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ABSTRACT

Sectors and the OECD Business Cycle*

This Paper argues that economic structure is a robust determinant of the OECD business cycle. Countries that share similar manufacturing sectors are shown to display more synchronized business cycles. Interestingly, the well-established impact of trade on business cycles is thus mitigated, and its direct impact lessened. The structure of sectoral output also goes some way towards explaining idiosyncracies in the UK business cycle.

JEL Classification: E32, F41
Keywords: trade, economic structure, international business cycles

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NON-TECHNICAL SUMMARY

In the presence of sector-specific stochastic developments, a natural candidate in explaining why aggregate business cycles are synchronized is the extent to which economies share similar sectors. This Paper provides strong empirical evidence in support of this intuition by computing indices of similarities in sectoral employment for a sample of 21 OECD countries and relating them to measures of cycle synchronization. Economic structure by itself is found to explain roughly 30% of the cross-sectional variation in co-fluctuations and interestingly appears to weaken sizeably the role of bilateral trade intensity in multivariate settings. Cycle synchronization is shown to be three to four times more responsive to sectoral similarities than to trade intensity; given those estimated elasticities, the fall in aggregate cycle synchronization due to increased sectoral specialization observed in OECD countries over the last three decades is likely to have more than offset the effect of higher bilateral trade.

These results are interesting for at least three reasons. First, they provide independent albeit indirect evidence on the importance of sector-specific stochastic developments in explaining aggregate fluctuations, thus contributing to an abundant literature. Second, they shed some light on widely discussed 'anomalies' regarding international fluctuations, the list being probably topped by the apparent idiosyncracies in the UK business cycle within Europe. The Paper goes some way towards explaining those, as the UK economic structure is shown to more significantly resemble the US than continental Europe. Third, given the extent of intra-industry trade between OECD countries, it is hardly surprising that rich countries sharing similar sectors tend to trade more intensely and that the inclusion of an index of economics structure lessens the importance of bilateral trade intensity in explaining cycle synchronization. What is more interesting, however, is the end result in multivariate estimations that the direct impact of trade seems significantly smaller than the role of sectoral patterns, both in terms of estimated elasticities and contribution to overall cross-sectional variation. Thus, the presence of the same activity across the border matters for aggregate cycle synchronization above and beyond the associated trade flows. This calls for an interesting interpretation of the results in Frankel and Rose (1998), who established the significance of a robust link between trade intensity and cycle synchronization. Then, if indeed a monetary union results in more trade – an empirical fact forcefully documented in Rose (1999) for fixed exchange rate regimes – members of the union will see their outputs fluctuate in phase as an endogenous result of their agreement to join, thus moving the union closer to an optimal currency area in the sense of Mundell (1961). Of course, if observed co-fluctuations are largely a manifestation of

economic structure, increases in trade intensity are unlikely to be associated with substantial changes in the extent of co-fluctuations. Although it confirms the direct impact of bilateral trade intensity, this Paper provides evidence that it is dwarfed by the role of economic structure. Perhaps surprisingly given the presumed long-run nature of structural developments, changes in patterns of specialization in the OECD since 1970 are at least of the same order of magnitude as changes in trade flows (and sometimes as much as ten times larger, depending on how they are measured), so much so that any evolution in the degree of cycle synchronization is very unlikely to have arisen from intensification of trade linkages.

1 Introduction

In the presence of sector-specific stochastic developments, a natural candidate in explaining why aggregate business cycles are synchronized is the extent to which economies share similar sectors. This paper provides strong empirical evidence in support of this intuition by computing indices of similarities in sectoral employment for a sample of 21 OECD countries, and relating them to measures of cycle synchronization. Economic structure by itself is found to explain roughly 30% of the cross-sectional variation in co-fluctuations, and interestingly appears to weaken sizeably the role of bilateral trade intensity in multivariate settings. Cycle synchronization is shown to be three to four times more responsive to sectoral similarities than to trade intensity; given those estimated elasticities, the fall in aggregate cycle synchronization due to increased sectoral specialization observed in OECD countries over the last three decades is likely to have more than offset the effect of higher bilateral trade.[1,2]

