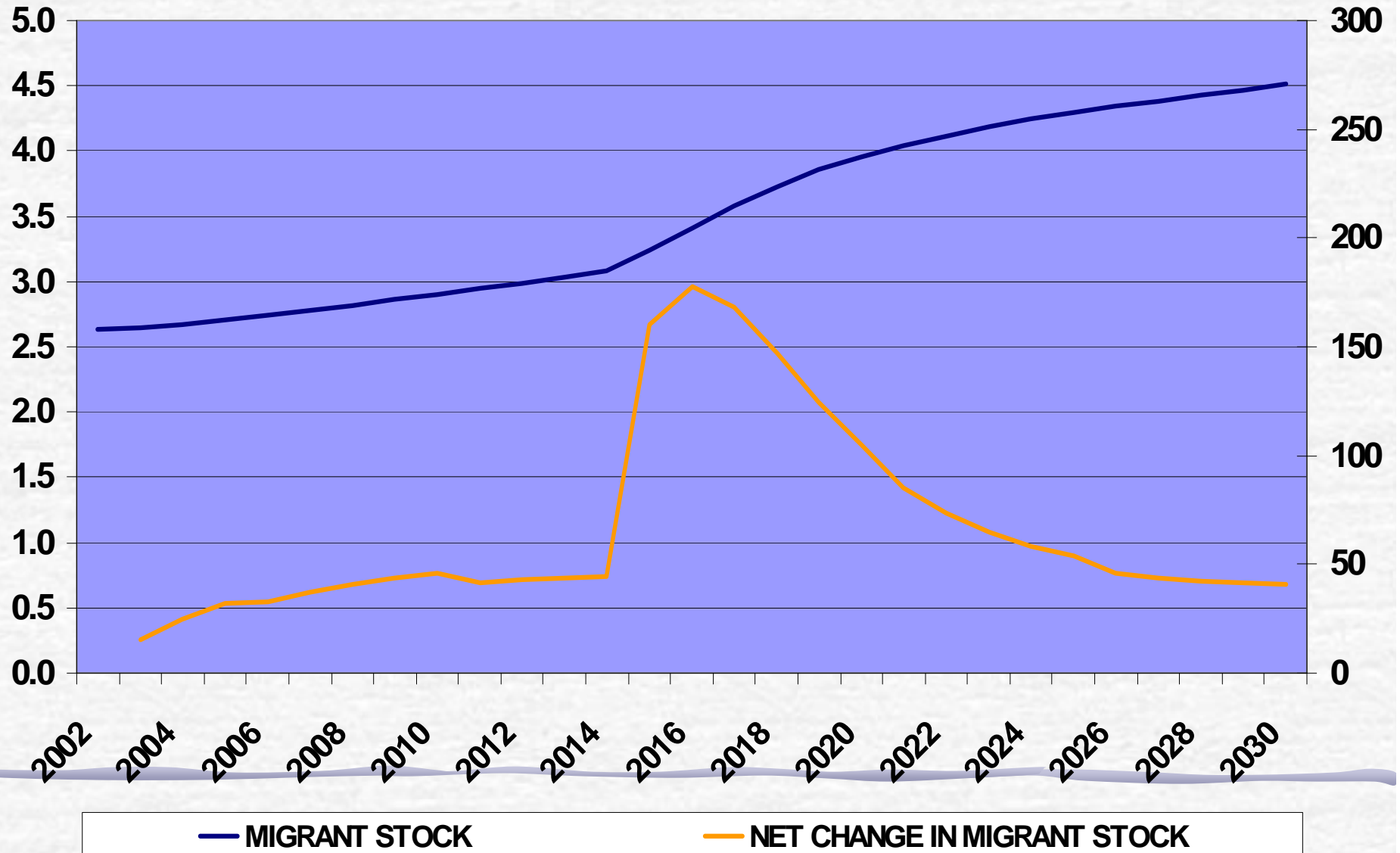
# "FREE" Dummy Taking Over (large country sample)

Migrant Stock (in millions) and Net Change Stock (in thousands)

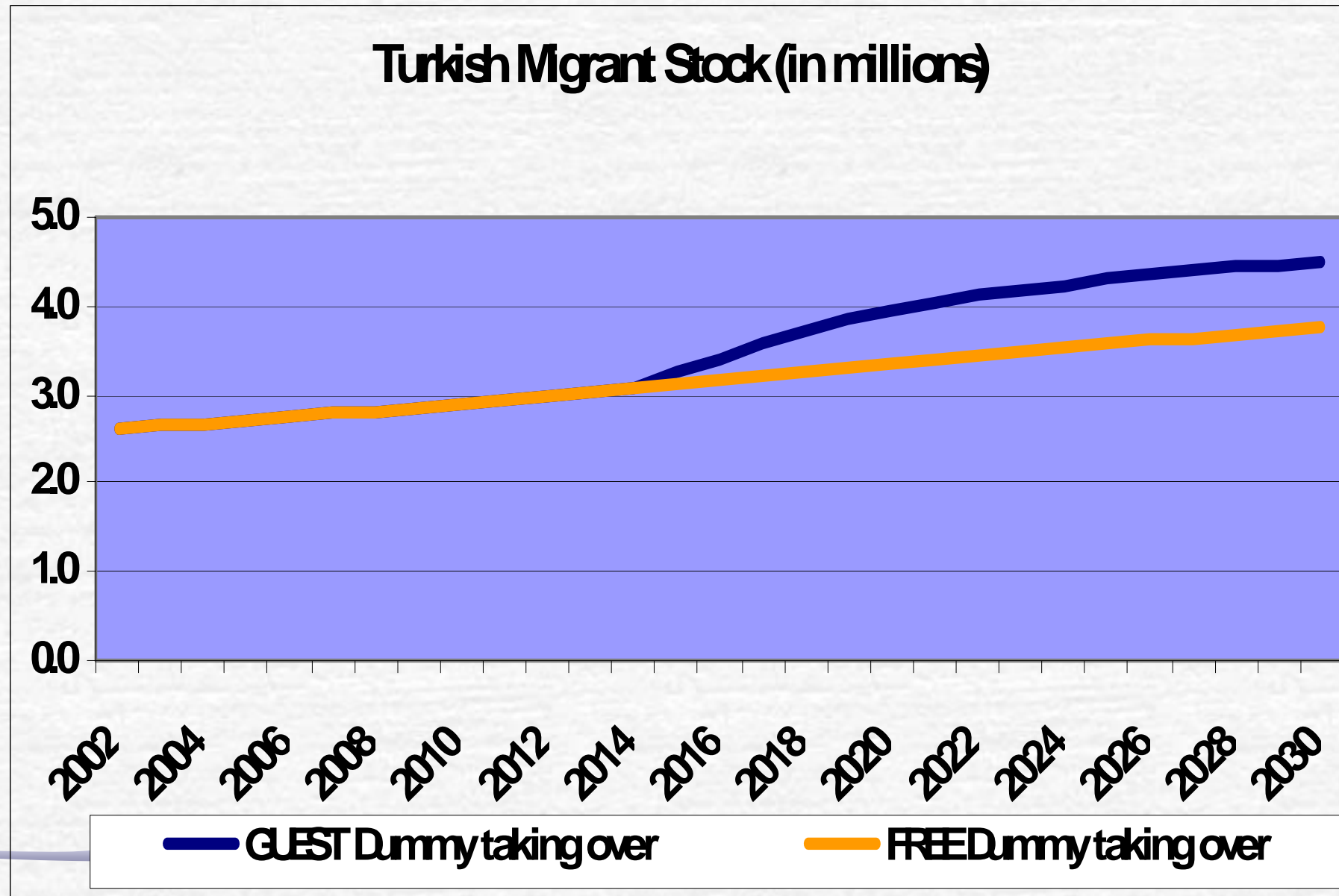


# "GUEST" Dummy Taking Over (large country sample)

Migrant Stock (in millions) and Net Change Stock (in thousands)



