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EUI, UAB, BGSE and CEPR

Discussion on International Debt Deleveraging

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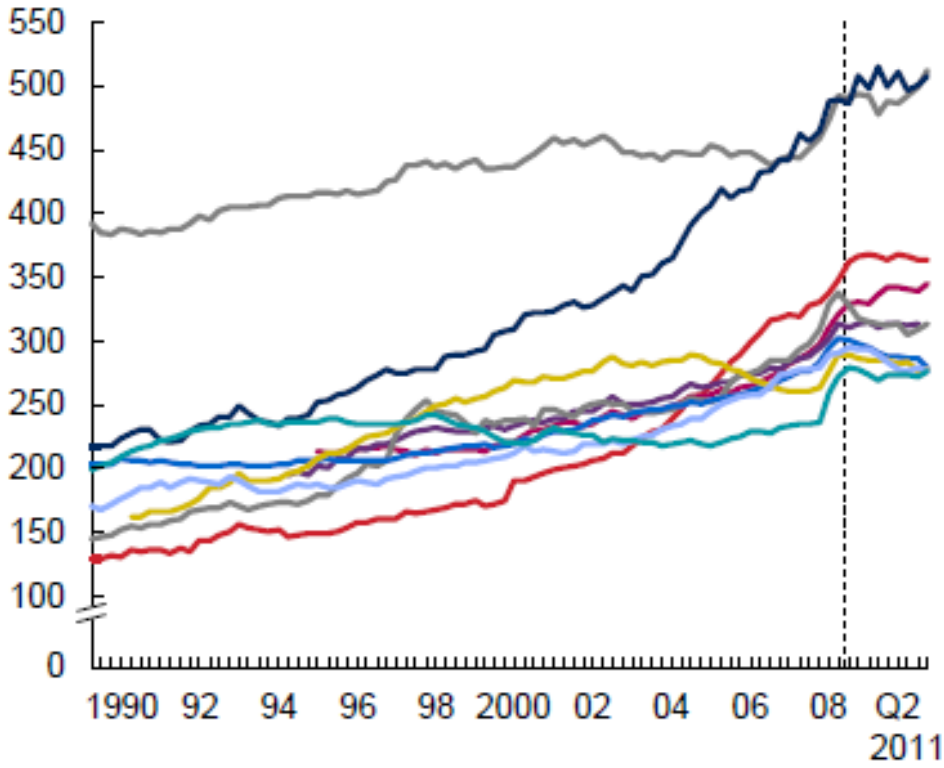
BoC-ECB workshop on exchange rates
27-28 June 2013
Frankfurt

Exhibit E1

Deleveraging has only just begun in the ten largest developed economies

Total debt,[1] 1990–Q2 2011

% of GDP



▲ Significant increase in leverage[2]

▼ Deleveraging

	Change, Percentage points		
	2000–08	2008–Q2 2011[3]	
Japan	37	39	▲
United Kingdom	177	20	
Spain	145	26	▲
France	89	35	▲
Italy	68	12	
South Korea	91	-16	▼
United States	75	-16	▼
Germany	7	1	
Australia	77	-14	▼
Canada	39	17	

1 Includes all loans and fixed-income securities of households, corporations, financial institutions, and government.
2 Defined as an increase of 25 percentage points or more.
3 Or latest available.

SOURCE: Haver Analytics; national central banks; McKinsey Global Institute

Framework

Deleveraging is studied in a framework of:

- Continuum of small open economies trading with each other
- Each economy is inhabited by a representative household who faces temporary and country-specific productivity shocks and smooth consumption by borrowing and lending (Bewley (1977))
- Each household is subject to an exogenous borrowing limit
- Deleveraging shock: tightening of the borrowing limit

Two basic versions of the model:

With flexible wages and exchange rates

With nominal wage stickiness in a monetary union

Set up

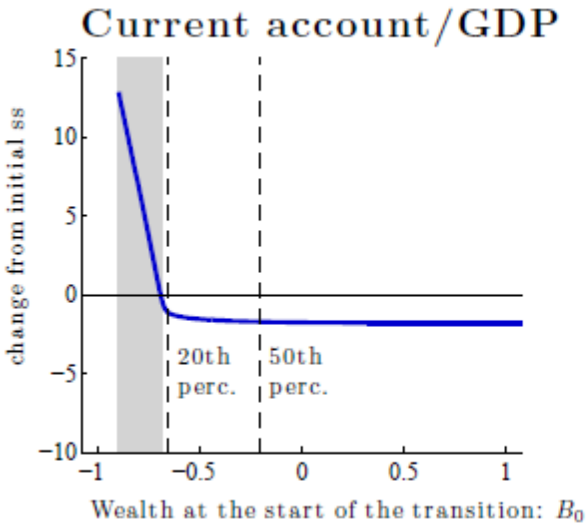
Time is discrete

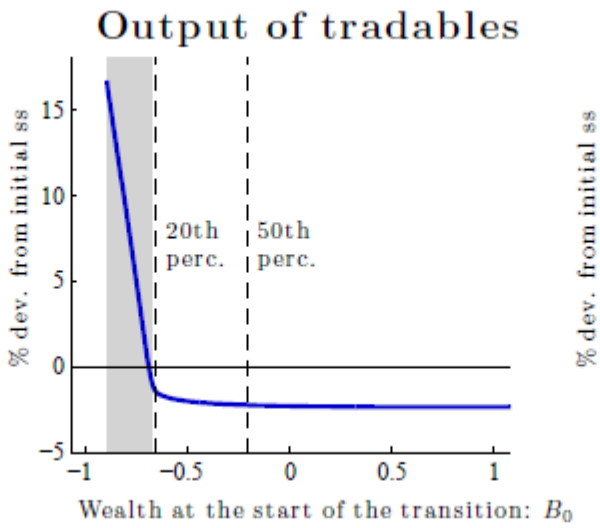
- Continuum of measure one of small open economies
- Each economy is populated by a continuum of identical households
- All economies produce two goods: a tradable good and a non-tradable good
- Idiosyncratic shocks, no aggregate uncertainty apart from borrowing limit shock
- International credit markets to smooth consumption
- Each household can trade in one period risk-free bond (denominated in units of the tradable consumption good and paying the gross interest rate R_t)