These results are interesting for at least three reasons. First, they provide independent albeit indirect evidence on the importance of sector-specific stochastic developments in explaining aggregate fluctuations, thus contributing to an abundantly documented literature.[3] Second, they shed some light on widely discussed "anomalies" regarding international fluctuations, the list being probably topped by the apparent idiosyncracies in the UK business cycle within Europe. The paper goes some way in explaining those, as the UK economic structure is shown to resemble significantly more the US than continental Europe. Third, given the extent of intra-industry trade between OECD countries (see for instance Balassa (1979)), it is hardly surprising that rich countries sharing similar sectors tend to trade more intensely, and thus that the inclusion of an index of economic structure impact the importance of bilateral trade intensity in explaining cycle synchronization. What is more interesting, however, is the end result in multivariate estimations that the direct impact of trade seems significantly smaller than the role of sectoral patterns, both in terms of estimated elastici-

[1] Thus perhaps explaining the lack of definite evidence on whether cycles have indeed become far more synchronized as the European economies have integrated. See for instance Artis and Zhang (1995), or Helg et al (1995).

[2] The relatively recent increased specialization in OECD countries is for instance documented rigorously in Imbs and Wacziarg (2000), who look at the time series properties of indices of specialization for a large sample of countries.

[3] See for instance Stockman (1988), Costello (1993) or Ghosh and Wolf (1996). Imbs (2000) shows sectoral composition effects remain important in more general settings, when including a sample of poor countries and a variety of other independent variables liable to account for the extent of co-fluctuations.

ties and contribution to overall cross-sectional variation. Thus, the presence of the same activity across the border matters for aggregate cycle synchronization above and beyond the associated trade flows. This calls for an interesting interpretation of the results in Frankel and Rose (1998), who established the significance of a robust link between trade intensity and cycle synchronization. Then, if indeed a monetary union results in more trade, an empirical fact forcefully documented in Rose (1999) for fixed exchange rate regimes, members of the union will see their outputs fluctuate in phase as an endogenous result of their agreement to join, thus moving the union closer to an optimal currency area in the sense of Mundell (1961). Of course, if observed co-fluctuations are largely a manifestation of economic structure, increases in trade intensity are unlikely to be associated with substantial changes in the extent of co-fluctuations. Although it confirms the direct impact of bilateral trade intensity, this paper provides evidence that it is dwarfed by the role of economic structure. Perhaps surprisingly given the presumed long-run nature of structural developments, changes in patterns of specialization in the OECD since 1970 are at least of the same order of magnitude as changes in trade flows (and sometimes as much as ten times larger, depending on how they are measured), so much so that any evolution in the degree of cycle synchronization is very unlikely to have arisen from intensification of trade linkages.[4] At the very least, the direct effects of trade have been offset by specialization dynamics. As developed in Frankel and Rose (1998), the latter is very likely to result from the former, through standard Ricardian arguments, thus rendering sectoral considerations redundant in the set of independent variables. There are two answers to this concern: first, while the direct effects of trade are measured in *intensive* terms, patterns of specialization are presumably motivated by considerations of bilateral *openness*, since for instance two very closed economies could very well trade quite intensely with each other with hardly any implications on their specialization patterns. Second and most importantly, aggregate trade data probably capture quite imperfectly how countries specialize, thus making it advisable to include readily available measures of sectoral activity in the estimations.[5]

The paper is organized as follows: next section describes the data and empirical method. Section 3 presents the results, including a discussion of idiosyncracies in the UK business cycle. Section 4

[4]That trade intensity is extremely persistent over time should not come as a surprise to trade economists – see for instance Frankel and Romer (1999), or Deadorff (1984).

[5]In fact, in Imbs and Wacziarg (2000), we show that the evolution of specialization patterns over time is largely related to openness. In particular, countries first tend to grow increasingly diversified, but the trend reverts once they reach a threshold level of income per capita, that is lower for open economies.

concludes.

