Common Factors in South-East Europe's Business Cycles 1899 - 1989

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Abstract: This paper constructs business cycle indices for the South-East European (SEE) countries from 1899 to 1989 in order to address two questions: to what extent has there been a common SEE business cycle, and to what extent has there been synchronisation of business cycles with England, France and Germany? We first explain why a construction of business cycle indices based on Common Dynamic Factor Analysis (CDFA) is preferable to one based on historical national accounts. In our estimations, we then find that business cycle integration, both within SEE and vis-à-vis the core economies, did not occur pre-World War I but did happen in the interwar period. Business cycle integration continued during the Cold War period even though the SEE countries found themselves on opposite sides of the iron curtain.

1. Introduction[1]

The purpose of our research is to construct business cycle indices for South-East Europe (SEE) from the 1870s to the present in order to address the following four questions: First, has there been an identifiable regional business cycle, or does the label "SEE" cluster together countries that should better be treated separately? Second, how volatile have business cycles been in SEE compared to the core countries of Western Europe and how can we account for the differences? Third, how persistent have macroeconomic fluctuations been? Questions 2 and 3 are important as the welfare cost of income fluctuations and the burden on stabilization policy rise on volatility and persistence. Last but not least, has the SEE business cycle exhibited characteristics similar to the stylized facts established on the basis of the business cycles of other countries and regions?

Increased interest in these questions is not only the natural result of the recent accession of several SEE countries to the European Union. The SEE countries also provide rich historical evidence to address a number of key economic issues such as the transmission of massive economic downturns such as the 1930s Great Depression (for Bulgaria cf. Tooze&Ivanov 2009) and the contagion of financial crises.

In a perfect world, we would study SEE business cycles by analyzing GDP data. Our knowledge of pre-WW II GDP for SEE, however, remains poor, notwithstanding recent contributions for Austria-Hungary (Schulze 2000, 2007), Bulgaria (Ivanov&Tooze 2007), Serbia (Palairet 1997) and Turkey (Pamuk 2006, Altug et al. 2008). Lacking direct GDP estimates, the influential national account Maddison data set, for instance, resorts to proxy measures of economic activity compiled by Good&Ma (1999). The lack of reliable GDP data for this part of Europe is widely known (cf. the forthcoming *Cambridge Economic History of Modern Europe*) but unlikely to be overcome in the near future; even where attempts are made in this direction, there is often a need to limit the estimation to a number of benchmark years (cf. above). But even post-WW II good quality GDP data for the entire period are available only for Austria and Greece.

This paper takes a different approach to reconstruct the business cycles of five SEE countries which combined have consistently accounted for more than 85 percent of SEE GDP from the 1870s to the present: Austria(-Hungary), Bulgaria, Greece, Romania and Serbia/Yugoslavia. The basic idea of our approach is that a cross-section of economic variables ranging from sectoral output over fiscal and financial variables to trade data share a common factor. Extracting the common factor for the entire period, in turn, delivers a business cycle index. In similar cases, such an index has been shown to be of similar quality as a conventional business cycle reconstruction based exclusively on GDP (Aiolfi et al. 2006). To the best of our knowledge, our research is the first attempt ever to construct such indices for SEE. It would therefore be a welcome addition to other business cycle reconstructions for other parts of the world (inter alia cf. Basu&Taylor 1999).

It should be emphasized that this paper constitutes research in progress. Most importantly, the daunting task of collecting 25 annual data series for the Common Dynamic Factor Analysis (CDFA)

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still lies ahead for Austria(-Hungary), Greece, Romania and Serbia/Yugoslavia. At this point of our research, we have collected most of the Bulgarian data for the pre-WW II period.

We will therefore proceed as follows: In the second section, we will explain why a business cycle reconstruction based on national historical accounts is not necessarily superior to the proposed CDFA and why it might even be worse. Our concerns partly stem from the idiosyncrasies of SEE GDP data, partly from general considerations as to why national historical accounts are unlikely to reflect the true but unknown GDP series. In the third section, we will not only explain the CDFA methodology; we will also use it to construct a pre-WW I Bulgarian business cycle which we can then compare with the latest GDP estimates for Bulgaria for this period. The fourth section, then, is devoted to addressing the key question spelt out in the first paragraph. Faute de mieux, we have to, at this point of our research, rely on GDP series to find an answer to the crucial question of whether there has been an identifiable regional business cycle and to what extent this business cycle was synchronized with Europe's main economies, i.e. England, France and Germany. Two results stand out: We find that a regional business cycle as well as synchronisation with Western Europe's business cycle emerged only in the interwar period. Second, we find that this business cycle then continued after World War II, even though SEE countries found themselves on opposite sides of the iron curtain. Section 5 summarises and concludes.

