FINANCIAL AND REAL CYCLE SYNCHRONIZATION IN CENTRAL, EASTERN AND SOUTH-EASTERN EUROPEAN COUNTRIES

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Outline

- Motivation
- Literature review
- Stylized facts on credit and real GDP developments in CESEE countries
- Data and methodology
- Main results
- Conclusion

Motivation

- A renewed debate: the linkages between the real economy and the financial sector
  - "Lost Decade" in Japan
  - Asian crisis
  - Global economic crisis
- Research objectives:
  - to describe the main characteristics of real and financial cycles
  - to examine the role of the credit market developments in shaping the real business cycles in CESEE
  - to analyze the interactions between the financial and real cycles of these countries with the respective cycles of the euro area

Literature review

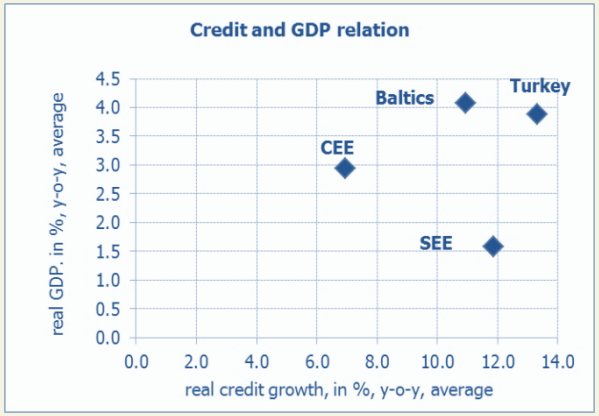
- Avouyi-Dovi and Matheron (2003) – there does not seem to be a strong dependence link between stock prices and the level of real activity, except in the United States; but in the longer term, it appears that real activity and stock prices share the same determinants.
- Egert and Sutherland (2012) - industrial production cycles overlap with cycles in real credit, interest rates and real stock prices to a great extent in OECD countries; unprecedented synchronization of the real and financial cycles during the global economic crisis.
- Claessens et al. (2011) – cycles in output display a high degree of synchronization with cycles in credit and house prices (using extensive database of business and financial cycles).
- Avouyi-Dovi et al. (2006) - some convergence in the cyclical movements of credit and activity in Poland, Hungary, the Czech Republic and the euro area.

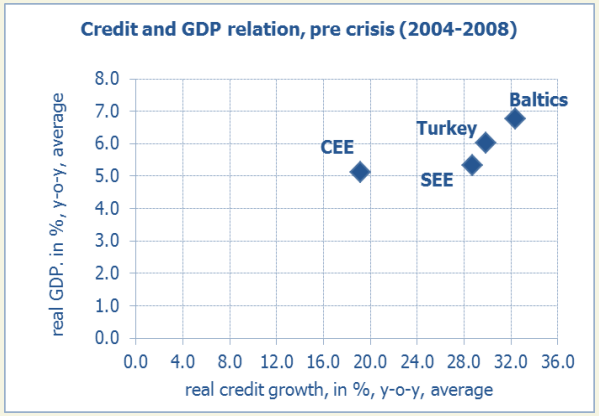
Literature review

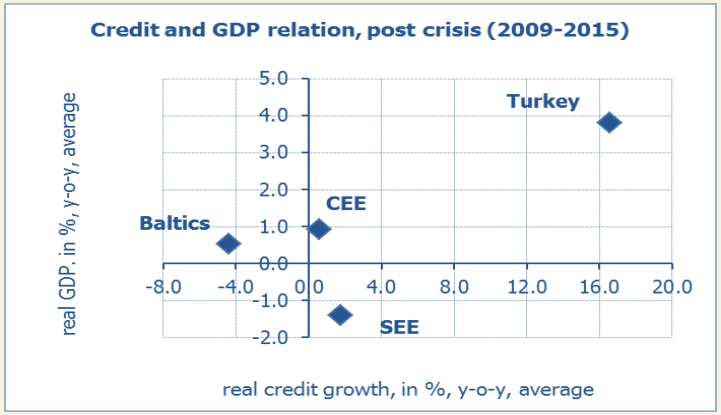
- Our contribution:
  - two-tiered approach, looking at linkages within individual countries and relative to the euro area.
  - use of a well established methodology, to avoid any subjectivities in the cycle dating.
  - most importantly: filling the gap in the literature – most studies mainly focused on advanced countries while relevant research dedicated to CESEE region is rather scarce.