# Comparison of the Two Scenarios





## Comparison of the Two Scenarios

### Net Change in Turkish Migrant Stock in the EU

|                | <u>2004-2015</u> | <u>2015-2030</u> | <u>Total</u> |
|----------------|------------------|------------------|--------------|
| Scenario FREE  | 460.000          | 613.000          | 1.073.000    |
| Scenario GUEST | 564.000          | 1.274.000        | 1.838.000    |

### Turkish Migrant Stock in the EU

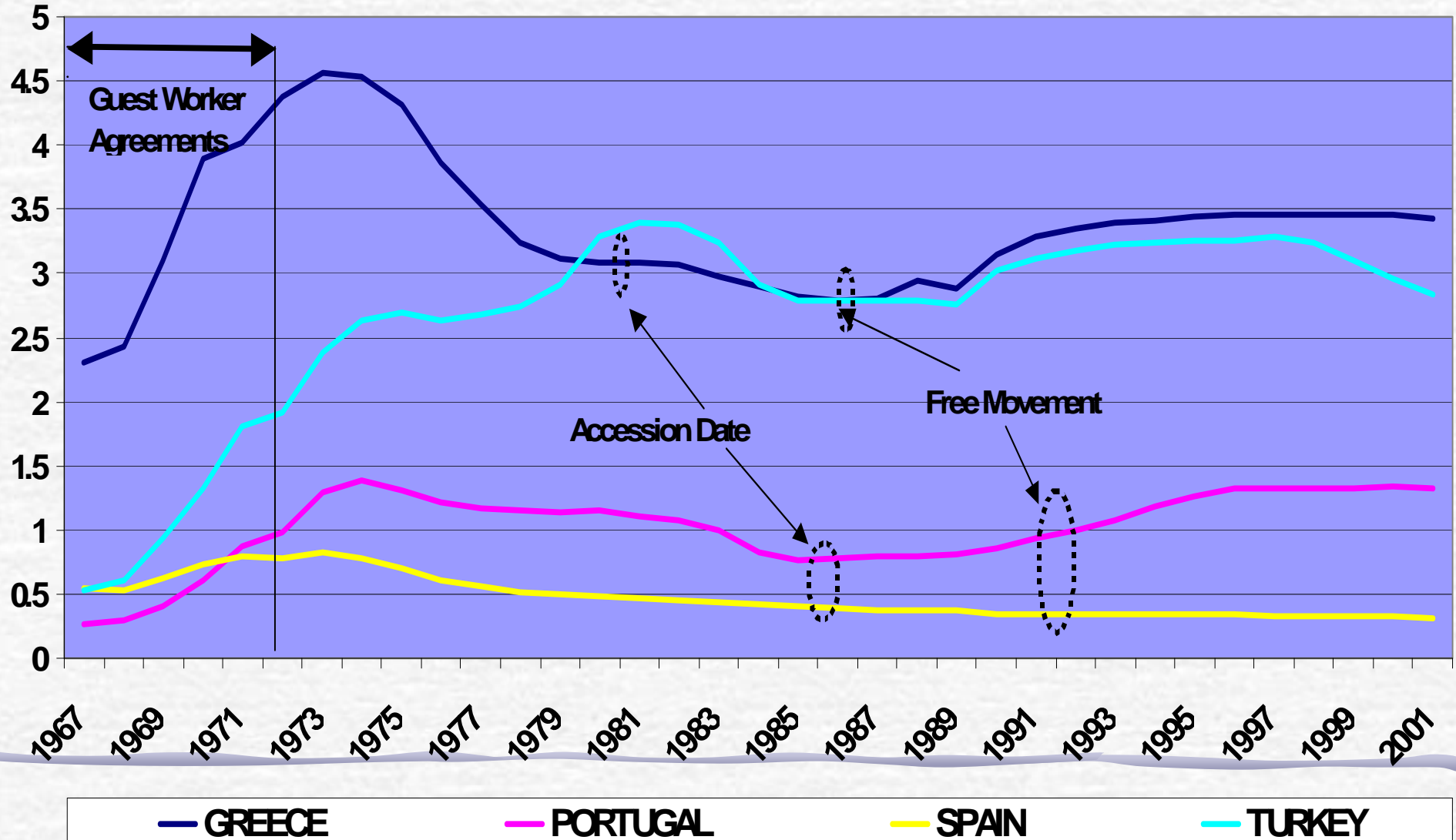
|                | <u>2004</u> | <u>2015</u> | <u>2030</u> |
|----------------|-------------|-------------|-------------|
| Scenario FREE  | 2.675.000   | 3.140.000   | 3.750.000   |
| Scenario GUEST | 2.700.000   | 3.250.000   | 4.500.000   |



# How to Inflate the Estimates Upwards?

# Migration Experience of Cohesion Countries

## Migrants in Germany as % of Source Country Population



## Model Specification with the Cohesion Countries and Turkey

$$m_{fht} = \alpha_h + \beta_1 m_{fh,t-1} + \beta_2 [\ln(e_{ft}) - \ln(e_{ht})] + u_{fht}$$

$m_{fht}$ : The share of migrants from country  $h$  residing in country  $f$  in per cent of home population

$w$ : Wage (proxied by GDP-PPP per capita)

$e$ : Employment rate (1-unemployment rate)

$h, f, t$ : Home, foreign countries and year, respectively.