2 Methodology

2.1 Data and Variables Computation

Business cycles are taken to be captured by quarterly fluctuations in real GDP from the IMF International Financial Statistics spanning 21 countries from 1959:1 to 1993:4 with some missing observations.[6] Data on bilateral trade come from Frankel and Wei (1995), and for robustness are supplemented by those provided in the IMF Direction of Trade base. Most importantly, data on the sectoral composition of aggregate employment are taken from UNIDO's three-digit manufacturing employment data, covering 28 sectors. The use of employment data is warranted by the absence of reliable measures of sectoral price levels, and thus avoids the pitfall of capturing relative prices movements, at the cost of not accounting for difference in capital stocks.[7]

The empirical strategy is similar to Frankel and Rose (1998), among others. Measures ρ of cycle synchronization are obtained by computing output bilateral correlations, using growth rates, or alternatively the Hodrick-Prescott filter to isolate the cyclical component of fluctuations, each method generating a maximum of 210 observations. Through most of the paper, bilateral trade is measured in intensive terms, i.e. relative to total imports and exports in the two partner countries. In particular, when using the Frankel and Wei (1995) data that only reports bilateral exports, I compute:

$$Tr_{ij} = \frac{X_{ij} + X_{ji}}{X_i + X_j}$$

where X_{ij} denotes exports from country i to j and X_i is total exports from i. When using the Direction of Trade dataset that includes both bilateral exports X_{ij} and imports M_{ij}, I follow Frankel

[6] Countries covered include Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the US.

[7] The well-known International Sectoral DataBase released by the OECD for 14 countries is an exception, with a coverage that is however insufficient given the present method. Data from this source will be used when looking at the UK case.

and Rose (1998) in computing

$$DOT_{ij} = \frac{X_{ij} + M_{ij}}{X_i + X_j + M_i + M_j}$$

Those measures are complemented with trade levels normalized by output, or "bilateral openness", defined as $\frac{X_{ij}+X_{ji}}{Y_i+Y_j}$.

Finally, to quantify the extent of sectoral similarities across pairs of countries, I compute the indices introduced by Krugman (1991) using the UNIDO data. Define

$$UNIDO(xx)_{ij} = \sum_{k=1}^{M} \mid s_{ki} \; - \; s_{kj} \mid$$

where s_{kj} denotes the share of sector k in country j 's aggregate employment, M is the number of sectors and xx is the year the index was computed. As is obvious, $UNIDO(xx)_{ij}$ will tend to be high for those pairs of countries that have dissimilar allocation of employment across sectors, and thus is argued to capture the extent to which i and j are subjected to the same sector-specific development. $UNIDO(xx)_{ij}$ is based on a maximum of 28 observations, but different sectors are missing in different countries: to avoid country-specific variation in the number of sectors used to calculate the indices, I truncate the data arbitrarily to the 22 sectors that are available for all countries - years considered.[8]

The variable is computed for 1963, 1971, 1980 and 1990, and the values obtained are plotted in Figure 1 against the extent of cycle synchronization, as measured by bilateral correlations of GDP growth rates from 1959:1 to 1993:4. The correlation is always significantly negative, with chronological values -0.570, -0.391, -0.381 and -0.349, thus giving (univariate) evidence that countries with dissimilar sectoral employment tend to be weakly correlated. As Table 1 shows, the cross-section formed by $UNIDO$ is extremely persistent over time, with serial correlation never below 0.79 and equal to 0.92 on average. In spite of this persistence however, the mean has regularly increased over the past three decades, from 0.166 in 1963 to 0.197 in 1990, a 20% increase. This confirms the evidence discussed for instance in Imbs and Wacziarg (2000) that OECD countries have become more specialized recently. The table also reports the maximum and minimum at each date: while maxima are reached for pairs of countries one would indeed expect to be drastically different (Germany and Iceland), the fact that France and the UK appear to be the most similar countries in

[8]Simply treating missing variables as zeros and running the estimations with all the data available resulted in very similar results.

the OECD should then result in higher degrees of synchronization between the UK and continental Europe, or at least France. I come back to this puzzle in section 3.