2. Pitfalls of a business cycle reconstruction based on historical national accounts

In a perfect world, we would study SEE business cycles by analysing GDP data on annual frequency (or even higher frequency). In this section, we will explain why historical national accounts are not as helpful for this purpose as they initially appear. Our concerns partly stem from the idiosyncrasies of SEE GDP data, partly from general considerations as to why historical national accounts are unlikely to reflect the true but unknown GDP series.

The most obvious limitation of SEE GDP data refers to the period 1870 – 1918. GDP estimates on an annual basis are available only for Austria-Hungary (Schulze), Bulgaria (Ivanov) and Greece (Kostelenos), of which only the data for the dual monarchy has made it into the Maddison (2003) data set. By contrast, the Kostelenos data have not been universally accepted and the annual estimates of Ivanov have not yet been published (Tooze&Ivanov 2007 and Ivanov 2006 is confined to the benchmark years of 1892, 1899, 1905, 1911, 1921 and 1924). The pre-WW I SEE GDP data reported by Maddison (2003) are on a decadal basis only (except for Austria-Hungary); moreover, the data do not constitute genuine GDP data but the results of proxy estimates by Good&Ma (1999), who draw on (a) the share of non-agricultural employment in the labour force, (b) the crude birth rate, and (c) letters posted per capita to approximate overall economic activity.[2]

For the interwar period, Maddison (2003) reports GDP data for all five countries under consideration. If the detailed critique of the Maddison data for Bulgaria by Tooze&Ivanov (2007) has implications for other countries (as is likely), then we have good reason to be equally sceptical towards the interwar data reported for Greece, Romania and Yugoslavia.

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[2] The Greek case is somewhat different; for details cf. Morys (2006).

The post-WW I data are beset with yet another problem: the institutional incentive of the East bloc economies – in our case Bulgaria, Romania and Yugoslavia – to over-report. Conceptual differences between the System of National Accounts (SNA) developed by the United Nations and its East bloc counterpart, the Material Product Accounting (MPA)[3], further complicate the situation.

But even if we leave the idiosyncrasies of SEE GDP data aside for the moment, an argument can be made for relying on CDFA rather than historical national accounts. As a matter of fact, these considerations have led to the use of CDFA even for countries such as the US (Ritschl et al. 2008) and Germany (Sarferaz&Uebele 2007) for which much more reliable GDP are available. First, national historical accounts are normally constructed with an eye towards the level rather than the volatility; this preference determines interpolation techniques which can lead to serious differences in volatility between the reconstruction and the true but unknown GDP series. Second, disaggregate series are often abundant for historical periods, but in many cases do not match national accounting categories very well; CDFA allows us to exploit the business cycle characteristics of these series. Third, CDFA deals better with structural breaks in sub-series than GDP, as CDFA is more flexible in excluding disaggregate time series with serious faults.[4]

3. Explaining and applying common dynamic factor analysis

This section has three main purposes. First, we want to describe the key idea of the common dynamic factor analysis (CDFA). Second, we want to introduce the reader to the 25 time series to be employed for the CDFA. Third, drawing on the data available to us, we will demonstrate that the common dynamic factor analysis is a viable alternative to the reconstruction of business cycles based on historical national accounts.

CDFA is best understood as an application of principal component analysis (PCA). PCA involves a statistical procedure that transforms a number of possibly correlated variables into a smaller number of uncorrelated variables called "principal components". The first principal component accounts for as much of the variability in the data as possible, and each succeeding component accounts for as much of the remaining variability as possible. While we generally require as many components as variables to reproduce the original variance structure, we are usually able to account for most of the original variability using a relatively small number of components.

The principal components (also referred to as principal component scores) are obtained as follows[5]: Let p be the number of variables (a maximum of 25 in our case) and let n be the number of observations (the number of years under consideration in our case); the n x p – matrix X is hence our data matrix. Let Σ further be the ordinary (Pearson) correlation matrix (of dimension p x p) pertaining to the data matrix X.

Σ will then have p eigenvalues

$\lambda_1 >= \lambda_2 >= \ldots >= \lambda_p >= 0$

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[3] It is not easy to compare SNA and MPA in any straightforward sense, but MPA can be thought of as GDP excluding the service sector.
[4] For a comparison of both techniques cf. Ritschl et al. (2008) and Aiolfi et al. (2006).
[5] Cf. Johnson&Wichern (2002), chapter 8. The calculation as performed by EViews 6 is marginally different as explained in the EViews Users Guide.

and, correspondingly, p eigenvectors

$u_1, u_2, \ldots u_p.$

The k-th principal component – pc_k of dimension n x 1 – is then obtained as

$pc_k = ((u_k)^T X^T)T$

In extension, all principal component scores – a matrix pc of dimension n x p – can be obtained as:

