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TRANSMISSION OF SHOCKS**

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The Confidence Channel for the Transmission of Shocks

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Abstract

It is widely known that agents confidence is closely linked to macroeconomic cycles. A confidence channel may therefore have a significant impact in accelerating and amplifying the transmission of shocks accross borders. We endeavor to find empirical proof of the existence of a confidence channel between G7 countries (and Spain). This paper centers around the concept of a contagion of confidence from “large countries” to “small countries”. I apply instrumental-variable regressions to OECD standardized Consumers and Business Confidence measures, in order to investigate the relationship between the confidence series of all G7 countries, and Spain. Macroeconomic variables are included in these regressions to control for domestic causes of confidence changes. We find that, even after having controlled for domestic macroeconomic causes of confidence level variations, the level of confidence of agents in large countries does have an influence on the level of confidence of agents in smaller countries.

Il est connu que la confiance des agents est très fortement liée aux cycles macroéconomiques. Un canal de la confiance pourrait donc non seulement accélérer, mais également amplifier la transmission des chocs macroéconomiques par delà les frontières. Nous cherchons à mettre en évidence une preuve empirique de l’existence d’un canal de la confiance entre les pays du G7 (et l’Espagne). Le concept étudié sera celui d’une contagion de la confiance des “gros pays” vers les “petits pays”. Les séries Consumer et Business Confidence Index de l’OCDE représentent la confiance des agents d’un pays, et leurs interactions sont modélisées par des régressions à variables instrumentales. Des variables macroéconomiques sont également incluses dans ces régressions pour capturer l’effet de l’environnement macroéconomique sur la confiance des agents. Nous concluons que, même après avoir contrôlé des effets macroéconomiques des variations de la confiance, le niveau de confiance des agents dans les “gros pays” conserve une influence significative sur le niveau de confiance des agents des pays plus “petits”.

1 Introduction

Despite the popularity of Consumer and Business Confidence Indicators in the press, economists have not yet found a consensus on how to interpret agents' confidence. The importance that it should be given in empirical research or theoretical models also remains unclear. However, a clear interest for the role of confidence in the economy tends to resurface with each period of economic downturn, and even more so today, as economics seems to be undergoing a profound crisis.

Beyond the effects of the traditional trade and financial channels, a channel of confidence could not only accelerate the transmission of macroeconomic shocks, but also amplify their effects. The concept of such a confidence channel and its implications are often mentioned in the literature, but rarely explored in detail. The strong correlation between agents confidence and domestic macroeconomic situation is broadly supported by the data. Therefore, if agents in one country are influenced by the confidence of agents in another country, this could have significant impacts on the workings of the economy. In the absence of an established theoretical framework, I will endeavor to use simple and intuitive tools to support (or invalidate) the existence of confidence contagion between G7 countries (and Spain).

Whereas previous papers tended to concentrate on the domestic effects of confidence shocks, or to only consider a limited set of countries, I will instead apply my methods to those eight countries in a systematic manner. The aim is to expose the existence of confidence contagion between a broad range of countries. My study will be based on the concepts of "large countries" as opposed to "small countries": in any pair of countries, the smaller one (Italy or Spain for instance) will be influenced by the larger one (the United States for instance). The concepts of "large" and "small" refer of course to their weight in the world economy, and not to other characteristics like surface.

In terms of recent publications, Beaudry et al. [2008] use VAR models to show that, subsequent the arrival of news about better productivity in the US or in Germany, there is an expansion not only of the domestic economy, but also of the economy of Canada and Austria (respectively). Nevertheless, my approach differs from theirs in that I devote my attention to confidence series instead of stock indices, and disregard in my models the macroeconomic consequences of confidence movements. Moreover, they do not include in their study any variable representing the confidence of small countries. Horn [2003] also studies the confidence channel through regressions, but he only considers the influence of the US on Germany, and does not control for macroeconomic causes of confidence variation. The substantial paper by Anderton et al. [2004] also contains a short digression on the confidence channel between the US and the Euro Area.

Another branch of the literature studying confidence series tries to measure their predictive power (Ludvigson [2004], Smithies Committee [1955], Juster [1964]). In general, such studies conclude that there exists some mediocre predictive power of confidence indicators for macroeconomic variables. Recently, many researchers have also investigated the effects of anticipation shocks on macroeconomic variables, using mainly DSGE or SVAR tools. Those papers (Beaudry and Portier [2004], Beaudry et al. [2008], Schmitt-Grohe and Uribe [2008], Barsky and Sims [2009]) emphasize the importance of anticipations in macroeconomic fluctuations. Jaimovich and Rebelo [2006] generate recessions using only anticipation shocks, and no real shocks. Furthermore, Matsusaka and Sbordone [1995],

demonstrate that, even after having controlled for some macroeconomic causes, consumer confidence always Granger-causes domestic GDP, and this for all G8 countries.

The literature suggests many possible representations of confidence: “irrationally biased anticipations”, “perception of information”, “stock prices”, and so on. It is inherently difficult to define and measure agents’ confidence. In this study, I simply use consumer confidence and business confidence series, which are flawed, but seem to represent the most obvious choice. Household confidence is therefore represented by the Consumer Confidence Indicator (CCI), and business confidence by the Business Confidence Indicator (BCI) of the Organisation of Economic Cooperation and Development. Countries taken into account are G7 countries, Spain, and the Euro Area is also included in some cases. National series from these countries have been harmonized by the OECD in order to ensure comparability, which is necessary to the coherency of our results

Section 2 will summarily present the data, and give values of bilateral contemporaneous correlations. That is, we see that there is in most cases a strong comovement of confidence series across the board of countries. Section 3 explains the methodology we will use to demonstrate the contagion of confidence from large countries to small countries. Section 4 highlights the issues we may encounter due to endogenous variables, and describes my reasoning in trying to overcome these problems. Section 5 presents the empirical results, that point to a significant influence of large countries on small countries for confidence levels. Section 6 investigates the existence of cointegration relationships, in an attempt to circumvent possible spurious regression issues. Finally, section 7 concludes.

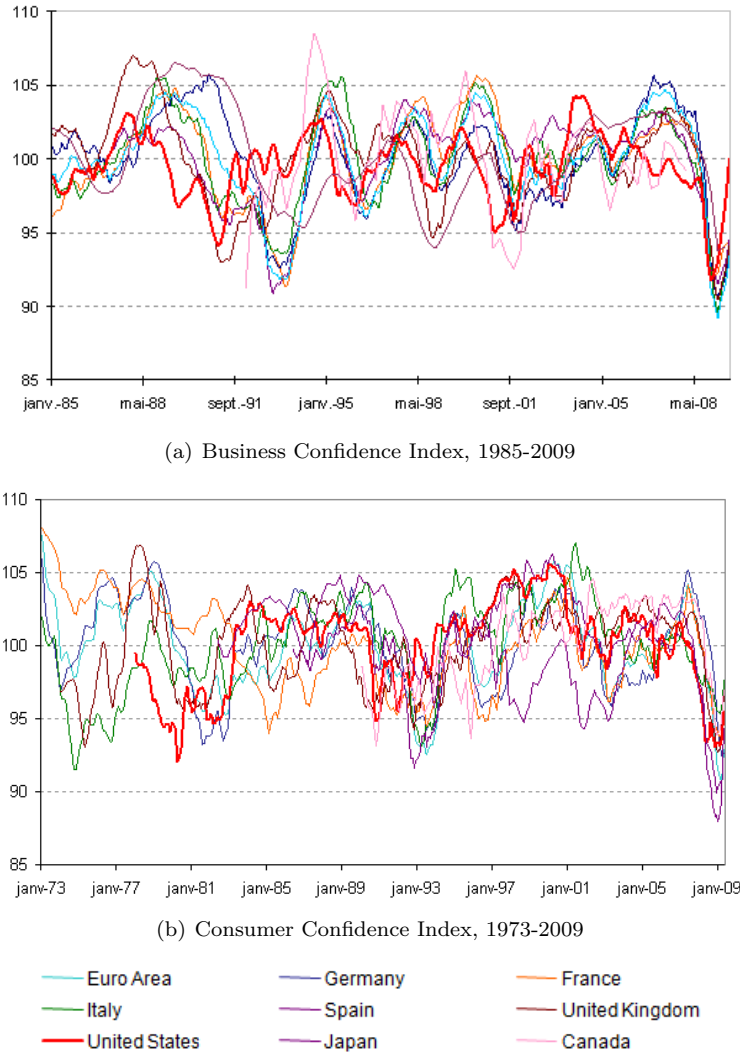


Figure 1 – Comovement of confidence series between all countries

2 A look at the data

We will start by having a quick look at plots of confidence series, followed by values of contemporaneous correlations, as a first indicator of synchronization between countries.