2.2 Econometric Issues

Consider the estimated equation

$$\rho = \alpha_0 + \alpha_1 Trade + \alpha_2 UNIDO + \varepsilon \tag{1}$$

It was widely discussed that (1) is liable to suffer from an endogeneity bias, in that it could very well be that intense bilateral trade is but a sign that the two partner countries are very much in phase. This would for instance happen in open-economy models where domestic demand falls partly on foreign goods: then, positively correlated (demand) shocks result in more bilateral trade as each country demand more of the other's output.[9] Fortunately, it is quite easy to find instruments for bilateral trade flows, using some of the so-called "gravity" variables, such as the kilometric distance between the trade partners, which the paper shows can actually be excluded from the set of explanatory variables in (1).[10]

There is every reason to expect the independent variables in (1) to display a high degree of persistence, trade flows since they are largely explained by geographic considerations as already mentioned, sectoral output since structural change presumably occurs at low frequencies. As a result, the approach of the paper is mainly cross-sectional: although the results will be shown robust to the choice of different dates for the independent variables, ρ is computed over the whole sample period so as to maximize the precision of correlation coefficients.[11] The preferred specification of (1) will make use of trade and sectoral data at the beginning of the sample (1970 and 1963, respectively), but dates will be shown to make little difference, as expected in the case of persistent variables.[12]

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[9]This also requires that changes in relative demand not be offset by movements in relative prices, as will be the case for instance in models with "Pricing to Market" (or local currency pricing). See Imbs (2000).

[10]See for instance Frankel and Romer (1999).

[11]This stands in contrast to Frankel and Rose (1998), who divide their sample in four sub-periods. The results discussed here do not change when sub-periods are introduced.

[12]This is also the reason why estimations accounting for country-pair specific fixed effects are forbidden, given their tendency to exacerbate measurement errors (surely present here given the computed dependent and independent variables), and the relatively small size of the sample.

3 Sectors and the OECD business cycle

This section discusses results associated with various specifications of (1). Table 2 reports estimates when trade intensity is measured using the data in Frankel and Wei (1995), with values in 1970 while $UNIDO$ is measured in 1963, and the cycle is isolated using GDP growth rates. The subsequent tables in the paper ensure results are robust along each one of these three margins.[13] As is evident from estimation (i), close to a third of the variation in cycle synchronization is explained by structural considerations, or more than twice as much as the R-square when only trade intensity is on the right-hand side (see (iii)). Furthermore, the point estimate on $UNIDO63$ is very significantly negative, as expected. Inclusion of trade intensity in (ii) changes very little to the estimates, adds a mere 6% to the R^2, and comparison of (ii) and (iii) underlines the extent to which OECD countries trade within sectors: the coefficient on trade falls by 35% in (ii), a proportion that reflects the extent to which bilateral trade is intense between countries that share the same sectors. Of course, the coefficient on trade in (iii) is difficult to interpret in the context of monetary union, as it includes both direct effects and the indirect fact that trade is partly a reflection of economic structure. While Rose (1999) documents the effect of monetary regimes on the former, effects on the latter are surely an elusive question, both empirically and theoretically. Direct effects of trade intensity are thus somewhat weaker when conditional on economic structure.

This is however not the main point of the paper, which is mainly quantitative. Indeed, consider (v) and (vi) where trade intensity is instrumented using kilometric distance and a dummy variable reflecting whether countries share a common border.[14] Several comments are in order: first, direct effects of trade intensity are now even weaker in a statistical (and economic) sense, whereas they appeared very significant in the univariate estimation (vi).[15] Second, the direct impact of the index of sectoral similarities is very significantly negative, as it remains in almost all of the paper's estimations. Third and most importantly, the point estimates suggest the effect of sectoral structure is quantitatively much more important than that of trade. In particular given the estimates in (v), an increase in trade intensity by one standard error results in output correlations higher by 0.050,

[13] All estimations are run using Huber-White estimates of standard errors, to take care of potential issues of heteroskedasticity.

[14] Estimation (iv) confirms that the instruments are excludable from the set of independent variables. Furthermore, taken together, they explain 41.5% of the variation in trade intensity.

