

Institutions and Business Cycles*

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Abstract

This paper investigates the relationship between the main features of business cycles and the institutional and structural characteristics of 62 industrial, emerging and formerly centrally planned economies from all continents. We find that a variety of institutional indicators, including stronger governance, greater civil liberties, more developed labour and capital markets, and higher levels of central bank independence are significantly associated with business cycle characteristics – namely, volatility and persistence. Our study also demonstrates that similarity of the institutional environment in dimensions such as governance and the level of labour and capital market development strongly affects the co-movement of business cycles across countries.

I. Introduction

This paper investigates the relationship between the main business cycles features and the institutional and structural characteristics of countries in which they are observed. The role of institutions in determining macroeconomic outcomes has been discussed extensively in the literature. There are numerous studies that show empirically that institutional features such as property rights and the rule of law have positive effects on economic performance – see, for example, Knack and Keefer (1995), Hall and Jones (1999), Easterly and Levine (2003) and Rodrik et al. (2002). There is also a large literature on the effect of monetary and financial institutions on macroeconomic performance for both developed and developing countries. Bade and Parkin (1988), Alesina (1989), Alesina and Summers (1993), Grilli et al. (1991), Cukierman et al. (1992, 2002), and Eijffinger and Schaling (1993) examine the impact of central bank independence on inflation. In addition, Neyapti and Dincer (2005), Allen and Gale (2007), de Haan and Shehzad (2009) and Dincer and Neyapti (2010) focus on the impact of bank regulation on economic performance.

Yet there has been relatively little work that examines the institutional underpinnings of business cycle fluctuations. Among the few papers that have examined the role of institutional factors on cyclical fluctuations, Canova et al. (2012) consider the impact of the Maastricht Treaty, the creation of the ECB, or the euro changeover on European business cycles. They find that the process of cyclical convergence precedes these institutional changes and may be consistent with a greater conformity of

*An earlier version of this paper was presented at the European Monetary Forum in Athens, Greece, 30–31 March 2012. We received helpful comments from two anonymous referees as well as Sumru Öz and Monica Schwartzman.

the shocks affecting these economies. The recent global financial crisis has also stimulated new research that assigns a key role to institutional factors in generating the cyclical fluctuations that have been observed. Giannone et al. (2010) consider the relationship between various rating and regulatory indices and GDP growth during 2008–09 for 102 countries. Even after controlling for the effects of a key set of macroeconomic indicators, they find that the set of policies that favour credit market liberalization correlate negatively with countries' resilience during the current financial crisis. Essers (2012) examines the role of democratic governance in accounting for the differences in responses of countries to the global financial crisis, but finds paradoxically that democratic country features are negatively correlated with growth performance during the 2008–09 global crisis. Diamond and Rajan (2009) attribute the ability of many emerging economies to avoid the worst effects of the 2008–09 crisis to institutional and policy reforms that such countries enacted in response to previous crises.

Despite the interest in such findings, these analyses only refer to a specific episode – the 2007–08 financial crisis – and do not seek to understand the institutional underpinnings of business cycles across countries more generally. Yet there are good reasons to believe that institutional factors such as better governance, well functioning markets, lack of corruption and adherence to the rule of law may lead to less severe contractions and more stable and prolonged expansions, as well as affecting how synchronized business cycles are across countries. In this paper, we present new evidence on the role of institutional factors in determining business cycle characteristics such as volatility, persistence and co-movement, after controlling for the impact of structural and macroeconomic factors. We take into account the major institutional arrangements of committing to price and exchange rate stability by means of controlling for the level of central bank independence and membership in a currency union. We also consider indicators of governance, civil liberties and the level of labour and capital market development. Because macroeconomic indicators themselves are the outcomes of alternative institutional arrangements, examining the role of the different institutional arrangements on business cycles may be more informative than examining their implied outcomes.¹

First, we document the business cycle characteristics of a mixed sample of 62 countries that includes developed, emerging and formerly centrally planned economies from all continents; this is one of the broadest data sets available to date on business cycle characteristics. While there is a growing number of studies that examine business cycle characteristics for developing or emerging economies (see, e.g. Rand and Tarp 2002; Aguiar and Gopinath 2007; Benczur and Ratfai (2010); Male 2011; Altug and Bildirici 2012; Canova and Ciccarelli 2012), our study provides new evidence regarding the differences in cyclical phenomena across broad country groupings. We use a nonparametric approach to obtain the turning points of the business cycle for each country, and derive business cycle features based on such turning points. Second, we investigate the impact of a set of institutional indicators in affecting the duration and amplitude in different phases of the business cycle and business cycle synchronization across countries. The regression analysis controls for the macroeconomic indicators that are identified in the literature as the relevant factors for business cycle fluctuations, as well as for dummies for various country-groups. In addition, we control for the potential endogeneity of the institutional indicators both by using their initial values, where available, and by instrumenting them with measures of initial political institutions and country of legal origin. Likewise, we control for the endogeneity of the macroeconomic indicators by using their pre-sample averages.

Our results indicate that stronger governance tends to be associated with more vigorous expansions, while both capital market development and civil liberties dampen business cycles. We also find that greater central bank independence leads to less prolonged contractions. In our analysis of the determinants of business cycle synchronization, we examine the impact of proximity in their institutional and policy environments while controlling for the impact of variables found to be important in earlier

¹A case in point could be examining the effect of central bank independence on business cycles, rather than examining that of inflation.

studies.² We find that business cycle synchronization is strongly related to similarities in the institutional environment, as proxied by composite indicators of governance and of labour and capital development. These results complement those of Fonseca et al. (2007), who investigate the impact of similarity in labour market institutions on business cycle synchronization for the OECD countries, and find that it has a significant effect. Since our results hold even conditioning on the most relevant macroeconomic indicators, they suggest that policy measures to deal with cyclical fluctuations worldwide should pay heed to the institutional environment at least as much as to macroeconomic and structural indicators.

The remainder of this paper is organized as follows. Section II summarizes the business cycle characteristics for the countries used in our study. Section III describes the institutional, structural and macroeconomic variables and presents regression results that correlate them with the business cycle characteristics. Section IV provides evidence on the determinants of business cycle synchronization, while Section V concludes.

II. Business Cycle Characteristics

The business cycle characteristics for different countries are based on the turning point classification of the classical cycle measured at quarterly frequencies. It is well known that measures of classical cycles do not control for trends, as they are computed based on the upturns and downturns of the level of the series. Nevertheless, the turning point dates implied by the methodology are usually consistent with the business cycle dating based on the NBER and CEPR classifications, which are obtained using judgement calls. To determine the peaks and troughs of the classical cycle, we use the quarterly version of the Bry–Boschan algorithm recently suggested by Harding and Pagan (2005, 2006). Let Y_t denote real GDP measured at the quarterly frequency and $y_t = \ln(Y_t)$. According to this algorithm, the peak of a business cycle is identified if $\{y_{t-1} - y_{t-2} > 0, y_t - y_{t-1} > 0, y_{t+1} - y_t < 0, y_{t+2} - y_{t+1} < 0\}$. Likewise, a trough is identified at time t if $\{y_{t-1} - y_{t-2} < 0, y_t - y_{t-1} < 0, y_{t+1} - y_t > 0, y_{t+2} - y_{t+1} > 0\}$. A complete business cycle is defined as alternating peaks and troughs with a minimum duration of five quarters.