2.1 Comovement

We can see that in general, business confidence series series follow a rather similar pattern through time for all countries (Figure 1(a)). This is particularly true for Euro Area countries. However, as far as consumer confidence is concerned, the series seem to be much less synchronized. At first sight (Figure 1(b)), there is no obvious similarity, apart from the period 2007-2009, where all confidence series have dipped in a spectacular manner.

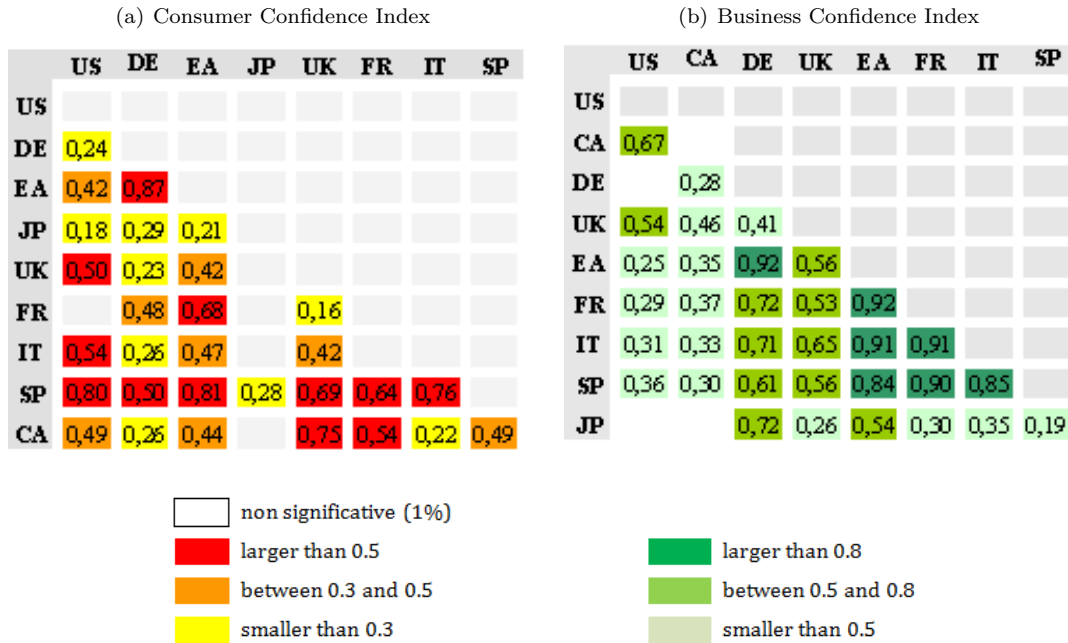


Table 1 – Contemporaneous bilateral correlations of confidence series

2.2 Contemporaneous correlations

Table 1 presents bilateral correlations between all our contemporaneous confidence indicators.

For consumer confidence, we notice that the values of correlations are not necessarily coherent with the synchronization of real macroeconomic cycles between those two countries. For instance, correlation between the growth rate of GDP in Italy and the United States is not significantly different from 0, whereas correlation of their respective CCI is greater than 0.5. On the contrary, Japanese GDP growth is not significantly correlated with american or european growth: and indeed, the correlation of the CCI are also non-significant¹.

Business confidence indicators are in general better correlated than consumer confidence indicators, which is coherent with our observation from Figure 1. Indeed, a much greater proportion of those correlations are larger than 0.5. However, we can notice the relative weakness of correlations between Euro Area countries and the United States. The values concerning BCI are much easier to interpret that those concerning CCI. Business confidence series between Euro Area countries are strongly related, but less so with that of the United States. Businesses in the United Kingdom, on the other hand, are equally close to businesses in the United States or in the Euro Area in terms of confidence. Businesses in France, Italy and Spain are particularly similar. Business confidence in Japan, while exhibiting no significant comovement with BCI of anglo-saxon countries, is well synchronized with German BCI, possibly because of the similar economic characteristics of those two countries, which are both invested in high-technology industry and rely strongly on exportations.

¹Values of GDP growth rate correlations taken from Lambert and Chavy-Martin [2008]

3 Detecting the influence of large countries

In the previous section, we have seen that there appears to be a strong international synchronization of confidence movements. Now, I will try to determine what causes changes in consumer and business confidence. It is intuitive to say that agents' confidence may be influenced by the macroeconomic situation that they observe around them. Therefore, I will first try to explain movements in confidence by changes in domestic macroeconomic variables. That is, I will regress confidence series on the growth of GDP, the growth of consumption, of unemployment, and so on. In a second step, I will include in those regressions the confidence series of some large country, such as the United States. I will show that in most cases, even after controlling for macroeconomic causes, the confidence level of large countries has a significant role to play in the determination of the confidence level of smaller countries.

Due to the availability of some macroeconomic variables, data frequency is quarterly. Macroeconomic variables involved are: the growth of GDP, of consumption, of hourly wages, of unemployment, of investment (Gross Fixed Capital Formation is used as a proxy for investment), capacity utilization rates, long term interest rates, an index of share prices, as well as inflation². Growth rates from a series X are given by $400 \times (\ln(X_t) - \ln(X_{t-1}))$. Series that exhibited a seasonality pattern were deseasonalized using the mobile average method. These series were then smoothed with a Kalman filter, according to the method described in Stock and Watson [2003], in order to eliminate potential stochastic trends: indeed, we are mostly interested in effects induced by quarter to quarter changes. Moreover, the two variables "growth rate of GFCF" and "growth rate of capacity utilization rate", which intuitively do not affect Consumer Confidence, are only included in BCI regressions.

Of course, many other factors could potentially explain changes in confidence levels: savings, taxes, house prices, and so on. It would also have been possible to replace some of the aforementioned variables by other variables of similar interpretation: the unemployment rate by hours worked, for instance, or private consumption by its components (services and non-durables goods). However, I have tried to avoid overidentification, and have therefore restrained myself to the most common macroeconomic variables, whose impact on confidence would be the most obvious.

" Basic " models simply regress the confidence series on its own lagged value.

$$C_t = a + bC_{t-1} + e_t$$

where C_t is a confidence indicator (in level).

" Domestic " regressions are models that explain the variations in confidence series by the inclusion of domestic macroeconomic variables

$$C_t = a + b_0C_{t-1} + b_1X_{1,t} + \dots + b_jX_{j,t} + c_Y Y_{t-1} + c_U U_{t-1} + e_t$$

where $X_{i,t}$ are domestic macroeconomic variables (in growth). Because it is reasonable to assume that confidence can be adjusted instantaneously following a change in macroeconomic factors, the contemporaneous values of these explanatory variables are used.