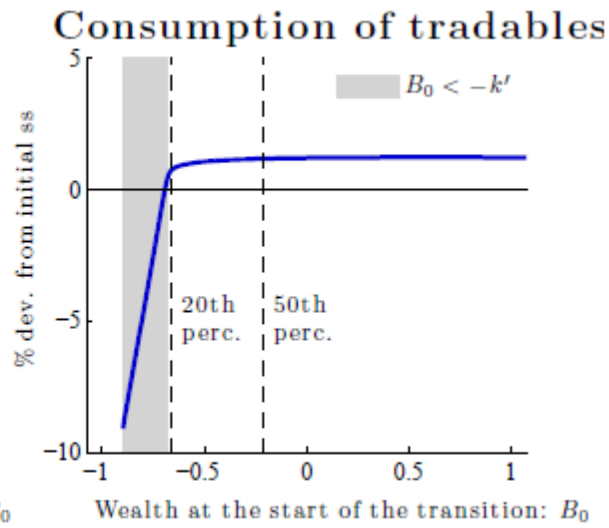
Transmission flexible wages –exchange rates

Tightening borrowing limit =>

- Fall in foreign debt on highly indebted countries and reduction of net foreign asset position of surplus countries.
- increase in savings of both countries forced for highly indebted countries and due to precautionary motives in unrestricted countries=> Fall in world interest rate
- No much action in world output
- Highly indebted countries increase tradable output. Wealth effect makes households increase labor supply inducing fall in real wages and increase in tradable employment and output.
- Unconstrained countries increase tradable consumption or reduce tradable output or both


Current account/GDP
change from initial ss
15
10
5
0
−5
−10
−1
−0.5
0
0.5
1
20th perc.
50th perc.
Wealth at the start of the transition: B_0


Output of tradables
% dev. from initial ss
15
10
5
0
−5
−1
−0.5
0
0.5
1
20th perc.
50th perc.
Wealth at the start of the transition: B_0


Consumption of tradables
% dev. from initial ss
5
0
−5
−10
−1
−0.5
0
0.5
1
$B_0 < -k'$
20th perc.
50th perc.
Wealth at the start of the transition: B_0

Transmission sticky wages – flexible exchange rates

- If wages are rigid after deleveraging shock, but exchange rate are flexibile the model generates similar dynamics with flexible wages-exchange rates equilibrium:
- Depreciation of nominal exchange rate in highly indebted countries => increase in labor and production of tradables and appreciation in low-debt countries and increases in consumption of tradables.

Deleveraging in a monetary union with nominal wage rigidities

- With fixed exchange rate and wages=>
  - no means to adjust CA for highly indebted countries
  - no reaction of tradable output and adjustment through consumption with big fall in price of nontradables
  - => real depreciation with fixed wages
  - => fall in demand for labor in nontradable sector and fall in nontradable output