The characteristics of business cycle activity are derived from the turning points determined according to this data-based approach. The persistence and volatility of business cycles are measured as the duration and amplitude during each business cycle phase, and co-movement is measured by the pairwise synchronization of the different business cycle states. Let D_i be the duration of a business cycle phase, say a recession or an expansion, and let A_i denote its amplitude. If the consecutive turning points fall on the dates t and $t + d$, then $D_i = d$ and $A_i = y_{t+d} - y_t = \Delta_d y_t$. Business cycle synchronization is measured using the concordance index, which measures the fraction of time that two series are jointly in phase over the business cycle (see Harding and Pagan 2006). Specifically, define S_{it} as a binary random variable that is associated with different phases of the business cycle:

$$S_{it} = \begin{cases} 0 & \text{if country } i \text{ is in a recessionary phase} \\ 1 & \text{otherwise.} \end{cases} \quad (1)$$

²A numerous set of factors have been hypothesized to affect how synchronized business cycles are across countries. These include trade intensity (Frankel and Rose 1998), bilateral financial linkages (Imbs 2004, 2006), or the presence of currency unions (Rose and Engel 2002). Darvas et al. (2005) examine the role of fiscal divergence across countries. There are also some studies that have examined the role of institutional and cultural factors in international trade. Guiso et al. (2004) use data on relative trust among European countries to determine whether and how important trust is for international bilateral trade among these countries. Aviat and Courdacier (2005) incorporate institutional variables in a gravity equation to capture information costs.

Table 1: Summary of Business Cycle Characteristics

	Contraction		Expansion	
	Duration [†]	Amplitude [‡]	Duration [†]	Amplitude [‡]
G-7	3.37 (0.54)	2.38 (1.00)	27.83 (9.16)	22.32 (6.08)
EU	3.78 (1.08)	2.94 (1.47)	28.72 (12.85)	22.96 (8.73)
Other industrialized	3.20 (1.54)	3.11 (3.42)	22.75 (7.21)	31.33 (7.15)
Latin American	4.18 (1.33)	8.53 (4.74)	14.78 (9.90)	19.16 (10.85)
Other emerging	3.72 (2.03)	6.41 (4.94)	15.11 (11.12)	22.72 (12.93)
Transition	4.06 (1.47)	7.83 (4.76)	23.59 (12.12)	41.84 (22.33)

Notes: [†] in quarters; [‡] in percent.

G-7: US, UK, Japan, Canada, France, Germany, Italy. EU: Austria, Belgium, Denmark, Finland, Germany, Greece, Luxembourg, Netherlands, Portugal, Spain, Sweden. Other industrialized: Australia, Hong Kong, Iceland, Israel, Malta, New Zealand, Norway, Singapore, S. Korea, Switzerland, Taiwan. Latin American: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay, Venezuela. Other emerging: Botswana, Jamaica, Morocco, Malaysia, Philippines, S. Africa, Thailand, Turkey. Transition: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kyrgyzstan, Slovakia, Romania, Russia.

Then business cycle synchronization between two countries is defined by the concordance index:

$$I_{ij} = \frac{1}{T} \left\{ \sum_{t=1}^T S_{it} S_{jt} + \sum_{t=1}^T (1 - S_{it})(1 - S_{jt}) \right\}, \quad (2)$$

where T is the minimum of the sample sizes for variables i and j , that is, $T = \min(T_i, T_j)$. This implies that the synchronization measure between country i and country j is computed over the sample period of the country with the shortest sample. It is easy to see that the concordance index has a maximum value of one when $S_{it} = S_{jt}$ and zero when $S_{it} = (1 - S_{jt})$.

The sources and time coverage of the data used to derive the business cycle characteristics are described in Table A1 in the Appendix. The measures of average business cycle characteristics are available only for countries that exhibit complete business cycles.³ Table A2 in the Appendix shows the duration and amplitude of contractions and expansions for all the countries that have multiple recessions and expansions.

Table 1 displays the means and standard deviations of the business cycle characteristics of six groups of countries. We observe that the average length of a complete business cycle for the G-7 and EU countries is close to 32 quarters, which is close to the duration of a typical business cycle given in the literature for developed economies (see, e.g. Baxter and King 1999). The G-7 and EU countries also display similar output losses and gains during contractions and expansions, respectively. However, there is greater variability in the business cycle characteristics for the EU countries. Many have argued that recessions in the core EU countries tend to be milder relative to those of other developed countries such as the US (see, e.g. Krolzig and Toro 2004). Part of the reason for our finding of slightly more severe recessions for the EU countries may be that our classification includes countries which are typically classified as periphery countries in the EU. The industrialized countries outside of the G-7 and the EU tend to have shorter expansions with larger amplitudes than countries in the G-7 or the EU. This finding partly reflects the experience of countries such as Israel, South Korea, Singapore and Taiwan, which have experienced strong growth and convergence to the per capita

³Countries in our sample that do not satisfy this criterion include Bolivia, Georgia, Indonesia, Ireland, Latvia, Lithuania and Slovenia. A subset of these countries only experience downturns in economic activity associated with the 2008 global financial crisis. We also eliminated Kazakhstan because the average amplitude of its expansions was an outlier to the remaining sample.

income levels of G-7 and other developed countries in the EU in the postwar period. However, in contrast to the EU countries, the other industrialized countries tend to display less variability during expansions compared to contractions.

The remaining country groupings experience much more variability in the business cycle characteristics than others. Among the developing countries, the Latin American countries have the worst measures across business cycle characteristics – the longest and deepest recessions as well as the shortest and weakest expansions. The experience of countries such as Argentina, Mexico, Peru, Uruguay and Venezuela dominate those observations whereas countries such as Brazil, Chile and Ecuador have slightly differing characteristics than the rest of this group. Brazil has the shortest and mildest contractions among all the Latin American countries, while Chile and Ecuador have long expansions characterized by large output gains. The highly heterogeneous group of emerging market economies tends to have only slightly better business cycle characteristics than those of the Latin American countries. However, this group also displays considerable variation in its characteristics. For example, while Thailand tends to have longer and stronger expansions, Turkey experiences short recessions and short expansions. The transition and CIS countries are similar to the Latin American and other emerging economies in terms of the duration and amplitude of their contractions. However, they tend to display longer and more robust expansions, reflecting the economic gains that countries such as Croatia, Estonia and Slovakia have made in the aftermath of market reforms and liberalization.

III. Determinants of Business Cycle Characteristics

The role of institutional factors in determining economic outcomes has recently gained prominence; according to some, ‘institutions rule’ (see Rodrik et al. 2002). Yet there has been relatively little work that has examined the impact of institutions on business cycle characteristics across countries. As Giannone et al. (2010) state: ‘In principle market orientation, a stable political system and good governance should make countries more resilient to large shocks and thereby mitigate output losses due to recessions’. We also conjecture that such characteristics should lead to more stable and prolonged expansions and/or shorter and less severe downturns, which appear to be a concomitant aspect of the convergence process that has been studied extensively in the growth literature.