[15] In all tables, two stars indicate significance at the 1% level, one star at the 5% level.

while a similar increase in $UNIDO63$ results in ρ higher by 0.086, an impact almost twice larger.[16] If past experience can be taken as indicative of deep relationships, the dominant force in affecting cycle synchronization is more likely to be economic structure given the evidence in Table 1 and the relative stability of trade intensity over the last three decades.[17]. In particular, estimation (vii) is run in logarithms, and ρ is found to be almost eight times more responsive to changes in economic structure than to trade intensity. If those estimates are taken seriously, the average increase in $UNIDO$ that is documented in Table 1 (18% between 1963 and 1990) seems to have resulted in a *fall* by 14% in the extent of cycle synchronization in the OECD: rich countries have specialized over the last 30 years, and it has impacted the OECD business cycle in a non-negligible way. On the other hand, the 17% rise in average trade intensity is estimated to have resulted in aggregate correlations higher by a paltry 1.7%.[18] One would be hard-pressed to claim that the impact of trade is of overwhelming importance.

Table 3 reproduces estimations (ii), (v) and (vii) from Table 2 with various measures of trade. It is meant to first establish whether trade explains more of the cross-section in ρ when measured differently, second to control for its putative endogeneity, and third to obtain estimated elasticities.[19] The first three specifications in Table 3 use a measure of "bilateral openness" in 1970, with no noticeable differences from table 2. In particular, trade's contribution to the cross-sectional variation in ρ remains of second-order (4.5%), countries with similar sectors remain very significantly more correlated, and the direct effects of trade are only significant at the 5% confidence level in (ii). An increase of one standard error in the extent of bilateral openness results in a correlation higher by 0.047, whereas the similar experiment with $UNIDO63$ pushes ρ up by 0.112. As before, the elasticity of ρ is eight times larger in response to changes in $UNIDO$ than to changes in openness. Estimations (iv), (v) and (vi) revert to trade intensity, as implied by the IMF Direction of Trade database: the relative cross-sectional explanatory power of the two variables remains essentially unchanged, although the point estimates imply roughly equal quantitative role for both

[16] In 1970, the standard deviation on trade intensity is 0.051, which for instance corresponds to a jump from the Iceland - Netherlands pair to Denmark - Netherland. A similar increase in UNIDO63 (with standard error 0.0751) represents a jump from UK - US to Australia - Finland.

[17] Trade intensity as measured by Frankel and Wei (1995) has increased by 17% between 1970 and 1990, but by only 1.5% using the Direction of Trade database.

[18] And less than one tenth of a percent if one uses data from the Direction of Trade instead.

[19] R-squares are of course meaningless in two-stage least square estimations. See Greene (1993), Ch. 20.

of them.[20] Nevertheless, the elasticity estimate for $UNIDO$ remains three times larger, as well as more significant statistically.[21]

Table 4 reports results when the cross-section of trade links and sectoral similarities are measured at different dates. The estimations confirm previous results, although the measured effect of trade is relatively larger than in the previous tables, particularly in (ii).[22] Nevertheless, the pattern of elasticites remains unchanged, with the measured impact of economic structure dominating by a factor of four.[23] Table 5 completes the robustness analysis using the Hodrick-Prescott filter to compute international correlations between business cycles. These results are less conclusive, not least because the inclusion of both variables combined with the two-stage estimation seem to influence the coefficient on trade substantially more than previously.[24] Given the notorious undesirable properties of the Hodrick-Prescott filter in cross-country analyses, those results should perhaps be taken with a grain of salt, although none of them brings the importance of the sectoral variable into question.[25]

The findings in this paper can bring some insight to a much discussed feature of the UK business cycle. It is often argued that the UK economy fluctuates very much in phase with the US, much more so than it does with its immediate trade partners in the rest of continental Europe. This is more than just academically relevant, as an important item in the checklist helping to decide whether it is optimal for the UK to be part of the European Monetary Union in the sense of Mundell (1961), is the degree of synchronization of its cycle with the rest of Europe. As this paper has argued, the way aggregate resources are allocated across sectors is a crucial variable in addressing this

[20] Given estimates in (iv), one standard error increase in trade intensity results in ρ higher by 0.074, against 0.081 for the sectoral index.

[21] Furthermore, as mentioned before, trade intensity as implied by this data source has hardly increased since 1970.

[22] The coefficients in (ii) imply that ρ rises by 0.06 in response to a one standard error increase in trade intensity, and only by 0.05 when $UNIDO71$ is increased by the equivalent amount.