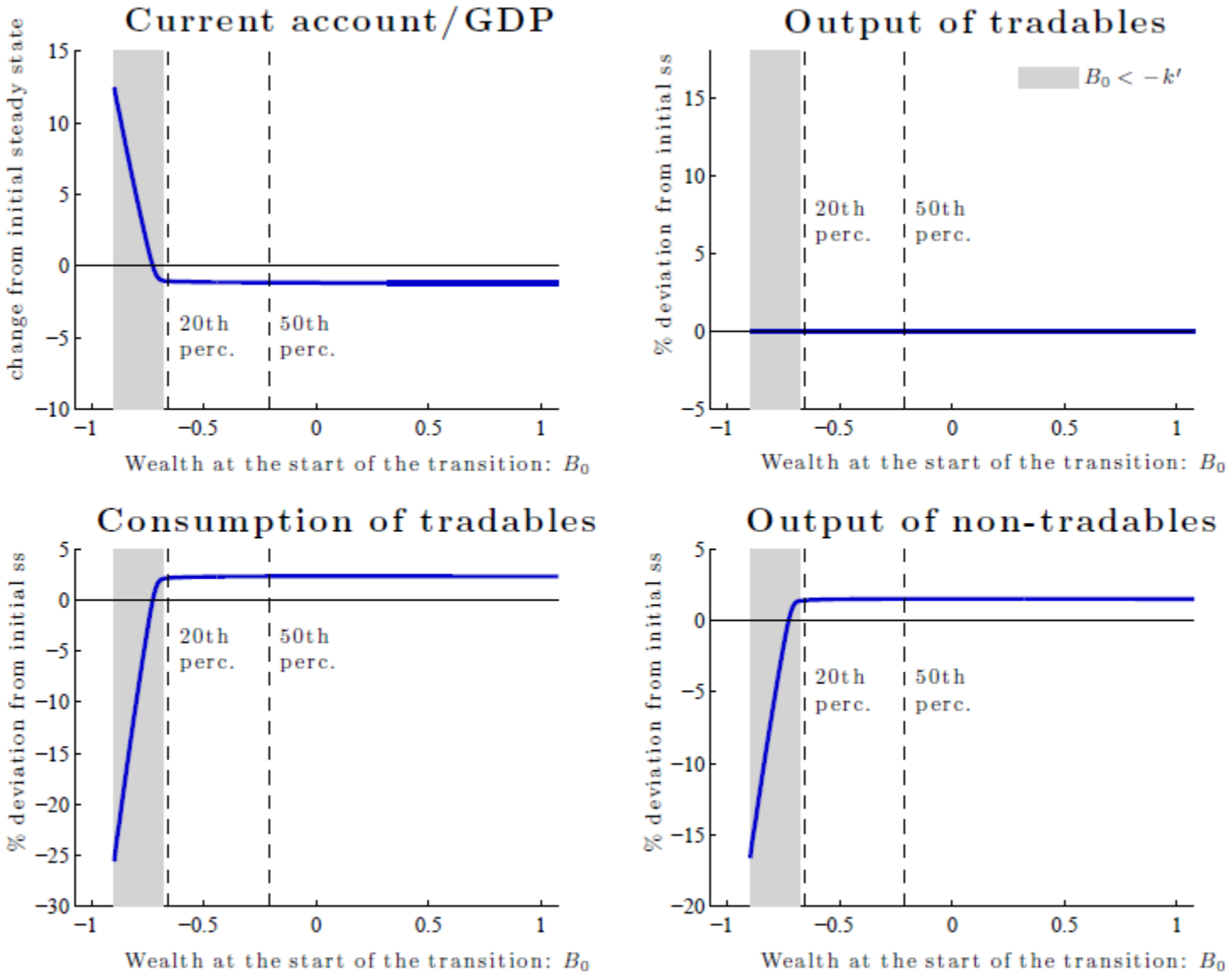


Figure 6: Impact responses to deleveraging shock across the NFA distribution - monetary union with nominal wage rigidities.

Zero lower bound, monetary union and sticky wages

- With zero lower bound: fall in interest rate cannot clear the market for tradables => fall in price of tradables =>
- a) decrease in production of tradables
- b) downward pressures to prices of nontradables and fall in employment and output of nontradables in highly indebted countries
- c) Fisher's debt inflation depresses further aggregate demand

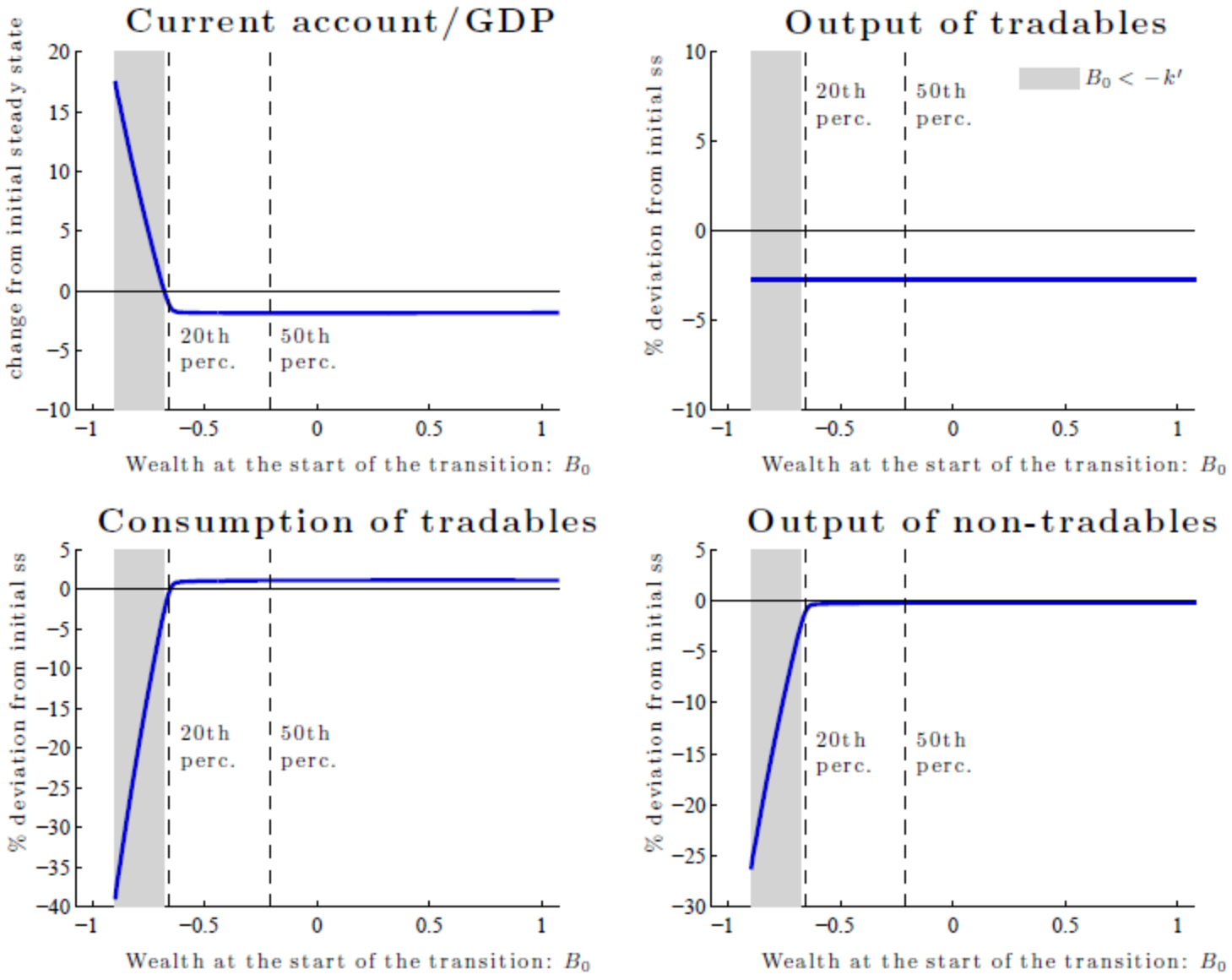


Figure 8: Impact responses to deleveraging shock across the NFA distribution - liquidity trap in a monetary union.

A lot of testable implications

- Do traded and non traded output responses to a financial shock depends on

  A) monetary union membership?
  B) country's initial debt level?
  C) the extent of nominal wages stickiness?

- They same question can be asked for relative prices. I will concentrate toady on output.