In this paper, our aim is to understand the association of institutional factors and business cycle characteristics. The institutional variables are intended to measure the constraints on the actions of the relevant agents (see North 1990). The issue of the appropriate measurement of institutions in empirical work has generated much controversy.⁴ The efficacy of formal institutions in a society may be captured by a general notion of governance. However, institutional factors may also be correlated with various structural and macroeconomic variables, making it difficult to identify their separate effects. In what follows, we seek to uncover the role of a set of institutional factors after controlling for the effects of the structural and macroeconomic characteristics of the different groups of economies.

A. Indicators

Several indices of governance and institutional quality have been used in the recent literature. In trying to identify the factors that led to the large drops in GDP during the recent global financial crisis, Giannone et al. (2010) focus on one of the sub-indicators of the Worldwide Governance Index, namely, regulatory quality in the pre-crisis period. Frankel and Saravelos (2010) use an index of legal

⁴See Glaeser et al. (2004) for a discussion of this issue in the context of the growth literature.

rights and an index of business disclosure as a potential leading indicator for the 2008–09 financial crisis. In his study of democratic governance, Essers (2012) also controls for overall institutional quality based on the World Bank governance indicators.

In view of the existing studies, we consider the impact of the following institutional indicators on business cycle characteristics.

- The Worldwide Governance indices provided by the World Bank (see Kaufmann et al. 2009) constitute a widely used aggregate measure of governance. They measure different dimensions of governance grouped as (i) voice and accountability, (ii) political stability and absence of violence, (iii) government effectiveness, (iv) regulatory quality, (v) rule of law and (vi) control of corruption.⁵ We combine these six groups of governance indicators under one index, denoted *Gov*, by taking the average of the normalized indices such that a number close to one indicates good governance.
- The Institutional Profiles Database 2009 (*IPD*) developed by the French Development Agency⁶ presents a broad spectrum of institutional characteristics that goes beyond measuring governance. Our empirical analysis focuses on indices regarding the level of labour and capital market development (denoted *ipdlm* and *ipdkm*, respectively).⁷
- The Civil Liberties Index prepared by Freedom House (*FH*) measures freedom of expression, assembly, association, and religion and is available annually from 1972 to 2008. The index ranks civil liberties on a scale of 1 to 7, with 1 representing the most free and 7 representing the least free.
- Indices of central bank independence (*CBI*) by Cukierman et al. (1992) are provided for four decades between 1950 and 1989, and are extended by Arnone et al. (2007) to the 1990s and by Cukierman et al. (2002) to encompass the transition economies. This is a legal index that aggregates 16 characteristics of central bank (CB) charters, including variables measuring the allocation of authority over monetary authority, procedures for resolution of conflicts between the CB and the government, the relative importance of price stability in the charter of the CB, the nature of limitations on lending by the CB to the government, and procedures for the appointment and dismissal of the governor of the CB.⁸
- A dummy variable to indicate whether a country is a member of a currency union (*CU*). See Roger and Stone (2005).

The data on the structural variables are derived from the World Bank's World Economic Indicators. The variables that we use are (i) openness (*open*) measured as the sum of exports and imports as a percentage of GDP; (ii) the income share of industrial value added (*iva*); (iii) credit extended to the private sector as a ratio of GDP (*CRY*); (iv) gross saving as a ratio of national income (*SY*) and (v) the log of GDP per capita (*GDP^{pc}*) measured in 2000 US\$. The rationale for including these variables follows the recent literature (see Giannone et al. 2010; Frankel and Saravelos 2010; Essers 2012). Countries that have greater levels of openness may have greater capability in reducing the impact of shocks on their national economies through greater risk sharing opportunities. Likewise, if countries with a larger industrial base are also able to mitigate the impact of shocks on their business cycles, then omitting these variables will lead us to attribute such a role to institutions. Third, the credit-GDP ratio is useful for capturing the level of financial development, which may affect the nature of

⁵This indicator is constructed for 212 countries and territories bi-annually for 1996, 1998, 2000 and annually for 2002–08.

⁶See <http://www.cepii.fr/anglaisgraph/bdd/institutions.htm>.

⁷The exact components of the indices *ipdlm* and *ipdkm* are described in Table A3 in the Appendix.

⁸As noted by Cukierman et al. (2002), this measure may be a poor proxy for actual independence if there are substantial deviations between the law and practice.

business cycle fluctuations over and above that implied by the existing institutions. The ratio of gross saving to national income is useful for capturing both public and private imbalances in the economy that typically impact negatively on a country's business cycle characteristics. Finally, including per capita income helps control for the level of institutions that may not be captured by measured characteristics. Our analysis in Section II also suggests that there are important differences in business cycle characteristics across the various country groupings, especially the developing ones. The country groups whose effects are controlled via dummies are the EU (*EU*), the Latin American countries (*LA*) and the transition countries (*CEE*).

B. Measurement

In our empirical analysis, we employ cross-sectional regressions that relate average business cycle characteristics, such as the duration and amplitude of contractions and expansions for each country, to a set of country-specific indicators of institutional quality, after controlling for the impact of macroeconomic and structural factors. Before presenting the results of this exercise, it is worthwhile discussing the measurement of the institutional indicators that we hypothesize to explain business cycle features. Of these indicators, the Freedom House indicator *FH* is available since 1972 for the majority of the countries in our sample. For a subset of developed countries for which the business cycle indicators are available since 1960, *FH* has remained essentially constant over the period from 1972 to 2009, suggesting that using its 1972 value as an initial value will not create a problem for these countries. For the remaining countries, the sample periods used to calculate the business cycle characteristics start in 1970 or later, allowing us to control for the potential endogeneity of *FH* by using its pre-sample average (or value) with respect to the relevant sample periods for the business cycle data. By contrast, the variable *Gov* is available between 1996 and 2008 and the IPD indicators are only available for 2009. If one took the view that institutions, especially informal institutions, change very slowly over time, then it might be possible to rationalize the inclusion of the 1996 value of *Gov* as a measure of initial institutions. In what follows, we initially consider regressions that include the initial values of the World Bank governance indicator and pre-sample averages of the Freedom House indicator, where available, which we denote by Gov_{ini} and FH_{ini} , respectively, as well as measures averaged over the entire sample period for each country.

The measurement of the indicators of monetary institutions raises additional issues. The indices of *CBI* are provided on a decadal basis, and the exact date of change within a decade is not recorded. This does not allow for the identification of an initial value of *CBI* per country. As Cukierman et al. (1992, 2002) note, the indices of central bank independence also typically change slowly, as they reflect changes in the underlying central bank law. Accordingly, in this study, we use averages of the available measures across the sample periods for which the business cycle features are measured.⁹ Second, countries that are members of a monetary (or currency) union in our sample are the euro area countries, for which membership took effect in 1999 or the early 2000s. Since the business cycle characteristics of these countries are typically calculated using data from periods earlier than the dates of their membership in a currency union, including this variable as a determinant of average business cycle characteristics may not be useful.¹⁰ However, we employ membership in a currency union as part of the analysis on the determinants of business cycle synchronization, which uses data from the 1980s onwards.

⁹As an example, real GDP data for Argentina are available over the period 1980–2009. Hence, the index of *CBI* used in for Argentina is an average of the values calculated for the decades 1980–89 and 1990–99.

