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US Outlook and German Confidence: Does the Confidence Channel Work?

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Abstract

One channel of business cycle shock transmission which gained attraction only recently is the confidence channel. The aim of the paper is to find out whether the confidence channel is actually working between the US and Germany. This is analysed using times series methods. In contrast to other studies the direct informational content of leading US indicators for German producer confidence and the significance of asymmetric reactions is tested. The results show that there is a relationship between the respective variables, which has become closer during the nineties. However the hypothesis of asymmetries had to be rejected.

Keywords: *Confidence Channel,*
Business Cycle,
Leading Indicators

JEL Classification: E37

Introduction

In 2001 almost all professional forecasters were surprised by the extent of global economic deterioration. Although there was the general expectation of a weaker business activity, outright recessions in all major global economies were a surprise not welcomed. There were a lot of hints that US growth would slow down in 2001 and it was assumed that this shock would have its world wide implications. Moreover it was clear that the oil price shock would hamper global economic growth on top of a restrictive course of monetary policy in all major industrial countries during the year 2000. All these traditional channels of global shock transmissions were considered when forecasts were made. Nevertheless the expected outcome was not the wide spread recession which took place. Obviously some important features driving a downturn on a global scale had been overlooked.

One channel which gained attraction only recently is the confidence channel.[1] Confidence on future economic activity will deteriorate in one country when the outlook for another major economy clouds. If e.g. forecasts for the US signal a weaker growth than previously expected confidence in other economies e.g. Germany accordingly will decline too. Reasons for this transmission are global trade and capital links. Two different implications with respect to economic activity can be derived from the existence of this channel. Firstly one can assume that transmission of shocks is speeded up by a confidence channel. Since people know that due to a decline in the US there will be a decline in exports in due time, they react immediately. In particular investment will then be reduced not just after a decline in exports occurs but already ahead of it. That is exactly what was observed in 2001 in Germany. The question is whether the confidence channel just leads to a speeding up of transmission or whether a stronger impact is implied. This second conclusion must be distinguished from the first one. It can only hold if either people do not have rational expectations and overshoot in their reaction to news. Or other links like foreign capital assets even lead to an enhancement of shocks. In this case investors reduce their domestic investments when the value of their foreign assets declines. In any case the existence of a confidence channel would change the pattern of the business cycle. Then expectations of US developments may lead to deviations from patterns shaped by the usual fundamental variables. In particular the rapid downturn 2001 in the Euro area may be explained in this way.

[1] Cf. IMF (2001).

The aim of the paper is to find out whether the confidence channel is actually working between the US and Germany. This is done by using information on leading indicators in the US and looking how they influence confidence in Germany. The focus is on producer confidence since firms are significantly earlier and - due to global assets - more affected than private households. Questions to be addressed are: Does such a relationship exist ? Has its importance increased during recent years ? Are there asymmetries in the sense that negative shocks show a higher impact on economic growth than positive ones?

These questions are analysed using times series methods. In this paper the direct informational content of US indicators for German confidence and the significance of asymmetric reactions is tested. It is measured by using a composite leading indicator for the and the ifo expectation index for Germany. The results show that there is a relationship between the respective variables, which has become closer during the nineties. However the hypothesis of asymmetric had to be rejected. These results derived differ to some extent from those of other studies which do not test the impact on expectations directly.[2] They rather focus on the impacts of shocks on the real economy while not testing the implications for expectations. Therefore in these approaches the transmission of shocks is based mainly on the fundamentals like exports, technological change or foreign direct investment. Some approaches outline that the transmission is caused by stock market movements.[3] In any case the impact on expectations is never directly measured. Thus the reaction of fundamentals which may be due to clouded expectations is not considered. In this paper as a first step in this direction is attempted.