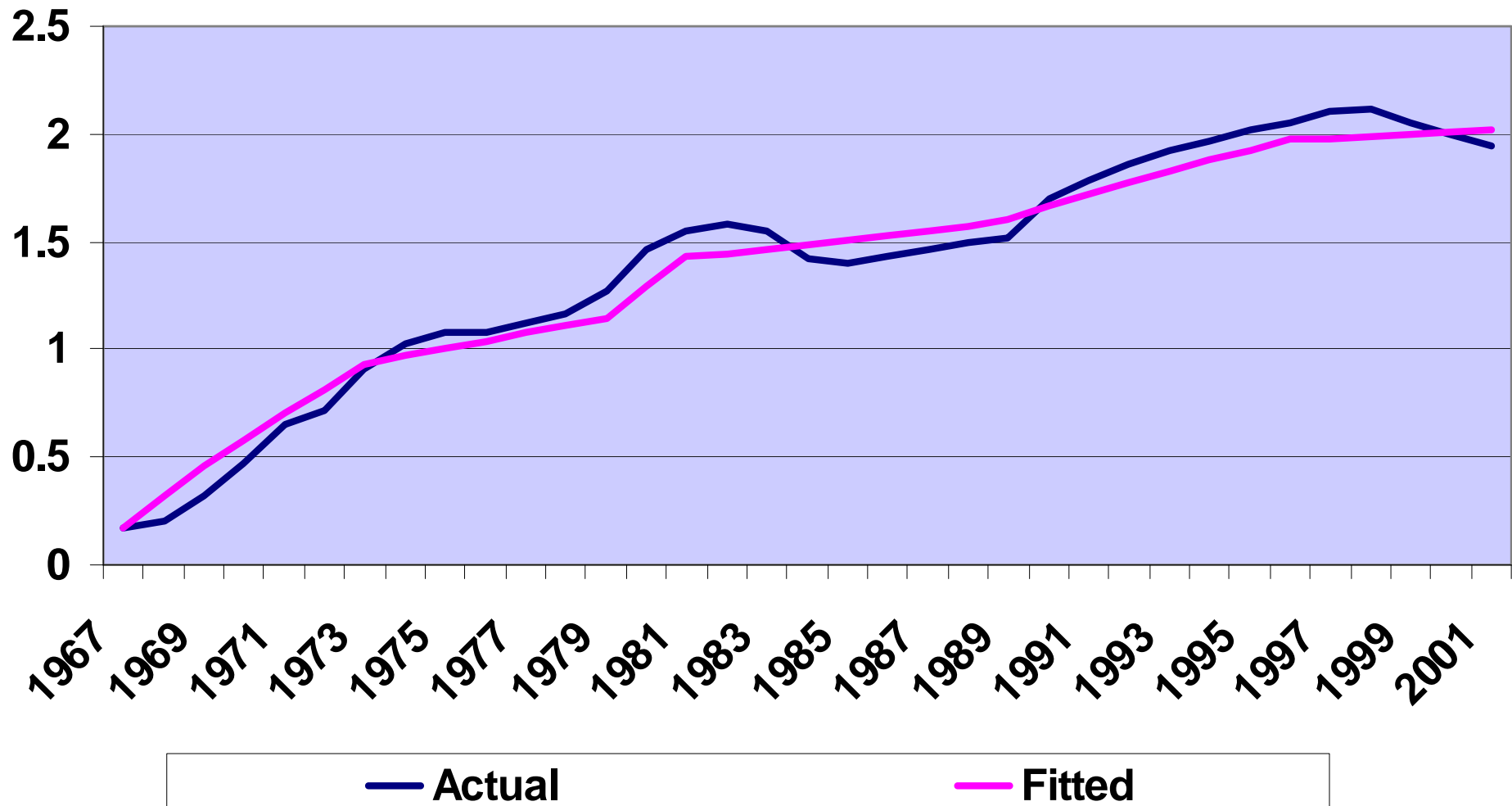
Estimation Method: SUR

## Estimation Results with the Cohesion Countries and Turkey

| <u>Independent Variables</u>   | <u>Coefficients</u> | <u>Std. Errors</u> | <u>P-value</u> |
|--------------------------------|---------------------|--------------------|----------------|
| M(-1)                          | 0.89                | 0.021              | 0.000          |
| $\ln(e_f) - \ln(e_h)$          | 0.15                | 0.204              | 0.061          |
| FREE                           | 0.05                | 0.013              | 0.000          |
| GUEST                          | 0.16                | 0.020              | 0.000          |
| INTERVENTION                   | 0.24                | 0.053              | 0.000          |
| INSURGENCY                     | 0.07                | 0.034              | 0.051          |
| INTERVENTION                   | 0.24                | 0.053              | 0.000          |
| Adjusted R <sup>2</sup> = 0.99 |                     |                    |                |

# Actual vs. Fitted Turkish Migrant Stock (Estimation with Cohesion Countries and Turkey)

## Turkish Migrant Stock in Germany (in millions)



# Scenarios Using the Estimates Obtained from the Cohesion Countries and Turkey

Two scenarios are simulated

## Common Assumptions

- ✓ **Free Movement** between EU and Turkey will get into force in **2015**
- ✓ Growth rate in the urban sector % 6.5
- ✓ Growth rate in the rural sector % 2
- ✓ Productivity growth in the urban sector % 3