Stylized facts

- Close relationship between credit and economic growth in CESEE
- Divergent trends after the crisis







Data and methodology

- Cycle defined as "a process that moves sequentially between a series of clearly identifiable phases in a recurrent or periodic fashion" (Hamilton 2005, p.435).
  - contractionary phase: the time period between a high point (peak) and a low point (trough)
  - expansionary phase: trough-to-peak
- How we determine peaks and troughs?
  - BBQ algorithm by Harding and Pagan (2002)
  - censoring rules: every P-T and T-P phases should be at least 2 quarters long and every P-P and T-T cycles should be at least 5 quarters long

Data and methodology

- Measuring cycle characteristics:
  - duration
  - amplitude
  - cumulative movements
  - asymmetries
  - coefficients of variation of durations and amplitudes
- Initial step: transformation of the original series containing the turning points into binary variables:
  - S_{xt} = {1 if x is in expansionary phase at time t, 0 otherwise}
  - S_{yt} = {1 if y is in expansionary phase at time t, 0 otherwise}

Data and methodology

- How we measure cycle synchronization?
  - the Concordance Index (Harding and Pagan, 2002).

$$\hat{I} = \frac{1}{T}\left\{\sum_{t=1}^{T} S_{xt}\, S_{yt} + \sum_{t=1}^{T}(1 - S_{xt})(1 - S_{yt})\right\}$$

where S_{xt} and S_{yt} are the binary variables, T is the number of time periods

  - testing statistical significance: GMM estimation with a HAC weighing matrix, Bartlett kernel and Newey-West fixed bandwidth

$$\frac{S_{yt}}{\hat{\sigma}_{Sx}\hat{\sigma}_{Sy}} = \alpha_1 + \rho\frac{S_{xt}}{\hat{\sigma}_{Sx}\hat{\sigma}_{Sy}} + u_t$$

where $\hat{\sigma}_{Sx}$ and $\hat{\sigma}_{Sy}$ are the empirical standard deviations of S_{xt} and S_{yt}, respectively, α_1 is a constant, ρ is the correlation coefficient and u_t is an i.i.d. error term.

Data and methodology

- Sample - 16 CESEE countries:
  - Central and Eastern Europe (CEE: Czech Republic, Slovakia, Hungary, Poland and Slovenia;
  - Southeastern Europe (SEE): Macedonia, Serbia, Bulgaria, Albania, Bosnia & Herzegovina, Croatia and Romania;
  - the Baltic region: Estonia, Latvia and Lithuania
  - and Turkey

Data and methodology

- Variables:
  - real GDP volume as measure of business cycle
  - credit to the private sector as measure of financial cycle
    - both in natural logarithms
- Focus on the levels of the variables i.e. classical cycles
- Quarterly data, seasonally adjusted
- Sample period: 1995q1-2015q4 conditional to data availability
- Data sources: Eurostat, ECB, national statistical offices and national central banks
- BBQ analysis performed in MATLAB; GMM estimation done in eViews.

Main results
- Business cycle characteristics-

- Expansions last significantly longer than contractions.
  - similar to the euro area
- Decreases in output during contractions more than compensated by increases during expansions.
- Significant asymmetries in the shapes of the contractionary and expansionary phase.
- SEE region having the worst combination of characteristics: spending more time in recessions and less time in expansions compared to other regions and experiencing larger declines in output and smaller output gains cumulatively.
- CEE region performing better than others: shortest duration and lowest amplitude of contractions and longest duration and reasonably large amplitude of expansions.
- The Baltic countries and Turkey experience both lengthy durations and large amplitudes of recessions and expansions – boom-bust behavior

Main results
-Financial cycle characteristics-

- Similar to business cycles:
  - credit upturns longer-lived than downturns
  - asymmetries present in the shapes of the downturn and upturn phase
  - expansions more variable than contractions
- Different from business cycles:
  - credit downturns last longer than economic recessions; credit upturns tend to be shorter than economic expansions
  - amplitude of downturns and upturns significantly higher than amplitude of business cycle phases
  - average cumulation smaller than for business cycle

Main results
-Cycle dating-

- Economic activity:
  - 44 contractions and 41 expansions overall
  - 14 contractions and 14 expansions in CEE
  - 20 contractions and 18 expansions in SEE
  - 7 contractions and 7 expansions in the Baltics
  - 3 contractions and 2 expansions in Turkey
- Credit activity:
  - 37 downturns and 44 upturns overall
  - 12 downturns and 13 upturns in CEE
  - 17 downturns and 21 upturns in SEE
  - 4 downturns and 6 upturns in the Baltics
  - 4 downturns and 4 upturns in Turkey