2. Data

To measure the transmission of confidence between the US and Germany several steps of econometric analysis are taken. As a first step, times series properties of both variables are tested. Both indicators follow different principles. The ifo expectation indicator (ifo Indikator der Geschäftserwartungen) is a balance between shares of positive and negative expectations whilst the US composite leading indicator contains a growth component. Therefore, an assessment of degree of integration is required. The outcome will determine the transformation with which the respective indicator will enter the consecutive analysis. In a second step an unrestricted VAR will be designed to find out whether there is interdependence between both variables or what is – given the size of the respective economy - more likely that the impact runs from the US to Germany. The next step consists in an application of a Granger test which

[2] Cf Baxter /Crucini (1995),Baxter (1995),Backus7Kehoe/Kydland (1992)and Canova/Marrinan(1998).

should provide some further insight into the structure of leads and lags. Especially one should finds out whether the US economy is leading or lagging behind expectations in the German economy. A lead is expected. This analysis serves at the same time as a mean to detect informational content of the US variable for Germany. After that, stability over the sample period will be checked. Then an estimation equation is developed. Finally, the symmetry of transmission in upswing and downswing phases will be tested.

The construction principle of the ifo business expectation indicator (IFO) is fairly simple. It is the balance between the shares of positive and negative answers with respect to the nature of economic perspectives.[4] As the graph below shows, recessions in 1982 and 1992 /93 are expressed by significant negative values. However, the intensity of the ups and downs is not really reflected in the indicator. Whereas the options 1999 and 2000 show high positive values. The mild recession of 2001 shows almost the same negative values for the indicator as the much deeper slumps in 1982 and 1992. The same applies to the upturns: The recovery in 1994 showed much lower growth rates than those in 1987 or 1999. Nevertheless, the indicator showed even higher values for 1994.

One would assume that this construction leads to a stationary series. Indeed the results of the ADF test[5] do not request a rejection of the I(0) hypothesis.(Cf Table 1) Hence the ifo indicator will enter without any further transformation.