[23] Further (non-reported) estimations confirm that the same result prevail when using data on trade and structure for the same year.

[24] When trade only was included on the right-hand side, its effects were unambiguously significant and positive.

[25] In implementing the HP filter, the parameter lambda was set to 1600 for all countries. As argued in Marcet and Ravn (2000), setting lambda at this identical arbitrary level for all countries might result in isolating cyclical components of GDP that are somewhat counter-intuitive for some countries. There is indeed a very large literature on the drawbacks of the HP filter in cross-country analyses. See for instance Canova (1998).

question, not to mention pinpointing relevant trends. This is illustrated in Table 6, where GDP growth rate bilateral correlations between the UK, the US and a variety of European countries are reported. Countries are ordered according to cycle synchronization, so that it is quite immediate to notice that indeed the UK is sizeably more synchronized with the US than with continental Europe, an exception being France where the difference is probably not significant.[26]. The second row in table 6 reports the indices of sectoral similarities as computed between the UK and the five other economies where data was available from the OECD International Sectoral DataBase (ISDB) rather than UNIDO. ISDB provides one- to two-digit data on sectoral employment beyond just manufacturing, as it includes all the economy, agriculture and services included (although at a lower level of aggregation). Quite remarkably, the relationship is almost linear, just as it is when using the index based on UNIDO data in 1971 instead. Furthermore, the European average for $UNIDO$ is 0.102, almost twice larger than the value for the US: in other words, British economic structure is almost twice more similar to the US than to a continental Europe average. Given this discrepancy and our most conservative elasticity estimates of around -0.4, one should expect the UK business cycle to be a third more synchronized with the US than with Europe.[27]

4 Conclusion

This paper makes a quantitative point: unless we are to observe unprecedented increases in trade flows, most of the change in the extent of cycle synchronization is liable to originate in the way countries specialize in some sectors. This is indeed shown to be an important consideration when attempting to explain why business fluctuations in the UK occur much more in phase with the US than they do with British commercial partners in European institutions. By extension, economic structure - and its dynamics - is central in identifying Optimal Currency Areas, established or to come, probably much more than trade.

[26]Those correlations are estimated using the whole sample covering 1959:1 to 1993:4, or 140 observations. As a first approximation, discrepancies short of 0.1 probably will not be significant at the 5% confidence level.

[27]When excluding Austria, Greece and Spain, the European average falls to 0.075, still 50% higher than the US. Then, an elasticity of -0.4 implies the British economy should be 14% more correlated with the US than with an average of France, Germany, the Netherlands and Italy.

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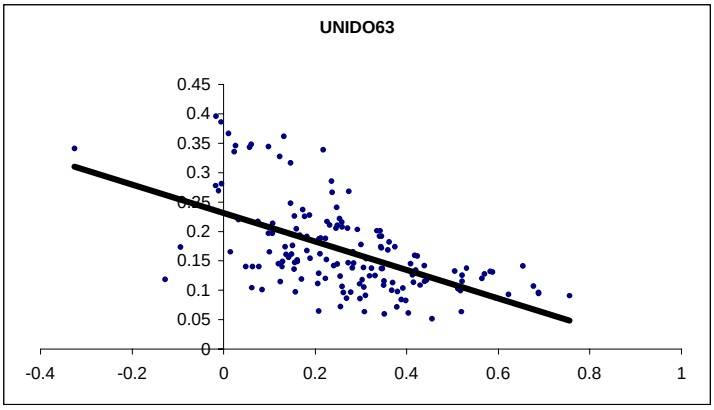
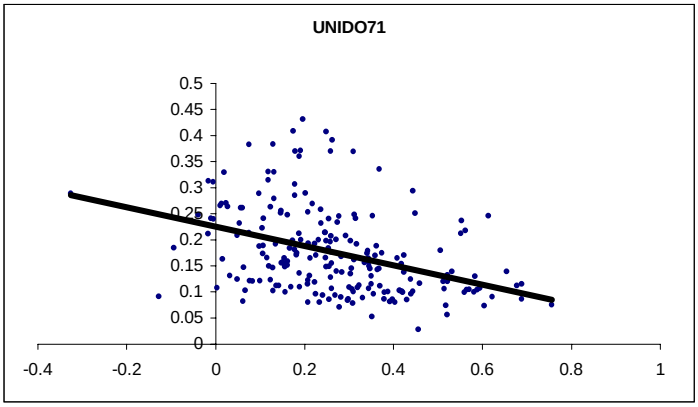
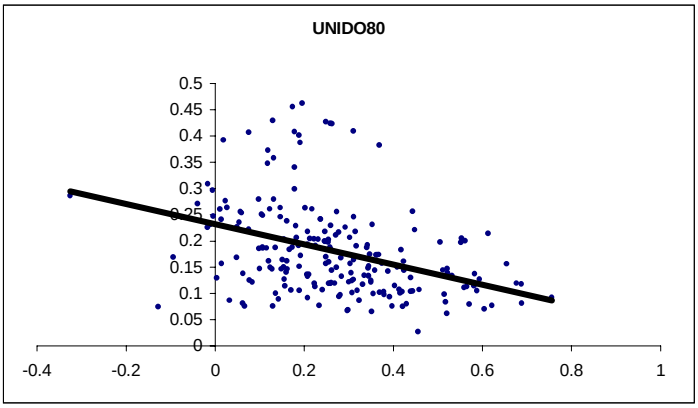
Figure 1: Sectoral Composition and Cycle Synchronization