We also include in the regression Y_{t-1} , which is the lagged value of the growth of GDP, and U_{t-1} , which

²A complete description of macroeconomic variables used can be found in appendix B.

is the lagged value of the growth of unemployment. These two variables represent the influence of “headline news”. That is, an agent’s confidence at any point in time t can be influenced not only by the macroeconomic situation that he is experiencing in the quarter t , but also by the headline figures that he hears from the media, which typically will describe the macroeconomic situation of the previous quarter $t - 1$. The figures most typically reported by the media being GDP and unemployment, these are the two series that I retain.

Finally, foreign explanatory variables are added to the domestic ones. We are trying to show that some of the residual variance which is not explained by the agents’ domestic environment comes from an influence by the confidence levels of agents in “large countries”. These are our “final” regressions.

$$C_t = a + b_0 C_{t-1} + b_1 X_{1,t} + \dots + b_j X_{j,t} + c_Y Y_{t-1} + c_U U_{t-1} + d'_0 Y_t^l + d'_1 Y_{t-1}^l + d_0 C_t^l + d_1 C_{t-1}^l + e_t$$

where C_t^l is a confidence series from the large country, and Y_t^l is the GDP series of the large country. If the parameters d_0 and d_1 are significant on one hand, and if the inclusion of those foreign variables leads to a significant increase in the fit of the regression, than I will conclude that there exists a contagion of confidence from large countries to small countries.

The inclusion of the large country’s GDP, and of its lag, allows us to control whether the contagion of confidence happens in a direct or indirect manner. This will be explained in more detail in section 5, under the paragraph *How to interpret those results*.

In order to determine whether a significant increase in R^2 follows the inclusion of foreign variables in the regression, a Fisher test for R^2 incrementation is used. That is, the null hypothesis is “ R^2 incrementation due to the additional variables is not significantly greater than 0”. The test statistic is

$$F = \frac{\frac{R_2^2 - R_1^2}{k_2 - k_1}}{\frac{1 - R_2^2}{n - k_2 - 1}}$$

where, if (1) is nested in (2), R_i^2 represent the model fit, k_i are degrees of freedom, n is the total number of observations. This test statistic can be compared to critical values of a Fisher distribution with $(k_2 - k_1)$ and $(n - k_2 - 1)$ degrees of freedom: I have chosen a size of 10%.

All those models are estimated using an heteroskedasticity consistent covariance matrix. We will see that some of the confidence series may be integrated of first order instead of being stationary (see Table 9). In this case, it is possible that a significantly different from zero parameter estimate is elicited between two confidence series, that is spuriously large. However, in our case, this problem should not occur, since both the lags of the dependant and the independant confidence series are included in the explanatory variables³.

The concepts of large and small countries are of course relative. Germany for instance may at the same time be a small country when compared with the United States, and a large country when compared to Italy. The “small country”/“large country” couples that we have tested for are the following:

- Canada: US
- Germany: US

³Hamilton, Time Series Analysis, p.561

- Japan: US, Euro Area
- United Kingdom: US, Euro Area
- France: US, Germany
- Spain: US, Germany, France
- Italy: US, Germany, France

4 Endogeneity or exogeneity?

All our regressions are potentially subject to an endogeneity problem. Take the simple example of explaining variations in Consumer Confidence levels by the consumption growth rate. When households observe that their ability to consume is on the rise, their confidence is also expected to increase; on the other hand, when consumers' confidence in the future increases, their level of consumption may also rise (through a higher expectation of future wages, for instance). In this situation, it may be appropriate to use instrumental variable estimation instead of ordinary least squares estimation.

4.1 Methodology and choice of instrumental variables

Endogeneity in our models arises from the fact that confidence levels can have an influence on the macroeconomic situation of a country, as agents spontaneously modify their behaviours (consumption, investment, and so on) according to their expectations of the future. However, not all macroeconomic variables stand to be directly affected by movements in confidence. For instance, Business Confidence has little to do in the short term with consumption growth rates. Similarly, Business Confidence can be directly linked to movements in the unemployment rate, as managers will hire more or less depending on their expectations of the future; but changes in Consumer Confidence may have little direct effect on employment. I have assumed in the following that only certain variables are endogenous with each kind of confidence index. That is, the growth of GDP and consumption are endogenous with the Consumer Confidence index. The growth rate of GDP, unemployment, hourly wages, GFCF and capacity utilization are considered potentially endogenous with Business Confidence. Finally, the long term interest rates, share prices and inflation rates are taken as exogenous (indeed, interest rates and share prices could have been endogenous with investor confidence, which we do not study here).

This assumption allows us to slightly narrow down the number of endogenous variables that we are facing. The instrumental variables that I choose are the lagged once series of the macroeconomic variables entering in our regression equations. I also include lags of some other macroeconomic variables such as short-term interest rates, civilian employment, labor costs, trade balance. An index of overall GDP growth (simple average of all GDP growth rates across different countries) intervenes as well. Finally, in the regressions concerning Consumer Confidence, since GFCF and capacity utilization do not enter the models as regressors, and are likely exogenous, these two variables are also used as instrumental variables.

BCI regressions						CCI regressions				
	growth of	R^2	Partial R^2	F-stat	p-value	growth of	R^2	Partial R^2	F-stat	p-value
US	GDP	0,67	0,37	10,70	0,00	GDP	0,69	0,41	19,90	0,00
	Wage	0,56	0,40	22,77	0,00	Cons.	0,63	0,30	18,96	0,00
	Unemp.	0,79	0,47	21,65	0,00					
	GFCF	0,67	0,22	7,30	0,00					
	Cap. U.	0,57	0,20	4,22	0,00					
CA	GDP	0,63	0,39	3,01	0,00	GDP	0,71	0,26	9,56	0,00
	Wage	0,26	0,20	1,35	0,23	Cons.	0,51	0,15	5,43	0,00
	Unemp.	0,47	0,18	1,01	0,46					
	GFCF	0,44	0,31	2,48	0,01					
	Cap. U.	0,62	0,42	4,12	0,00					
JP	GDP	0,66	0,25	2,75	0,01	GDP	0,63	0,53	27,20	0,00
	Wage	0,34	0,22	3,16	0,00	Cons.	0,35	0,17	4,57	0,00
	Unemp.	0,41	0,15	2,05	0,05					
	GFCF	0,38	0,17	2,14	0,04					
	Cap. U.	0,48	0,31	5,73	0,00					
UK	GDP	0,66	0,33	3,73	0,00	GDP	0,59	0,28	3,40	0,00
	Wage	0,25	0,23	4,47	0,00	Cons.	0,45	0,17	3,33	0,00
	Unemp.	0,61	0,18	2,57	0,02					
	GFCF	0,39	0,18	2,84	0,01					
	Cap. U.	0,18	0,08	2,18	0,04					
DE	GDP	0,51	0,22	5,49	0,00	GDP	0,50	0,35	20,26	0,00
	Wage	0,27	0,22	3,98	0,00	Cons.	0,35	0,20	11,09	0,00
	Unemp.	0,60	0,11	6,76	0,00					
	GFCF	0,42	0,23	3,56	0,00					
	Cap. U.	0,48	0,26	3,10	0,01					
FR	GDP	0,70	0,42	12,83	0,00	GDP	0,59	0,42	14,79	0,00
	Wage	0,31	0,19	4,81	0,00	Cons.	0,26	0,14	5,15	0,00
	Unemp.	0,78	0,24	8,11	0,00					
	GFCF	0,66	0,38	9,97	0,00					
	Cap. U.	0,48	0,22	2,60	0,02					
SP	GDP	0,49	0,17	2,35	0,03	GDP	0,55	0,34	6,90	0,00
	Wage	0,31	0,24	2,65	0,02	Cons.	0,65	0,29	6,82	0,00
	Unemp.	0,66	0,15	3,29	0,00					
	GFCF	0,52	0,23	2,65	0,02					
	Cap. U.	0,35	0,24	3,31	0,00					
IT	GDP	0,53	0,26	5,56	0,00	GDP	0,56	0,42	8,08	0,00
	Wage	0,31	0,18	4,60	0,00	Cons.	0,37	0,20	5,11	0,00
	Unemp.	0,35	0,22	4,18	0,00					
	GFCF	0,44	0,25	4,22	0,00					
	Cap. U.	0,41	0,25	9,07	0,00					