Main results
-Cycle dating-

- Business cycle dates

	Euro area	Macedonia	Bulgaria	Croatia	Serbia	Albania	BIH	Romania	Slovenia	Czech Rep.	Slovakia	Hungary	Poland	Estonia	Latvia	Lithuania	Turkey
P		2001Q1															
T		2001Q3															
P		2002Q2															
T		2003Q1			1995Q4						1997Q4				1995Q4		1999Q3
P		2006Q1			1997Q4			1996Q3		1996Q3	1998Q4	1996Q2	2002Q4	1998Q3	1998Q2	1998Q3	2000Q4
T		2006Q4		2000Q2	1999Q2			1999Q2		1997Q4	1999Q4	2006Q4	2003Q1	1999Q1	1998Q4	1999Q3	2001Q4
P	2008Q1	2008Q3	2008Q4	2008Q1	2008Q1	2009Q2	2008Q3	2008Q3	2008Q2	2008Q3	2008Q3	2007Q2	2004Q2	2007Q4	2007Q3	2008Q2	2008Q1
T	2009Q2	2009Q3	2010Q1	2010Q2	2009Q4	2009Q4	2009Q1	2010Q3	2009Q4	2009Q2	2009Q1	2008Q2	2004Q3	2009Q3	2010Q3	2009Q4	2009Q1
P	2011Q1		2012Q2	2011Q2	2011Q4	2014Q4	2010Q4		2011Q2	2011Q4		2010Q1	2012Q3	2014Q4			
T	2013Q1		2012Q4	2014Q1	2012Q4	2015Q1	2012Q3		2013Q1	2013Q1		2011Q4	2013Q1				
P					2013Q3							2012Q2					
T					2015Q1												

- Financial cycle dates

	Euro area	Macedonia	Bulgaria	Croatia	Serbia	Albania	BIH	Romania	Slovenia	Czech Rep.	Slovakia	Hungary	Poland	Estonia	Latvia	Lithuania	Turkey
P													2001Q3				
T										1996Q4			2002Q1				
P		2001Q1		1998Q4						1997Q2		2006Q3	2004Q1	1998Q3			
T		2001Q3		2000Q1						2002Q3		2007Q1	2004Q3	1999Q2			1994Q4
P		2002Q3		2008Q4				2008Q3	2008Q4		2009Q1	2009Q1	2009Q1	2008Q2	2008Q3	2008Q3	1998Q2
T		2003Q1		2009Q3				2009Q3	2009Q2		2009Q4	2009Q4	2009Q4	2013Q2	2014Q2	2014Q4	1999Q4
P	2009Q1	2009Q1	2009Q1	2010Q3			2008Q4	2010Q1	2010Q3		2011Q3	2010Q2	2011Q4		2014Q4	2015Q3	2000Q3
T	2010Q1	2009Q3	2011Q1	2011Q1			2010Q1	2011Q2			2012Q2	2011Q1	2012Q3				2002Q2
P	2011Q3	2012Q2	2012Q2	2011Q4	2012Q1	2012Q1	2014Q2	2011Q4				2011Q3					2008Q3
T	2014Q2	2012Q4	2013Q2	2014Q3	2014Q1	2014Q1	2015Q1	2014Q4									2009Q2
P	2015Q1		2014Q3	2015Q1	2015Q1	2014Q4											2015Q2

Main results
-Synchronization between real business and financial cycles-

Country	$\hat{\rho}$	CI
Euro area	0.61	0.78***
Macedonia	0.59	0.89***
Bulgaria	0.93	0.77***
Croatia	0.62	0.76***
Serbia	0.25	0.64
Albania	-0.06	0.56
BIH	-0.02	0.61
Romania	0.30	0.61
Slovenia	0.29	0.64
Czech Republic	-0.21	0.59
Slovakia	-0.18	0.81
Hungary	0.08	0.68
Poland	-0.19	0.80
Estonia	0.54	0.72**
Latvia	0.31	0.57
Lithuania	0.54	0.56**
Turkey	0.85	0.86***

** and *** indicate significance at the 5% and 1% level

	CESEE	CEE	SEE	Baltics
mean	0.69	0.70	0.69	0.62
max	0.89	0.81	0.89	0.72
min	0.56	0.59	0.56	0.56
standard deviation	0.11	0.10	0.12	0.09

- Output and credit tend to be pro-cyclical.
- Statistically significant results only in Macedonia, Bulgaria, Croatia, Estonia, Lithuania and Turkey.
- Highest concordance registered in Macedonia (0.89).
  - higher even than the statistic for the euro area (0.78).
- Turkey displays second highest concordance index of 0.86, followed by Bulgaria (0.77), Croatia (0.76), Estonia (0.72) and Lithuania (0.56).
- Slovakia and Poland- high but statistically not significant CI.
- Output and credit being 69% of the time on average in the same phase of the cycle in CESEE region as a whole.
- CI are very similar for CEE and SEE, the Baltic region lagging behind

