Competitiveness in Europe: confronting Italy and Germany

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- **Diverging paths**
  - *According to the latest projections, in 2011 GDP will grow at rates of 3.5% in Germany and 1.1% in Italy*
  - *Current growth rates are the highest in Germany since the Reunification, but are still below long term average in Italy.*

- **Growth differentials are expected to widen**
  - *Next figure shows GDP cumulative growth differential between Italy and Germany since 2000 to 2012*
  - *Italy performed slightly better than Germany till 2004 (with a positive differential of 2 points)*
  - *But in the period 2005-2012, Italy is expected to accumulate a negative differential of 8.8 points (nearly 0.7 points each year)*

Cumulative growth differential (Italy – Germany): GDP
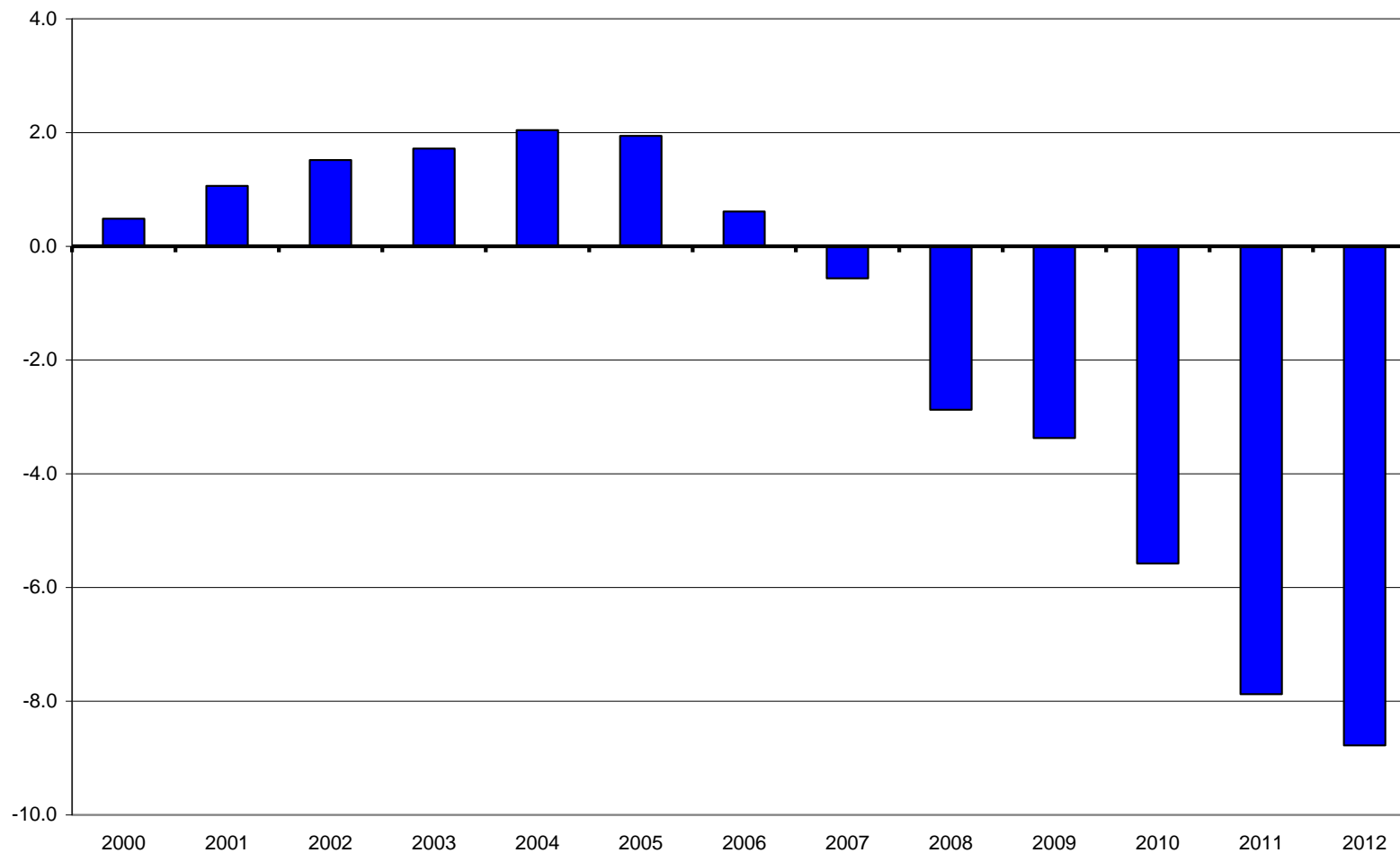
- **Interpretations**
  - *We are asking our German colleagues to explain why German growth accelerated*
 - *What we have to do is give some explanation for Italian prolonged stagnation*
- **The role of productivity**
  - *There are few doubts that Italian poor performance is due to a slowdown in productivity (both labor productivity and TFP)*
  - *We will explore today some issues related to Italian productivity slowdown*
 - *Before we do this, some caveats must be considered*

First: shocks on demand components

- *First: some demand components have been growing faster in Germany than in Italy, but this cannot be attributed to productivity dynamics*
- *Since 2005 public consumption has been growing faster in Germany than in Italy, so that we can say that budget policy is more supportive in Germany than in Italy*
- *Since 2008 the construction sector has been experimenting, in Italy, a severe recession, with a 15% cumulative loss of output. Construction sector is performing poorly in Germany as well, but recession ended in this country in 2005*