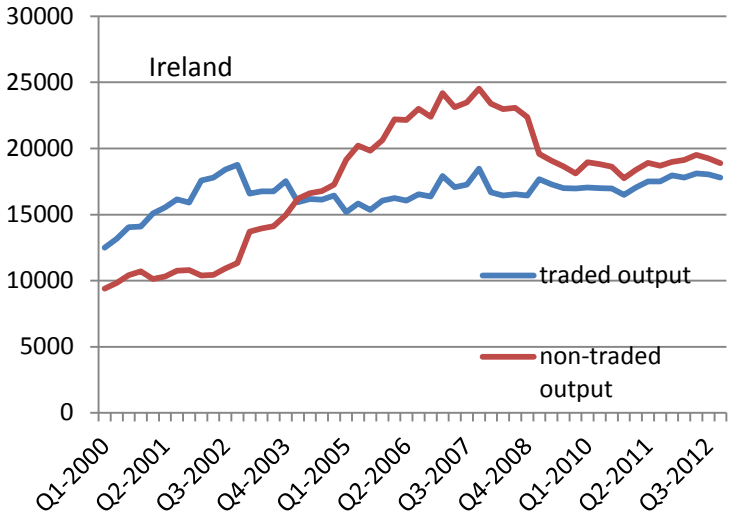
Exercise

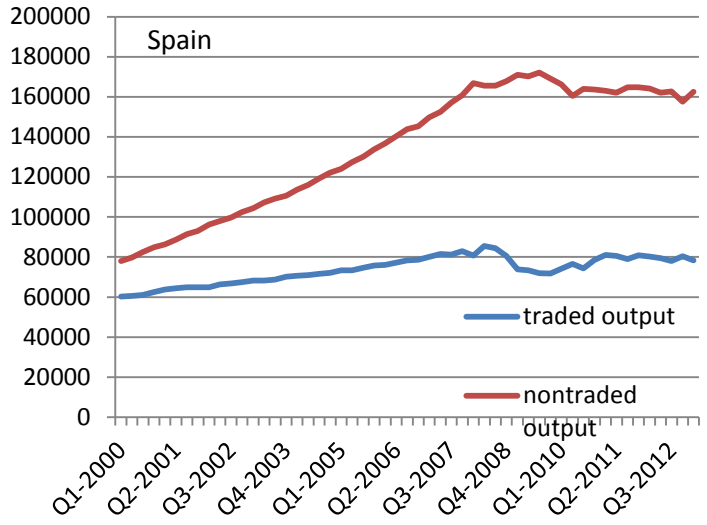
- How did traded and non-traded output react during the last recession in different European countries?

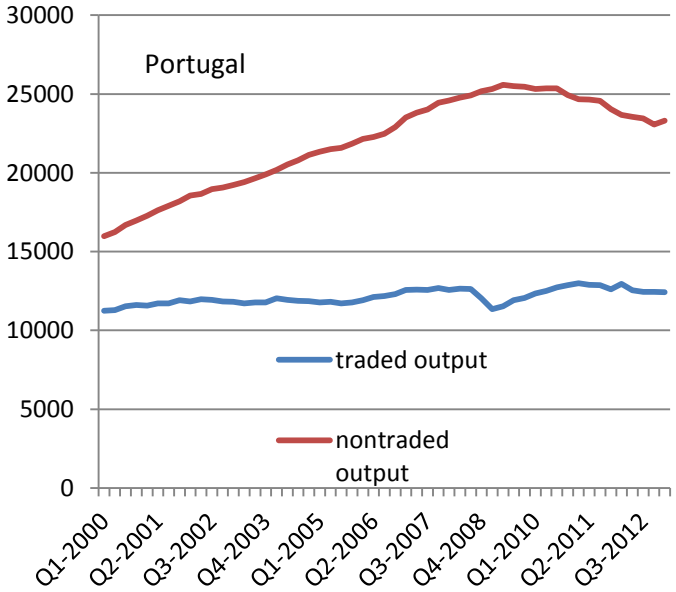
- Using data from the OECD I constructed measures of traded and nontraded output, using quarterly GDP by industry data. For each country, I define traded output as real output in manufacturing, mining, and agriculture, while nontraded output is simply the difference between total GDP and this measure of traded output.

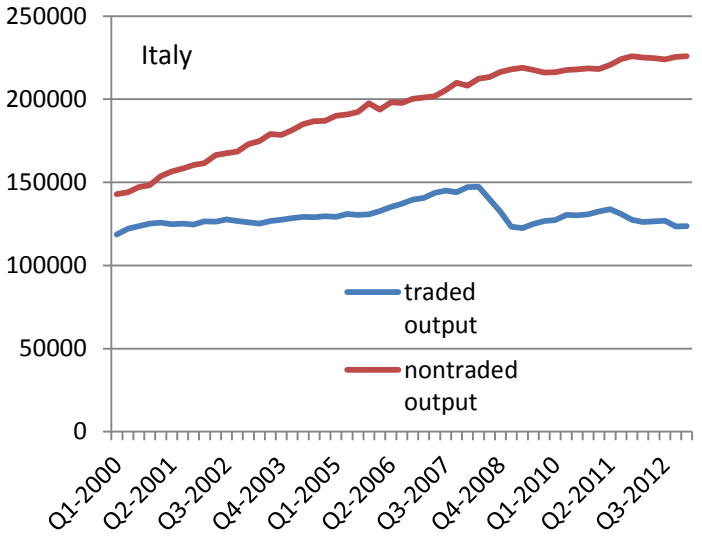
- I have divided countries in different groups
  1. High debt EMU countries
  2. Low debt EMU countries
  3. Non EMU countries
  4. Accession countries

High debt to GDP EMU countries:
Model predictions: fall in traded and significant fall in non-traded