$pc = (pc_1 \ pc_2 \ldots pc_p) = ((u_1 \ u_2 \ldots u_p)^T X^T)^T$

The basic of idea of CDFA is to take only the first principal component and to interpret this component in an economically meaningful way. In our case, this means that we need to come up with a certain number of variables which promise to exhibit some form of correlation with GDP. CDFA then implies that a cross-section of such economic variables shares a common factor; extracting the common factor for the entire period, in turn, will deliver a business cycle index. We suggest the inclusion of the following list of economic variables which range from sectoral output over fiscal and financial variables to trade data (table 1).
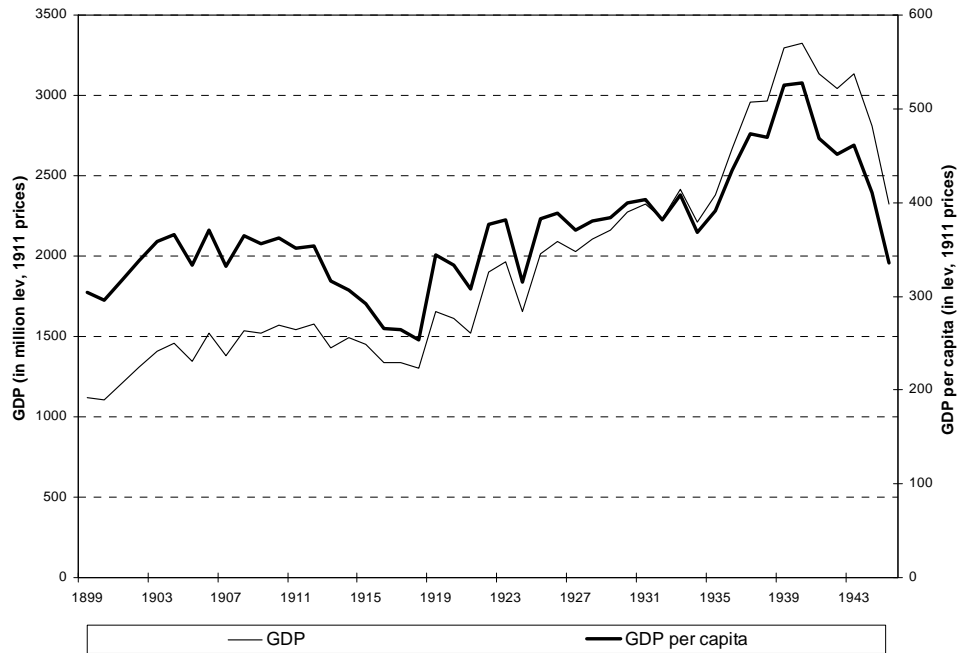
Table 1

Annual data series for common dynamic factor analysis

Sectoral output indicators			
	#1	agricultural production	arable agriculture
	#2	communication	letters sent
	#3	industrial output	
	#4	mining	
	#5	construction	import of cement
	#6	transportation	freight traffic on railways
	#7	fixed investment	
Fiscal indicators			
	#8	government expenditure	
	#9	government revenue	
Financial indicators			
	#10	narrow money	M0
	#11	broad money	M3
	#12	consumer price index	
	#13	short term interest rate	
	#14	mortgage credit	
Trade indicators			
	#15	terms of trade	
	#16	real effective exchange rate	
	#17	exports	
	#18	imports	
	#19	trade balance	
Other indicators			
	#20	external spread	
	#21	foreign capital inflows	
	#22	foreign short term interest rate	
	#23	foreign output	
	#24	real wage	
	#25	population	

Our confidence in CDFA would certainly be enhanced if we were in a position to compare a business cycle index based on CDFA with a business cycle based on historical national accounts. In other words, if CDFA worked reasonably well for a specific time period for which we have GDP data, we would then feel more comfortable to rely on this technique also for periods for which we do not have historical national accounts (which is the very reason why we turned to CDFA in the first place).

Chart 1

GDP and GDP per capita estimates for Bulgaria, 1899 - 1945

Source: Own calculations by Ivanov.

Thanks to the GDP reconstruction for Bulgaria by Ivanov (2006 and 2009) we are in such a position. While Ivanov has reconstructed GDP for the period from 1899 to 1945, not all of our 25 variables as listed in table 1 are available for this period. We do have, however, 13 high-quality time series for the period 1899–1912. Confining ourselves to pre-World War I data has the additional advantage of avoiding the "structural break" of World War I which shows up in several of our time series.