Cumulative growth differential (Italy – Germany): public consumption expenditure
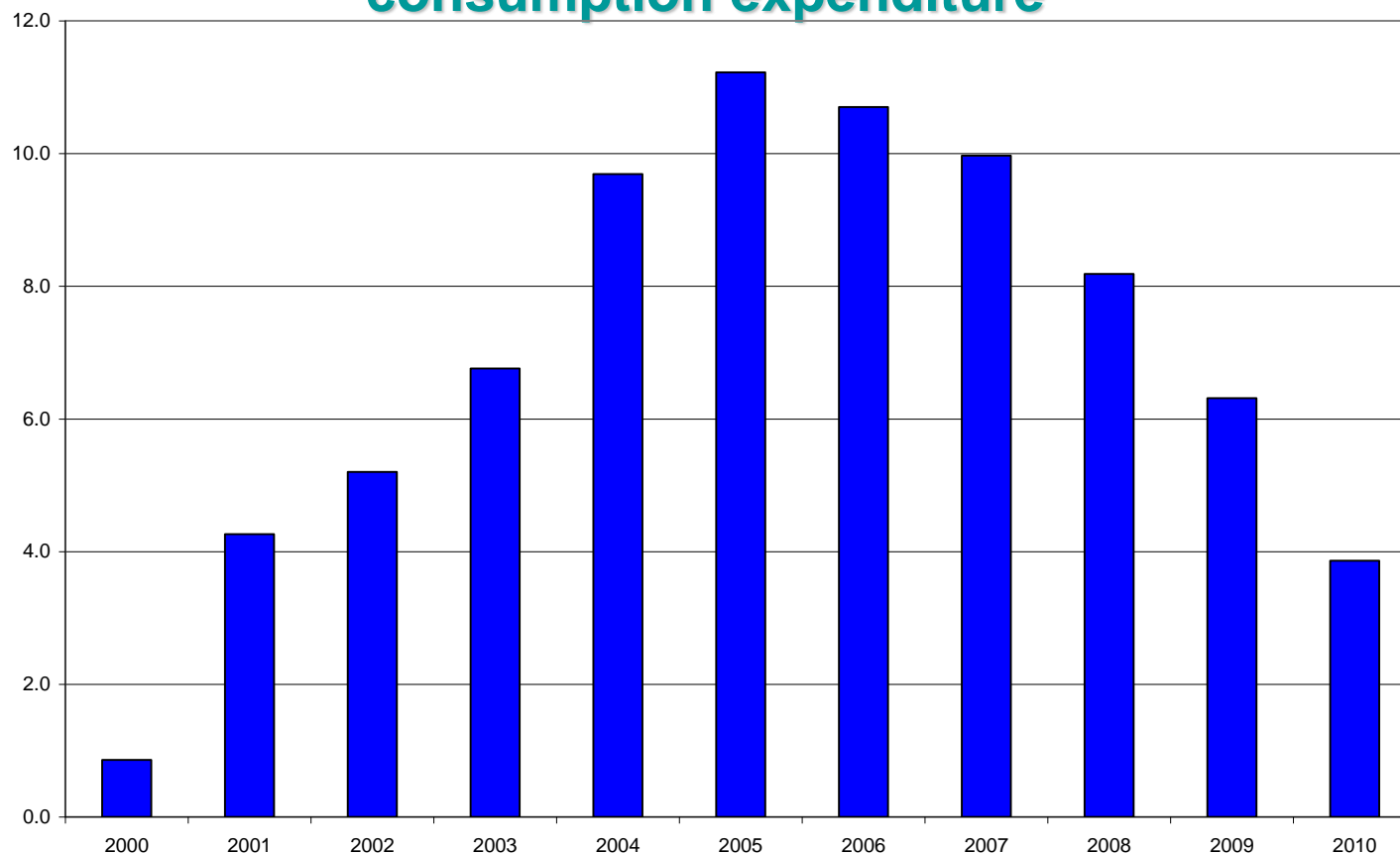
Cumulative growth differential (Italy – Germany): construction
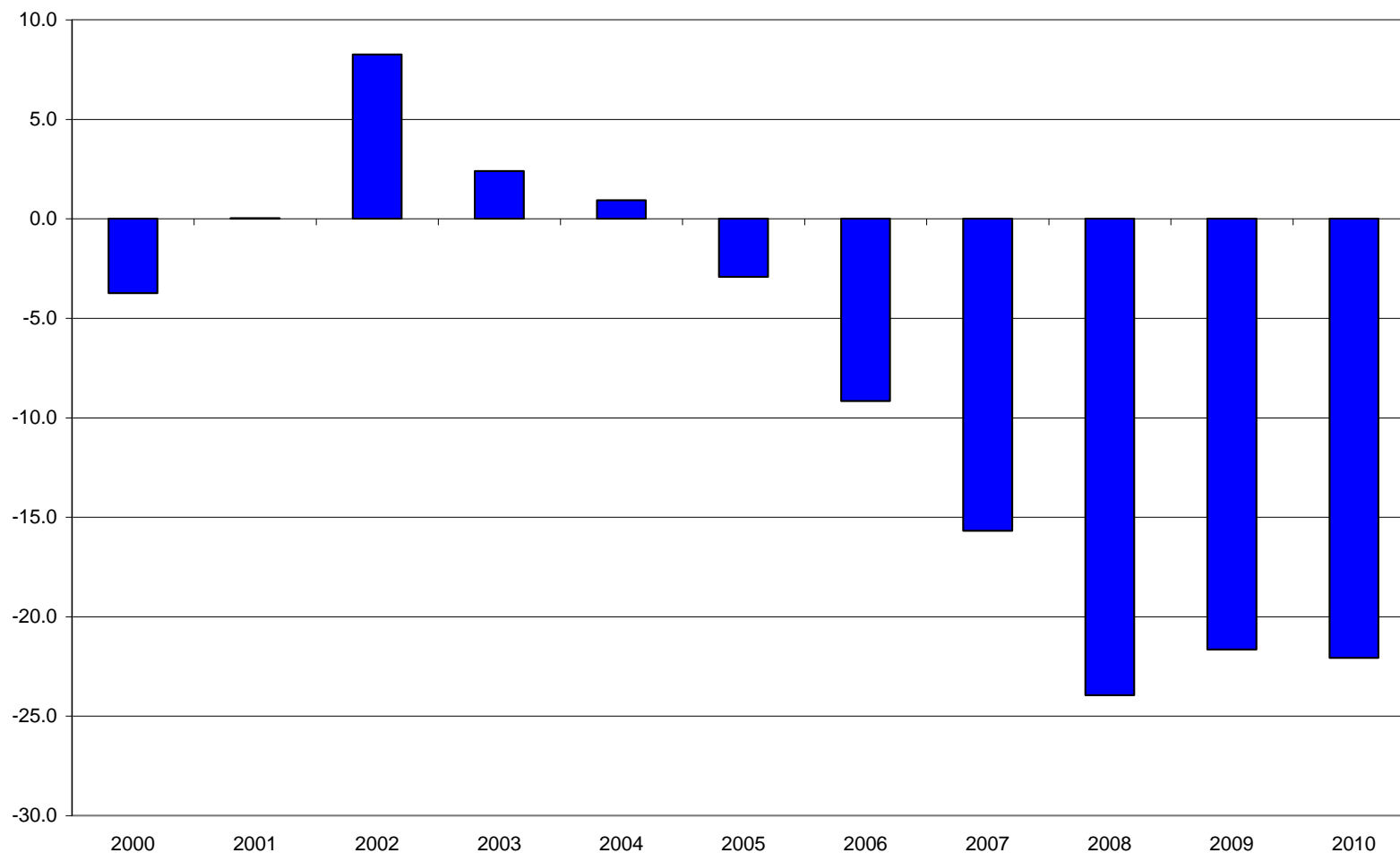
Second: Imports

- *Second: import penetration is much stronger in Italy than in Germany (differentials in import growth are lower than differentials in export growth) and this reduces the Italian relative rate of GDP growth*

- *Import penetration can be due to a loss of competitiveness and, in this case, productivity slowdown can be an explanation*

- *But import penetration can also result from a shift of the model of internationalization that requires a larger amount of imported, intermediate goods. And it is not clear how this is correlated with productivity dynamics. Certainly, it reduces GDP.*