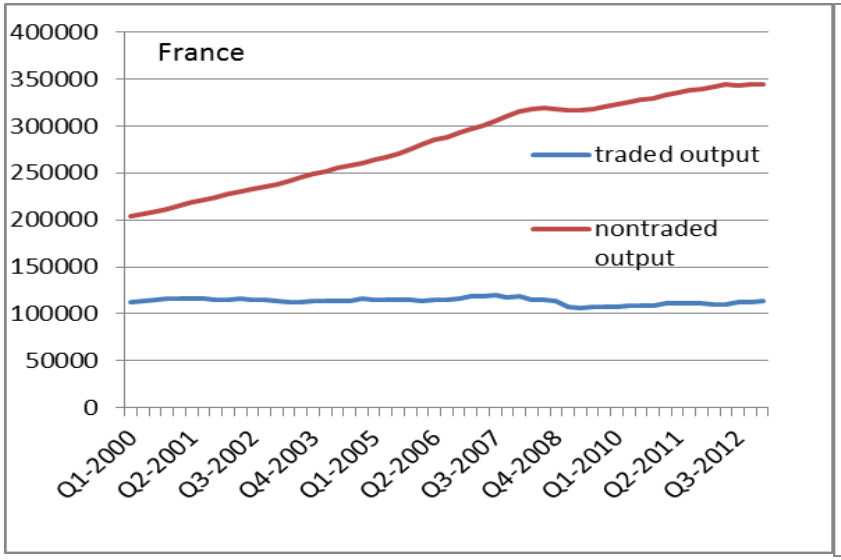


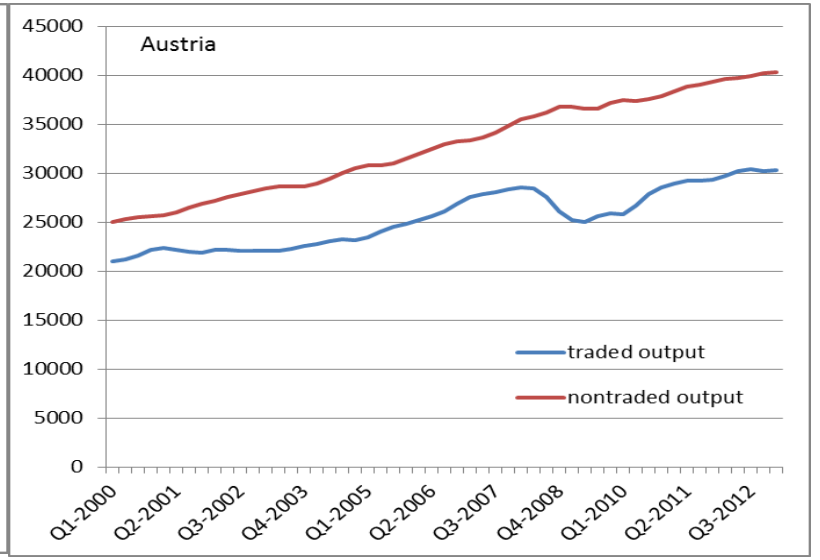


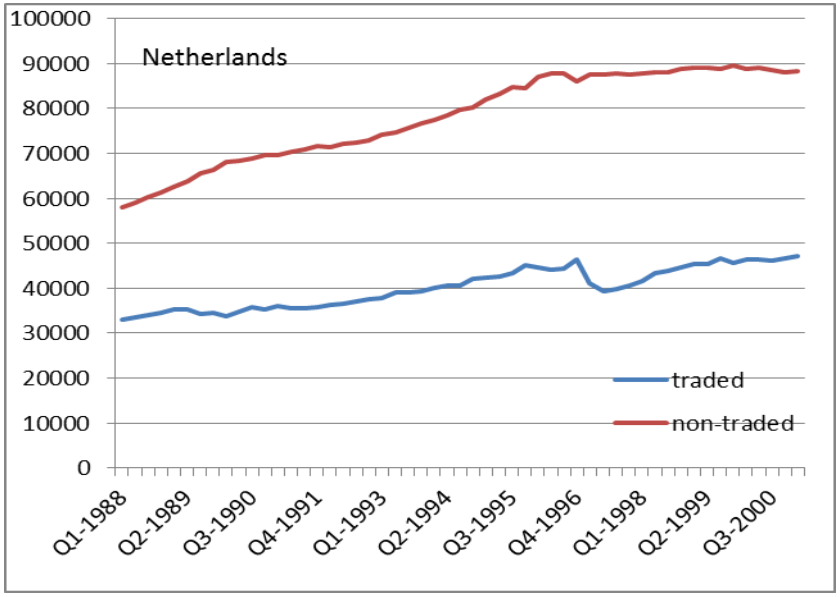


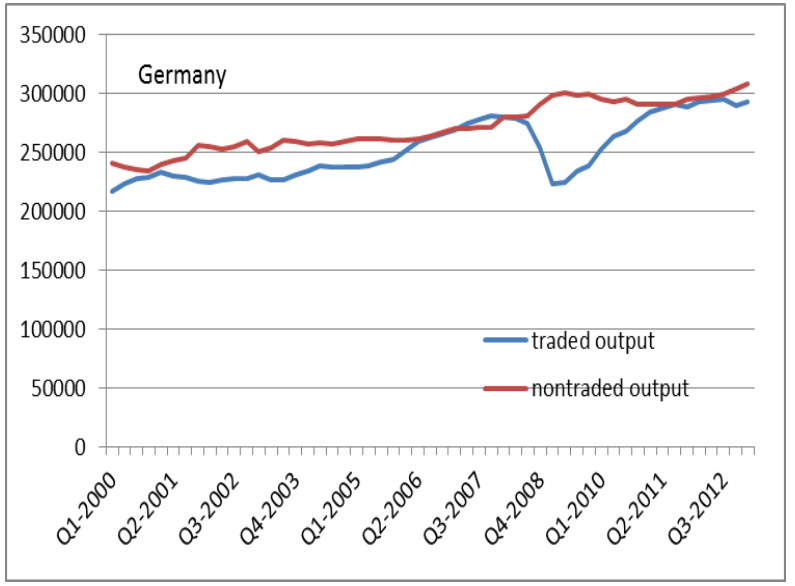