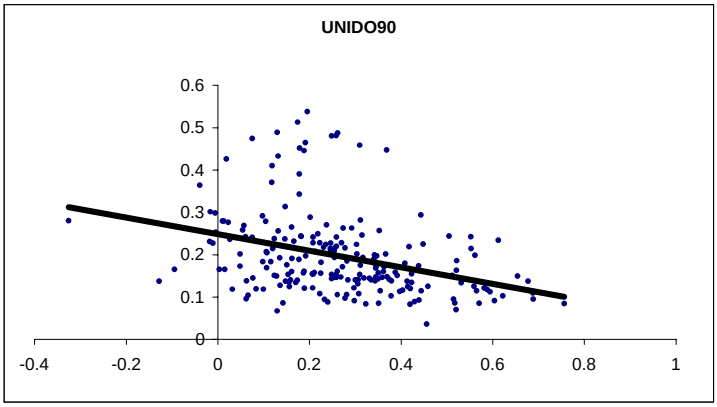


Table 1: Summary Statistics

					Correlations		
	Max	Min	Mean	Strd Error	UNIDO63	UNIDO71	UNIDO80
UNIDO63	0.3962 Tur – Swe	0.0511 UK – Fra	0.1665	0.0751			
UNIDO71	0.4316 Ger – Ice	0.0282 UK – Fra	0.1762	0.0823	0.938		
UNIDO80	0.4628 Ger – Ice	0.0269 UK – Fra	0.1811	0.0877	0.885	0.974	
UNIDO90	0.5373 Ger – Ice	0.0360 UK – Fra	0.1966	0.0977	0.790	0.939	0.973

Table 2: Cycle Synchronization and 2-digit Manufacturing Employment

	(i)	(ii)	(iii)	(iv)	(v) - IV	(vi) - IV	(vii) - IVLog
Constant	0.491**	0.431**	0.225**	0.457**	0.425**	0.224**	-2.543**
	[16.63]	[13.25]	[17.00]	[11.07]	[11.98]	[14.12]	[5.35]
UNIDO63	-1.341**	-1.170**		-1.213**	-1.151**		-0.800**
	[9.42]	[7.86]		[7.66]	[7.50]		[4.74]
Trade70		0.882**	1.359**	0.779*	0.978*	1.393**	0.105*
		[3.65]	[5.60]	[2.25]	[2.48]	[3.19]	[2.06]
Distance				-2.43×10^{-6}			
				[1.24]			
Adjacency				-0.001			
				[0.01]			
N Obs	153	152	206	152	152	206	144
R-Square	0.325	0.388	0.158	0.395	/	/	/

The dependent variable is bilateral correlations between quarterly GDP growth rates. Huber-White t-statistics are reported between brackets. Trade is in intensive form as implied by the data in Frankel and Wei (1995). Distance is the kilometric distance between main cities, Adjacency takes value one if countries have a common border. (v), (vi) and (vii) run two-stage least-squares using adjacency and distance as instruments for trade. (vii) is estimated in logarithms.