Table 2

Correlation between annual time series and GDP / GDP
per capita Bulgaria 1899 - 1912

		Correlation (coefficient) with	
		GDP	GDP per capita
Sectoral output indicators			
#1	agricultural production	**+ 0.82**	**+ 0.82**
#2	communication	**+ 0.51**	**+ 0.52**
#4	mining	**- 0.68**	**- 0.68**
#5	construction	**- 0.60**	**- 0.59**
#6	transportation	+ 0.30	+ 0.31
Fiscal indicators			
#8	government expenditure	**- 0.53**	**- 0.53**
#9	government revenue	- 0.11	- 0.11
Financial indicators			
#10	narrow money	- 0.15	- 0.15
#11	broad money	- 0.11	- 0.11
Trade indicators			
#16	real effective exchange rate	**- 0.80**	**- 0.79**
#17	exports	**+ 0.64**	**+ 0.64**
#18	imports	+ 0.55	+ 0.55
Other indicators			
#24	real wage	**- 0.80**	**- 0.80**
First Principal Component		**+ 0.88**	**+ 0.88**

NB: Time series are 4-year moving averages of the original data.

Sources: Bulgarian General Directorate of Statistics, Bulgarian National Bank, Bulgarian State Gazette; GDP and GDP per capita based on own calculations by Ivanov.

Table 2 shows the correlation coefficient between GDP / GDP per capita and the 13 time series which we want to use for the CDFA. The strongest correlation (+0.82) is exhibited between agriculture (#1) and GDP. This should not come as a surprise given that the agricultural sector accounted for about 60 percent of total Bulgarian GDP before World War I. Similarly, exports (#17) and GDP are closely correlated as national accounting would suggest (+0.64). Other indicators, such as communication (#2), do not show up as strong as expected but certainly with the correct sign (+0.51). We did find some results surprising, most notably the very weak (and indeed slightly negative) correlation between the monetary aggregates (##10, 11) and GDP (-0.15 and -0.11, respectively). Our way to deal with this issue was to exclude those variables from the CDFA which either exhibited a very low correlation with GDP or where economic theory makes interpreting the sign difficult. We have highlighted the variables to be included in the CDFA in table 2 (##1, 2, 4, 5, 8, 16, 17, 24).

Chart 2

Business cycles of Bulgaria, 1903 – 1912: Approximation via historical national accounts versus approximation via Principal Component Analysis

| — Bus. cycle approx. by GDP per capita | - - - Bus. cycle approx. by 1st Principal Component |

NB: GDP per capita time series is 4-year moving average of the original data. Similarly, the 1st PC was extracted from 4-year moving averages of the time series ##1, 2, 4, 5, 8, 16, 17, 24.

Source: Own calculations.

We then extracted the first principal component from the eight time series under consideration and plotted it against Ivanov's GDP per capita estimate. Figure 2 shows that the first principal component tracks GDP per capita developments very well. Two issues, in particular, are worth noting: First, the correlation between the first principal component and GDP per capita is higher (+0.88) than between agricultural production (#1) and GDP per capita (+0.82) (#1 turned out to be the individual time series most closely correlated with GDP per capita, cf. table 2). Given that the upper bound of any correlation coefficient is unity, the increase from +0.82 to +0.88 is not trivial. Second, the principal component series looks a good deal smoother and hence in some sense more plausible than the business cycle based on historical national accounts. This finding seems to vindicate our remarks in the second section where we explained why a business cycle reconstruction based on historical accounts might actually be inferior to CDFA even if sources are good and the reconstruction is carried out carefully.

4. Business Cycles in South East Europe, 1899–1989

As we are still in the process of collecting many of the 25 time series for the other four SEE countries besides Bulgaria, we will rely on conventional GDP data in this section despite all the problems involved and allured to earlier. The two main questions we will address in this section are: First, has there been an identifiable regional business cycle among the SEE countries? Second, to what extent was the business cycle of individual SEE countries and/or SEE as a whole synchronized with the business cycles of Europe's main economies, i.e. England, France and Germany?

As some of the data available to us at this stage of our research are of questionable quality, we deemed it sufficient to rely on rather simple statistical techniques. Rather than employing more sophisticated concepts such as the coefficient of coherence (Lemmens et al. 2008), we will approximate business cycle integration by the correlation coefficient between GDP per capita growth rates of individual countries. We chose GDP per capita over GDP, as frequent border changes in SEE affect the GDP series substantially more than the GDP per capita series. It seems sensible to distinguish between business cycle integration pre-WW I, in the interwar period and post-WW II.

4.1. Pre-WW I: 1899-1913

Data availability determined the choice of 1899 as the starting point for our pre-WW I investigation. Maddison does not provide pre-WW I GDP estimates on annual basis for any SEE country except Austria-Hungary (cf. above). As we wanted to include at least three SEE countries, we relied on Ivanov's estimates (Ivanov 2006 and 2009) for Bulgaria and Kostelenos et al. (2007) for Greece, whose estimations stretch back to 1899 and 1842, respectively. Table 3 shows the correlation coefficient between GDP per capita growth rates between 1899 and 1913.