¹⁰Controlling for other institutions of monetary policy such as inflation targeting and currency board regimes is also beyond the scope of the current paper due to the same problem.

In what follows, we employ two alternative methods to examine the role of the institutional indicators on the business cycle characteristics. First, we consider OLS regressions that use the pre-sample averages or initial values of *FH* and *Gov* together with the indicator *CBI*, which is available as an average over the relevant sample period, and the indicators *ipdlm* and *ipdkm*, which are measured at a specific date during the sample. Second, we employ instrumental variables estimation where we instrument the institutional indicators with measures of initial political institutions from the Polity IV Database as well as measures of legal origin from La Porta et al. (2008). To measure initial political institutions, we use an index based on the pre-sample average of the combined Polity score (or *polity2* variable), which is calculated by subtracting an institutionalized autocracy score from an institutionalized democracy score. We convert the original scores (ranging from -10 for strongly autocratic to +10 for strongly democratic) to a 0–1 score. We control for the possible endogeneity of the macroeconomic and structural factors by using their pre-sample averages with respect to the real GDP data used to derive the business cycle features for each country, where available.

C. Regression Results

Table 2 reports the results of the regressions that analyze the impact of the institutional factors after controlling for the pre-sample values of the macroeconomic indicators and the region dummies. The first part of this table shows that *Gov_{ini}* is positively associated with the duration and amplitude of expansions, although only the latter coefficient is significant at the 10% level.¹¹ Hence, countries with better governance tend to have stronger expansions. Second, countries that score better on the pre-sample values of *FH_{ini}* (lower *FH*) tend to have smaller output losses during contractions and smaller output gains during expansions. Third, central bank independence (*CBI*) tends to reduce the duration of contractions. Finally, the EU and transition countries tend to have longer contractions relative to the average. The second part of Table 2 considers, as an alternative to the above reported institutional measures, the impact of the indicators of labour and capital development from the *IPD* database. Here we find weak evidence that the existence of more developed labour markets is associated with smaller output losses during contractions. However, none of the macroeconomic or structural factors have significant associations with the business cycle characteristics in any of the regressions reported in Table 2.¹²

Next, in order to account for the possible endogeneity problem, we consider instrumental variables estimation where we instrument the in-sample averages of the indicators *Gov*, *FH*, *ipdlm* and *ipdkm* with the pre-sample values of the combined Polity score *polity2*, as well as dummies for UK, French and German legal origin.¹³ These regressions are given by

$$Gov = \underset{(6.56)}{0.705} + \underset{(2.06)}{0.162} polity2 - \underset{(-1.84)}{0.157} lglor^{UK} - \underset{(-3.26)}{0.278} lglor^{FR} - \underset{(-1.62)}{0.142} lglor^{GER}, \bar{R}^2 = 0.35$$

$$FH = \underset{(4.53)}{3.15} - \underset{(-4.00)}{2.04} polity2 + \underset{(1.60)}{0.892} lglor^{UK} + \underset{(1.56)}{0.867} lglor^{FR} + \underset{(0.49)}{0.278} lglor^{GER}, \bar{R}^2 = 0.36$$

$$ipdlm = \underset{(12.37)}{2.69} + \underset{(4.03)}{0.651} polity2 - \underset{(-1.82)}{0.310} lglor^{UK} - \underset{(-2.58)}{0.438} lglor^{FR} - \underset{(-0.51)}{0.09} lglor^{GER}, \bar{R}^2 = 0.48$$

$$ipdkm = \underset{(8.05)}{2.05} + \underset{(2.00)}{0.377} polity2 + \underset{(0.19)}{0.039} lglor^{UK} + \underset{(0.06)}{0.012} lglor^{FR} - \underset{(-0.22)}{0.045} lglor^{GER}, \bar{R}^2 = 0.02$$

¹¹However, the coefficient for *Gov* on the duration of expansions attains significance at levels of 10% in regressions which exclude *iva*, or in specifications which exclude the region dummies.

¹²Furthermore, in specifications that include the pre-sample values of the macroeconomic indicators alone or with the region dummies, the only indicator that attains significance is the pre-sample value of GDP per capita. This occurs in regressions for the amplitude of contractions and the duration of expansions.

¹³“The omitted category is Scandinavian legal origin.”

Table 2: Determinants of Business Cycle Characteristics – OLS Estimation

Dependent variable	Contraction			Expansion			Contraction			Expansion		
	Duration	Amplitude	Amplitude	Duration	Amplitude	Amplitude	Duration	Amplitude	Amplitude	Duration	Amplitude	Amplitude
Constant	2.49 (0.58)	-0.06 (-0.52)	-0.52 (-1.08)	-31.30 (-0.80)	0.11 (1.47)	0.15 (1.53)	3.74 (1.04)	0.15 (1.53)	0.15 (1.53)	-7.30 (-0.24)	0.50 (1.20)	0.50 (1.20)
<i>open</i>	-1.00 (-1.47)	0.02 (1.03)	0.11 (1.47)	-1.25 (-0.20)	0.11 (1.47)	-0.002 (-0.07)	-0.79 (-0.78)	-0.002 (-0.07)	-0.002 (-0.07)	1.37 (0.16)	0.07 (0.63)	0.07 (0.63)
<i>iva</i>	1.94 (0.53)	0.11 (1.15)	-0.21 (-0.51)	-13.35 (-0.40)	-0.21 (-0.51)	0.10 (0.85)	1.45 (0.35)	0.10 (0.85)	0.10 (0.85)	-36.42 (-1.04)	-0.60 (-1.25)	-0.60 (-1.25)
<i>CRY</i>	-0.005 (-0.009)	-0.006 (-0.37)	-0.02 (-0.33)	2.75 (0.49)	-0.02 (-0.33)	-0.01 (-0.56)	-0.006 (-0.009)	-0.01 (-0.56)	-0.01 (-0.56)	5.50 (0.96)	0.02 (0.21)	0.02 (0.21)
<i>SY</i>	-1.18 (-0.35)	-0.03 (-0.36)	-0.15 (-0.40)	-24.90 (-0.81)	-0.15 (-0.40)	-0.05 (-0.51)	-1.97 (-0.51)	-0.05 (-0.51)	-0.05 (-0.51)	20.20 (0.62)	0.48 (1.06)	0.48 (1.06)
<i>GDP^{pc}</i>	0.35 (0.77)	0.01 (1.13)	0.04 (0.88)	4.11 (1.00)	0.04 (0.88)	0.01 (0.62)	0.64 (1.05)	0.01 (0.62)	0.01 (0.62)	-1.73 (-0.33)	-0.05 (-0.72)	-0.05 (-0.72)
<i>Govⁱⁿⁱ</i>	-0.75 (-0.32)	-0.09 (-1.40)	0.51 (1.91)	33.19 (1.54)	0.51 (1.91)	—	—	—	—	—	—	—
<i>FHⁱⁿⁱ</i>	0.14 (0.62)	0.01** (2.05)	0.07*** (3.00)	2.77 (1.36)	0.07*** (3.00)	—	—	—	—	—	—	—
<i>CBI</i>	-4.08** (-2.12)	-0.06 (-1.15)	-0.12 (-0.54)	-0.51 (-0.03)	-0.12 (-0.54)	—	—	—	—	—	—	—
<i>ipdlm</i>	—	—	—	—	—	-0.07* (-1.92)	-1.50 (-1.11)	-0.07* (-1.92)	-0.07* (-1.92)	18.51 (1.62)	0.14 (0.90)	0.14 (0.90)
<i>ipdkm</i>	—	—	—	—	—	-0.003 (-0.12)	-0.48 (-0.50)	-0.003 (-0.12)	-0.003 (-0.12)	-1.07 (-0.13)	-0.05 (-0.45)	-0.05 (-0.45)
<i>EU</i>	1.47** (2.09)	0.008 (0.40)	-0.10 (-1.33)	0.35 (0.05)	-0.10 (-1.33)	0.004 (0.23)	0.79 (1.16)	0.004 (0.23)	0.004 (0.23)	-0.96 (-0.17)	-0.09 (-1.20)	-0.09 (-1.20)
<i>LA</i>	0.89 (1.22)	0.03 (1.66)	-0.04 (-0.45)	-6.06 (-0.91)	-0.04 (-0.45)	0.02 (0.91)	0.27 (0.34)	0.02 (0.91)	0.02 (0.91)	-2.57 (-0.38)	-0.04 (-0.40)	-0.04 (-0.40)
<i>GEE</i>	1.68** (2.07)	0.01 (0.51)	0.10 (1.10)	7.22 (0.97)	0.10 (1.10)	0.04 (1.60)	1.30 (1.44)	0.04 (1.60)	0.04 (1.60)	-1.91 (-0.25)	0.03 (0.30)	0.03 (0.30)
No. of obs.	44	44	44	44	44	42	42	42	42	42	42	42
\bar{R}^2	0.04	0.36	0.17	0.12	0.17	0.27	-0.13	0.27	0.27	0.15	-0.07	-0.07