Main results
-Synchronization of real business cycles-

Country	Euro area	
	$\hat{\rho}$	CI
Macedonia	0.12	0.75
Bulgaria	0.76	0.81***
Croatia	0.57	0.83**
Serbia	0.34	0.73*
Albania	-0.31	0.52
BIH	0.99	0.84***
Romania	-0.12	0.69
Slovenia	0.90	0.95***
Czech Republic	0.56	0.87**
Slovakia	0.04	0.75
Hungary	0.29	0.78
Poland	0.70	0.78**
Estonia	0.40	0.82
Latvia	0.14	0.75
Lithuania	0.19	0.82
Turkey	0.25	0.72

*, ** and *** indicate significance at 10%, 5% and 1%

	CESEE	CEE	SEE	Baltics
mean	0.78	0.83	0.74	0.80
max	0.95	0.95	0.84	0.82
min	0.52	0.75	0.52	0.75
standard deviation	0.09	0.08	0.11	0.04

- CI statistically significant only for the minority of the CESEE countries
  - high risk of asymmetric shock transmission
- Slovenia - strongest link with the euro area business cycle; the two outputs coincide in the same phase of the cycle about 95% of the time
- Other euro area member-countries display non-concordance
- In other non-euro area CEE countries, a strong degree of business cycle synchronization in the Czech Republic (0.87) and Poland (0.78)
  - preparedness to join the Eurozone?
- In SEE region output cycles with the euro area overlapping in BIH (0.84), Croatia (0.83), Bulgaria (0.81) and Serbia (0.73)
- Baltic countries and Turkey significantly not concordant with the euro area

Main results
-Synchronization of financial cycles-

Country	Euro area	
	$\hat{\rho}$	CI
Macedonia	0.11	0.77
Bulgaria	0.39	0.72*
Croatia	0.63	0.83***
Serbia	0.92	0.85***
Albania	0.93	0.85***
BIH	0.36	0.60
Romania	0.69	0.68***
Slovenia	0.77	0.77***
Czech Republic	-0.32	0.48**
Slovakia	0.98	0.74***
Hungary	0.75	0.88***
Poland	0.44	0.79
Estonia	0.43	0.75**
Latvia	0.75	0.81***
Lithuania	0.62	0.74***
Turkey	-0.08	0.58

*, ** and *** indicate significance at 10%, 5% and 1%

	CESEE	CEE	SEE	Baltics
mean	0.74	0.73	0.76	0.77
max	0.88	0.88	0.85	0.81
min	0.48	0.48	0.60	0.74
standard deviation	0.11	0.15	0.10	0.04

- Concordance found in 75% of the CESEE countries
  - much higher than business cycle synchronization
- Highest significant concordance observed in Hungary
  - cycles overlapping 88% of the time
- Significant concordance evidenced in all of the Baltic countries and in all CEE countries (Poland exception).
- Peculiarity: low and statistically significant CI obtained for the Czech Republic
  - countercyclical relationship with EA credit cycle i.e. 52% of the time Czech financial cycle in different phase
- In SEE, a strong positive co-movement evidenced in all countries, with the exception of Macedonia and BIH.
- No significant synchronization in the case of Turkey

Main results
-Short summary for Macedonia

- First analysis of its kind to the best of our knowledge
- 3 complete business cycles in Macedonia for the period 1997q1:2015q3
- Business cycle characteristics similar to those in developing economies
- Expansionary phase lasting for about 12 quarters on average
- Recessions are short-lived - 3 quarters on average.
- In recessions average decline of activity 6.2%, cumulative loss in output 10.8%
- In booms average rise of activity significantly higher (16.5%, with cumulative output gain 121.1%)
- Financial cycle shares similar characteristics with the business cycle:
  - average duration 2 quarters of downturns, 13 quarters of upturns
  - amplitude of upturns significantly higher than downturns (47% vs. 3%)
- Real and credit cycle in Macedonia found to be highly synchronized, moving concordantly in 90% of the time

Conclusion

- Key finding: real and financial cycles are significantly synchronized only in the minority of CESEE countries (Macedonia, Bulgaria, Croatia, Estonia, Lithuania and Turkey).
- A few CESEE countries have a synchronous real business cycle with the euro area.
  - Bulgaria, Croatia, Serbia and BIH of the SEE region
  - Slovenia, Czech Republic and Poland of the CEE region
  - no synchronization in the Baltic countries and Turkey.
- Financial cycles found to be significantly concordant with the euro area in far larger number of the CESEE countries:
  - prospects of joining the monetary union?
  - Macedonia, BIH, Poland and Turkey only countries not concordant with the financial cycle of the euro area.
- These results provide useful stylized facts of the CESEE countries cycle behavior which should prove valuable to policy makers in these countries.
- Caveat - concordance examined only in terms of the classical cycle definition:
  - a natural way of expanding the analysis by studying the properties of the growth and/or deviation cycle.
  - the potential determinants underlying the synchronization of business and financial cycles another area for future research.

Thank you for your attention!