Table 3

Correlation coefficient between growth rates of GDP per capita,
1899 - 1913

	England	France	Germany	Austria-H.	Bulgaria	Greece
England	1.00					
France	0.79	1.00				
Germany	0.89	0.63	1.00			
Austria-Hungary	0.40	0.41	0.43	1.00		
Bulgaria	-0.79	-0.68	-0.75	-0.50	1.00	
Greece	0.17	0.22	-0.12	-0.55	0.02	1.00

NB: Time series are 4-year moving averages of the original data.

Sources: Cf. text.

For aggregation purposes, it is helpful to condense the n * (n – 1) / 2 = 15 correlations into three key indicators: (1) the average correlation among the core economies, i.e. England, France and

Germany; (2) the average correlation between core countries and peripheral countries; (3) the average correlation among Austria-Hungary, Bulgaria and Greece. We obtained these averages as the arithmetic average of the individual correlations.

(1) average correlation intra-core   0.77

(2) average correlation core-periphery   -0.08

(3) average correlation intra-SEE   -0.34

The intra-core correlation yields a value of +0.77, reflecting in particular the extraordinarily high degree of business cycle integration between England and Germany, the two largest European economies since the 1870s (+0.89). Such a high value does not take us by surprise given how economic historians have come to see the decades before World War I which is often referred to as the first age of globalisation (Daudin et al. 2008).

More interesting in our context are the low (indeed slightly negative) correlation coefficients between core and periphery (-0.08) as well as intra-SEE (-0.34). This finding constitutes *prima facie* evidence that SEE did not participate in the first age of globalisation (at least not to the extent that it would lead to a synchronisation of business cycles). A closer inspection of the data reveals a substantial difference between Austria-Hungary on the one hand and Bulgaria and Greece on the other. As opposed to the later two countries, Austria-Hungary does exhibit a positive correlation of 0.41 with the Western European core economies. This difference should not take us by surprise. Austria-Hungary was the only SEE country that had participated to a reasonable degree in the 19th century spread of industrialization on the European continent. Most of these industries were located in the dual monarchy's Austrian part that enjoyed good transport and trading links with Germany.

Figures 3 to 6 visualize our findings. Figure 3 shows the high degree of business cycle integration between England, France and Germany in the early 20th century; a first boom period which was brought to an end by the American banking crisis of 1907 and another, even more spectacular boom immediately preceding World War I. The following three figures superimpose the business cycles of Austria-Hungary (figure 4), Bulgaria (figure 5) and Greece (figure 6) on this Western European business cycle; we can see that Austria-Hungary broadly follows a similar pattern, whereas Bulgaria and Greece go their own ways.
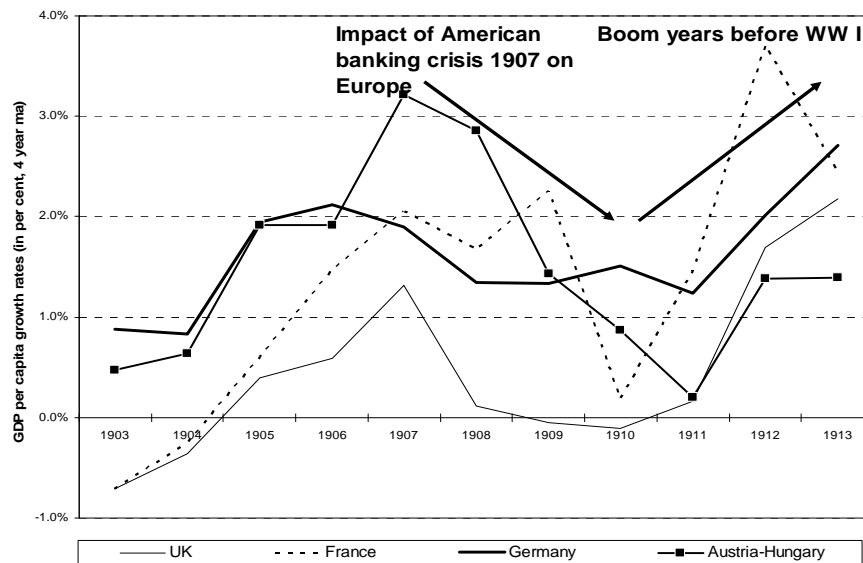
Chart 3