Table 2 – First stage statistics

	BCI regressions	CCI regressions
US	0,87	0,42
Canada	0,68	0,70
Japan	0,61	0,20
UK	0,26	0,47
Germany	0,54	0,56
France	0,23	0,23
Spain	0,33	0,95
Italy	0,30	0,24

Table 3 – P-values of overidentification tests

For each regression equation, I select the combination of instrumental variables amongst those described above that seems to be the best. That is, I attempt to maximize the first stage partial R^2 and the robust F-statistic. I also check that the combination of instrumental variables does not cause overidentification issues. However, the great number of regressions and of potentially endogenous variables makes it difficult to select instruments that are powerful enough on each occasion. Because most regressions exhibit a weak instruments problem, simply using OLS estimation may produce less biased and more efficient results. In keeping with this notion, I use the Durbin-Wu-Hausman exogeneity test to determine which variables should truly be considered as endogenous, and which could be considered as exogenous, and thus estimated through OLS. For the remaining endogenous variables, I will implement an estimation procedure reputed robust to weak instruments, as described in Mikusheva and Poi [2006].

Table 2 presents the first stage statistics of the two stage least squares estimation. Usual criteria to determine whether instruments are strong enough include the partial R^2 , which should be sizable, and the F-statistic. As a rule of thumb, the latter should be greater than 10 in order for the instruments to be considered strong enough to produce unbiased estimators. We see that in our regressions, this is often not the case. This means that our resulting instrumental variables estimators may not only be less efficient, but also more biased than the simple OLS estimators.

However, even if the values of the F statistics are often less than 10, this statistic remains significantly different from zero in all cases except for two (the growth rates of hourly wages and unemployment in Canada). Moreover, the first stage R^2 and the partial R^2 as well tend to be reasonably large: 15% to 50% for partial R^2 . That is, our instrumental variables retain some explanatory power for the endogenous variables.

There are two main reasons why the F statistics are so low in our regressions. Firstly, the relatively numerous endogenous regressors means that we need a large number of instrumental variables to achieve identification, and to reasonably explain all of them. Coupled with the equally numerous exogenous regressors, our first stage regression models contain numerous explanatory variables. This leads in turn to a low efficiency of our estimators and a low F statistic value. Secondly, the included exogenous variables tend to “absorb” a great part of the explanatory power in the first stage regressions, at the expense of the excluded exogenous variables.

Table 3 reports the Sargan’s test statistic for overidentification. The null hypothesis being that the instruments are compatible, we can see that none of the test results are problematic in this respect.

growth of	US	Canada	Japan	United Kingdom	Germany	France	Spain	Italy
BCI regressions								
GDP	0,86	0,97	0,46	0,77	0,66	0,51	0,51	0,19
Wage	0,71	0,25	0,36	0,98	0,48	0,63	0,72	0,51
Unemp.	0,63	0,55	0,80	0,99	0,92	0,88	0,49	0,23
GFCF	0,33	0,61	0,66	0,10	0,92	0,57	0,24	0,50
Cap. U.	0,01*	0,35	0,01*	0,27	0,27	0,51	0,30	0,98
CCI regressions								
GDP	0,53	0,44	0,33	0,20	0,07*	0,59	0,05*	0,15
Cons.	0,48	0,90	0,55	0,11	0,92	0,62	0,39	0,74

Table 4 – P-values of exogeneity tests

4.2 Exogeneity tests

As we have said in the previous section, the first stage statistics indicate that OLS estimation might be the better option for our estimations. Results of exogeneity tests, summed up in Table 4, actually tend to support this choice: only four explanatory variables seem to be truly endogenous. At a threshold of 10%, in the Business Confidence regressions, the growth rate of capacity utilization in the United States and Japan appears to be endogenous. We also reject exogeneity for the growth rate of GDP in Germany and Spain in the Consumer Confidence regressions.

Of course, if our instruments are truly weak instruments, then the results of the Durbin-Wu-Hausman test may be questioned as well. But we have seen that partial R^2 and p-values for the F statistic show that the instruments do have significant explanatory power for the variables to be tested. For this reason, we will choose to trust the results of the exogeneity tests.

How to interpret the fact that all these macroeconomic variables actually appear to be exogenous? We can postulate that, while confidence is free to shift instantaneously, agents may take a few months to adjust their behaviour to a change in expectations. Then, changes in the real economy due to changes in confidence do not appear contemporaneously; hence the apparent exogeneity.

We now have two good reasons to choose OLS estimation instead of instrumental variables estimation. Firstly, first stage statistics show that that latter may be even more biased than the former, not to mention less efficient. Secondly, most of our potentially endogenous variables appear to be exogenous. For those four variables of which the endogeneity is confirmed by the exogeneity tests, I have implemented an instrumental variable estimation and inference procedure that is robust to weak instruments: conditional likelihood ratio estimation. This procedure is described in more details in Mikusheva and Poi [2006]

		Growth of :									
	GDP	Cons.	Wage	Unemp.	GFCF	Cap. U.	Int. Rate	Share P.	L. GDP	L. Unemp.	Infl.
Business Confidence Index											
US						+		-			+
Canada				-		+					
Japan					-	+		+			
UK				-		+	+				
Germany	+					+	+	+			
France	+			-		+	+		+		
Spain				-	+	+					
Italy	+					+	+		+		
Consumer Confidence Index											
US		+	-	-							-
Canada	+	+							+		
Japan	+						+	+			
UK	+			-			-			+	
Germany	+							+			
France			+				+	+	+		-
Spain	+			-				+			
Italy							+	+			-

Table 5 – Domestic macroeconomic variables that have a significant influence on confidence

5 Empirical Results

5.1 Domestic macroeconomic variables

Table 5 summarizes the results of all the domestic regressions. For readability, I have not reported all coefficient estimates and standard errors. The cells in the table are left empty when the corresponding coefficient estimate is not significant at a threshold of 10%. When the significant coefficient is positive, the cell is filled by a + sign; when it is negative, by a – sign.

For a majority of variables, the sign of the coefficient estimate is intuitive. Both consumer confidence and business confidence increase when the growth rate of GDP increases; and they both decrease when unemployment is on the rise. Only very few results are counterintuitive: the effect of changes in share prices in the US, for instance, which appears to be negative on Business Confidence.

Overall, several results stand out. Capacity utilization seems to be the most important variable in the determination of business confidence. For both business and consumer confidence, the growth rates of GDP, of unemployment, of long term interest rates, and of share prices seem to be important factors. Surprisingly, the growth rate of consumption does not appear to have a significant impact on the level of consumer confidence.

Moreover, the arrival of “headline news” information does not generally seem to have a strong influence on confidence. That is, lagged values of macroeconomic series do not contribute to the determination of confidence levels as often as contemporaneous series. This shows that agents’ sentiment is based on the macroeconomic conjuncture that they are experiencing, and not so much on the information that

they receive from the media. For instance, when a household observes that one of its members has been made redundant, or observes that unemployment is rising in its neighbourhood, it will adjust its confidence level immediately. It does not in general wait for the official unemployment rate to be published the next quarter.