Table 1

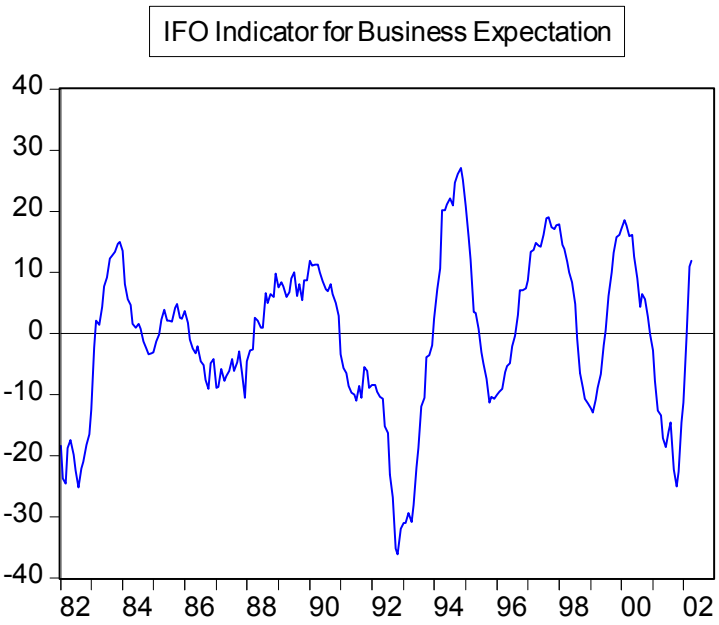
Augmented Dickey-Fuller-Test

Sample: 1982.01 2002.04

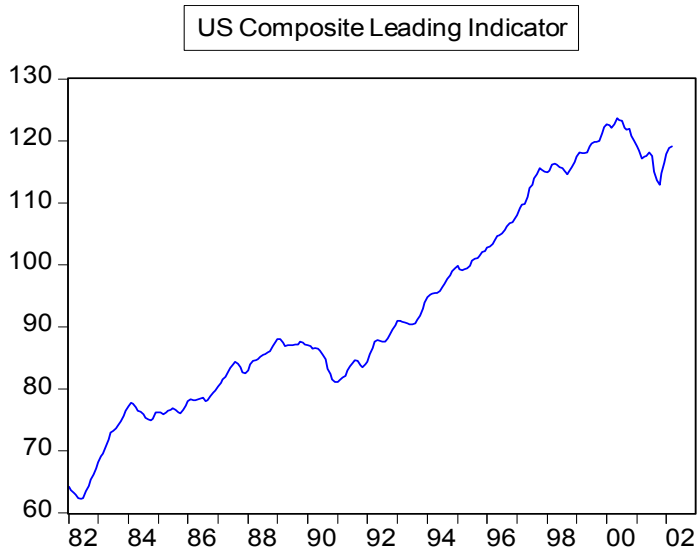
Variable	Specification	Lags	t-value	Critical values		Order of integration
				5%	1%	
IFO	NO TREND NO CONSTANT	1,2,3,4,6,7	-6,43	-1,94	-2,57	0
USIND	CONSTANT TREND	1,3,5	-2,27	-2,87	-3,46	-
Δ USIND	CONSTANT	1,2,3	-6,10^{XXX}	-2,87	-3,46	1

H_o: Time Series is I(1) will be rejected forstrong negative values.
^{XXX} denotes significant at 1 %-level.

[3] CF SVR (2001), Ziffer 470.
[4] In this analysis the original values of the ifo expectation indicator have been seasonally adjusted by the BV4 method.
[5] The equation has been derived by omitting all insignificant lagged values starting from 12 lags downwards.



The series for the US is the composite leading indicator (USIND) which contains several components which include information for the near future of economic development.

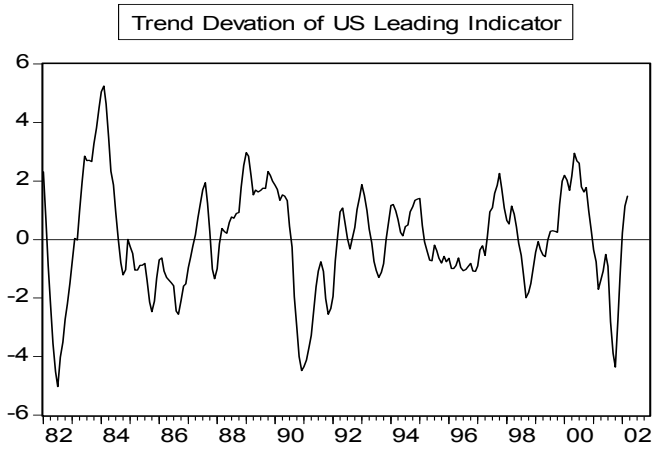


Looking at the times series properties of USIND[6], it is obvious that the series is not stationary, not even trend stationary. But a decline in the outlook of the US economy clearly shows up in a decline of the indicator. This is the case during the recessions at the beginning of the eighties and the nineties and to a very dramatic extent during last year[7].

[6] The equation has been derived as in footnote 5
[7] This is partly because of the attacks on September 11,2001.

The results of the ADF Test in table 1 show that the I(1) hypothesis is not rejected at the 1 % significance level. Therefore the variable USIND will enter the following analysis as first difference. That means it is rather the change of the leading indicator or the outlook on business cycle activity which plays a major role in the following. As an alternative also the stationary annual change of this variable was used. But the results proved to be very similar to those of the monthly change, hence they are omitted.

One could also argue that not the actual leading indicator should be used but rather its deviation from a trend in order to have a comparable measure to the ifo indicator which makes its interpretation more intuitively.[8] In order to do so the USIND series was filtered by the Hodrick-Prescott (HP) procedure and the deviation between the actual USIND and its HP filtered trend was used as the relevant deviation (USINDDEV). This time series is stationary by construction.



Again the impact of recessions can clearly be detected. Astonishingly the most recent decline is as strong as during the much harder recessions at the beginning eighties. But this can be due to the construction of this measure since previous acceleration of growth has shifted the trend upwards a lot.