Table 3: Checks – Measures of Trade

	(i) – Open	(ii) – IVOpen	(iii) - OpenLog	(iv) - DOT	(v) – IVDOT	(vi) - DOTLog
Constant	0.480**	0.468**	-2.445**	0.436**	0.398**	-1.615**
	[13.66]	[12.56]	[4.90]	[10.18]	[7.64]	[3.35]
UNIDO63	-1.517**	-1.492**	-0.808**	-1.235**	-1.075**	-0.440**
	[8.67]	[8.29]	[4.97]	[5.07]	[3.87]	[3.09]
Trade	0.717*	0.978*	0.129*	0.933**	1.372**	0.141*
	[2.05]	[2.10]	[2.09]	[4.25]	[2.91]	[2.50]
R-Square	0.369	/	/	0.286	/	/
N Obs	152	152	144	136	136	133

(ii)-(iii)-(v)-(vi) are run using distance and adjacency to instrument for trade. (i)-(ii)-(iii) use bilateral openness, whereas (iv)-(v)-(vi) use data on trade intensity from the Direction of Trade base. The dependent variable is bilateral correlations between quarterly GDP growth rates. Huber-White t-statistics are reported between brackets.

Table 4: Checks – Dates

	(i) – 70	(ii) – IV70	(iii) – Log70	(iv) – 80	(v) – IV80	(vi) – Log80
Constant	0.337**	0.328**	-1.722**	0.309**	0.307**	-1.827**
	[11.87]	[9.72]	[4.19]	[10.99]	[8.91]	[4.80]
UNIDO	-0.598**	-0.570**	-0.408**	-0.446**	-0.437**	-0.393**
	[4.50]	[3.92]	[3.12]	[3.80]	[3.32]	[2.97]
Trade	2.138**	2.395**	0.105*	1.175**	1.217**	0.091*
	[5.44]	[3.26]	[2.53]	[5.62]	[5.31]	[2.15]
R-Square	0.241	/	/	0.240	/	/
Nb Obs	208	208	199	204	204	197

The dependent variable is bilateral correlations between quarterly GDP growth rates. Huber-White t-statistics are reported between brackets. All estimations except (i) and (iv) are run using distance and adjacency to instrument for trade. (i)-(ii)-(iii) use UNIDO data in 1971 and trade intensity in 1980, (iv)-(v)-(vi) use UNIDO data in 1980 and trade intensity in 1990.

Table 5: Checks – Filtering

	(i)	(ii) – IV	(iii)	(iv) – IV	(v)	(vi) – IV
Constant	0.232**	0.234**	0.145**	0.157**	0.124**	0.138**
	[5.69]	[5.12]	[4.36]	[4.05]	[3.61]	[3.47]
UNIDO	-0.911**	-0.915**	-0.334	-0.369*	-0.179	-0.213
	[3.86]	[3.71]	[1.85]	[1.97]	[1.21]	[1.35]
Trade	0.846*	0.827	1.881**	1.553	0.968**	0.771
	[2.17]	[1.56]	[3.81]	[1.73]	[3.87]	[1.68]
R-Square	0.178	/	0.095	/	0.084	/
Nb Obs	152	152	208	208	204	204

The dependent variable is bilateral correlations between the cyclical component of GDP as implied by the Hodrick-Prescott filter. Huber-White t-statistics are reported between brackets. In (i)-(ii), UNIDO is measured in 1963 and trade intensity in 1970, in (iii)-(iv) data is from 1971 and 1980, respectively, and in (v)-(vi) both variables are for 1990.

Table 6: The UK Case

	US	France	Germany	Nlds	Italy	Austria	Greece	Spain
Cycle correlation with UK	0.520	0.455	0.397	0.261	0.233	0.222	0.177	0.142
ISDB 1970	0.118	0.120	0.157	0.166	0.200	.	.	.
UNIDO 1971	0.056	0.028	0.086	0.107	0.080	0.119	0.182	0.112