	Basic reg. R^2	Domestic reg. R^2 increment	Final reg. R^2 increment	Large country	Significativity of foreign CI foreign GDP	
Consumer Confidence Index						
United States	85,0%	3,7%				
Canada	79,3%	7,6%	3,7%	US (+)	both	none
Japan	89,6%	3,3%	0,9%	EA (+)	both	none
United Kingdom	83,1%	2,8%	-	-	-	-
Germany	86,1%	3,0%	-	-	-	-
France	89,4%	3,0%	1,0%	DE (+)	both	none
Spain	88,7%	1,4%	4,4%	US (+)	1.	none
Spain			3,5%	FR (+)	none	1.
Italy	82,4%	6,9%	1,1%	DE (+)	both	none
Business Confidence Index						
United States	65,8%	23,2%				
Canada	64,2%	21,5%	3,9%	US (+)	1.	L.
Japan	90,8%	5,8%	-	-	-	-
United Kingdom	84,1%	7,0%	2,4%	US (+)	1.	1.
United Kingdom			1,2%	EA	both	none
Germany	84,3%	11,7%	0,7%	US (+)	1.	none
France	83,2%	12,0%	0,9%	US (+)	1.	none
France			2,0%	DE (+)	both	1.
Spain	88,9%	4,1%	2,5%	DE (+)	both	none
Spain			3,3%	FR (+)	both	none
Spain			0,9%	US (+)	1.	none
Italy	83,2%	10,2%	1,3%	US (+)	1.	none
Italy			2,4%	DE (+)	both	none
Italy			2,4%	FR (+)	both	none

Table 6 – Fit of basic, domestic and final regressions

5.2 Influence of large countries

Let us now move on to analysing the influence of large country confidence level in the determination of small country confidence level. This is estimated thanks to our “final” regressions. As we have said before, we consider that the confidence level of a large country plays a role in the determination of confidence in a smaller country if, firstly, the inclusion of the foreign GDP and confidence series produce a greater regression fit, and secondly, at least one of the included foreign confidence series has an estimated parameter that is significantly positive.

The first three columns of Table 6 present the R^2 of all our regression models. For domestic regressions, the value given is the R^2 increment over the basic regressions when domestic variables are added to the model. For final regressions, the value given is the R^2 increment over the domestic regressions when foreign explanatory variables are added to the model. The fourth column indicates the large

country of which the confidence series are significant and produce such an R^2 increment. The cells in the third and fourth column are left empty if no variables from any larger country has produced an improvement in R^2 and a significant estimated parameter. Of course, for some countries, many large countries may have an influence.

We find that business confidence seems to be more heavily influenced by the environment than consumer confidence, be it by the domestic macroeconomic situation or by international factors. The R^2 increment in business confidence regressions from basic to domestic models ranges from 4,1% to 23,2%, whereas for consumer confidence regressions it ranges from 1,4% to 7,6% and is in general considerably lower. Business confidence regressions fit is also much more often improved by the addition of foreign variables than in the case of consumer confidence regressions.

Overall, we can conclude that the confidence of agents in large countries does play a role in the determination of confidence of agents in smaller countries. Except for three cases, all confidence series can be better explained with the inclusion of foreign variables, rather than by using domestic variables alone. Therefore, the confidence contagion effect that we were looking for does seem to exist.

How to interpret those results?

The inclusion of foreign GDP and lagged GDP series in the same regression models allows us to control for the relevance of our interpretation. Indeed, it is possible that small countries' confidence reacts not to movements in the large countries' confidence level, but to the accompanying changes in the large countries' real economy. The significance of coefficients describing the impacts of GDP series and confidence series is detailed in columns five and six of Table 6. 1. indicates that the series of contemporaneous values has a significant impact on confidence; L. indicates that the series of lagged once values has a significant impact on confidence. At some cases, both series are significant, or none.

We can say that my previous interpretation remains valid if only one or both the confidence series parameters are significant, or if parameters concerning confidence series and GDP are jointly significant. However, if parameters concerning GDP are significant, and parameters concerning confidence are not significant, then we can conclude that confidence contagion takes place in an indirect way, through the real effects that accompany changes in confidence.

We observe that in only one instance, that is, the addition of French variables in the regression concerning Spanish consumer confidence, the R^2 increment is due to the inclusion of GDP series and not of confidence series. Spanish consumer confidence is therefore not influenced by French, but only by American, consumer confidence. No other small/large country couples exhibit this problem. So we can safely say that confidence contagion exists in a direct sense between countries.

As a second type of control, I have checked whether the observed effect really comes from a contagion from large to small countries, or simply from some bilateral similarity between confidence series due to unobservable underlying causes (global shocks, for instance). To that effect, I have taken the US domestic regression and added in turn foreign GDP and confidence variables from other small countries. Out of 16 such regressions, only 2 exhibit at the same time a significantly positive coefficient for the confidence series of the smaller country, and a significant increase in the fit of the regression. These two regressions are the models in which I have included the consumer or business confidence series of Canada. Given that the great majority of such regressions do not exhibit significant effects,

	Coefficient ratio c_2/c_1	p-value of Wald test
Consumer Confidence Index		
Canada (US)	1,00	0,98
Japan (EA)	1,01	0,22
France (DE)	0,99	0,63
Spain (US)	1,00	0,78
Italy (DE)	1,01	0,18
Business Confidence Index		
Canada (US)	0,99	0,40
United Kingdom (US)	0,98	0,05
United Kingdom (EA)	0,99	0,46
Germany (US)	1,01	0,26
France (US)	1,01	0,01
France (DE)	1,00	0,37
Spain (US)	1,01	0,64
Spain (FR)	1,00	0,92
Spain (DE)	1,01	0,03
Italy (US)	1,01	0,48
Italy (FR)	0,99	0,11
Italy (DE)	0,99	0,18

Table 7 – Asymetric effects in times of increasing or decreasing confidence

it is very probable that the relationships listed in Table 6 are due to a contagion from large countries to smaller countries, and not only to bilateral similarities.

5.3 Asymmetric effects

We have seen in the previous section that there existed a phenomenon of confidence contagion from large countries to small countries. It is often assumed that one of the major roles of the confidence channel would be to accelerate the transmission of adverse macroeconomic shocks, before even the real shocks take place in the larger country. It would therefore be very interesting to know if confidence contagion becomes stronger during periods of bad macroeconomic conjuncture, or simply when the confidence of agents in the large country decreases, compared to when it increases.

I use the same method already employed by Horn [2003] to test this hypothesis of asymmetric influence. I only consider the large / small country pairings that appeared in the previous section. The new regression models are the following:

$$\begin{cases} up = 1 & \& \quad down = 0 & \quad \text{si } (1 - L)C^g \geq 0 \\ up = 0 & \& \quad down = 1 & \quad \text{sinon} \end{cases}$$

$$uC^g = up \times C^g \quad ; \quad dC^l = down \times C^l$$

$$C_t = a + b_0 C_{t-1} + b_1 X_{1,t} + \dots + b_j X_{j,t} + c^Y Y_{t-1} + c^U U_{t-1} + d'_0 Y_t^l + d'_1 Y_{t-1}^l + d_0^u u C_t^l + d_0^d d C_t^l + d_1 C_{t-1}^l + e_t$$

where L is the lag operator, C_t is the domestic confidence indicator, $X_{i,t}$ are macroeconomic variables

Consumer Confidence Index	
US → all countries	Stronger influence in times of rising confidence. This is especially true in the cases of France, Germany, Japan and the Euro Area.
EA → UK	No result
EA → JP	Stronger influence in times of rising confidence.
DE → FR, IT, SP, UK	Stronger influence in times of rising confidence.
Business Confidence Index	
US → JP	Much stronger influence where US confidence drops.
US → all countries	No result
EA → UK DE → FR, IT, SP	Clearly stronger influence in times of decreasing confidence.
DE → JP	Stronger influence in times of rising confidence.
EA → JP	No result

Table 8 – Asymetric effects in regressions involving only monthly confidence series

(in growth), and C_t^l is the confidence indicator of the large country. As before, Y_t is the domestic GDP and Y_t^l is the GDP of the large country ; U_t is the growth rate of domestic unemployment.