- *We still miss, today, of a comprehensive analysis of this issue.*

Cumulative growth differential: external trade
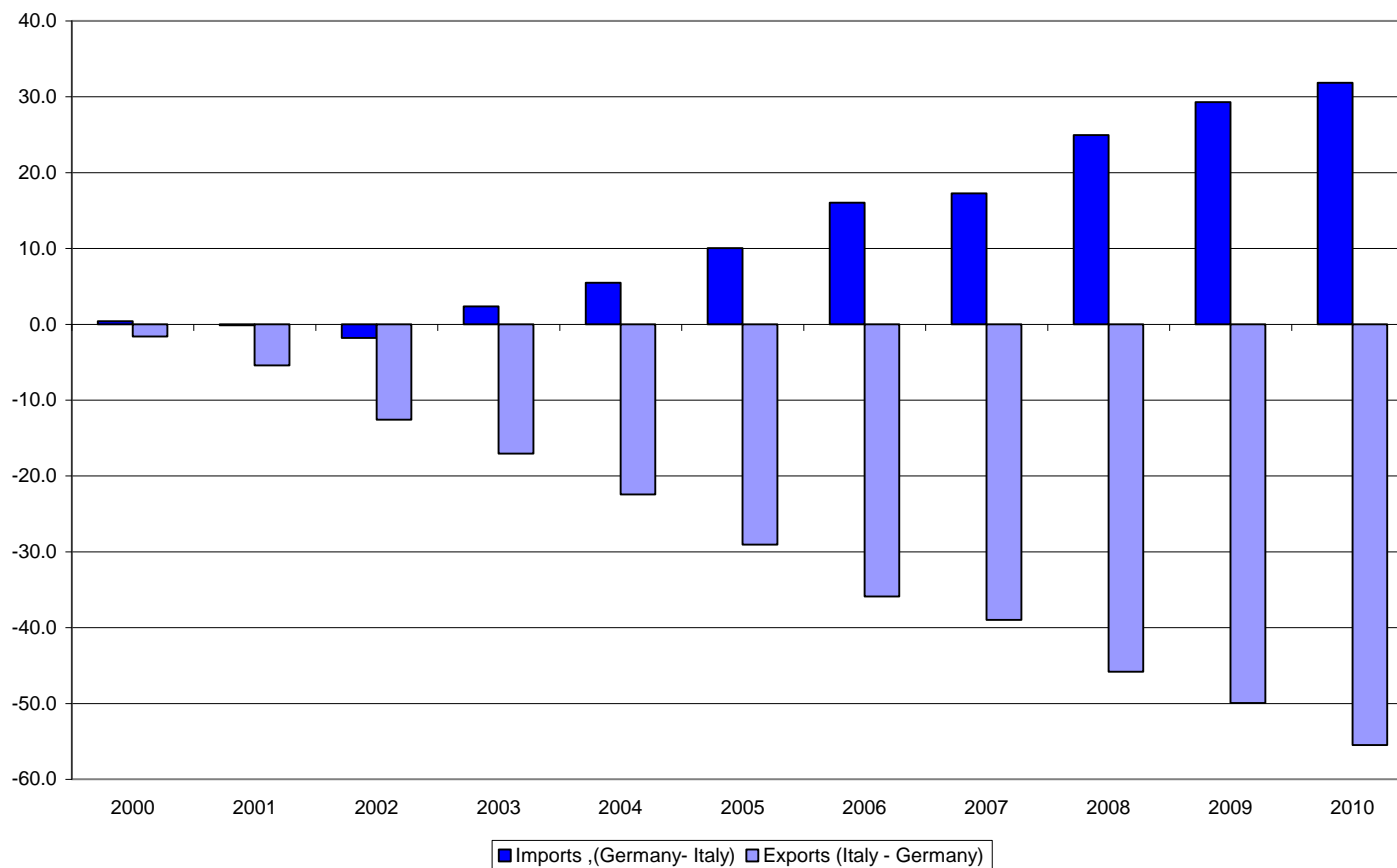
Third: Labor market reforms

- *Third: there is growing evidence that labor market reforms implemented in the 90s encouraged Italian firms to substitute capital with labor (Jona Lasinio e Vallanti, 2011; Tronti, 2010a, 2010b; Saltari e Travaglini, 2006; Dew-Becker and Gordon, 2008)*

- *This is an unexpected, perverse effect of structural reforms on labor market.*

- *Ciccarone and Saltari (2010) argue that the main difference between the German and Italian model lies in the nature of labor reforms*

…Labor market reforms

- *In Germany, reforms were aimed at augmenting internal flexibility. This reinforced adaptation of firms to business cycle conditions and made easier to catch business opportunities in new markets. These are reforms targeted at enhancing growth potential.*
- *In Italy reforms increased external flexibility, reducing the cost of labor relative to capital. These are reforms that induce movements on the production function, not a shift of the production function*

▪ (…) *Labor market reforms*

- *We consider a simple evidence for this. As figures illustrate, employment grew faster in Italy than in Germany. The opposite is true for investments on business sector.*

- *I.e., due to labor reforms of the 90s, the Italian economy moved to a model with higher labor intensity, lower capital intensity and lower productivity.*

- *This means that we have reduced unemployment, but have missed to strengthen growth potential. The net effect on welfare is uncertain.*

- *It is time to rethink the model, may be introducing a productivity target in income policies (Ciccarone 2009.)*

- *However, political consensus is still low on this subject.*

Employment growth (2000 = 100, Italy/Germany)