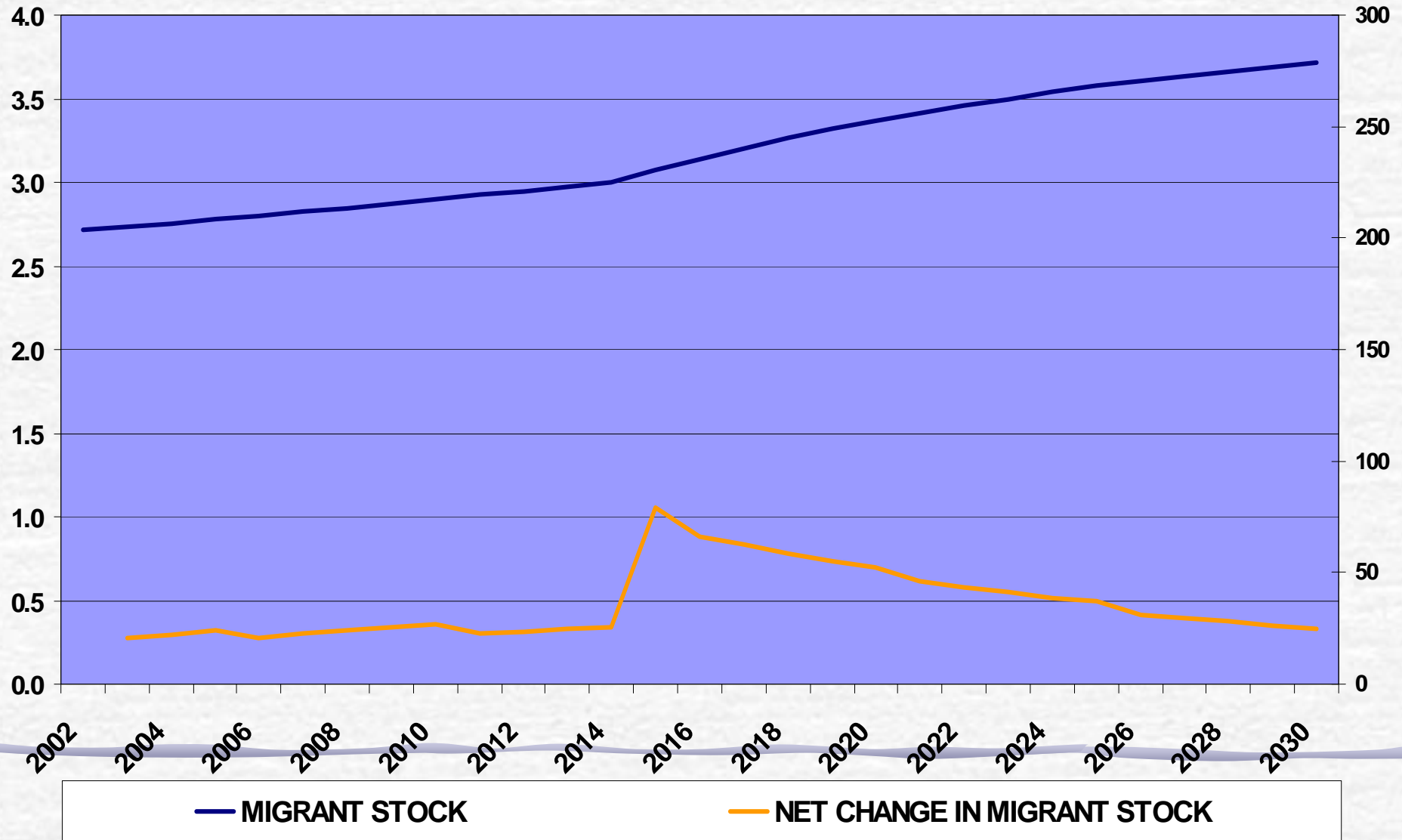
FREE Dummy taking over

GUEST Dummy taking over

# Scenario FREE Dummy Taking Over

Using the Estimates Obtained from the Cohesion Countries and Turkey

**Migrant Stocks (in millions) and Net Change in Migrant Stock (in thousands)**

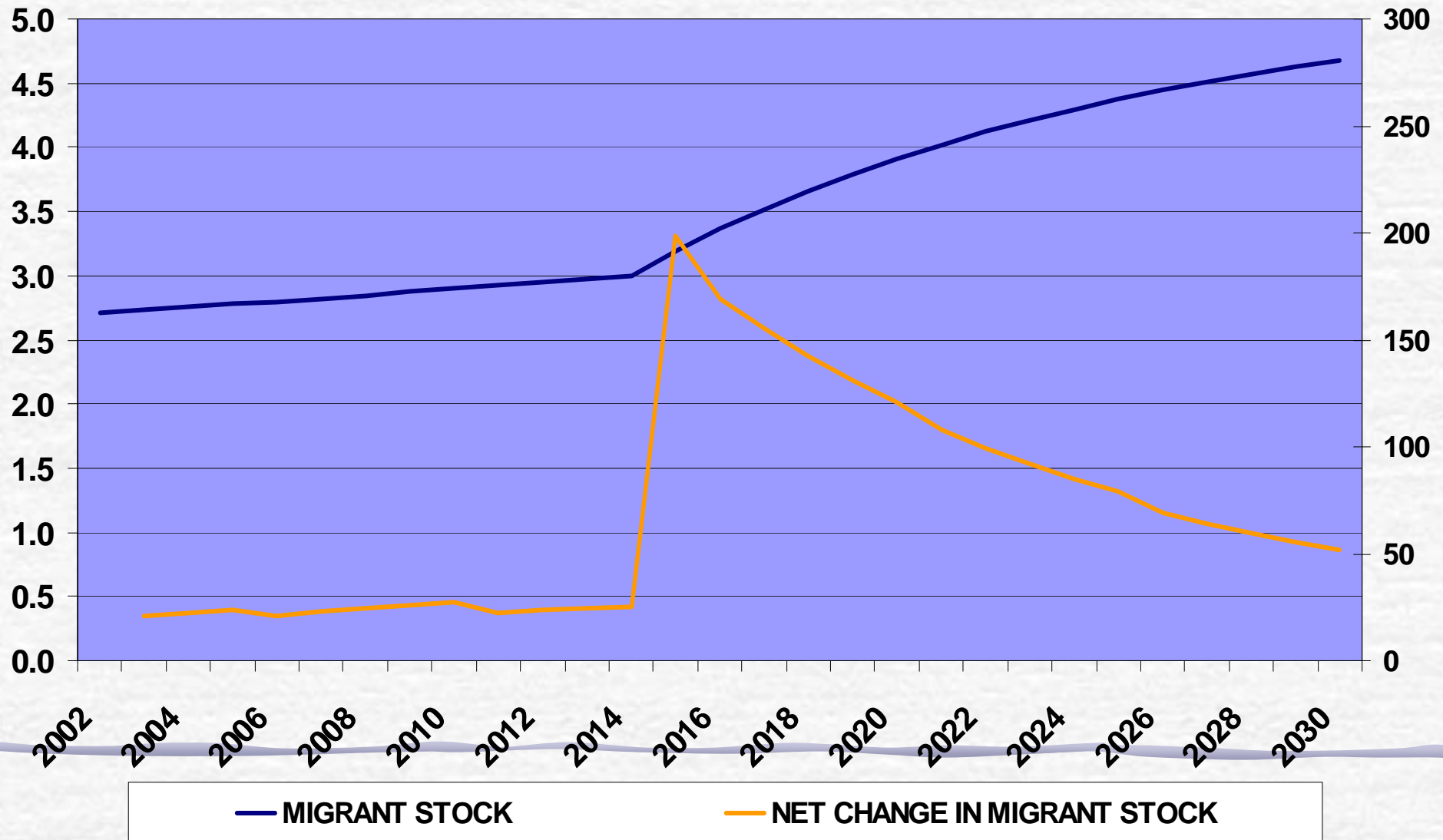




# Scenario GUEST Dummy Taking Over

Using the Estimates Obtained from the Cohesion Countries and Turkey

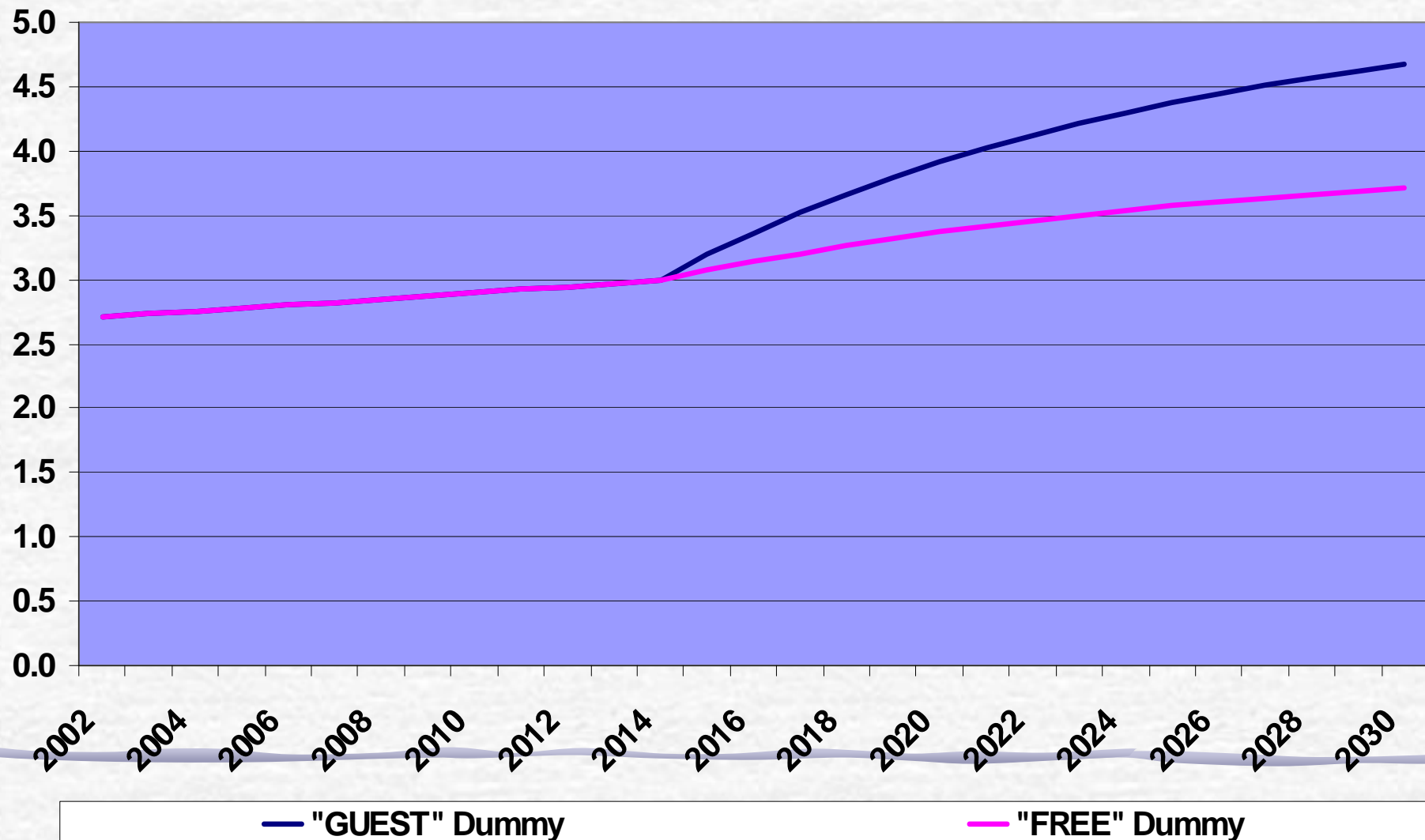
Migrant Stocks (in millions) and Net Change in Migrant Stock (in thousands)



## Comparison of the Two Scenarios

Using the Estimates Obtained from the Cohesion Countries and Turkey

Turkish Migrant Stocks (in millions)



## Comparison of the FREE and GUEST Scenarios

Using the Estimates Obtained from the Cohesion Countries and Turkey

### Net Change in Turkish Migrant Stock in the EU

|                | <u>2004-2015</u> | <u>2015-2030</u> | <u>Total</u> |
|----------------|------------------|------------------|--------------|
| Scenario FREE  | 320.000          | 640.000          | 960.000      |
| Scenario GUEST | 440.000          | 1.480.000        | 1.920.000    |

### Turkish Migrant Stock in the EU

|                | <u>2004</u> | <u>2015</u> | <u>2030</u> |
|----------------|-------------|-------------|-------------|
| Scenario FREE  | 2.755.000   | 3.075.000   | 3.715.000   |
| Scenario GUEST | 2.755.000   | 3.195.000   | 4.677.000   |



Higher Numbers?