**Business cycles of England, France and Germany,
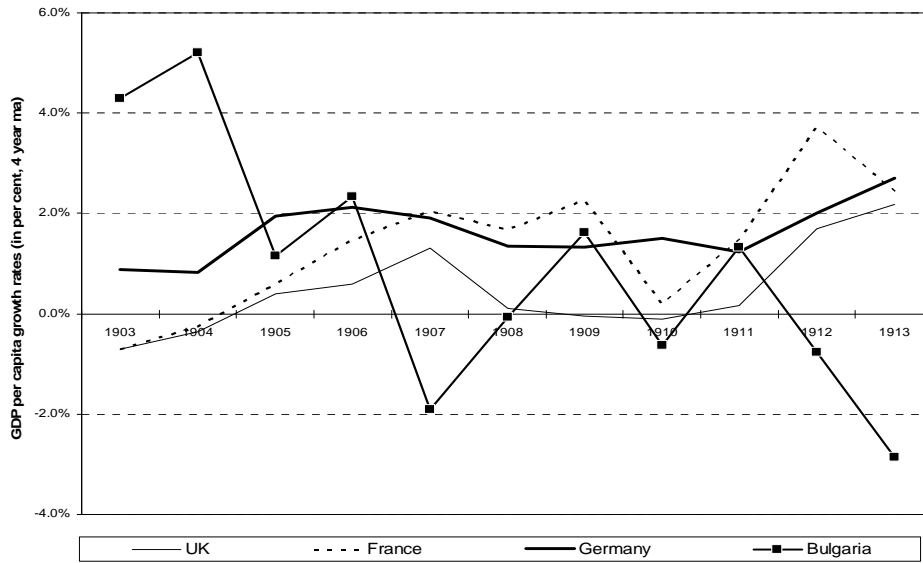1903 – 1913**
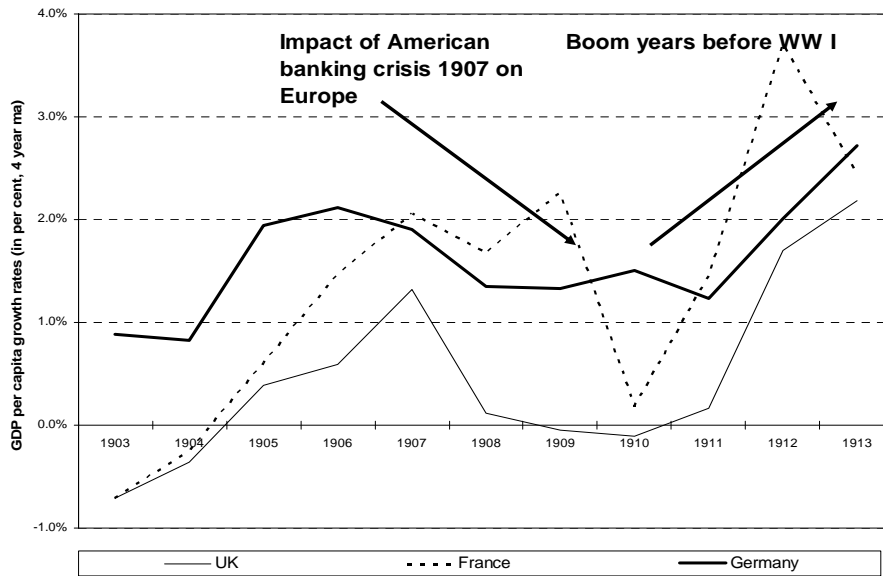
Source: Cf. text.

Chart 4

**Business cycles of England, France, Germany and Austria-Hungary,
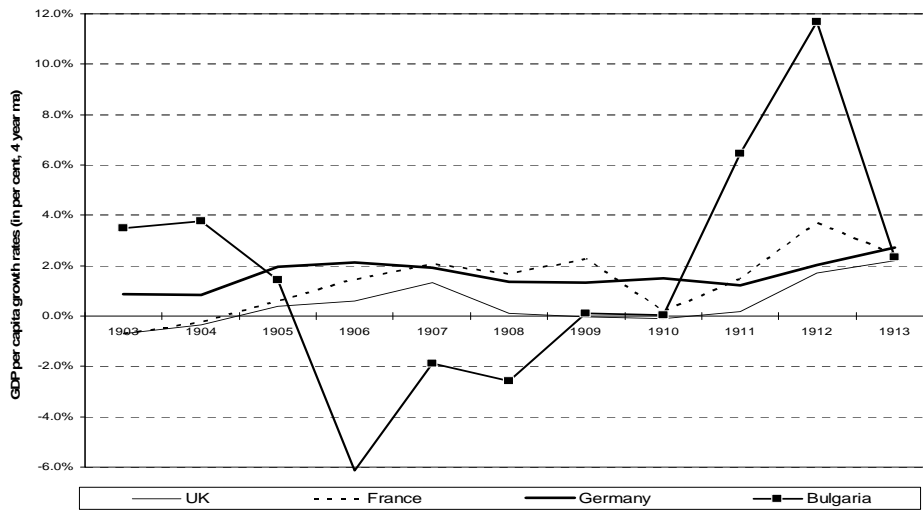1903 – 1913**

Source: Cf. text.

Chart 5

**Business cycles of England, France, Germany and Bulgaria,
1903 – 1913**

Source: Cf. text.

Chart 6

**Business cycles of England, France, Germany and Greece,
1903 – 1913**

Source: Cf. text.