A Wald test for parameter equality is then applied to the coefficients d_0^u and d_0^d . If an asymmetric effect exists, then the Wald test should reject the null hypothesis of parameter equality. We should also observe $d_0^d > d_0^u$. I have also checked that splitting up the variable in two did not affect its significativity and that both parameters remained positive.

The results are presented in Table 7. The large country is written in parenthesis. The first column corresponds to the coefficient ratio d_0^d/d_0^u . If this ratio is greater than 1, the estimated impact of a loss of confidence in the large country is probably greater than the impact of a gain in confidence in the large country. However, we observe that this ratio is greater than 1 in only 7 out of our 17 cases. This is not very convincing. Moreover, the p-values of the Wald test, presented in the second column, show that in an overwhelming majority of cases, the null hypothesis of coefficient equality cannot be rejected. That is, there is no difference between times of confidence increases or decreases in terms of contagion. In only three cases, this null hypothesis is rejected at a threshold of 10%; and amongst those three cases, one corresponds to a higher impact in times of rising confidence, and two correspond to a higher impact in times of decreasing confidence.

We are lead to reject very strongly the hypothesis that confidence contagion is always stronger in times of loss of confidence in the large country.

Faced with disappointing results, I implemented an alternative regression model, without any macroeconomic explanatory variable, and which makes use of monthly confidence series. The estimated impact of the confidence channel is amplified, and precision improved by refining the frequency. Table 8

	Quarterly		Monthly	
	CCI	BCI	CCI	BCI
United States	I(1)	I(0)	I(1)	I(0)
Canada	I(1)	I(0)	I(1)	I(1)
Japan	I(1)	I(1)	I(1)	I(1)
United Kingdom	I(1)	I(0)	I(1)	I(1)
Euro Area	I(0)	I(1)	I(1)	I(1)
Germany	I(0)	I(0)	I(0)	I(1)
France	I(1)	I(1)	I(1)	I(1)
Italy	I(1)	I(1)	I(1)	I(1)
Spain	I(1)	I(1)	I(1)	I(1)

Table 9 – Integration of confidence series, *Phillips-Perron, size 1%*

summarizes the results, which I do not present in detail for readability. Only business confidence contagion between european countries confirm our original hypothesis. Regarding consumer confidence, the contagion is generally stronger in times of rising confidence. However, these results are clearly disputable, because we did not control for macroeconomic effects.

6 Cointegration of confidence series

Some confidence series being integrated of order 1 (Table 9), I come back to the previously mentioned question of spurious relations. In order to avoid this problem, I will test for the presence of cointegration relationships between confidence series of large and small countries, where applicable: that is, when a significantly positive relationship is given by our instrumental variable regressions, and moreover both confidence series involved are integrated. To do this, I simply use Johansen tests on VECM models. The adequate specification is the presence of a constant in the cointegration relation.

$$\Delta \begin{pmatrix} C_t^l \\ C_t \end{pmatrix} = \begin{pmatrix} \theta_1 \\ \theta_2 \end{pmatrix} \left((1 \quad \alpha) \begin{pmatrix} C_{t-1}^l \\ C_{t-1} \end{pmatrix} + \pi \right) + C(L) \Delta \begin{pmatrix} C_{t-1}^l \\ C_{t-1} \end{pmatrix} + \epsilon_t$$

where C is a confidence series, C^l is a confidence series from a large country. For the uncovered cointegration relationships to be compatible with our hypothese, the following properties must also be verified :

- α is negative \rightarrow there is comovement between the series
- θ_2 is positive and significative \rightarrow the confidence level of agents in the small country does not depart too widely from the confidence level of agents in the large country
- If θ_1 is significative, it must be negative \rightarrow otherwise, the confidence series of the large country generated by the model is unstable

Table 10 lists the few significant relations from the previous section which could be spurious, and indicates whether the series involved are cointegrated in a way that satisfies these conditions. The results are not as good as we could wish. Several factors could explain these unintuitive results. First

Large country Cointegration

Consumer Confidence Index		
Canada	US	no
Spain	US	yes

Business Confidence Index		
Italy	FR	yes
Spain	FR	no

Table 10 – Cointegration relations

of all, I have used all available observations in estimating those models. However, these cointegration relationships seem to be extremely sensitive to the period taken into account. That is, by taking a few quarters out at the beginning or the end of the available period, the results of the tests can change arbitrarily. We can conclude that the results in Table 10 are not very robust. Secondly, we have accepted the null hypothesis of the Phillips-Perron test at a level of 1%. It happens that for most series, this null hypothesis would then be rejected if we chose a level of 5% instead. It is possible that our confidence series are simply stationary, and that could be the reason why few cointegration relationships appear.

7 Conclusion

On the basis of intuitive hypotheses, and using conventional econometric tools, I have conducted a systematic investigation into the existence of a confidence channel between G7 countries (and Spain).

Through simple correlations, I have shown that confidence series are undeniably well-synchronized between countries, in particular within the Euro Area. Business confidence series seem to be better synchronized than consumer confidence series.

The main goal of this paper is to demonstrate an influence of confidence levels in large countries on confidence levels in small countries. I have implemented instrumental variable regressions in order to ascertain the factors that determine agents' confidence. Contemporaneous macroeconomic variables capture agents' reaction to their economic environment, while lagged values of GDP and unemployment growth rates represent a "headlines" effect. On a domestic level, the growth rate of GDP, of unemployment, interest rates and share prices seem to be the most important factors across all countries for both consumers and business confidence ; furthermore, capacity utilization rates are always significantly linked to business confidence. Household consumption, hourly wages, inflation or investment, along with headline variables, appear to have little effect.

By introducing confidence series of large countries into those models, I have shown that agents' confidence in large countries almost always plays a role in the formation of confidence levels of agents in small countries. When confidence series are not stationary, tests of cointegration produce ambiguous results.

The possibility of asymmetric effects is also investigated. Because we have seen that there confidence contagion exists, it is important to know whether this contagion produces stronger effects during times of decreasing confidence, as this could be a crucial mechanism in accelerating and amplifying the spreading of negative macroeconomic shocks worldwide. Modified regressions leaving a supplementary degree of freedom for asymmetric effects do not confirm this hypothesis in general.

The main results of this paper is thus: confidence contagion takes place from larger countries to smaller countries, at least within G7 (and Spain); this holds true for both households and businesses. In light of this finding, the macroeconomic effects of the confidence channel are certainly worthy of further investigation.

I have tried to address technical problems such as endogeneity by using instrumental variable regressions. However, it is clear that the treatment of endogeneity could be improved by finding better instrumental variables. Another interesting path for future research would be to fully address the second part of the problematic: in order for there to be a confidence "channel" for the transmission of macroeconomic shocks, simple confidence contagion must be shown to have an impact on the real macroeconomic situation of the small countries concerned. This investigation could be done through appropriate structural VAR models and impulse-response functions. Lastly, the research into a possible confidence channel would vastly benefit from a proper theoretical framework.

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A Annexe : Series de confiance

Most of the information given below is directly taken from OECD data “Sources and Definition”. Confidence indicators are taken from the OECD *Monthly Economic Indicators*. The data, as well as the relative information can be found on the OECD website

<http://stats.oecd.org/>

All series except for Canadian CCI are deseasonalized.

Method of construction Questions in the following polls generally have three possible answers : “worse”, “same” or “better”. For each questions, the percentage of people having answered “worse” is subtracted from the percentage of people having answered “better”. Taking the mean for all questions, we obtain the composite index. These are the “balance” series, which are more or less centered around zero. Note that the OECD standardizes the national series in order to ensure comparability across the board of countries.