Legend: Manfactoring sector — Whole economy
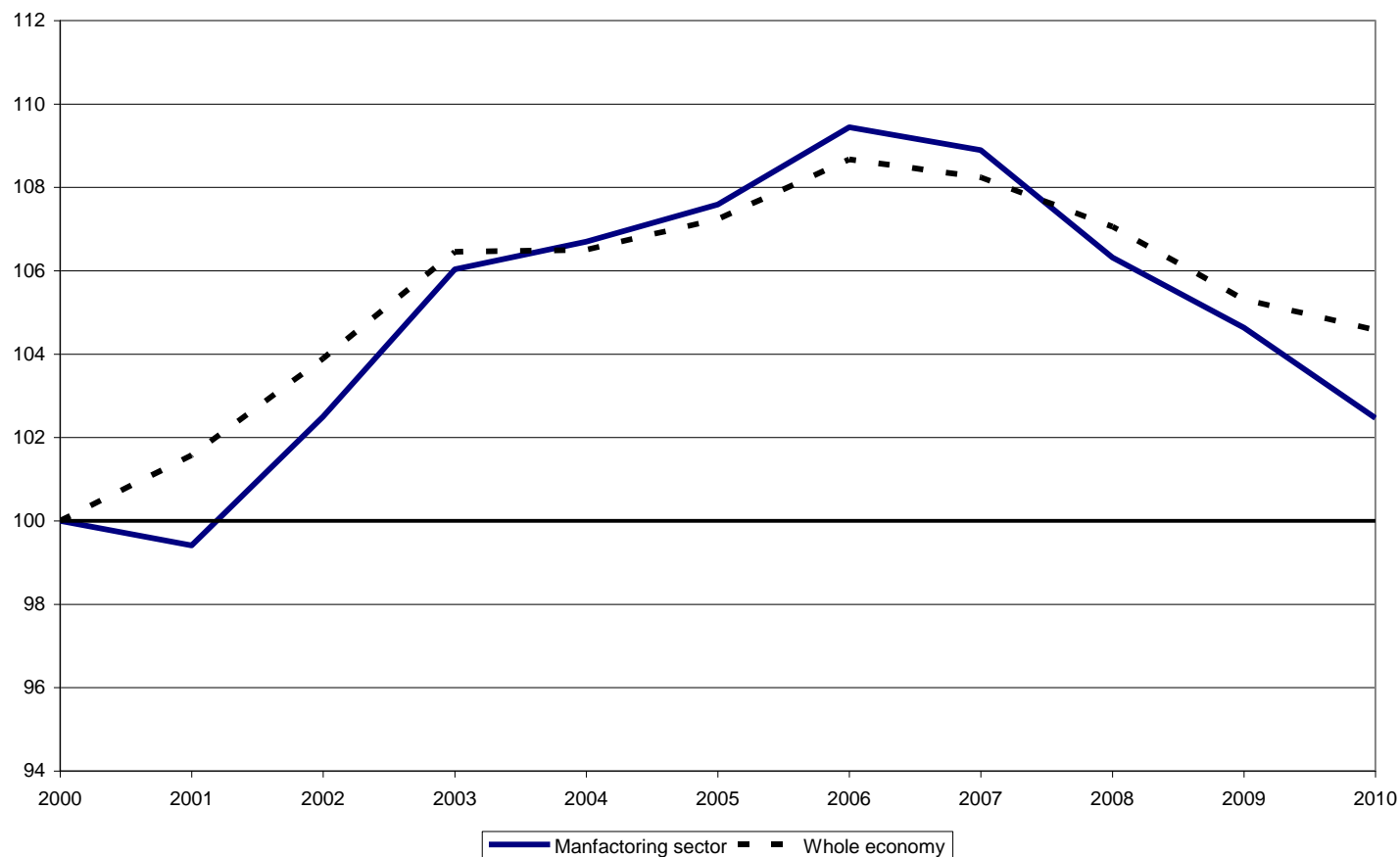
Cumulative growth differential (Italy – Germany): GFCF excluding constructions
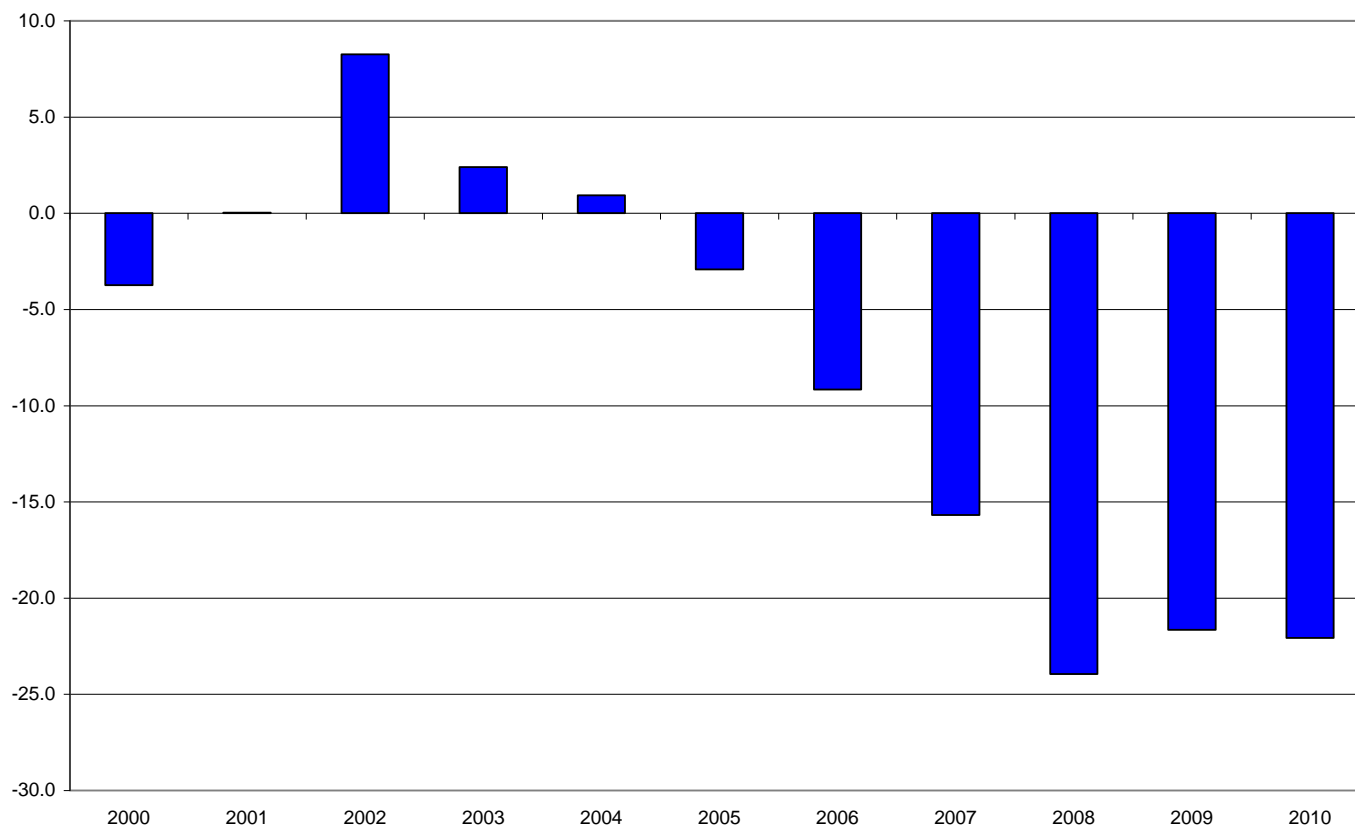
■ Fourth: shocks on foreign labor force

- *Since 2005 Italy has been registering consistent increases in foreign population and labor force (see figure).*
- *In the long run, this could be supportive to productivity, allowing a shift of native to more skilled jobs or augmenting female skilled labor force (through the provision of domestic services).*
- *It the short run, the effect could have a negative sign, favouring substitution of foreign, low skilled workers with native ones or because of the low returns on schooling measured for foreign labor force (Accetturo and Infante 2011).*
- *The problem here is that shock on foreign labor force have been recurring, so that the system has yet to reach the new steady state equilibrium.*
- *Here again, we would need a more accurate measure of the impact of foreign labor force on productivity, in the short and in the long run.*

# Foreign population and labor force: percent growth 2005-2010

	Population	Labor force	Employees
Italy	84.8	80.9	77.9
Germany	0.2	1.5	9.7

Fifth: quality matters (?)

- *Last but not least, some authors stress the issue of mismeasurement of quality upgrading of Italian productions (Trau e De Nardis (2003); Cipolletta (2003))*
- *The thesis is that Italian firms react to international competition through quality upgrading, that is not measured by statistics of production, value added and exports.*
- *The evidence supporting this thesis is that Italian exports perform much better in international comparison, when they are measured in nominal and not in real terms;*
- *Di Giacinto and Micucci (2011) show that about 25% of export price increase can be attributed, in Italy, to quality upgrading*