What then explains our finding? This question seems even more pressing given that our data do show evidence that crises emanating outside SEE also had a sizeable effect on this part of Europe; figures 4-6, for instance, do show the impact of the American banking crisis.[6] The lack of business cycle integration before World War I is probably best explained by the absence of factors that are normally seen as crucial for the transmission of business cycles. In the Bulgarian and the Greek cases, there is little evidence of sizeable capital imports from Western Europe before World War I (for Austria-Hungary cf. Morys 2006). Similarly, trade was limited both with Western Europe as well as within SEE. In this context, the absence of intra-SEE trade might be due to the widespread pursuit of protectionist policies in SEE before World War I (which were often exacerbated by political motivations, e.g. the 1906 "pig war" between Austria-Hungary and Serbia). Protectionist policies further reduced the scope for trade which was already somewhat limited due to (a) a similar economic structure of SEE countries and (b) the absence of mutual borders between Austria-Hungary, Bulgaria and Greece (at least until the Balkan wars of 1912/13).

4.2. The Interwar Period: 1921-1938

Starting in 1921, Maddison provides annual GDP data for Austria, Bulgaria, Greece and Yugoslavia, with annual data for Romania beginning in 1926. All these series stretch at least until 1938. We therefore choose 1921 to 1938 as our estimation period for the interwar period, but we relied on the Ivanov data for Bulgaria rather than the data provided by Maddison. Table 4 presents our results. In accordance with our approach for pre-WW I, we provide the "condensed" results below:

(1) average correlation intra-core	0.30
(2) average correlation core-periphery	0.48
(3) average correlation intra-SEE	0.41

Table 4

Correlation coefficient between growth rates of GDP per capita,
1921 - 1938

	England	France	Germany	Austria	Bulgaria	Greece	Romania	Yugosl.
England	1.00							
France	-0.07	1.00						
Germany	0.58	0.38	1.00					
Austria	0.27	0.80	0.69	1.00				
Bulgaria	-0.26	0.49	0.26	0.37	1.00			
Greece	0.78	0.40	0.68	0.48	0.13	1.00		
Romania	0.19	0.33	0.39	0.34	0.60	-0.04	1.00	
Yugoslavia	0.63	0.83	0.75	0.93	0.46	0.38	0.41	1.00

NB: Time series are 4-year moving averages of the original data.
Sources: Cf. text.

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[6] A closer analysis of the Bulgarian data, however, seems to reveal that the 1907 data are largely driven by an extraordinarily poor grain harvest. The precise role of the American banking crisis on the Bulgarian economy requires further research.

We shall start our discussion with developments in the core economies. The average intra-core correlation is down to 0.30, compared with 0.77 pre-World War I. This reflects the de-globalisation of the interwar period, due to the legacy of World War I and then exacerbated by the Great Depression. The core economies, whose business cycles had once been well integrated, started ticking again to their own clock.

Against this international background, it is even more surprising to see developments in SEE. The average correlation core-periphery yields a value of 0.48 and the average correlation intra-SEE stands at 0.41. Both values are not particularly high but they are evidence of SEE business cycle integration within SEE as well as vis-à-vis Western Europe.

How can we explain this puzzle? Three explanations suggest themselves: First, business cycle integration had always been there but only in the interwar period have we enough countries and hence data to detect it. We should not forget that the three countries we drew on for the pre-World War I investigation did not have mutual borders until the Balkan wars of 1912/13 (cf. above). Second, as the SEE economies grew richer, they specialized more, thereby making intra-regional trade more attractive and hence the transmission of business cycles more likely. Third (and perhaps more controversially), the dramatic border changes after World War I might have given rise to the emergence of a common business cycle. In the political history of the interwar period, many problems are blamed on the new borders after World War I but there might well have been positive economic effects. The almost perfect business cycle integration between Austria and Yugoslavia (0.93) might be explained as follows: After World War I Yugoslavia not only incorporated large parts of what used to belong Austria-Hungary (Slovenia, Croatia, Bosnia-Herzegovina and the Voivodina) but those parts were economically much more advanced than what had been the Kingdom of Serbia before 1918. 50 percent of the entire Yugoslav banking capital after World War I, for instance, was concentrated in Croatia alone; Zagreb and not Belgrade was initially the economic capital of Yugoslavia. These are only some of the many aspects in recent research by Aleksic (2009) which demonstrate how much economic power Yugoslavia inherited from the dual monarchy. Cities such as Ljubljana, Zagreb and Novi Sad might well have continued to carry out a great deal of their economic activity with Austria even after World War I, thereby potentially importing (or exporting for that matter) the business cycle. A similar rationale might explain increased business cycle integration of Romania which had gained the vast territory of Transylvania from the dual monarchy.

4.3. Post World War II: 1950-1989

Maddison provides continuous annual GDP series for all SEE countries from 1950 to 2001, but we decided to end our analysis in 1989 in order to address more directly the following question: Was the interwar business cycle integration doomed to unravel after World War II when some SEE countries fell in the Western camp (Austria, Greece), some in the Eastern camp (Bulgaria, Romania) and Yugoslavia somewhere in between? Table 5 presents our results.