## Model Specification with Turkey only

$$m_{ft} = \alpha + \beta_1 m_{f,t-1} + \beta_2 \ln(w_{ft-1}/w_{ft-2}) + \beta_3 \ln(e_{ft}/e_t) + u_{ft}$$

$m_{ft}$ : The share of migrants from country *Turkey* residing in country *Germany* in per cent of Turkish population

$w$ : Wage (proxied by GDP-PPP per capita)

$e$ : Employment rate (1-unemployment rate)

$f,t$ : Foreign country (Germany) and year respectively

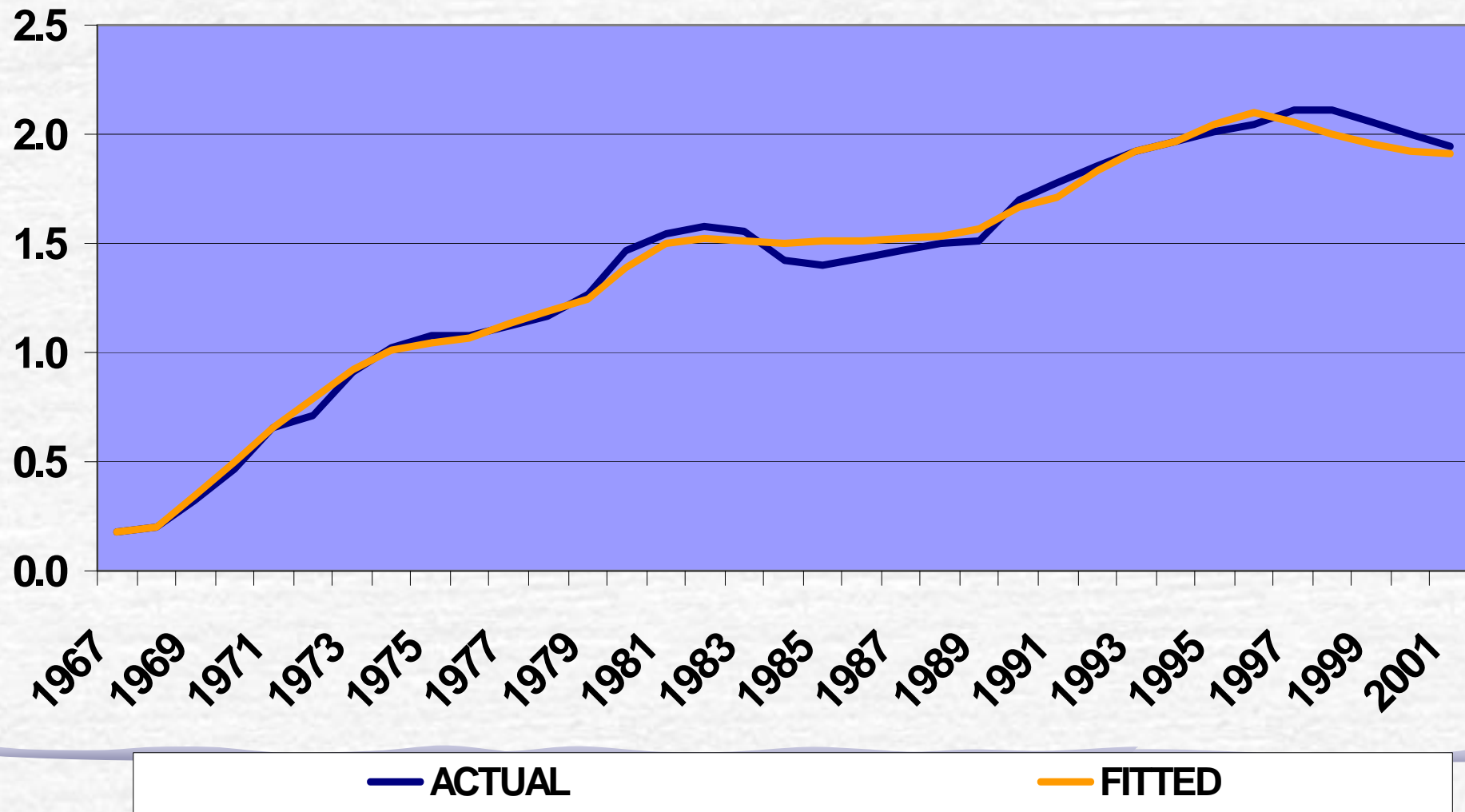
Method: OLS

## Estimation Results with Turkey only

| <u>Independent Variables</u>   | <u>Coefficients</u> | <u>Std. Errors</u> | <u>P-value</u> |
|--------------------------------|---------------------|--------------------|----------------|
| M(-1)                          | 1.22                | 0.140              | 0.000          |
| M(-2)                          | -0.25               | 0.139              | 0.081          |
| $\ln(w_{f,t-1}/w_{h,t-2})$     | 1.93                | 0.729              | 0.014          |
| $\ln(e_f/e_h)$                 | 1.25                | 0.634              | 0.059          |
| GUEST                          | 0.17                | 0.095              | 0.094          |
| INTERVENTION                   | 0.16                | 0.092              | 0.090          |
| INSURGENCY                     | 0.13                | 0.045              | 0.008          |
| Adjusted R <sup>2</sup> = 0.97 |                     |                    |                |

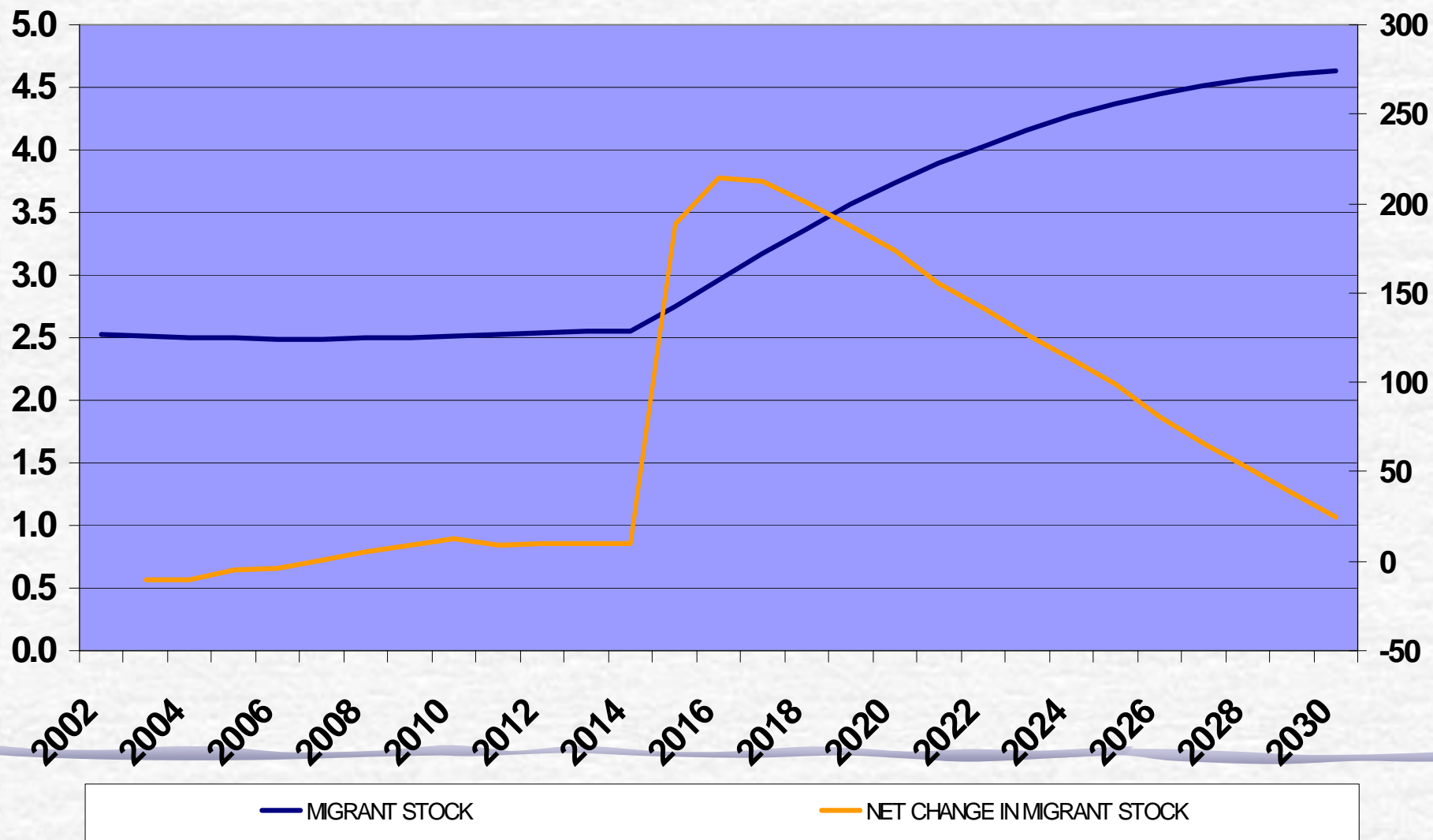
# Actual vs. Fitted Migrant Stock (Turkey only)