Nominal and real exports: Italy vs Germany
2000 = 100
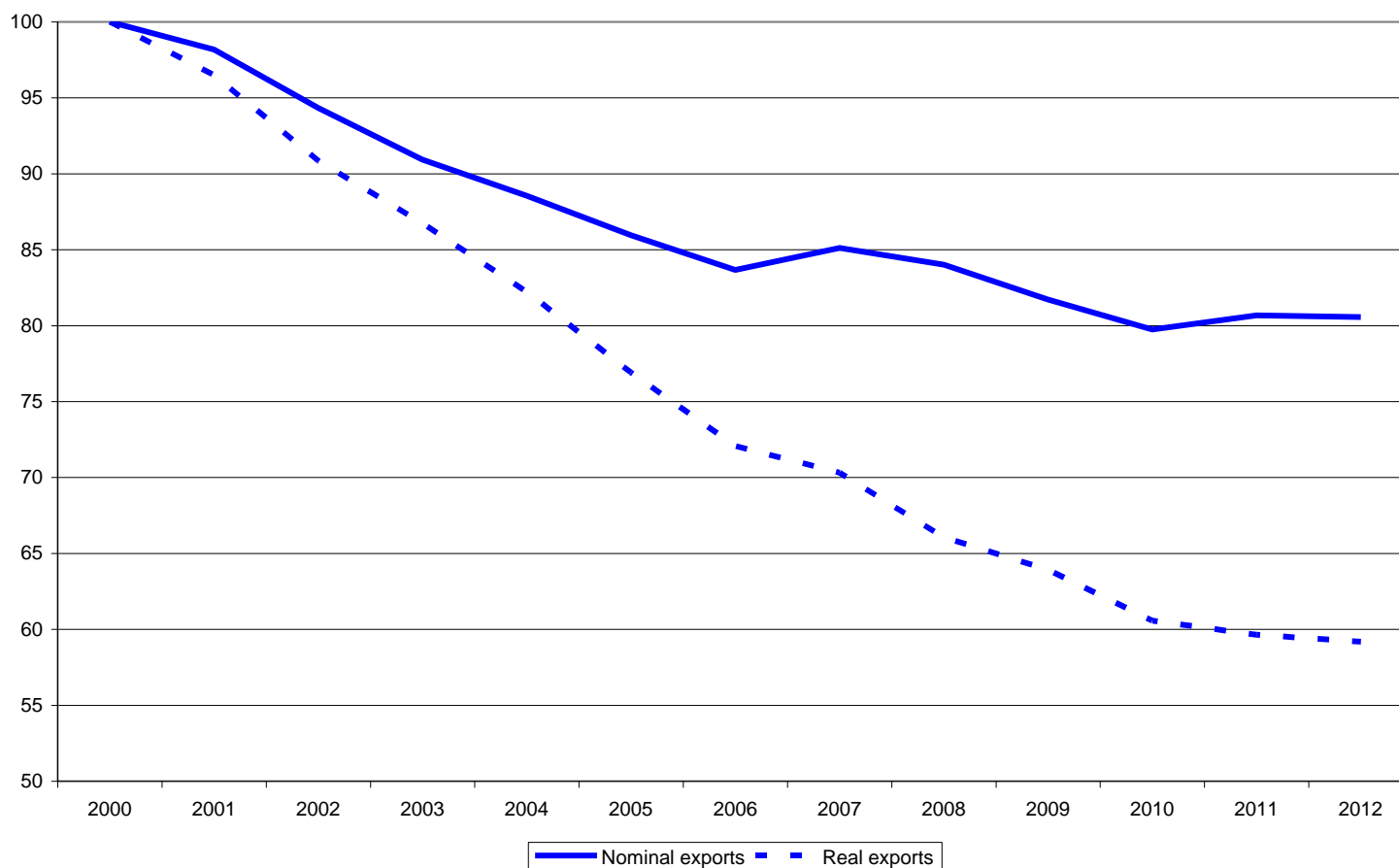
Quality matters (?)

- *If you follow this thesis, you will have a more reassuring picture of Italian economic trends*
- *But the thesis is not fully satisfactory. Both increases in quality and efficiency are beneficial for social welfare.*
- *But if you only increase quality, the maximum result you can get is to preserve market shares.*
- *If you want to increase market shares (i.e. increase growth potential), gains in efficiency are needed.*
- *And it is only when you expand your markets that full benefits can be reaped from quality upgrading (German model?)*

- **Growth and productivity**
  - We will now turn specifically to productivity issues.
  - Labour and total factor productivity will be considered.
- **What explains growth?**
  - Production requires various inputs, which can be aggregated into labour (L) and capital (K).
  - Output dynamics depend on input dynamics, though the latter is not always sufficient.
  - Other factors should be accounted for:
    - Improved quality of inputs;
    - Efficient use of resources;
    - Technological progress;
    - …

■ Total Factor Productivity (TFP)

- Given the following production function

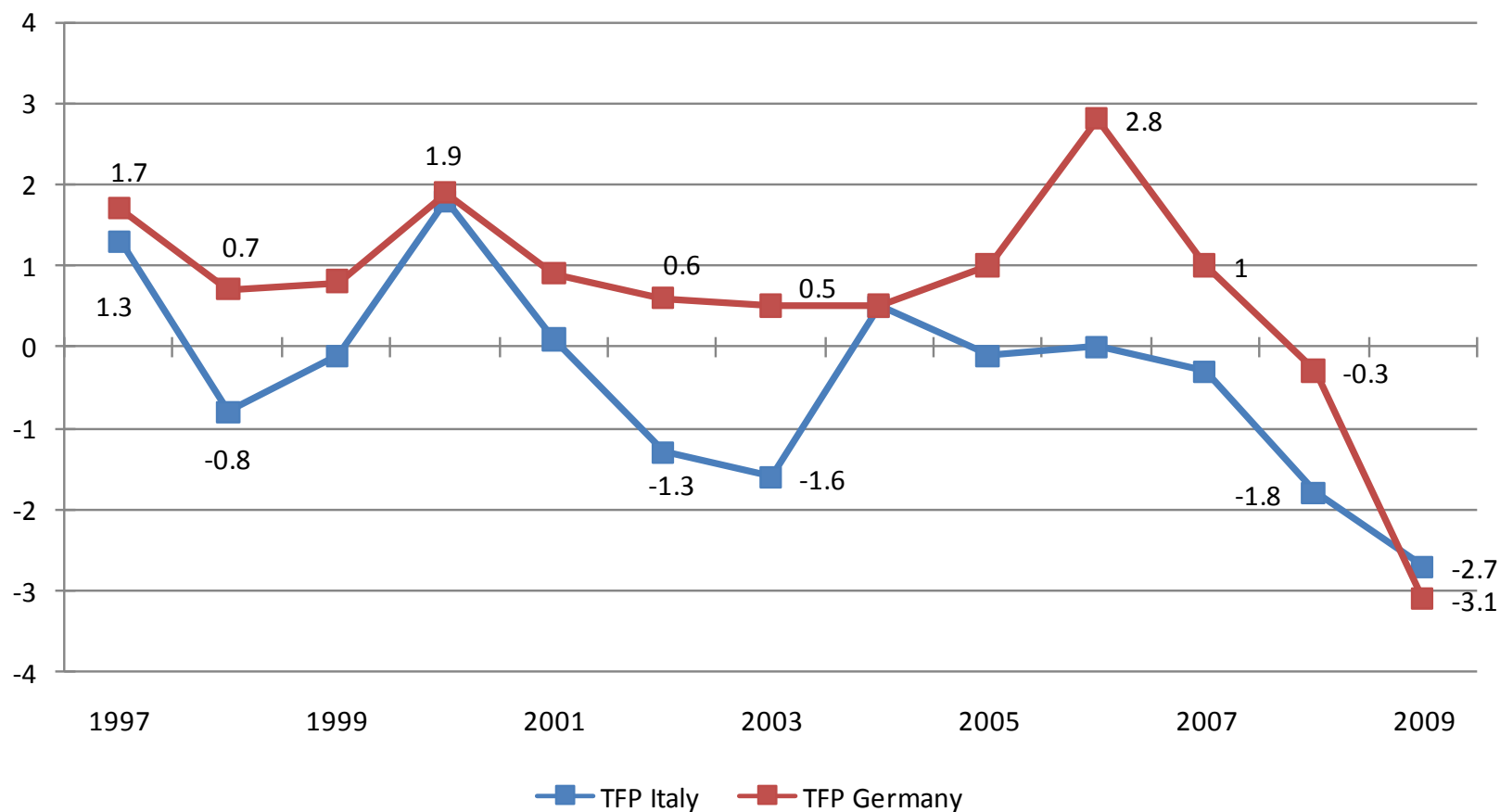$$Q_t = A_t F(K_t, L_t)$$

the growth rate of output is given by

$$\frac{\dot{Q}}{Q} = \frac{\dot{A}}{A} + s_t^K \frac{\dot{K}}{K} + s_t^L \frac{\dot{L}}{L}$$

where s^i ($i = K, L$) are input shares.