t-Statistics in parentheses. *, **, and *** indicate statistical significance at 10, 5 and 1 percent levels, respectively.

where the numbers in parentheses are the t -ratios. The regressions show that the *polity2* variable is a significant determinant of all four institutional indicators, and that it enters the respective regressions with the correct signs. We also find that the dummies for UK and French legal origin are useful for explaining *Gov* and *ipdlm* but not *FH* or *ipdkm*. Among the four indicators considered, the instruments are the least successful in accounting for the cross-sectional behaviour of *ipdkm*.

Table 3 shows the instrumental variables estimation of the specifications considered in Table 2.¹⁴ The region dummies for *EU* and *CEE*, as well as *CBI*, continue to be significant explanatory variables in the regression for the duration of contractions. In addition, a better score on the Freedom House indicator (a lower *FH*) continues to dampen the amplitude of contractions and expansions. By contrast, better governance and higher levels of real GDP per capita are associated with stronger expansions. Of the indicators of labour and capital market development, *ipdlm* loses its significance while *ipdkm*, as well as the *LA* dummy, are now found to reduce the duration and amplitude of expansions.¹⁵ However, given the very poor explanatory power of the instruments for *ipdkm*, the result regarding this indicator seems difficult to interpret.

IV. Business Cycle Synchronization

The extent and determinants of business cycle synchronization across countries have also been among the major concerns of the recent macroeconomics literature. In a comprehensive analysis, Baxter and Kouparitsas (2005) examine a large set of potential determinants of business cycle synchronization. They conclude that bilateral trade and a gravity variable measured as the distance between countries are among the most robust variables. Imbs (2010) considers the role of trade and financial linkages as a determinant of business cycle synchronization in the 2008–09 financial crisis. Aside from a few recent studies mentioned in the introduction, however, the role of institutional factors in affecting bilateral business synchronization across countries has not been considered.

As in Baxter and Kouparitsas (2005), we conduct a robust estimation approach to determine which institutional variables remain significant once we control for other potential determinants of business cycle synchronization (see Leamer 1983 or Levine and Renelt 1992). In their analysis, Baxter and Kouparitsas (2005) examine the role of gravity variables, bilateral trade, total trade, similarity of sectoral structure, similarity in the basket of goods, factor endowments and currency union, based on a cross-sectional analysis. Imbs (2010) includes a control for the impact of the size of the respective economies. Hence, based on the results of these and similar studies, as well as data availability, we include the following variables in the estimated regressions as part of the baseline specification: (i) a gravity variable defined as the (logarithm of the) distance between country i and j divided by 1,000, D_{ij} , (ii) the sum of the initial per capita income of the respective economies defined as $\ln(GDP_i^{pc}) + \ln(GDP_j^{pc})$ and (iii) a measure of trade intensity between countries i and j defined as:

$$T_{ij} = \frac{X_{ij} + X_{ji}}{X_i + X_j}, \quad (3)$$

where X_{ij} denotes total merchandise exports from country i to j and $X_i = \sum_j X_{ij}$, and each variable is measured as an average over the available sample period.¹⁶

¹⁴Sine we have two instruments and four endogenous variables, we used the instrumented variables two at a time in the estimated regressions.

¹⁵However, we found that *ipdlm* had a positive and significant impact on the duration and amplitude of expansions in the absence of the region dummies or using other combinations of them.

¹⁶In their study, Fonseca et al. (2007) argue that the gravity variable may proxy for country-specific effects such as a common language or common border, and they use fixed effects in their panel estimation for the OECD countries. However, Baxter and Kouparitsas (2005) find that the gravity variable tends to remain significant even after allowing for country-pair fixed effects. Based on their results, we include the gravity variable as an always-included variable in the absence of country-pair fixed effects.