## Turkish Migrant Stock (in millions)



# Scenario Turkey Member – Free Movement of Labor High Growth Scenario

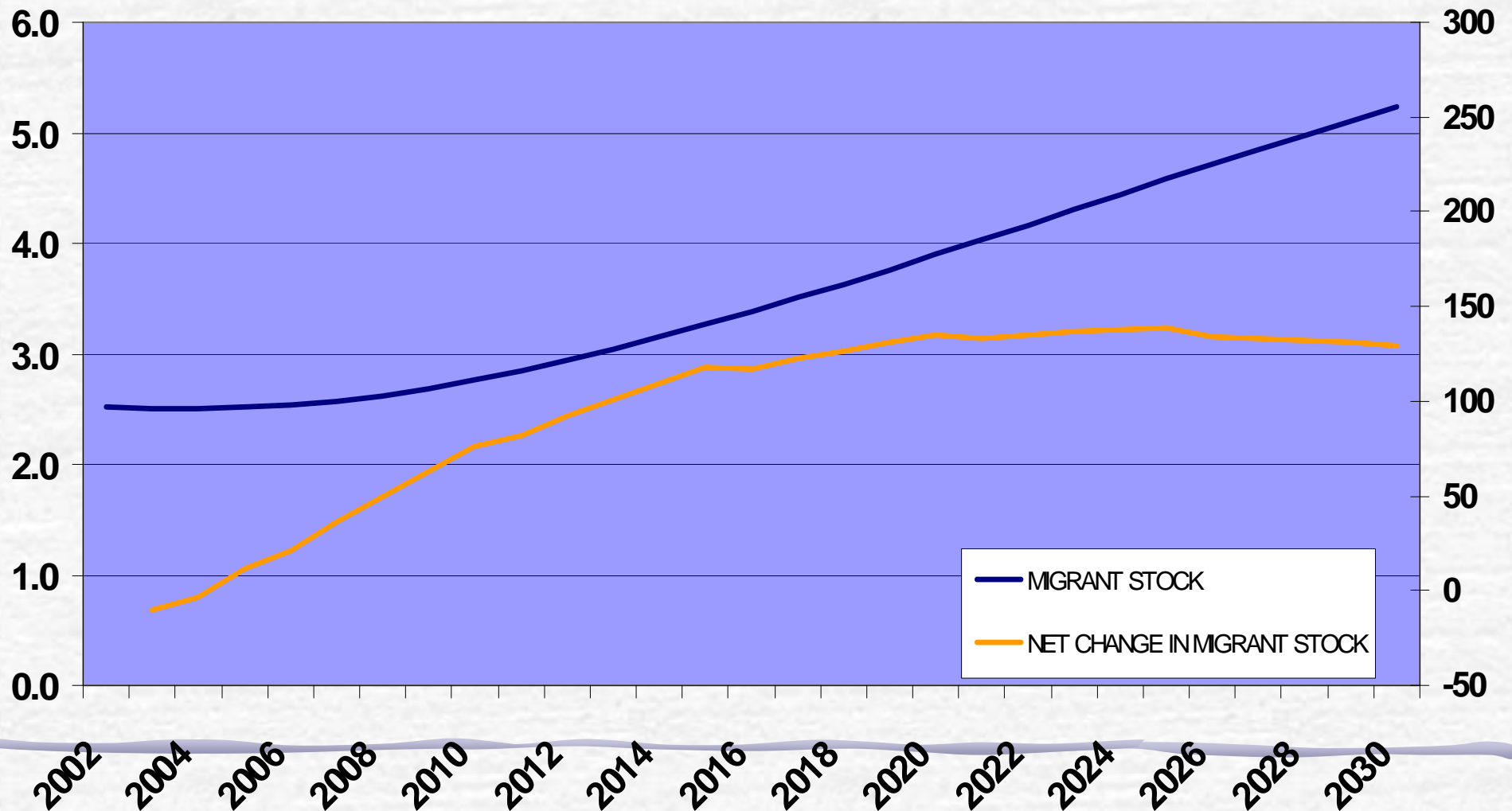
Turkish Migrant Stock (In million) and Net Change Stock (In thousand)





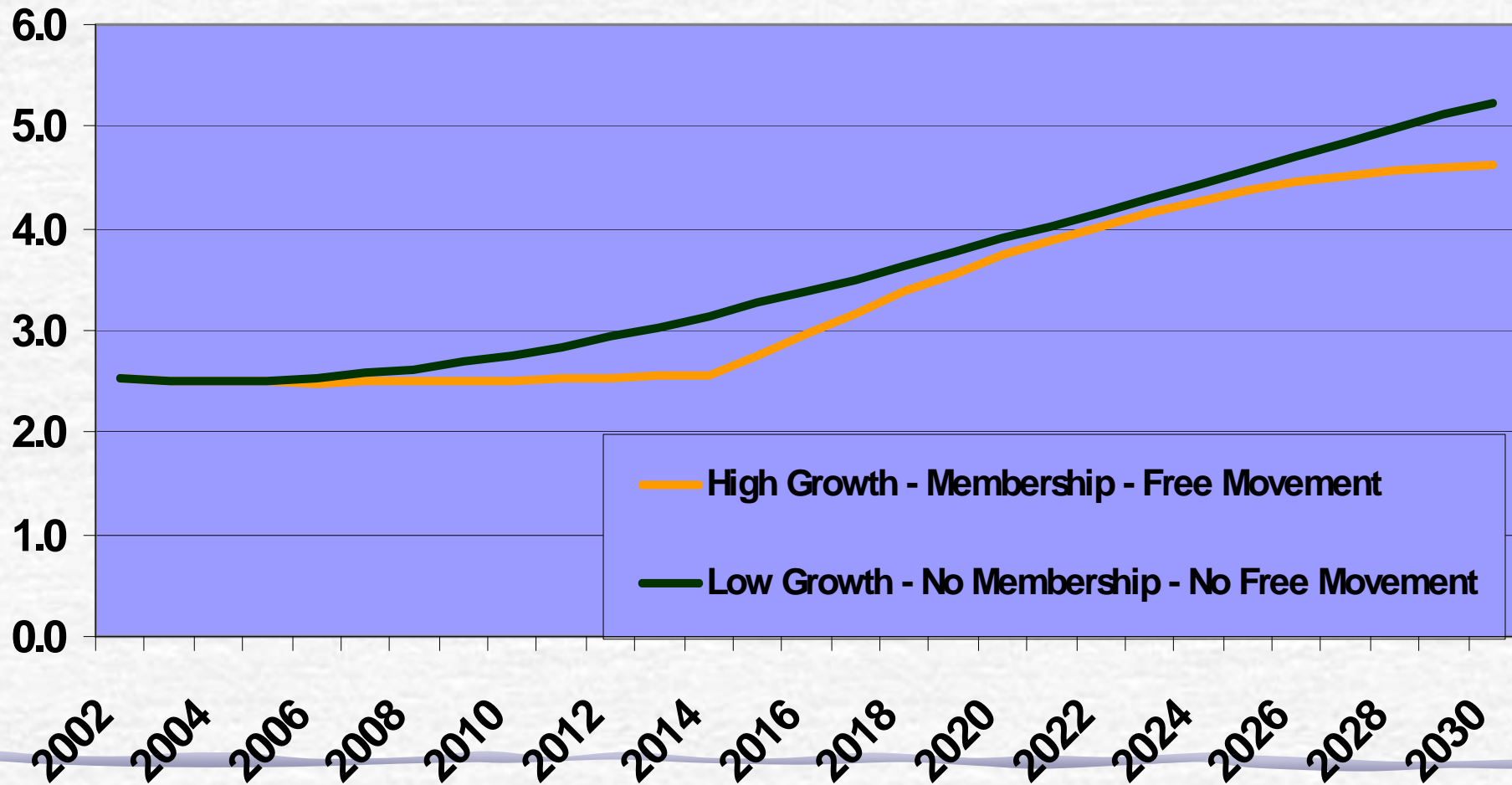
# Scenario No Membership – No Free Movement Low Growth Scenario