A.1 Beginning and end of series

Estimations in general have been run over the complete available time period of each series involved.

	Consumer Confidence	Business Confidence
United States	January 1978 - May 2009	January 1960 - August 2009
Zone Euro	January 1973 - May 2009	January 1985 - August 2009
Japan	Juin 1982 - Mars 2009	June 1974 - June 2009
United Kingdom	January 1974 - May 2009	January 1985 - August 2009
Germany	January 1973 - May 2009	January 1985 - August 2009
France	January 1973 - May 2009	January 1985 - July 2009
Italy	January 1973 - May 2009	January 1985 - August 2009
Spain	Juin 1986 - April 2009	April 1987 - August 2009
Canada	January 1990 - May 2009	January 1992 - January 2009

Table 11 – Beginning and end of series

A.2 Consumer Confidence Index

United States University of Michigan

The index is compiled by the University of Michigan thanks to the results from a survey of consumers based on telephone interviews of approximately 500 households per month.

Questions asked are the following :

- We are interested in how people are getting along financially these days. Would you say that you (and your family living there) are better off or worse off financially than you were a year ago ?

- Now looking ahead : do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now ?
- Now turning to business conditions in the country as a whole, do you think that during the next twelve months we ll have good times financially, or bad times, or what ?
- Looking ahead, which would you say is more likely : that in the country as a whole we ll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what ?
- About the big things that people buy for their homes, such as furniture, a refrigerator, stove, television, and things like that. Generally speaking, do you think now is a good or bad time for people to buy major household items ?

Canada Conference Board Canada

Data is collected through a monthly survey of approximately 2000 households. A description of the survey is available at

<http://www.conferenceboard.ca/>

The four questions asked in the survey are :

- Considering everything, would you say that your family is better or worse off financially than six months ago?
- Again, considering everything, do you think that your family will be better off, the same or worse off financially six months from now?
- How do you feel the job situation and overall employment will be in this community six months from now?
- Do you think that right now is a good or bad time for the average person to make a major outlay for items such as a home, car or other major item?

Zone Euro European Commission

The European Commission calculates the agregate value for the Euro Area by weighing the national indicators by the final consumption spending taken from national accounts.

National indicators are calculated in a harmonized way accross participating countries. The four questions asked in the surveys are:

- Expected change in financial situation of household over the next 12 months;
- Expected change in general economic situation over next 12 months;
- Expected change in unemployment over the next 12 months;
- Expected change in savings of household over next 12 months.

There are five answer alternatives to each question (a lot better, a little better, the same, a little worse, a lot worse). The confidence indicator is expressed as the balance of positive over negative results. The confidence indicator published by the EC is constructed with double weights on the extremes. Responses “a lot better” and “a lot worse” get the weight 1 and “a little better” and “a little worse” get the weight 1/2, and “the same” has zero weight. The composite indicator is the mean of all four questions; the results for the question concerning unemployment are taken negatively. Apart from Luxemburg, all countries deseasonalize their CCI series.

The following countries, that is France, Germany, Italy and Spain follow this same methodology.

France Institut National de la Statistique et des Etudes Economiques

INSEE collects monthly data via telephone interviews. Sample size is 3300, and the response rate is 70%. The sampling method is random sampling using the phone register, amongst the households who have a telephone number and who are not registered on an opposition list. Every month, France Télécom provides INSEE with a sample of 1100 phone numbers. Each unit is interviewed during three consecutive months and then removed from the sample.

Germany GfK Marktforschung

The survey called GfK-Wirtschaftsdienst Konsum-und Sparklima (GfK financial services, consumer and savings climate) is conducted by GfK Marktforschung. The results are based on monthly consumer interviews carried out in the first half of each month. The sample size is around 2 000.

Italy Istituto di Studi e Analisi Economica

Data is collected monthly by means of telephone interviews. The sample is selected from the population aged 18 years and over. Approximately 2000 persons are selected.

Spain Grupo Gallup España

The selected sample represents approximately 95% of the Spanish population. The sample size is around 2 000. Response rate is 33%.

United Kingdom Martin Hamblin GfK

Data are collected monthly by telephone interview. The nationally representative sample comprises of males and females aged 16 year and over. Quotas are set on gender, age, social class and region to ensure representativeness. About 2000 interviews are conducted each month. GfK produces the *Consumer Confidence Barometer*.

A thorough description of the survey can be found at

<http://www.gfknop.com/customresearch-uk/pressinfo/releases/singlearticles/003045/index.en.html>

Japan Economic and Social Research Institute, Cabinet Office.

The sample comprises 5040 households from 230 towns and villages. The survey interrogates households on the following topics :

- Consumer perception

- Willingness to buy or possession of durable consumption goods (in March only)
- Journeys undertaken or planned
- Plans for consumption of services
- Overall livelihood

Results are calculated on a 5 point scale. The following evaluation points in the five response categories are multiplied by the component ratio(%) and totalized: positive responses (improve +1), (improve slightly +0.75); neutral response (no change +0.5); negative responses (worsen slightly+0.25), (worsen +0). The consumer perception index is, then, the weighted average of the points of the results

A.3 Business Confidence Index

Euro Area European Commission

The indicator is the arithmetic average of the balances of the answers to the following four questions. Unemployment results are used inverted. The sum of the replies for each Member States are weighted in the Community total with the final consumption expenditures.

- Production perspectives : “How do you expect your production to develop in the 3 coming months? It will + improve, = remain unchanged, - deteriorate”
- Volume of stocks : level : “Do you consider the volume of stock currently hold to be...? + too large (above normal) = adequate (normal for the season) - too small (below normal)”
- Order books : level : “Do you consider your current overall order books to be ...? + more than sufficient (above normal) = sufficient (normal for the season) - not sufficient (below normal)”

The national indicators which are calculated in this way are those of France, Germany, Italy and Spain.

France Institut National de la Statistique et des Etudes Economiques

4500 enterprises are surveyed each month, except in August, by the Economic Outlook Department of INSEE. The survey covers 70% of total sales in the manufacturing industry. The method used is stratified sampling without replacement and with unequal probabilities. Each sample stratum corresponds to one activity sector (using the French NAF-NSE classification since April 1999). A quarterly survey complements the monthly one. Results for aggregated indexes are published before the end of the month and fifteen days later for the split levels.

Germany Institute for Economic Research

IFO started the monthly survey in 1962. Data are derived from a survey of 7000 enterprises, with the sample size for the manufacturing data being 3600 firms. The results are published one week after the Ifo Business Climate Index is released. The response rate is 85

Italy Istituto di Studi e Analisi Economica

The ISAE Monthly Survey started in 1962 and currently uses a sample size of 4000 enterprises with more than 10 employees. The survey is carried out at the end of each month by ISAE in line with EU recommendations. Questionnaires are mailed the week preceding the month of the inquiry (Mt); only answers arriving during the first two weeks of the following month are taken account of. The response rate is 95%.

Spain Ministerio de Industria, Turismo y Comercio, Subdireccion General de Estudios

The published monthly data are compiled from the results of the survey 'Encuesta de Coyuntura Industrial', conducted in 3 500 enterprises by the Ministry of Industry. The survey started in 1987. The questionnaires are collected mainly in the first fortnight of the month, the main means of communication being ordinary post, or fax, and further responses are received by telephone. The response rate is 62%.

United Kingdom Confederation of British Industry

Data are collected from the Quarterly Industrial Trends Survey and the Monthly Trends Inquiry carried out by the CBI using, on average, a sample of 1500 respondents. The Industrial Trends Survey (quarterly and monthly) started in 1958. The monthly and quarterly surveys are conducted within the first fortnight of each month with results available before the end of the month in question. CBI business survey samples are constructed from the following sources: CBI parent membership and subsidiary lists, UK sector trade associations, CBI Regional Office contact, Electronic database sources such as Dun & Bradstreet, FAME, KBE.

