Discussion of

# "International Debt Deleveraging"

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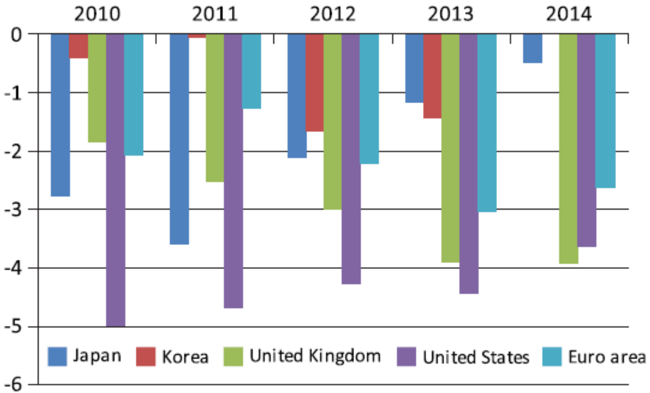
September 19, 2013

DEUTSCHE BUNDESBANK
EUROSYSTEM

# Output gaps

Figure 1: Estimated and projected output gaps of selected economies (% of potential GDP)




Source: IMF WEO April 2013.

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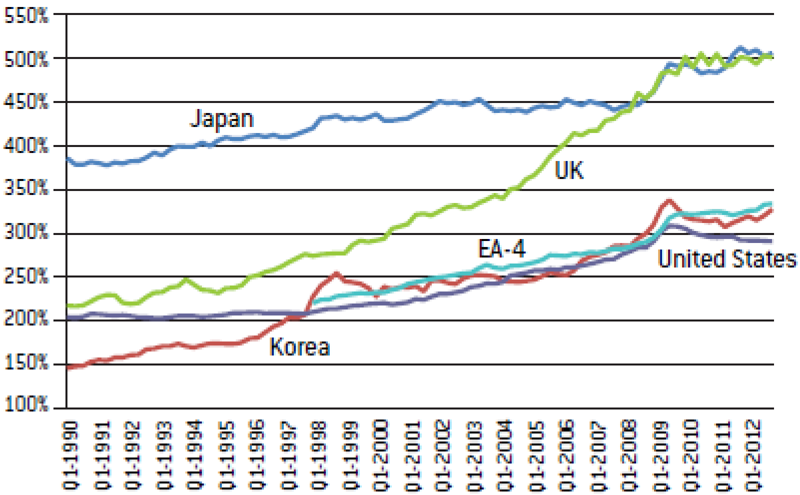
# Debt (% GDP)


550%
500%
450%
400%
350%
300%
250%
200%
150%
100%
Japan
UK
EA-4
United States
Korea
01-1990
01-1991
01-1992
01-1993
01-1994
01-1995
01-1996
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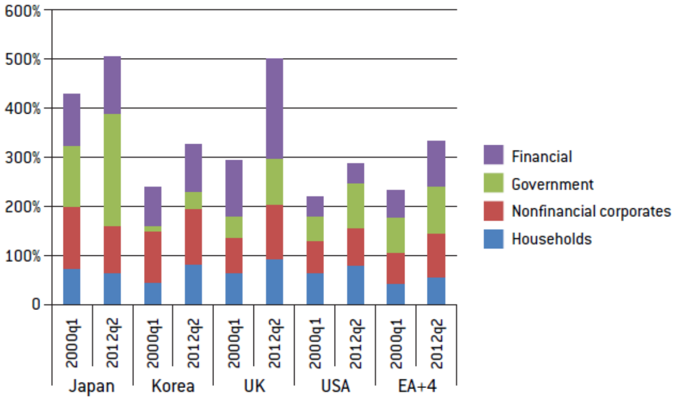
01-1998
01-1999
01-2000
01-2001
01-2002
01-2003
01-2004
01-2005
01-2006
01-2007
01-2008
01-2009
01-2010
01-2011
01-2012