Turkish Migrant Stock (In million) and Net Change Stock (In thousand)



# Comparison of the Two Scenarios (Turkey only sample)

## Turkish Migrant Stock (In million)



# Comparison of the Two Scenarios

## Net Change in Turkish Migrant Stock in the EU

|  | <u>2004-2015</u> | <u>2015-2030</u> | <u>Total</u> |
|--|------------------|------------------|--------------|
| Scenario High Growth -<br>Member - Free Movement | 246.000          | 1.888.000        | 2.134.000    |
| Scenario Low Growth –<br>No Member – No Free     | 760.000          | 1.974.000        | 2.734.000    |

## Turkish Migrant Stock in the EU

|  | <u>2004</u> | <u>2015</u> | <u>2030</u> |
|--|-------------|-------------|-------------|
| Scenario High Growth -<br>Member - Free Movement | 2.499.000   | 2.745.000   | 4.633.000   |
| Scenario Low Growth –<br>No Member – No Free     | 2.506.000   | 3.267.000   | 5.241.000   |



# A Summary of Simulations: Migration from Turkey

Net Change in Migrant Stock in EU from  
Turkey 2004-2030



### Large Country Sample (SUR) – High Growth – Membership – Free Movement

|                | <u>2004-2015</u> | <u>2015-2030</u> | <u>Total</u> |
|----------------|------------------|------------------|--------------|
| Scenario FREE  | 460.000          | 613.000          | 1.073.000    |
| Scenario GUEST | 564.000          | 1.274.000        | 1.838.000    |

### Cohesion Countries and Turkey Sample (SUR) – High Growth – Membership – Free Movement

|                | <u>2004-2015</u> | <u>2015-2030</u> | <u>Total</u> |
|----------------|------------------|------------------|--------------|
| Scenario FREE  | 320.000          | 640.000          | 960.000      |
| Scenario GUEST | 440.000          | 1.480.000        | 1.920.000    |

### Turkey Only (OLS Estimation)

|  | <u>2004-2015</u> | <u>2015-2030</u> | <u>Total</u>     |
|--|------------------|------------------|------------------|
| Scenario High Growth - Member<br>- Free Movement | 246.000          | 1.888.000        | 2.134.000        |
| Scenario Low Growth –<br>No Member – No Free     | 760.000          | 1.974.000        | <b>2.734.000</b> |

Low Growth – No Membership  
No Free Movement  
2.734.000

+

Add an Intervention and/or Insurgency  
Dummy?

The slide features decorative wavy lines in a light purple color at the top and bottom. The top section consists of several overlapping, curved lines that create a sense of movement. The bottom section is a single, solid, wavy line.

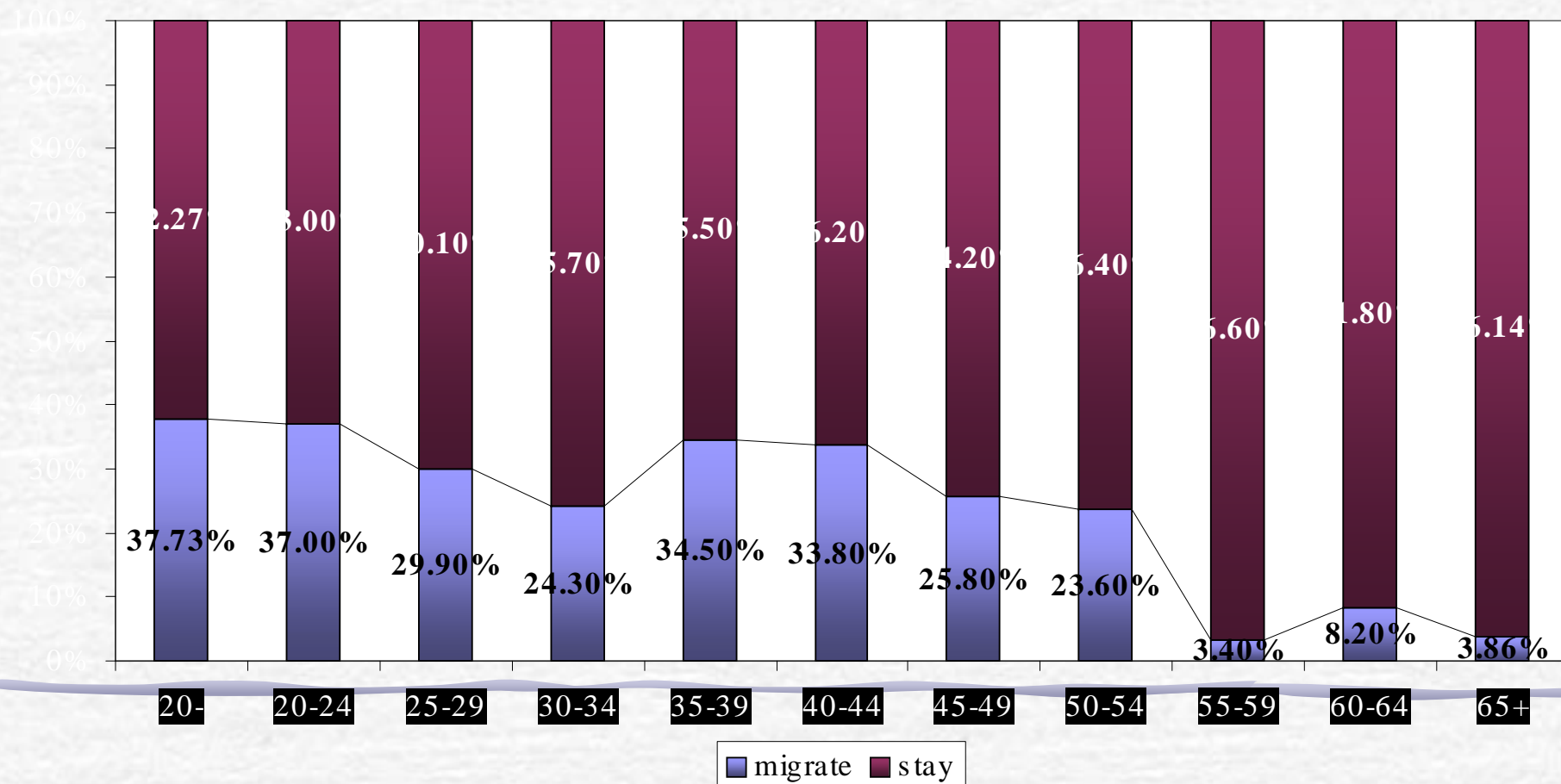
# Downward Adjustments

# Demographic Transition of Turkey

## Propensity to Migrate according to age groups

Based on reponses to NIDI-Hacettepe Survey (TIMS)