Low debt to GDP EMU countries:
Model prediction: fall in traded output

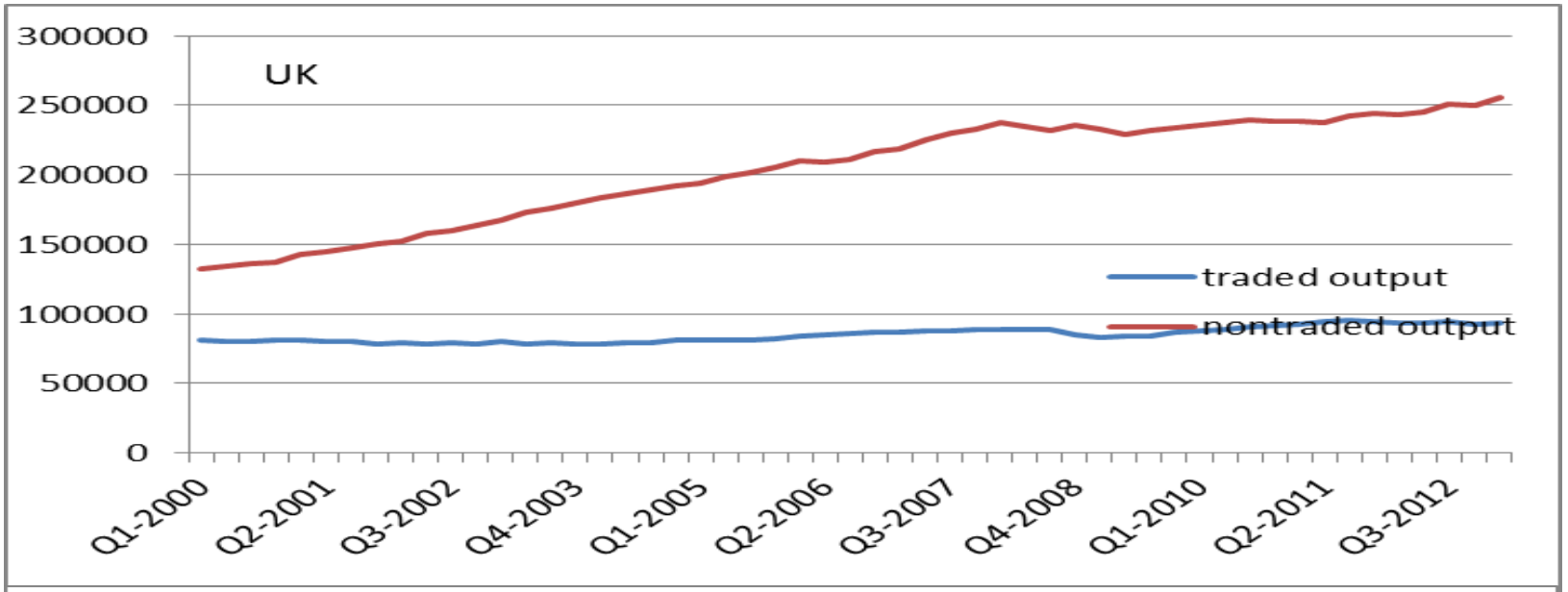


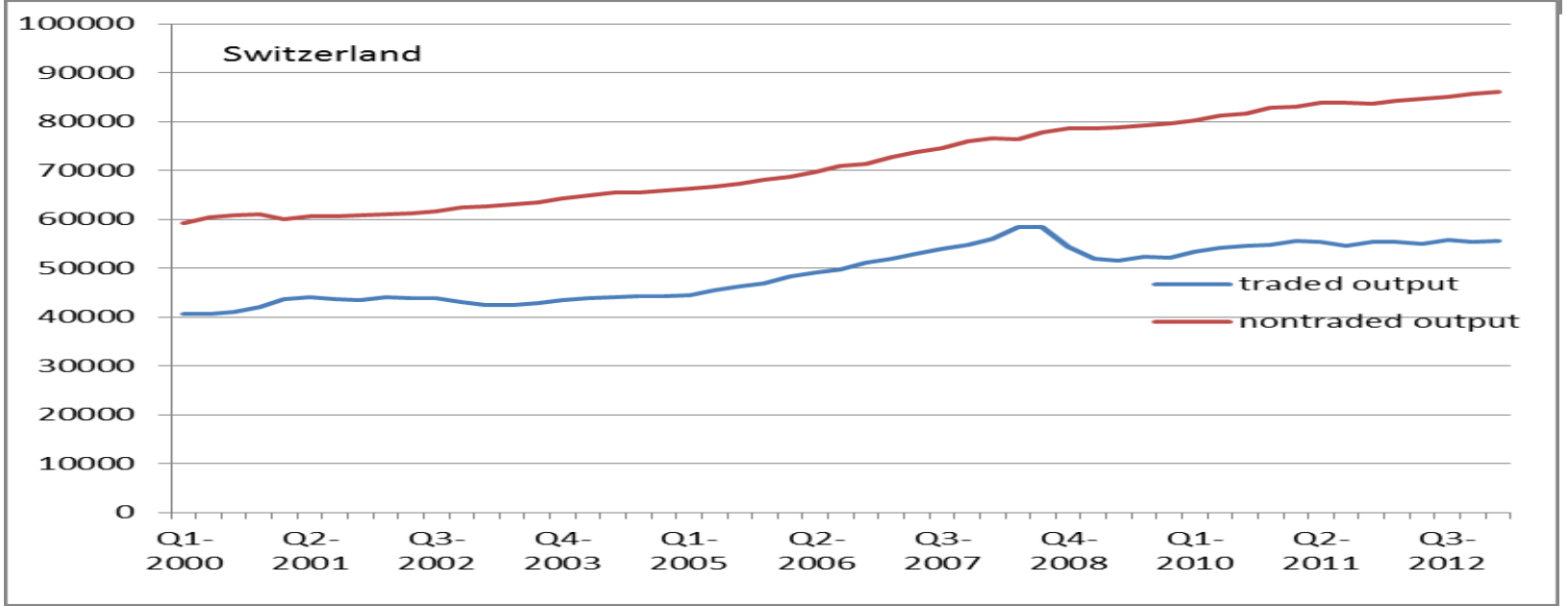