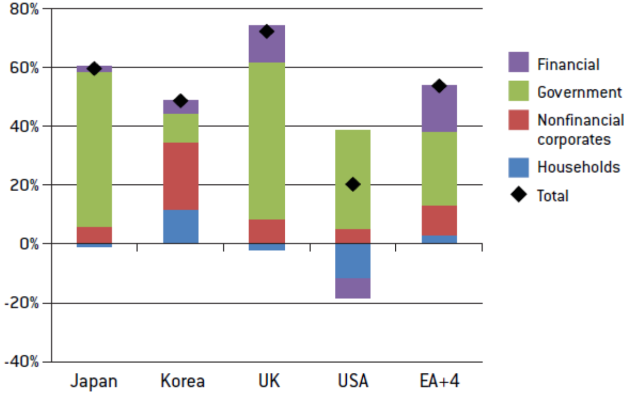
# Sectoral debt levels (% GDP)

Figure 3: Sectoral debt levels in 2000q1 and 2012q2 as a share of GDP



# Change in private and public debt (% GDP)

Figure 5: Change in private and public debt-to-GDP ratio 2007q1 to 2012q2



# Contribution

- Develops a framework which allows to investigate the impact of deleveraging in a group of financially integrated countries.
- Investigates the role of nominal wage stickiness and the monetary union for the transmission.
- Tries to contribute to the debate on the appropriate policy interventions.

# Methodology

Framework:

- Continuum of measure one of small open economies trading with each other.
- Each economy is populated by a continuum of identical households subject to an exogenous borrowing limit
- Two sector economies: tradable goods and a non-tradable goods
- Idiosyncratic productivity shocks
- Deleveraging triggered by a borrowing limit shock (Aggregate Uncertainty)
- One period risk-free bonds can be traded by households to smooth consumption

# Findings

Monetary union with nominal wage rigidities $\Longleftrightarrow$ fixed exchange rate and wages.

- Fall interest rate is amplified.
- Highly indebted countries can only improve the CA through a cut in the consumption of the tradable good.
- Real exchange rate depreciation with fall in price of non-tradables.
- Labor in the non-traded sector becomes less profitable $\Rightarrow$ fall in demand for labor in non-tradable sector and fall in non-tradable output.

In summary, a recession is observed in the countries that are financially constrained after the deleveraging shock.

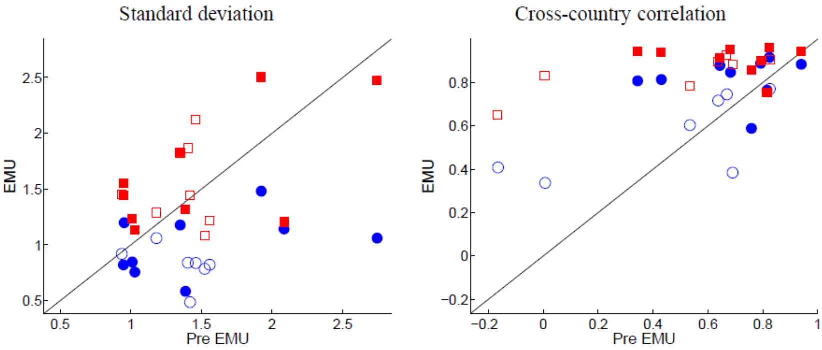
# Findings

Monetary union with nominal wage rigidities + zero lower bound.

- Following the shock the interest rate cannot fall.
- Fall in price of tradables and decrease in production.
- As before, downward pressures to prices of non-tradables and fall in employment and output of non-tradables in highly indebted countries.
- Usual debt deflation channel depresses aggregate demand.

Deleveraging can push the whole monetary union into a recession.

# Output fluctuations Pre-EMU/EMU



# Business cycle properties Pre-EMU/EMU

Table 1: Cyclical properties of time series before EMU and from EMU until crisis and today