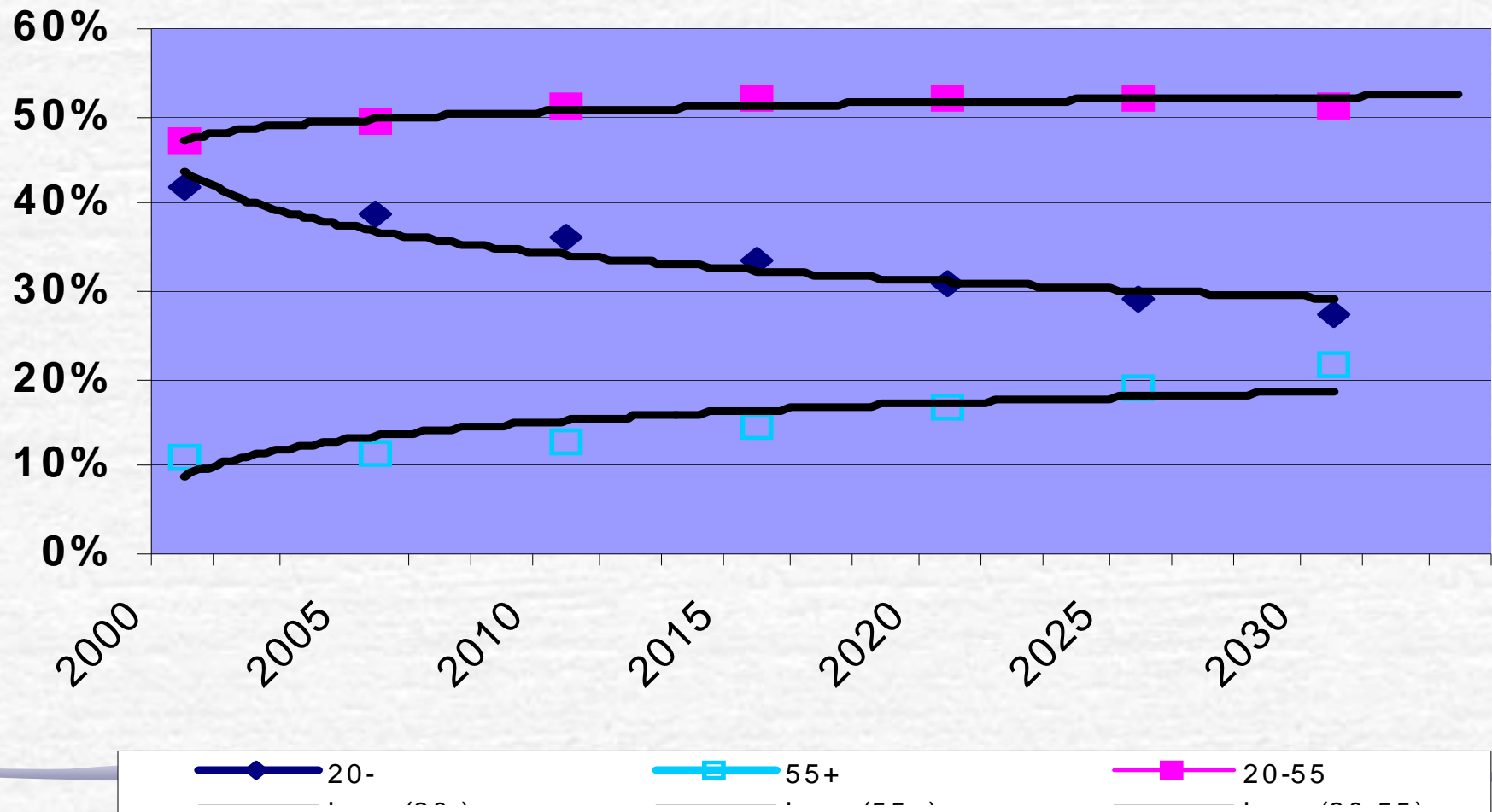
Propensity to Migrate According to Age Groups





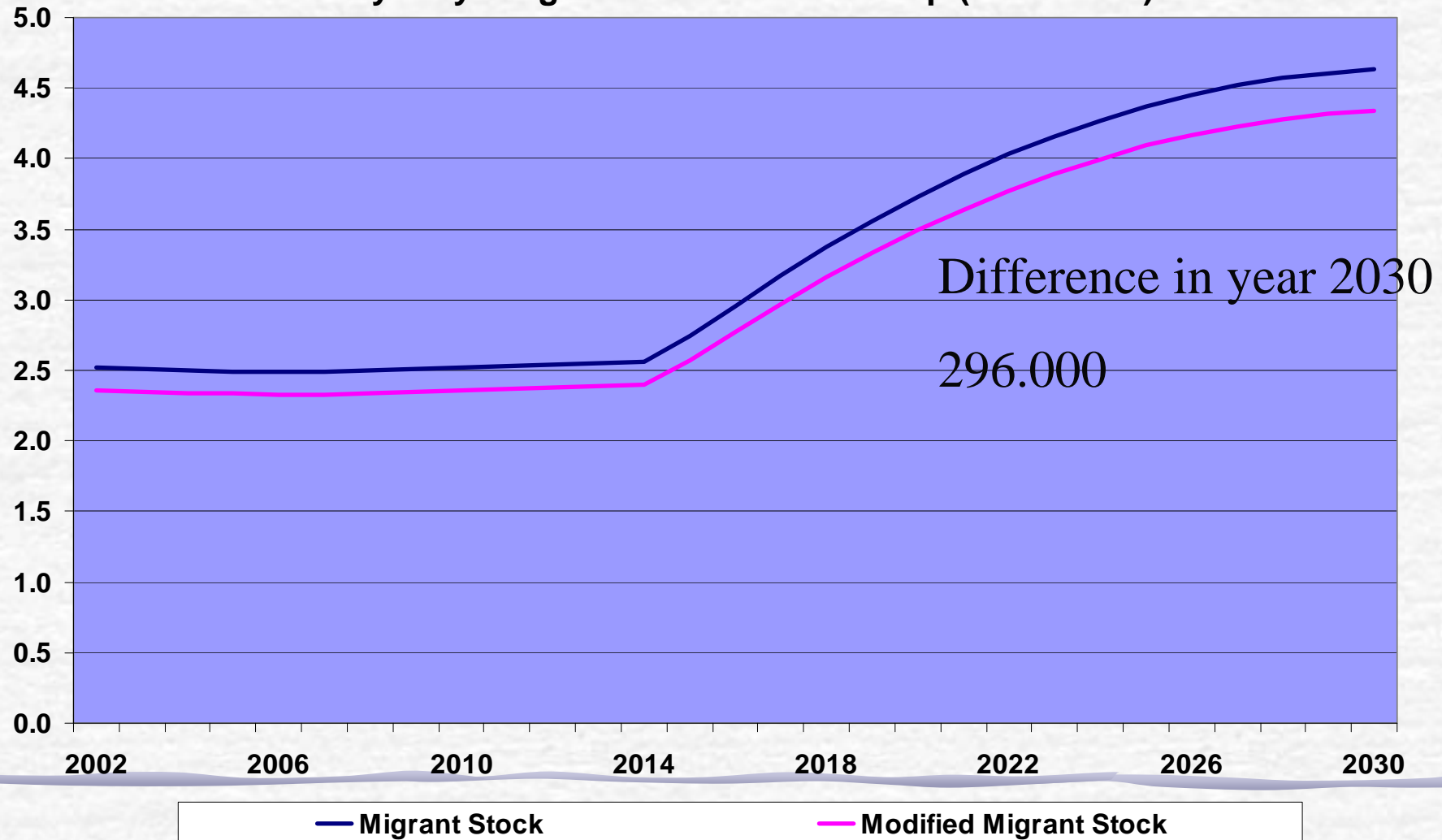
# Demographic Transition of Turkey

## Share of Age Groups in Total Population



# Demographic Transition of Turkey

Adjusting the Migrant Stock for Population Under 55 - Scenario with Turkey only - High Growth - Membership (in millions)



# Demographic Transition of Turkey

Adjusting the Migrant Stock for Population Under 55 - Scenario with Turkey only - Low Growth - No Membership