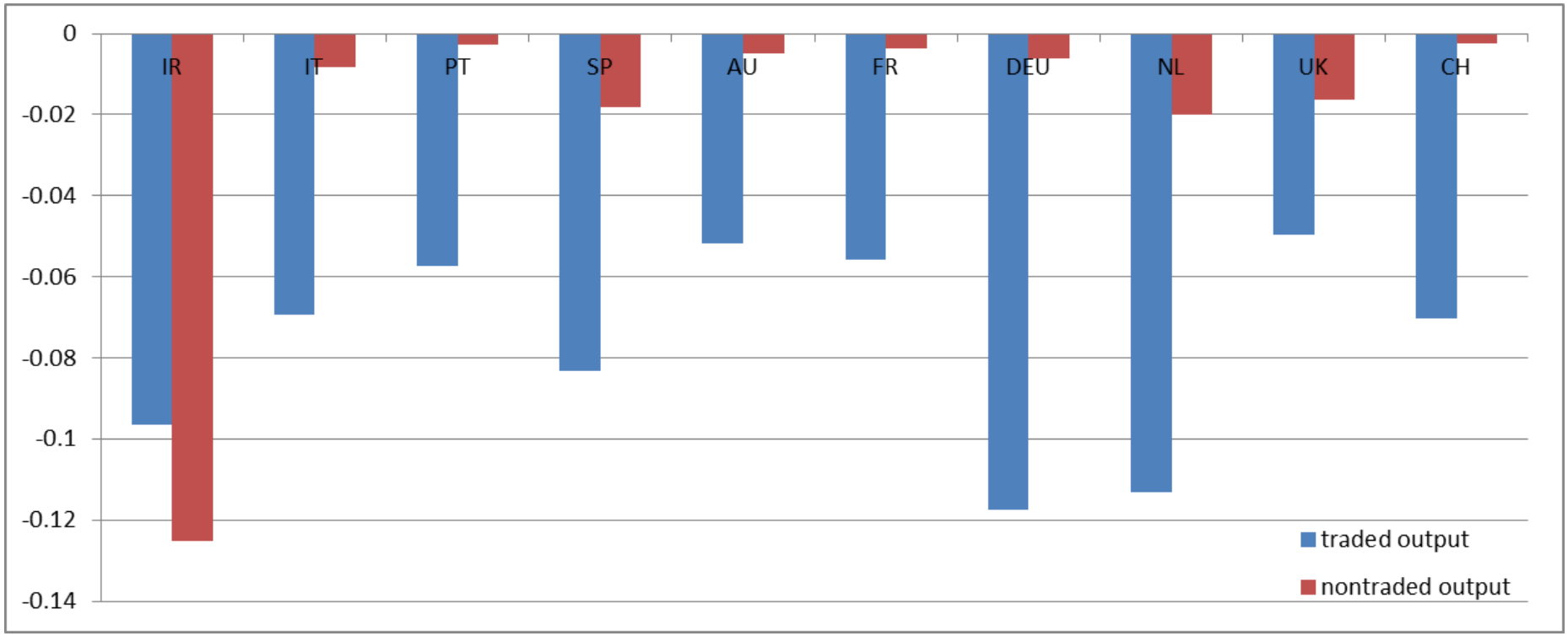


Non EMU countries:
Model predictions: for CH fall in traded and for UK increase in traded