| | Germany/EA6 | | | EMU Avg | | | Non-EMU Avg | | |
|---|---|---|---|---|---|---|---|---|---|
| | PreEMU | EMU | | PreEMU | EMU | | PreEMU | EMU | |
| | | -'07 | -'11 | | -'07 | -'11 | | -'07 | -'11 |
| **Volatility** | | | | | | | | | |
| Std. Dev. Y | 1.35 | 1.18 | 1.83 | 1.22 | 0.93* | 1.50 | 1.13 | 0.85 | 1.52 |
| Std C/Std Y | 0.70 | 0.58 | 0.34** | 0.92 | 0.81 | 0.61** | 0.89 | 0.73** | 0.70** |
| Std I/Std Y | 2.20 | 2.95* | 2.62 | 2.92 | 3.21 | 2.98 | 3.56 | 4.31 | 3.80 |
| Std GS/Std Y | 0.99 | 0.76 | 0.52* | 1.02 | 0.88 | 0.62** | 1.11 | 1.08 | 0.68* |
| Std UE/Std Y | 8.91 | 6.60* | 3.80** | 6.84 | 7.52 | 5.58 | 7.64 | 8.67 | 7.48 |
| Std Infl/Std Y | 0.21 | 0.24 | 0.16 | 0.28 | 0.41 | 0.26 | 0.36 | 0.45 | 0.36 |
| **Trade** | | | | | | | | | |
| Std RX/Std Y | 2.38 | 0.27** | 0.15** | 2.71 | 0.46** | 0.27** | 5.03 | 4.88 | 3.05* |
| Std NX/Std Y | 0.22 | 0.24 | 0.17 | 0.38 | 0.43 | 0.28* | 0.26 | 0.27 | 0.18* |
| **Cross-Country** | | | | | | | | | |
| Corr. Y Y* | 0.43 | 0.81* | 0.94** | 0.66 | 0.85* | 0.94* | 0.53 | 0.62 | 0.90** |
| Corr. C C* | 0.34 | 0.68 | 0.51 | 0.56 | 0.76** | 0.70 | 0.38 | 0.25 | 0.73** |
| Corr. I I* | 0.53 | 0.83* | 0.91** | 0.64 | 0.84** | 0.92** | 0.28 | 0.75** | 0.90** |
| Corr. GS GS* | 0.34 | -0.12* | 0.24 | 0.38 | -0.09** | 0.26 | -0.23 | 0.45** | 0.47** |
| Corr. UE UE* | 0.71 | 0.86 | 0.66 | 0.71 | 0.75 | 0.69 | 0.68 | 0.72 | 0.87* |
| Corr. Infl Infl* | 0.52 | 0.49 | 0.65 | 0.52 | 0.50 | 0.64** | 0.36 | 0.46 | 0.64* |

# Background

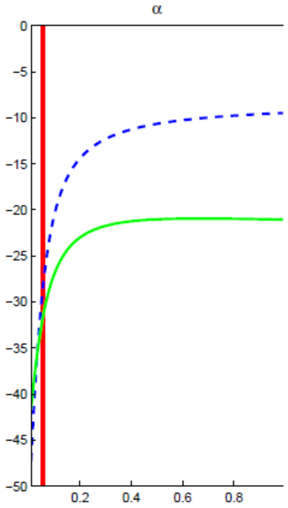
How to reduce debt burden?

- Suggestions to raise inflation target to improve private and public sector balance sheets. (Rogoff, Blanchard , Krugman, Rajan, Hamilton...)
- Rogoff in Project Syndicate has at the end of 2008 and 2010 suggested to allow some 6 to 7 percent inflation. Similar statements have been made by Paul Krugman and others.

# How inflation can reduce real public debt:

1. **Inflation surprises:** inflation expectations affect current inflation and nominal interest rates on newly-issued (and rolled-over) debt; unanticipated inflation reduces public debt.
2. **Maturity structure:** determines the fraction of debt to be rolled over, and thus of real public debt that can be inflated away even through anticipated inflation.

# Public debt reduction



# Maturities

Tab. 1 - Public debt and maturity structures

| | avg. maturity in years | % of debt maturing | net debt % of GDP | % change from 2006 | gross debt % of GDP | % change from 2006 |
|---|---|---|---|---|---|---|
| Canada | 5.6 | 15.9 | 35.1 | +33.5 | 84.2 | +19.8 |
| France | 6.5 | 16.9 | 79.2 | +33.6 | 85.0 | +33.6 |
| Germany | 6.0 | 10.2 | 54.7 | +3.8 | 80.1 | +18.5 |
| Italy | 6.7 | 21.2 | 100.6 | +12.0 | 120.3 | +12.9 |
| Japan | 5.2 | 54.2 | 127.8 | +51.6 | 229.1 | +19.8 |
| U.K. | 12.8 | 8.6 | 75.1 | +97.6 | 83.0 | +92.6 |
| U.S. | 4.4 | 21.2 | 72.4 | +70.0 | 99.5 | +62.8 |
| Average | 6.7 | 21.2 | 79.5 | +51.7 | 114.9 | +38.6 |

*Note:* G7 Advanced Economies, 2011 (projected). IMF Fiscal Monitor April 2011, May 2010.

# Composition of debt