- We can obtain the growth rate of TFP as a residual like

$$TFP = \frac{\dot{A}}{A} = \frac{\dot{Q}}{Q} - s_t^K \frac{\dot{K}}{K} - s_t^L \frac{\dot{L}}{L}$$

TFP percent growth rate (Source: OECD)

- TFP has played a positive role in Germany's growth, while it has been negative in Italy.
- This is a generalised phenomenon at the sectoral level.
- EU KLEMS data give detailed information relative to the contribution to sectoral value added growth of various factors:
  - Hours worked;
  - Labour composition change;
  - ICT and non-ICT capital services;
  - TFP.

Contributions to VA growth (% var VA) in Germany and Italy: 1995-2007

	Hours	ICT cap.	Non-ICT capital	Labour compos.	TFP	% var VA	VA share
Germany							
Agric., hunting, forestry and fishing	**-2,8**	0,0	-0,7	-0,4	5,1	1,2	1,3
Mining and quarrying	**-6,3**	0,1	0,0	0,1	0,6	-5,5	0,4
Total manufacturing	**-1,1**	0,2	0,1	0,3	2,0	1,5	22,1
Electricity, gas and water supply	**-1,2**	0,2	0,8	0,1	2,1	1,9	2,3
Construction	**-2,4**	0,0	-0,3	0,2	-0,7	-3,2	5,1
Wholesale and retail trade	**-0,3**	0,3	0,2	-0,1	1,3	1,5	11,1
Hotels and restaurants	1,3	0,1	0,0	0,0	-0,2	1,1	1,3
Trans., storage and communication	**-0,6**	0,3	0,5	-0,2	3,5	3,5	6,3
Fin., ins., real estate and bus. serv.	1,0	0,8	1,9	-0,2	**-0,8**	2,7	28,2
Community social & personal serv.	0,5	0,2	0,3	-0,1	0,4	1,3	22,0
Italy							
Agric., hunting, forestry and fishing	**-1,5**	0,0	0,4	0,2	1,4	0,5	3,2
Mining and quarrying	-0,3	0,1	1,9	0,1	**-1,4**	0,3	0,5
Total manufacturing	**-0,1**	0,2	0,5	0,2	**-0,1**	0,7	20,6
Electricity, gas and water supply	**-0,6**	0,1	1,0	0,0	0,2	0,6	2,1
Construction	1,7	0,1	1,2	0,1	**-1,3**	1,8	5,4
Wholesale and retail trade	0,0	0,3	1,0	0,4	**-0,5**	1,2	13,4
Hotels and restaurants	1,7	0,1	0,9	0,2	**-1,2**	1,6	3,4
Trans., storage and communication	0,7	0,4	0,9	0,1	1,5	3,6	8,1
Fin., ins., real estate and bus. serv.	1,6	0,3	0,6	**-0,2**	**-0,2**	2,2	23,5
Community social & personal serv.	0,9	0,2	0,4	**-0,2**	**-0,2**	1,2	19,8

Source: Own calculations from EU KLEMS database (November 2009 Release)

- During the same period there has not been a relevant "structural change" effect coming from shifts of labour across sectors in Germany [from 2000], where labour productivity has improved consistently while in Italy it has been very faint.

- We assessed it by means of a shift-share analysis on all industries in the EU KLEMS database (excluding L-Q sectors)

$$\frac{Y_T}{L_T} - \frac{Y_0}{L_0} = \underbrace{\sum_{j=1}^{J} \theta_{j0} \left(\frac{Y_{jT}}{L_{jT}} - \frac{Y_{j0}}{L_{j0}} \right)}_{\text{Intra–sectoral effect}} + \underbrace{\sum_{j=1}^{J} (\theta_{jT} - \theta_{j0}) \frac{Y_{j0}}{L_{j0}}}_{\text{Static sectoral effect}} + \underbrace{\sum_{j=1}^{J} (\theta_{jT} - \theta_{j0}) \left(\frac{Y_{jT}}{L_{jT}} - \frac{Y_{j0}}{L_{j0}} \right)}_{\text{Dynamic sectoral effect}}$$

Structural change effect

- Intra-sectoral effect: labour productivity due to effective productivity improvement
- Structural change effect: reflects the re-allocation of labour and can be decomposed in
  - Static sectoral effect: increase in productivity induced only by changes in sectoral composition
  - Dynamic sectoral effect: interaction between change in shares and productivity.
- Results are presented in the next table.

Sfift-share analysis

	1996-1999	2000-2003	2004-2007
Germany			
Intra-sectoral effect	1,0	2,1	2,5
Structural change effect	0,7	0,2	-0,1
Static sectoral effect	1,0	0,3	0,0
Dynamic sectoral effect	-0,3	-0,1	-0,1
Total effect	1,7	2,4	2,4
Italy			
Intra-sectoral effect	0,6	-0,2	0,1
Structural change effect	-0,1	-0,1	0,3
Static sectoral effect	0,0	0,0	0,3
Dynamic sectoral effect	-0,1	-0,1	-0,1
Total effect	0,5	-0,3	0,4

Note: Absolute variations of value added per hour worked.
Source: Own calculations from EU KLEMS data (November 2009 release)

- TFP has played an important role.
- However, TFP has shortcomings:
  - The "residual" nature of TFP can be seen as a critical point on the interpretation of this measure.
  - It is influenced by various factors, among of which we can think, e.g., about the correct measurement of inputs.
  - Another catch concerns the assumptions made under the standard growth accounting framework (Laurenceson and O'Donnell, 2011)
    - No technical inefficiency;
    - Technology is input homothetic;
    - Technical change is Hicks-neutral;
    - Technology exhibits constant returns to scale;
    - Marginal revenue products equal factor prices;
    - Input aggregator function is Cobb-Douglas.