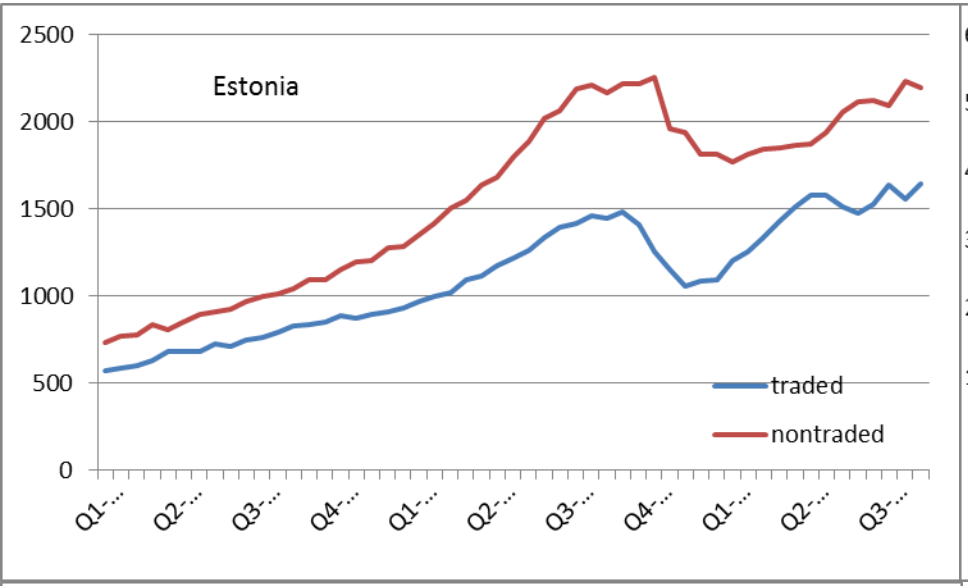


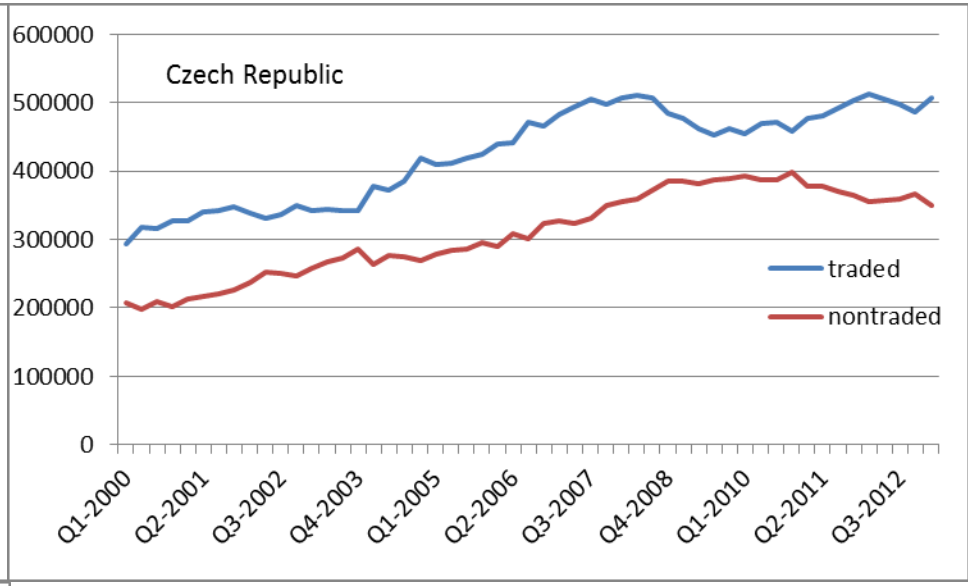


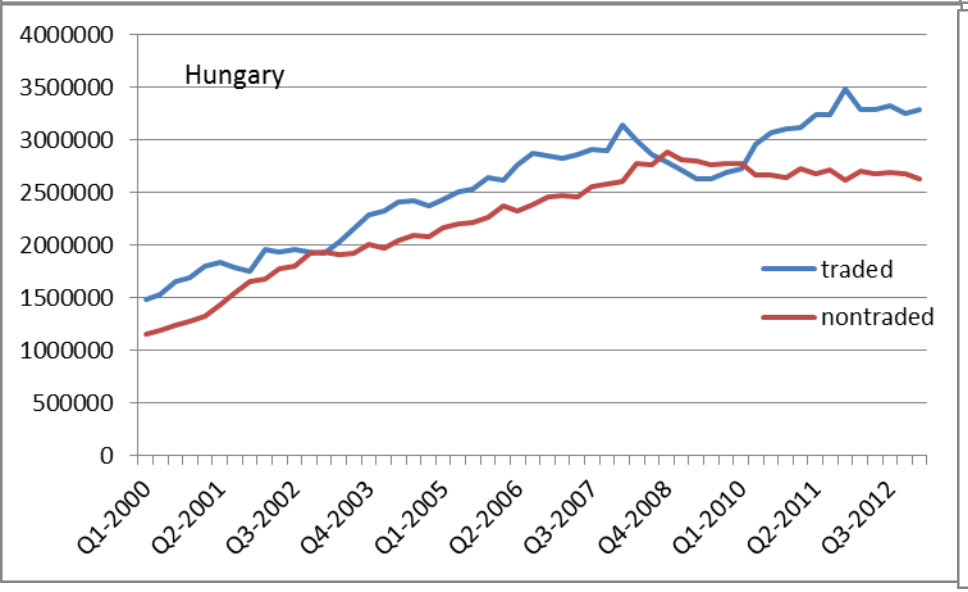
In summary

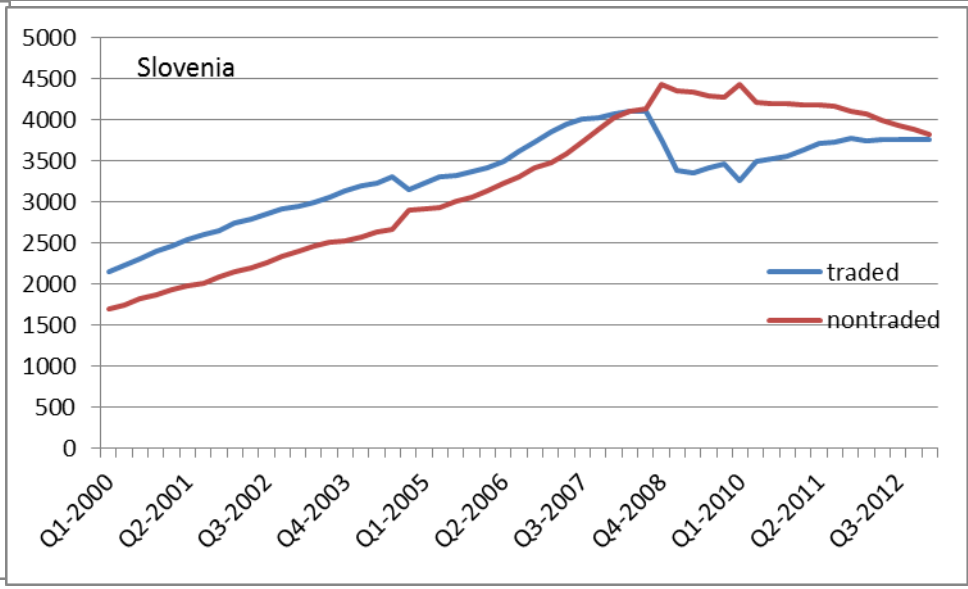

0
-0.02
-0.04
-0.06
-0.08
-0.1
-0.12
-0.14
IR
IT
PT
SP
AU
FR
DEU
NL
UK
CH
traded output
nontraded output

Accession countries









Total or public debt?

	Q2 2011	Government	Nonfinancial business	Households	Financial Institutions	Totals ▼
1	Ireland	85	194	124	259	663
2	Japan	226	99	67	120	512
3	United Kingdom	81	109	98	219	507
4	Spain	71	134	82	76	363
5	Portugal	79	128	94	55	356
6	France	90	111	48	97	346
7	Italy (Q1 2011)	111	82	45	76	314
8	South Korea	33	107	81	93	314
9	United States	80	72	87	40	279
10	Germany	83	49	60	87	278
11	Canada	69	53	91	63	276
12	Greece	132	65	62	7	267

- Source: McKinsey, Global Finance

Policy analysis

- Raising inflation target -> see also suggestion of (Schmitt-Grohe, S. and Uribe, 2013)

- Soft landing – makes sense in this model but not in others (i.e., with multiplie equilibria) or reality since it is accompanied by austerity measures and structural reforms that are not in the model.

More extensive analysis on the empirical relevance of the transmission mechanism is needed

- But, This is something other authors should do
- Luca has initiated a path to a new literature that will inspire a lot of future work
- Has provided the literature with a benchmark model to understand the effects of deleveraging in a monetary union and EMU dynamics

My congratulations!!!

Very good work