Table 3: Determinants of Business Cycle Characteristics – IV Estimation

Dependent variable	Contraction			Expansion			Contraction			Expansion		
	Duration	Amplitude	Amplitude	Duration	Amplitude	Amplitude	Duration	Amplitude	Amplitude	Duration	Amplitude	Amplitude
Constant	-2.78 (-0.47)	-0.15 (-0.85)	-76.32 (-1.37)	-1.10 (-1.52)	5.29 (1.00)	0.29** (2.03)	80.04* (1.94)	2.39*** (4.07)				
<i>open</i>	-0.82 (-1.00)	0.005 (0.22)	1.52 (0.19)	0.07 (0.76)	-0.34 (-0.38)	0.01 (0.52)	1.21 (0.17)	0.04 (0.42)				
<i>iva</i>	1.12 (0.31)	0.09 (0.83)	-17.60 (-0.51)	-0.33 (-0.75)	1.19 (0.30)	0.09 (0.86)	-6.36 (-0.21)	-0.27 (-0.62)				
<i>CRY</i>	0.15 (0.24)	-0.004 (-0.02)	3.61 (0.64)	-0.009 (-0.12)	0.20 (0.30)	-0.003 (-0.16)	0.62 (0.12)	-0.08 (-1.10)				
<i>SY</i>	-0.21 (-0.07)	0.04 (0.47)	-10.83 (-0.38)	0.25 (0.67)	0.74 (0.24)	0.04 (0.43)	-20.13 (-0.82)	-0.22 (-0.65)				
<i>GDP^{pc}</i>	0.24 (0.60)	-0.004 (-0.30)	7.54* (1.94)	0.03 (0.67)	0.25 (0.60)	-0.002 (-0.13)	7.97** (2.42)	-0.003 (-0.05)				
<i>Gov</i>	5.37 (1.27)	0.13 (1.03)	31.84 (0.80)	0.92* (1.78)	—	—	—	—				
<i>FH</i>	0.98 (1.45)	0.04** (2.01)	7.47 (1.17)	0.19** (2.25)	—	—	—	—				
<i>CBI</i>	-3.37* (-1.86)	0.002 (0.04)	7.34 (0.43)	0.16 (0.70)	—	—	—	—				
<i>ipdln</i>	—	—	—	—	-0.23 (-0.16)	-0.04 (-1.00)	15.16 (1.32)	0.27 (1.64)				
<i>ipdkm</i>	—	—	—	—	-1.65 (-0.54)	-0.07 (-0.86)	-68.54*** (-2.83)	-1.13*** (-3.31)				
<i>EU</i>	1.37* (1.99)	-0.001 (-0.04)	1.16 (0.18)	-0.07 (-0.88)	0.41 (0.63)	-0.01 (-0.58)	0.14 (0.03)	-0.06 (-0.82)				
<i>LA</i>	1.08 (1.53)	0.04* (1.74)	-7.62 (-1.14)	-0.05 (-0.63)	0.72 (0.94)	0.03 (1.27)	-10.79* (-1.80)	-0.15* (-1.87)				
<i>CEE</i>	1.73** (2.27)	0.03 (1.13)	6.01 (0.84)	0.10 (1.12)	0.62 (0.80)	0.02 (0.70)	-1.31 (-0.21)	0.03 (0.37)				
No. of obs.	44	44	44	44	45	45	45	45				
\bar{R}^2	0.04	0.27	0.11	0.05	-0.14	0.27	0.29	0.29				

t-Statistics in parentheses. *, **, and *** indicate statistical significance at 10, 5 and 1 percent levels, respectively.

To measure the proximity of the institutional variables that are defined as multi-dimensional indicators, we utilize the method introduced by Krugman (1991). As we described in Section 3.A, the World Bank governance indicator measures six different dimensions of governance for each country, while indicators of labour and capital market conditions, $ipdlm$ and $ipdkm$, have 16 and 13 components (see Table A2), respectively. Hence, we define the proximity of these indicators between countries i and j as

$$Inst_{ij}^{KI} = \sum_{k=1}^K \left| \left(\frac{Inst_{ik}}{Inst_i} \right) - \left(\frac{Inst_{jk}}{Inst_j} \right) \right|, \quad (4)$$

where the superscript KI denotes the 'Krugman index,' $Inst_{ik}$ refers to the k th component of the institutional indicator $Inst_i = Gov_i^{mi}, ipdlm_i, ipdkm_i$ for country i , where $K = 6, 16$ or 13 , respectively. CBI is already made available by Cukierman et al. (1992, 2002) and Arnone et al. (2007) in the form of a unidimensional index, as is the Freedom House indicator. Finally, we also examine the role of membership in a currency union, $BothCU_{ij}$, as a potential determinant of business cycle synchronization. We control for the impact of the differences in a set of structural and macroeconomic factors. These include the absolute difference between (i) the share of industry value-added in output, (ii) the credit to GDP ratio and (iii) the savings to national income ratios for countries i and j denoted iva_{ij} , CRY_{ij} and SY_{ij} , respectively.¹⁷ In the regressions which do not include membership in a currency union, we include a dummy indicator, EU_{ij} , which equals one if both countries i and j are EU countries, and zero otherwise.

To account for the differences in the availability of data, we compute the concordance index between countries i and j using data on the business cycle indicators S_{it} , (S_{jt}) beginning in 1980.¹⁸ Since the data on bilateral trade flows are available as of 1980 and CBI is measured based on decadal information up to 1999, this approach helps to ensure consistency of time coverage between the measures of business cycle synchronization and data on their potential determinants.

The results in Table 4 reveal that both trade intensity and distance are significant at the 1% level and enter the estimated regressions with the correct signs, and that the distance between countries i and j reduces business cycle synchronization while trade intensity tends to increase it. However, the coefficient on the sum of the initial per capita income for countries i and j is negative and is significantly estimated in only one case. With respect to the specific indicators, the further apart countries i and j are with regards to their composite governance indicators (Gov_{ij}^{KI}), the less synchronized are their business cycles. The divergence in their indices of composite labour market and capital market institutions ($ipdlm_{ij}^{KI}$ and $ipdkm_{ij}^{KI}$) also has a negative and significant effect. However, differences in CBI or FH or mutual membership in a currency union $BothCU_{ij}$ do not have significant effects on the synchronization of business cycles. This last result is similar to the findings of Baxter and Kouparitsas (2005), who also fail to establish a role for membership in a currency union as a robust determinant of business cycles.¹⁹

Table 5 reports the results of the robust estimation analysis. Of the five variables considered in the robust analysis, differences in the composite indicators of governance (Gov_{ij}^{KI}) and of labour and

¹⁷Fonseca et al. also consider the absolute difference of alternative institutional and policy variables in their estimation.

¹⁸This date may vary depending on the availability of real GDP data for each country. For example, for a set of transition countries, the business cycle indicators are available from the mid-1990s.

¹⁹In unreported results, we also considered regressions that examine the effects of differences in industrial structure as well as credit conditions and total savings as a fraction of GDP. We found that the more dissimilar are countries in their industrial structure, the less synchronized are their business cycles. By contrast, differences in credit to GDP ratios tend to increase synchronization while those in savings to GDP tend to decrease it. However, the impact of the last variable was not significantly estimated. Finally, we found that the dummy for both countries being an EU member had a positive and significant effect on business cycle synchronization.

Table 4: Business Cycle Synchronization: Baseline Specifications

Dependent variable	Business cycle synchronization index (<i>t</i>)										
Constant	0.93*** (28.12)	0.86*** (25.00)	0.90*** (25.23)	0.89*** (24.46)	0.86*** (23.09)	0.87*** (25.25)					
T_{ij}	0.46*** (4.28)	0.55*** (4.90)	0.44*** (4.07)	0.47*** (4.30)	0.50*** (4.34)	0.52*** (4.63)					
D_{ij}	-0.003*** (-5.85)	-0.004*** (-6.94)	-0.003*** (-4.74)	-0.003*** (-5.40)	-0.004*** (-7.12)	-0.004*** (-7.15)					
$\ln(GDP_i^{pc}) + \ln(GDP_j^{pc})$	-0.005*** (-2.57)	-0.003 (-1.57)	-0.001 (-0.66)	-0.002 (-1.09)	-0.003 (-1.30)	-0.004* (-1.84)					
Gov_{ij}^{KI}	-0.06*** (-9.26)	—	—	—	—	—					
CB_{ij}	—	0.007 (0.30)	—	—	—	—					
$ipdln_{ij}^{KI}$	—	—	-0.018*** (-7.59)	—	—	—					
$ipdkr_{ij}^{KI}$	—	—	—	-0.011*** (-6.17)	—	—					
FH_{ij}^{II}	—	—	—	—	—	—					
$BothCU_{ij}$	—	—	—	—	-0.003 (-1.28)	—					
No. of obs.	1275	1225	1035	1035	1128	1275					
\bar{R}^2	0.13	0.08	0.12	0.11	0.08	0.07					

t-Statistics in parentheses. *, **, and *** indicate statistical significance at 10, 5 and 1 percent levels, respectively.