- Is the previous indicator a "good" measure?
  - So much is discussed about TFP, but:
    - Is it correctly measured?
    - Does it really represent *technical progress*?
- Non-parametric production function
  - It is possible to relax some of the assumptions and estimate a production frontier with non-parametric methods.
  - We used Data Envelopment Analysis to compute a "best practice" production frontier (panel of 14 European countries for the period 1995-2008).
  - Distance from the frontier defines relative efficiency and a shift of the frontier represents technical progress.
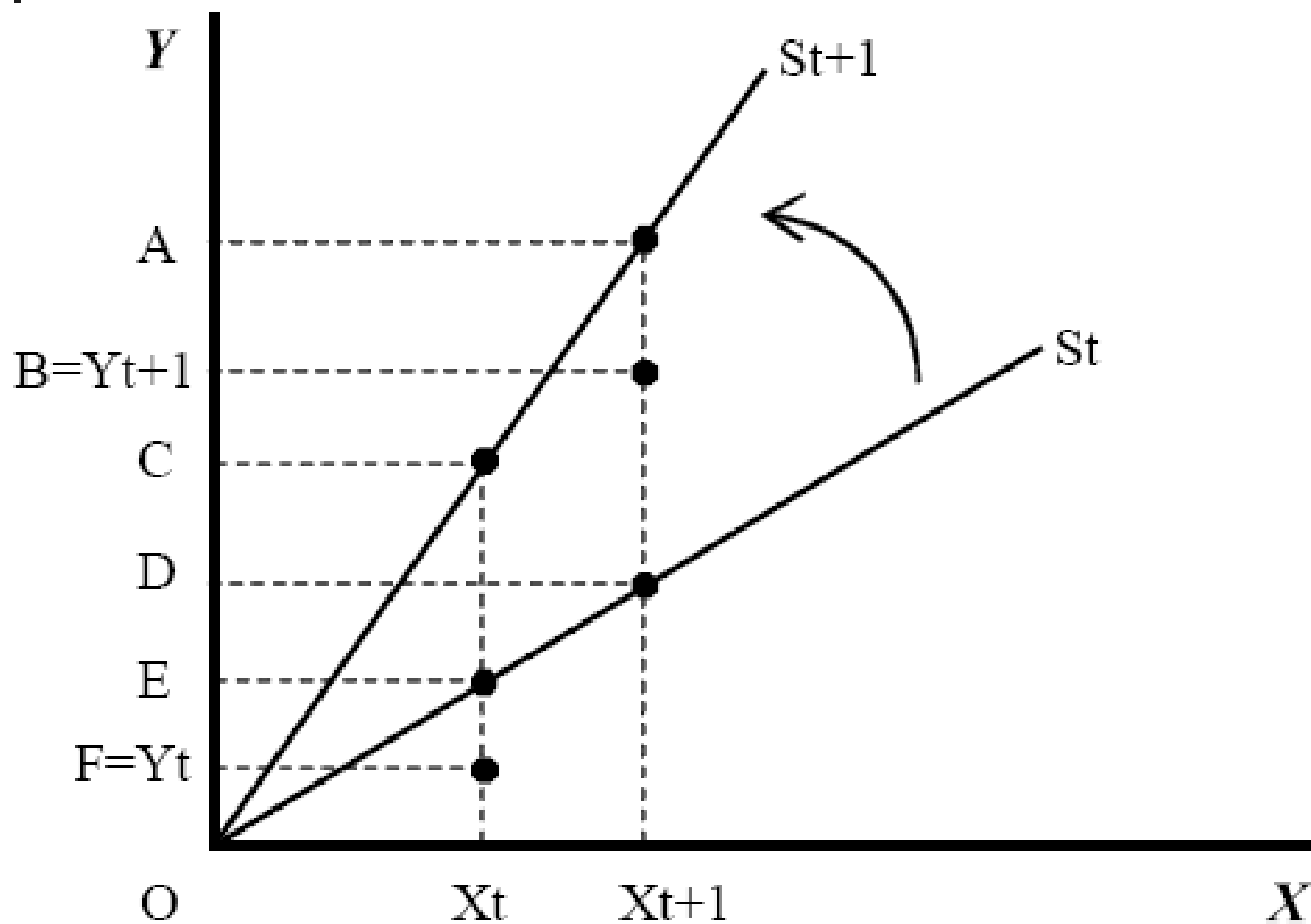
The Malmquist index (MI)

- It is possible to compare input-output combinations to the benchmark frontier and define their relative efficiency in terms of distance functions

$$\text{MI} = \left[\left(\frac{D_o^t(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})}{D_o^t(\mathbf{x}^t, \mathbf{y}^t)} \right) \left(\frac{D_o^{t+1}(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})}{D_o^{t+1}(\mathbf{x}^t, \mathbf{y}^t)} \right) \right]^{1/2}$$

$$= \frac{D_o^{t+1}(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})}{D_o^t(\mathbf{x}^t, \mathbf{y}^t)} \times \left[\left(\frac{D_o^t(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})}{D_o^{t+1}(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})} \right) \left(\frac{D_o^t(\mathbf{x}^t, \mathbf{y}^t)}{D_o^{t+1}(\mathbf{x}^t, \mathbf{y}^t)} \right) \right]^{1/2}$$

Solow residual vs. Malmquist productivity index

- **So… what does TFP represent?**
  - Given that the results from the "classical" growth accounting framework and the MI are so similar, we can use a decomposition of the latter to assess what are [some of] the factors that lie behind the familiar "residual".
  - We will try to *reduce* the "measure of our ignorance" (Abramovitz).
- **Decomposing the MI: Efficiency and technical change**
  - Efficiency, or "catching up", can be further decomposed into "pure" and "scale" efficiency.

- The term outside the brackets measures changes of relative efficiency

$$\text{efficiency change} = \frac{D_o^{t+1}(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})}{D_o^t(\mathbf{x}^t, \mathbf{y}^t)}$$

- The remaining term measures the shift in technology

$$\text{technical change} = \left[\left(\frac{D_o^t(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})}{D_o^{t+1}(\mathbf{x}^{t+1}, \mathbf{y}^{t+1})} \right) \times \left(\frac{D_o^t(\mathbf{x}^t, \mathbf{y}^t)}{D_o^{t+1}(\mathbf{x}^t, \mathbf{y}^t)} \right) \right]^{1/2}$$

TFP decomposition

	effch	techch	pech	sech	tfpch
	1 (3+4)	2	3	4	5 (1+2)
1995-2003					
Germany	-1,0%	2,1%	0,0%	-1,0%	1,0%
Italy	-1,2%	1,1%	-1,5%	0,3%	-0,1%
EU average	-0,2%	1,2%	-0,1%	-0,1%	1,0%
2004-2008					
Germany	2,0%	-0,9%	0,0%	2,0%	1,0%
Italy	-0,6%	-0,2%	-0,3%	-0,3%	-0,7%
EU average	0,4%	-0,2%	0,4%	0,0%	0,3%