Table 5

**Correlation coefficient between growth rates of GDP per capita,
1950 - 1989**

	Austria	Bulgaria	Greece	Romania	Yugoslavia
Austria	1.00				
Bulgaria	0.45	1.00			
Greece	0.47	0.64	1.00		
Romania	0.65	0.72	0.82	1.00	
Yugoslavia	0.22	0.69	0.51	0.64	1.00

NB: Time series are 4-year moving averages of the original data.

Sources: Cf. text.

The average correlation yields a value of +0.58 which suggests a somewhat higher business cycle integration after WW II compared with the interwar period. This means no less than that the business cycle was able to penetrate the iron curtain. Not surprisingly, the average correlation between countries on the same side of the iron curtain (Austria/Greece and Bulgaria/Romania/Yugoslavia) is somewhat higher (+0.63) than the average correlation between countries on opposite sides of the iron curtain (+0.55); it is worth keeping in mind, however, that the value of +0.55 is still at levels slightly higher than the average correlation intra-SEE of the interwar period (+0.41, cf. above).

What then might explain the persistence of a common business cycle after 1950? The iron curtain was meant to prevent the free movement of people but other factors could easily pass it. There is, first and foremost, the weather. As late as the 1960s, over 50 percent of the Bulgarian and the Greek economies were still accounted for by agriculture. Under these circumstances, similar weather conditions can then easily induce a synchronized business cycle. Second, there is substantial evidence that the oil price shocks of 1973 and 1979 had a major impact not only on the Western economies but also on the countries of the Eastern bloc. Third, following the death of Stalin, Eastern Europe did start to open economically towards the West by increasing trade and importing capital. This has been well documented by Ivanov for the case of Bulgaria (Ivanov 2008). In other words, while people might not have been able to pass the iron curtain, goods and capital certainly could. But even the free movement of labour was not completely prevented. Yugoslavia did have some form of labour mobility with the Western European economies, as the *Gastarbeiter* experience of many Yugoslav workers in Germany demonstrates. On reflection, then, we should not be all too surprised that there continued to be a common SEE business cycle in the Cold War period.

5. Conclusion

This paper represents the first attempt ever to construct business cycle indices for the South-East European (SEE) countries from late 19th century independence to the present day. Constructing these indices allowed us to address two key questions: to what extent was there a common business cycle among the SEE countries, and to what extent was the business cycle of individual SEE countries and/or SEE as a whole synchronized with the business cycles of the major European economies, i.e. England, France, and Germany.

In a perfect world, we would study business cycles by analyzing GDP data. We first explained why historical national accounts are not necessarily as suited for this task as they might appear initially. Our concerns partly stemmed from the idiosyncrasies of SEE GDP data, partly from general considerations as to why national historical accounts are unlikely to reflect the true but unknown GDP series. We then suggested Common Dynamic Factor Analysis (CDFA) as a promising alternative to construct business cycle indices. Based on a period of Bulgarian history for which we both have GDP figures and the time series required for the CDFA, we found that our business cycle closely tracked the GDP series. This finding boosted our confidence in using this technique also for other periods for which we lack such GDP data.

The fourth section was devoted to addressing two key questions: to what extent was there a common business cycle among the SEE countries, and to what extent was the business cycle of individual SEE countries and/or SEE as a whole synchronized with the business cycles of England, France, and Germany. Three results stood out: First, there was no discernible business cycle integration before World War I, neither among the SEE economies nor between the SEE economies and Europe's core economies; only Austria-Hungary's business cycle was moderately well integrated with Western Europe. This result suggests that SEE did not fully participate in the first age of globalization (at least not to the extent that it would lead to a synchronisation of business cycles). Our second major finding relates to the interwar period. We detected the emergence of a common SEE business cycle as well as increased synchronisation with Western Europe. This trend contrasted sharply with the core economies themselves, whose business cycles had been a good deal more integrated before World War I than in the interwar period. This SEE trend might be explained by increased specialisation of the SEE economies in the interwar period (reflecting higher GDP levels as much as contributing to them), thereby making intra-regional trade more attractive and hence the transmission of business cycles more likely. We also hypothesized that the dramatic border changes following World War I might well have played a part in the emergence of a common business cycle; regions incorporated into another country continued to have strong economic links with country they had initially belonged to. Last but not least, we found that SEE had a common business cycle even during the Cold War period. We explained this fact, surprising as it may seem, with reference to the many factors that were able to penetrate the iron curtain and could potentially give rise to a common business cycle: similar weather conditions for economies with a substantial agricultural sector, the 1970s oil price shocks as well as trade with and capital imports from Western Europe both of which were sizeable after the East bloc had abandoned Stalin's autarkist policies.

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