Table 5: Business Cycle Synchronization: Robust Analysis

Variable	Bound	β	t	Obs	\bar{R}^2	Control variables	Robust/ fragile
Gov_{ij}^{KI}	High	-0.032	-4.28	903	0.17	<i>EU, CBI, CRY, ipdlm^{KI}, ipdkm^{KI}, FHⁱⁿⁱ</i>	Robust
	Base	-0.060	-9.26	1,275	0.13		
	Low	-0.062	-9.76	1,225	0.14	<i>EU, CBI</i>	
CBI_{ij}	High	0.041	1.84	1,035	0.11	<i>EU, SY, CRY, ipdkm^{KI}</i>	Fragile
	Base	0.007	0.30	1,225	0.08		
	Low	-0.028	-1.18	1,035	0.14	<i>FHⁱⁿⁱ, CRY, Gov^{KI}</i>	
$ipdlm_{ij}^{KI}$	High	-0.010	-3.35	820	0.16	<i>EU, SY, FHⁱⁿⁱ, iva, CBI, ipdkm^{KI}, Gov^{KI}</i>	Robust
	Base	-0.018	-7.59	1,035	0.12		
	Low	-0.019	-7.79	903	0.13	<i>FHⁱⁿⁱ</i>	
$ipdkm_{ij}^{KI}$	High	-0.005	-2.04	903	0.16	<i>EU, SY, CRY, iva, ipdlm^{KI}, GOV^{KI}</i>	Robust
	Base	-0.011	-6.17	1,035	0.11		
	Low	-0.013	-6.60	903	0.12	<i>SY, FHⁱⁿⁱ, CBI</i>	
FH_{ij}^{ini}	High	0.001	0.47	820	0.11	<i>CBI, CRY, iva, ipdlm^{KI}</i>	Fragile
	Base	-0.003	-1.28	1,128	0.08		
	Low	-0.004	-2.04	1,035	0.08	<i>SY</i>	
$BothCU_{ij}$	High	0.014	1.26	820	0.11	<i>SY, FHⁱⁿⁱ, iva, ipdlm^{KI}</i>	Fragile
	Base	-0.001	-0.09	1,275	0.07		
	Low	-0.020	-1.99	1,128	0.12	<i>CBI, SY, Gov^{KI}</i>	

capital market development ($ipdlm_{ij}^{KI}$ and $ipdkm_{ij}^{KI}$) emerge as the robust determinants of business cycle synchronization. However, neither the differences in *CBI* nor *FH* nor membership in a currency union, *BOTHCU*, are found to be robust determinants of business cycle synchronization. It is worthwhile comparing our results with those in the literature. Of particular relevance are the results of Fonseca et al., who find that (absolute) differences in the tax wedge on the labour input²⁰ reduce business cycle synchronization for the OECD countries over the period 1964–2003. Fonseca et al. also create a new variable by interacting the tax wedge across countries with variables measuring the similarity in employment protection and trade unions’ bargaining power, and find that this too matters for business cycle synchronization. Since our measure of differences in labour market institutions is created as an index of variables that includes such features, our results point to the importance of similarity in labour market institutions in leading to greater business cycle synchronization across a much larger set of countries. These results are obtained after controlling for a variety of variables such as distance, trade intensity, similarity in industrial structure, similarity in initial macroeconomic conditions, and membership in the European Union.

V. Conclusion

This paper examines the business cycle characteristics of a large group of countries that includes industrial, emerging and transition economies from all continents and explores their relationship to a variety of institutional, macroeconomic and structural factors. The data set exhibits significant differences in business cycle characteristics across broad country groupings as well as heterogeneity

²⁰This is defined as the wedge between the real product wage and the real consumption wage.

within such groups. After controlling for macroeconomic and structural factors, cross sectional regressions demonstrate that business cycle characteristics show significant association with a variety of institutional indicators, including indicators of governance, civil liberties, central bank independence, and labour and capital market development.

Our study shows that once institutional factors are taken into account, macroeconomic factors do not matter for determining business cycle characteristics. This result appears noteworthy in the light of the importance that has been attached to macroeconomic factors in accounting for crises past and present (see, e.g. Corsetti et al. 1999 or Rose and Spiegel 2009). Our empirical results also show that institutional factors do not have uniform associations with business cycle characteristics. We find that better governance and higher income levels are associated with stronger expansions, while central bank independence tends to mitigate the severity of contractions. We also show that civil liberties and capital market development are associated with dampened business cycles. Furthermore, similarity in composite indices of governance and of labour and capital development emerge as robust determinants of bilateral business cycle synchronization, after controlling for the effect of variables found to be important in other studies. However, similarity in monetary institutions such as central bank independence or membership in a currency union do not emerge as robust determinants of business cycle synchronization. Our results indicate that institutional and structural measures are of key importance for understanding and developing policies for business cycles or their synchronization across countries. The evidence in this paper also sheds light on the spillover effects of the 2007–08 crisis as well as the euro area debt crisis.

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Appendix: Data

GDP data: The GDP data used in this study to measure business cycles is displayed in Table A1, together with the sample period available for each country as well as the data source. We characterize national business cycles in these countries using quarterly GDP at constant prices measured in units of the national currency.²¹ The GDP data for Canada, France, Germany, Italy, Japan, the US, the Netherlands, Finland, Sweden, Taiwan, Colombia, Ecuador, Jamaica and Morocco are available in de-seasonalized form. The remainder of the data were de-seasonalized using the X11 linear de-seasonalization method.

²¹These data have been derived from a dataset used by Benczur and Ratafi (2010).

Bilateral trade data: The bilateral trade data are obtained from the IMF's Direction of Trade database, and show the exports of each country i to countries j for 61 countries. These countries are given by USA, UK, Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Greece, Iceland, Ireland, Malta, Portugal, Spain, Turkey, Australia, New Zealand, South Africa, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay, Venezuela, Jamaica, Israel, Hong Kong, Indonesia, S. Korea, Malaysia, Philippines, Singapore, Sri Lanka, Thailand, Morocco, Georgia, Kazakhstan, Kryrgyzstan, Bulgaria, Russia, Czech Republic, Slovakia, Estonia, Latvia, Hungary, Lithuania, Croatia, Slovenia and Romania. Data on bilateral trade linkages are provided on an annual basis between 1980 and 2009. However, these data are not available for every country for each year of the sample. Hence, we compute the measure of bilateral trade linkages between country i and j reported in the text for the years in which these data are available, and then take an average across the years.