Note: EU average is the unweighted average of the indicators of 14 European countries
(Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands,
 Portugal, Spain, Sweden and UK). Source: Own calculations from Ameco data.
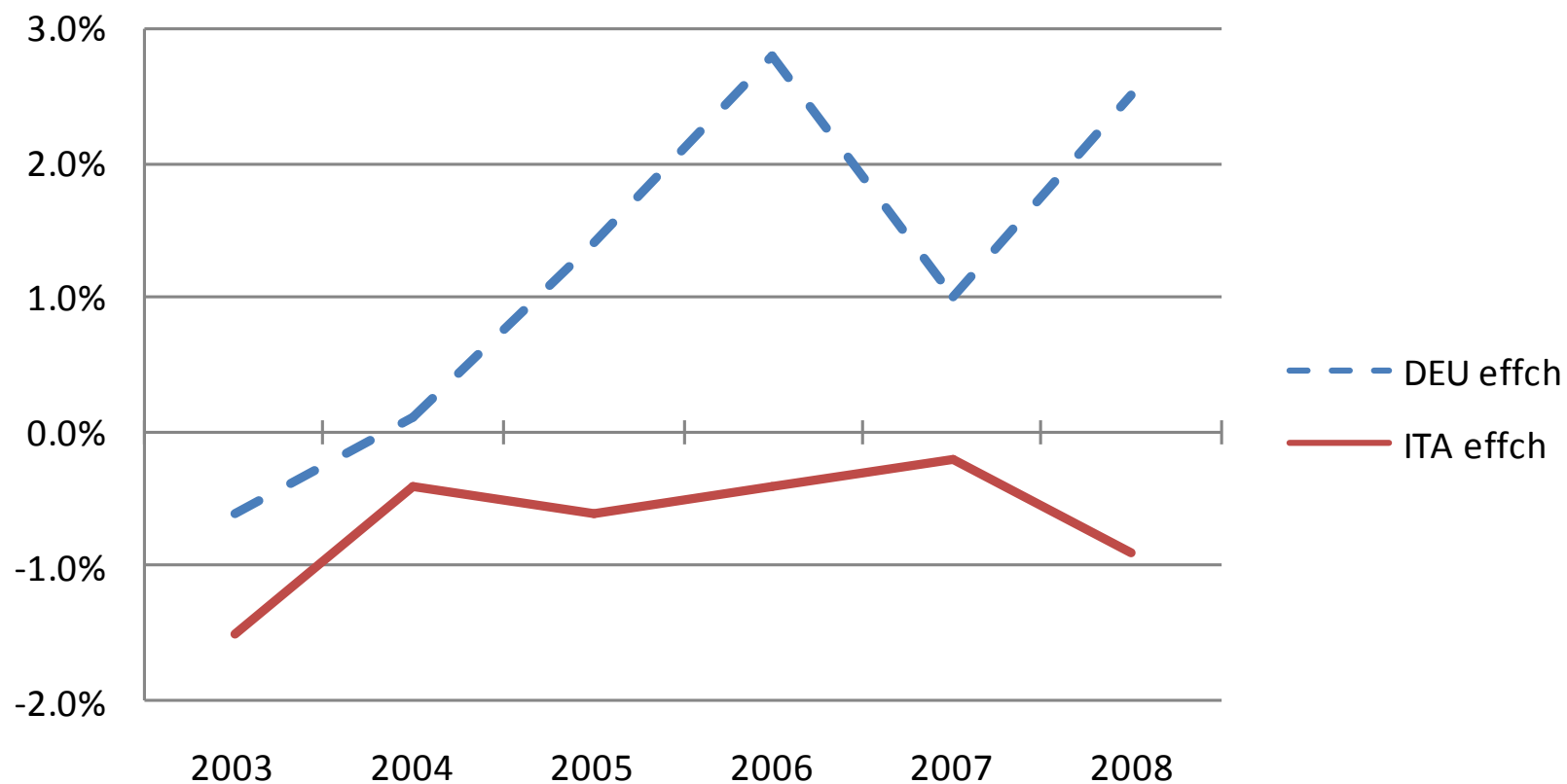
Italian TFP and its decomposition
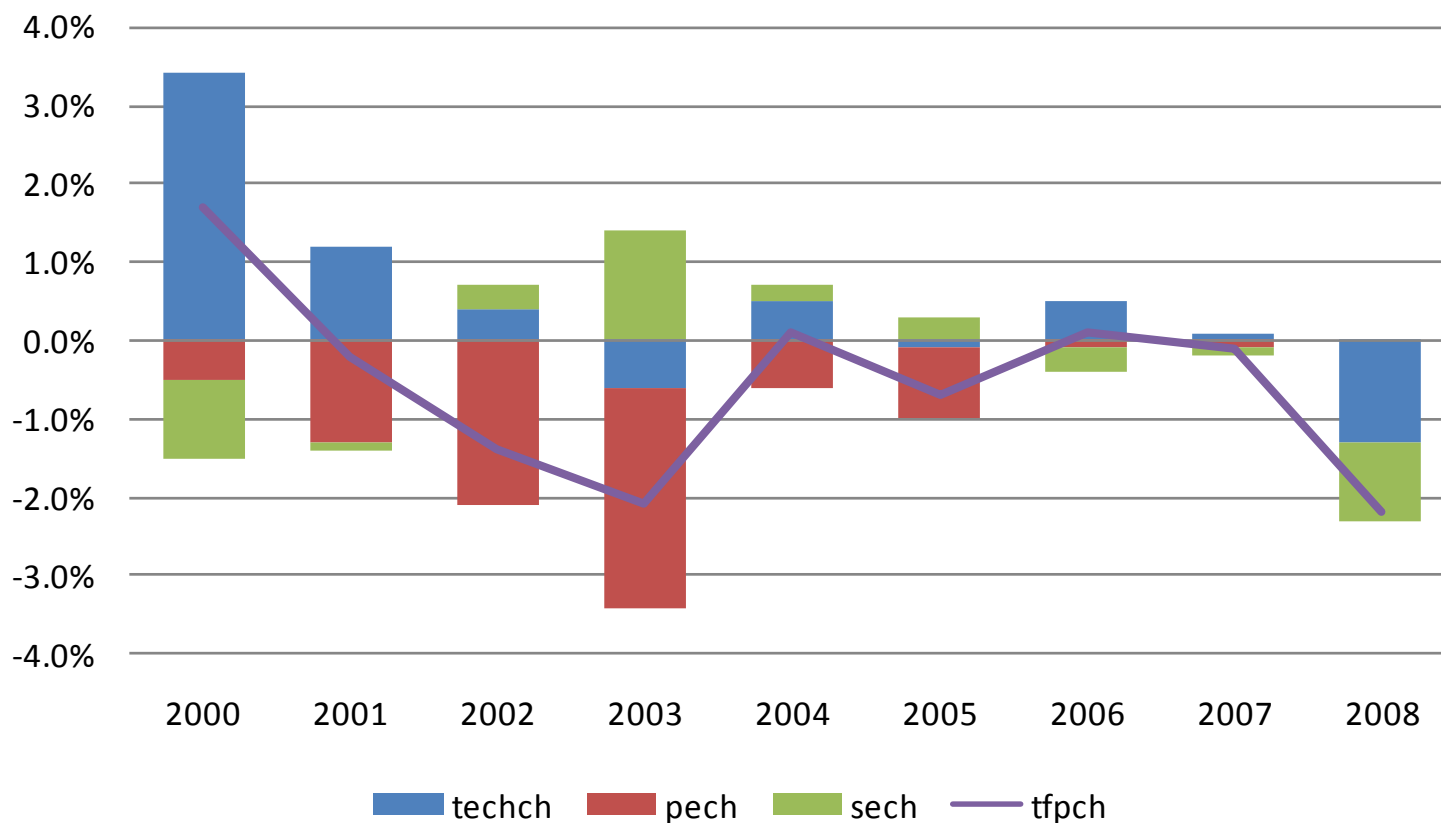
- Main differences between Germany and Italy during the last years:
  - *Scale efficiency* has played a significant role in Germany's performance.
  - In Italy *efficiency* has always provided a negative contribution to growth.
- How can we use this information?
  - It is important to acknowledge that TFP-induced growth is not simply "manna from heaven".
- But most importantly: **What can be done to improve the efficiency of the Italian economy?**
- The answers to the last question are the key of Italy's economic future.

THANKS FOR YOUR ATTENTION.