Japan Bank of Japan

Data are derived from the Bank of Japan's quarterly Short-term Economic Survey of Enterprises in Japan (TANKAN). The survey is conducted in March, June, September and December. Results are released at the beginning of April, July, October, and mid-December. The answer sheet is delivered and collected by mail. The sample enterprises are selected from a population of all private enterprises in Japan employing fifty or more persons (or twenty or more persons in the wholesaling, retailing, services, and leasing industries). In publishing the surveys, the enterprises are classified by size into large, medium and small according to their number of employees, as follows: Large enterprises: 1,000 employees or more Medium-sized enterprises: 300-999 employees Small enterprises: 20/50-299 employees. Questions concerning anticipations of the future refer to an horizon of three or four months.

Variables collected are

- Volume of stocks: level
- Selling prices: future tendency
- Employment: future level
- Capacity utilization rate: future tendency
- Business situation - activity: present
- Business situation - activity: future tendency

United States Institute for Supply Management, US

The Manufacturing ISM Report On Business is based on data compiled from monthly replies to questions asked of purchasing and supply executives in over 400 industrial companies, for 370 purchasing and supply executives in over 62 different industries representing nine divisions from the Standard Industrial Classification (SIC) categories. Membership of the Business Survey Committee is diversified by SIC category and is based on each industry's contribution to Gross Domestic Product.

The index produced by ISM is well-known under the name of Purchasing Managers Index. Questions asked are the following:

- Production: tendency relative to previous month
- Order books: level
- Orders inflow: tendency relative to previous month
- Export orders inflow: tendency relative to previous month
- Raw material stocks: tendency relative to previous month
- Employment: tendency relative to previous month

Canada Statistics Canada

Data are derived from the quarterly Business Conditions Survey (in January, April, July and October). The survey is conducted by Statistics Canada since January 1976, through a mail out-mail back form collection follow-up is only done for the top manufacturers. A fax reminder and questionnaire is sent to respondents who have not replied 3 days prior to the survey closing date. The results of the Business Conditions Survey reflect businessmen's judgements on their own situation at the time of the survey and their expectations for the next three-month period. Data are collected from a sample of about 9,000 manufacturing establishments selected from the frame maintained by the Business Register. The sample used for this survey is the sample used for the monthly Survey of Manufacturing and is revised bi-annually to reflect changes in the composition of the Canadian manufacturing population. The population is stratified by industry within province and each stratum is then divided into three substrata of large, medium and small establishments according to the shipment value reported to the ASM. All large establishments are surveyed and a systematic sample is independently selected within each of the other two size (medium and small establishments) substrata. The average response rate for the BCS is 45%.

Variables collected are

- Production: future tendency
- Finished goods stocks: level
- Order books: level
- Orders inflow: tendency
- Employment: future tendency

B Appendix : Macroeconomic data

Macroeconomic series were downloaded either from Datastream, or from Banque de Series Monetaires et Economiques of the Bank of France.

Gross Domestic Product Gross domestic product, volume, at the price levels and PPPs of 2005 (million USD)

Organisation for Economic Cooperation and Development, database Economic Outlook

Consumption Private Final Consumption Expenditure, volume

Organisation for Economic Cooperation and Development, database Economic Outlook

Investment Gross Fixed Capital Formation, total, volume

Organisation for Economic Cooperation and Development, database Economic Outlook

Unemployment

- United States : Harmonised unemployment rate: all persons, Organisation for Economic Cooperation and Development, Main Economic Indicators
- France : Unemployment rate, Organisation for Economic Cooperation and Development, database Economic Outlook, percentage, seasonally adjusted
- Italy : Unemployment rate (% of total labour force), Organisation for Economic Cooperation and Development, database Main Economic Indicators, percentage, seasonally adjusted
- Japan : Standardized unemployment rate, Organisation for Economic Cooperation and Development, database Main Economic Indicators, percentage, seasonally adjusted
- Spain : Standardized unemployment rate, Organisation for Economic Cooperation and Development, database Main Economic Indicators, percentage, seasonally adjusted
- Germany : Standardized unemployment rate, Organisation for Economic Cooperation and Development, database Main Economic Indicators, percentage, seasonally adjusted
- Germany de l Ouest : Unemployment rate (% civilian labour force), Deutsche Bundesbank, percentage, seasonally adjusted
- United Kingdom : Harmonised unemployment rate: all persons, Organisation for Economic Cooperation and Development, database Main Economic Indicators

Capacity Utilization Rate

- United States : Rate of capacity utilisation in industry, Organisation for Economic Cooperation and Development, database Main Economic Indicators
- France : Industry survey: capacity utilisation, INSEE, percentage, seasonally adjusted

- Spain : Utilisation of productive capacity - industry total, Ministerio de Economía y Hacienda, percentage
- Italy : ISAE business survey: capacity utilisation rate, ISAE, percentage
- Japan : Rate of capacity utilisation in industry, Organisation for Economic Cooperation and Development, database Main Economic Indicators, index, seasonally adjusted
- United Kingdom : Industry survey: capacity utilisation, European Commission, percentage, seasonally adjusted
- Germany : Industry survey: capacity utilisation, European Commission, percentage, seasonally adjusted
- Canada : Rate of capacity utilisation in industry, Organisation for Economic Cooperation and Development, database Main Economic Indicators, index, seasonally adjusted

Inflation Consumer Price Index, All Items, Index publication base

Organisation for Economic Cooperation and Development, database Main Economic Indicators

Hourly Wages

- United States : Hourly wages, International Monetary Fund, database International Financial Statistics, price index
- France : Hourly wage rates all activities, Organisation for Economic Cooperation and Development, database Main Economic Indicators, price index
- Germany : Wages and salaries per manhour, International Monetary Fund, database International Financial Statistics (Prices, Production, Labor)
- Canada : Wages: hourly earnings, International Monetary Fund, database International Financial Statistics (Prices, Production, Labor)
- Spain : Hourly wages, International Monetary Fund, database International Financial Statistics (Prices, Production, Labor)
- Italy : Contractual wage per person excluding family allocations, International Monetary Fund, database International Financial Statistics (Prices, Production, Labor)
- Japan : Wages: monthly earnings, International Monetary Fund, database International Financial Statistics (Prices, Production, Labor)
- United Kingdom : Average earnings production industry, International Monetary Fund, database International Financial Statistics (Prices, Production, Labor)

Disposable Income Household Disposable Income in Real Terms, constant prices, national currency (millions), seasonally adjusted

Organisation for Economic Cooperation and Development, database Economic Outlook

Long-term Interest Rates Long-term interest rates, Monthly, Per cent per annum (10 years government bonds)

Organisation for Economic Cooperation and Development, database Reference Series

Share Prices Shares Prices, Index

Organisation for Economic Cooperation and Development, database Monthly Economic Indicators, Financial Indicators

Trade Balance Total Exports less Imports of Goods, Monthly, in billions Current Prices (US Dollars)

Organisation for Economic Cooperation and Development, database Reference Series

Labor Costs Unit Labour Costs

Organisation for Economic Cooperation and Development, database Quarterly Indicators

Civilian Employment Civilian Employment

Organisation for Economic Cooperation and Development, database Monthly Economic Indicators, Labour Force Statistics

Short-term Interest Rate Short-term interest rates, Per cent per annum Organisation for Economic Cooperation and Development, database Monthly Economic Indicators, Financial Indicators

Remark : In the case of Germany, when the series for the whole of Germany were not available at the desired time-horizon, Germany has been assimilated to West Germany. Necessary adjustments were made concerning the 1991 period.

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