Table A1: Real GDP Data for 62 Countries

Country	Sample period	Source	Country	Sample period	Source
Argentina	1980:1–2009:2	SO	Korea, S.	1980:1–2009:1	SO
Australia	1960:1–2009:2	OECD	Kyrgyzstan	1995:1–2008:2	IFS
Austria	1988:1–2009:1	Eurostat	Latvia	1993:1–2009:1	SO
Belgium	1980:1–2009:2	Eurostat	Lithuania	1995:1–2009:1	SO
Bolivia	1990:1–2008:4	SO	Luxembourg	1995:1–2008:4	Eurostat
Botswana	1996:1–2008:3	IFS	Malaysia	1991:1–2009:2	BIS
Brazil	1991:1–2009:1	CB	Malta	1997:1–2009:1	SO
Bulgaria	1994:1–2009:1	SO	Mexico	1980:1–2009:2	OECD
Canada	1960:1–2009:2	OECD	Morocco	1990:1–2007:4	IFS
Chile	1981:1–2009:1	CB	Netherlands	1960:1–2009:2	Eurostat
Colombia	1994:1–2008:4	SO	New Zealand	1988:1–2009:2	OECD
Croatia	1994:1–2008:4	SO	Norway	1978:1–2009:1	OECD
Czech Republic	1994:1–2009:1	SO	Peru	1980:1–2009:1	SO
Denmark	1990:1–2009:2	Eurostat	Philippines	1993:1–2009:1	SO
Ecuador	1993:1–2008:4	CB	Portugal	1995:1–2008:4	Eurostat
Estonia	1993:1–2009:1	SO	Romania	1994:1–2009:1	SO
Finland	1960:1–2009:2	Eurostat	Russia	1995:1–2008:4	SO
France	1970:1–2009:2	Eurostat	Singapore	1985:1–2009:2	BIS
Georgia	1996:1–2008:4	SO	Slovakia	1993:1–2009:1	SO
Germany	1960:1–2009:2	Eurostat	Slovenia	1993:1–2009:1	SO
Greece	1960:1–2009:1	Eurostat	S. Africa	1970:1–2009:2	CB
Hong Kong	1973:1–2009:1	SO	Spain	1960:1–2009:2	Eurostat
Hungary	1995:1–2009:1	SO	Sweden	1960:1–2009:2	Eurostat
Iceland	1997:1–2009:1	OECD	Switzerland	1980:1–2009:2	OECD
Indonesia	1996:1–2009:1	BIS	Taiwan	1982:1–2009:1	SO
Ireland	1997:1–2008:4	Eurostat	Thailand	1993:1–2009:1	CB
Israel	1980:2–2009:2	SO	Turkey	1987:1–2009:2	CB
Italy	1960:1–2009:2	Eurostat	UK	1960:1–2009:2	Eurostat
Jamaica	1996:1–2008:2	CB	Uruguay	1988:1–2008:4	CB
Japan	1960:1–2009:2	SO	USA	1960:1–2009:2	FRED
Kazakhstan	1994:1–2009:1	IFS	Venezuela	1997:1–2009:1	SO

Sources. Organization for Economic Cooperation and Development (OECD): Quarterly National Accounts; Statistical Office of the European Union (Eurostat): Quarterly National Accounts; IFS: International Financial Statistics of the International Monetary Fund; BIS: Bank of International Settlements; FRED: Federal Reserve Bank of St. Louis database; CB: Central Bank; SO: Statistical Office.

Table A2: Business Cycle Features for 54 Countries

Country	Cdur	Campl	Edur	Eampl	Country	Cdur	Campl	Edur	Eampl
Argentina	6.33	0.12	12.50	0.22	Kyrgyzstan	3.00	0.09	11.00	0.84
Australia	3.33	0.02	28.50	0.30	Luxembourg	2.00	0.04	26.00	0.29
Austria	3.00	0.01	60.00	0.36	Malaysia	2.33	0.05	12.00	0.22
Belgium	3.50	0.02	34.00	0.25	Malta	4.00	0.04	10.00	0.11
Botswana	2.75	0.06	6.33	0.23	Mexico	4.00	0.06	22.50	0.21
Brazil	2.40	0.03	11.20	0.12	Morocco	3.75	0.10	5.50	0.15
Bulgaria	5.00	0.14	21.50	0.35	Netherlands	3.71	0.03	22.29	0.22
Canada	4.00	0.03	33.00	0.28	New Zealand	2.67	0.02	22.33	0.20
Chile	3.33	0.05	31.00	0.35	Norway	2.20	0.01	21.60	0.19
Colombia	5.00	0.07	7.00	0.07	Peru	3.88	0.14	9.38	0.23
Croatia	5.00	0.10	37.00	0.55	Philippines	2.00	0.02	19.50	0.25
Czech Rep.	6.00	0.03	40.00	0.39	Portugal	4.00	0.02	18.00	0.07
Denmark	3.50	0.01	20.33	0.13	Romania	6.00	0.15	14.33	0.34
Ecuador	2.50	0.04	28.00	0.35	Russian Fed.	3.50	0.08	5.00	0.04
Estonia	3.00	0.05	25.00	0.48	Singapore	2.75	0.04	20.25	0.41
Finland	5.00	0.04	29.00	0.30	Slovakia	3.00	0.07	35.00	0.54
France	2.67	0.02	42.00	0.26	S. Africa	5.33	0.03	19.17	0.18
Germany	2.89	0.02	17.33	0.15	Spain	3.50	0.02	30.25	0.25
Greece	3.63	0.06	13.88	0.16	Sweden	6.00	0.03	33.50	0.26
Hong Kong	2.71	0.03	16.43	0.31	Switzerland	3.29	0.01	12.14	0.08
Hungary	2.00	0.00	23.50	0.24	Taiwan	5	0.05	24	0.34
Iceland	2.00	0.02	18.50	0.25	Thailand	8.00	0.16	39.00	0.50
Israel	3.20	0.03	23.00	0.31	Turkey	3.20	0.08	13.00	0.24
Italy	3.11	0.01	16.40	0.14	UK	4.00	0.04	32.60	0.27
Jamaica	2.40	0.02	6.40	0.04	Uruguay	5.50	0.10	8.50	0.12
Japan	3.75	0.03	24.50	0.20	US	3.20	0.02	29.00	0.28
Korea, S.	4.00	0.06	53.50	0.95	Venezuela	4.67	0.16	3.00	0.05

Cdur and Edur stand for duration of contractions and expansions (in quarters); Campl and Eampl for amplitude of contractions and expansions (in rates of change). Campl measures the rate of output loss during a contraction, and Eampl the rate of output gain during an expansion.

Table A3: Components of the Indicators for Labor and Capital Relations

Index of labour market relations (<i>ipdlm</i>)	Index of capital market relations (<i>ipdkm</i>)
Freedom of association and trade union pluralism	Privatizations in the financial sector
Flexibility in the labour market	Nationalizations in the financial sector
Retraining and reskilling measures	Freedom in the allocation of loans
Adaptive education system	Competence of bank executives
Respect for workers' rights	Importance of venture capital
Weak employment contract rigidity	Sovereign wealth fund policy
Wage bargaining at the individual level	Financial information
Strikes	Competition within the banking system
Management of labour	Regulation of competition in banking
Openness to employment of non-nationals	Monitoring and auditing in banking
Quality of the supply of public goods	Reform of financial regulations
Weak segmentation of the labour market	Financial openness
Low incidence of child labour	Micro lending
Social mobility	
Social mobility: young higher education graduates	
Distribution of income	

Source: Institutional Profiles Database 2009 (IPD).