The ifo index was published until the end of 2001 at the 20th of each month covering the previous month. About the same time the USIND is released for the same period. This implies that until recently both indicators were simultaneously available. Since the beginning of this year the IFO indicator is published around the end of the month it covers. Therefore since then

[8] This analysis is based on a comment by Reinhard Pohl.

the US indicator is not available when ifo is published. That should in principle lead to a more delayed influence of USIND. But that remains to be tested.

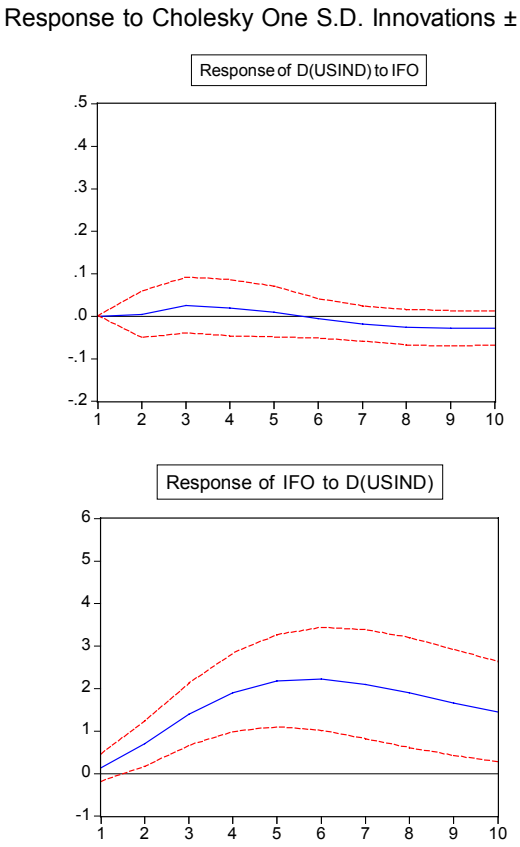
3. Granger Tests

The inclusion of the US outlook into an equation for German Business expectations is only a sensible concept if the US outlook in fact leads these expectations. To assess whether this is the case an unrestricted VAR is constructed just including the ifo index, the absolute change of USIND and a constant.

$$(1)\quad IFO_t = \sum_{i=1}^{k} \alpha_{1i} IFO(t-i) + \sum_{i=1}^{k} \beta_{1i} \Delta USIND(t-i)$$

$$(2)\quad \Delta USIND = \sum_{i=1}^{k} \alpha_{2i} IFO(t-i) + \sum_{i=1}^{k} \beta_{2i} \Delta USIND(t-i)$$

The lag length was determined using AIC and SIC information criteria. The optimal lag length turned out to be three. A simple Cholesky decomposition shows the expected result.



Given the leading role of the US economy it is not surprising that ifo index does not show any significant influence on the US indicator whereas the US indicator has some impact on the ifo index. The result holds for any transformation of the US indicator. Since USIND Granger causes IFO, IFO is the dependent variable.

In the following a parsimonious Granger test is applied to measure the lead of the US indicator. This is done by an univariate estimation of ifo first as a benchmark equation. Then increasing lags of USIND are added as long as they improve the explanatory power of the equation as measured by information criteria. The results should provide information whether the inclusion of USIND can beat the benchmark equation and thus contribute significantly to the explanation of IFO. The result for the period from 1982.01 to 2002.04 are presented in table 2.

Table 2

Granger Causality Test
US Outlook on German Confidence
- Dependent Variable: IFO Expectation Index - (1982.01-2002.04)

Variable	(1) Benchmark	(2) Δ USIND	(3) USINDDEV
IFO (-1)	1.08***	1.09***	1.09***
	(40.02)	(39.4)	(39.0)
IFO (-5)	-0.23***	-0.23***	-0.24***
	(2.98)	(3.06)	(3.10)
IFO (-6)	0.14*	0.11	0.12
	(1.71)	(1.41)	(1.46)
IFO (-9)	-0.10***	-0.07*	-0.07*
	(3.0)	(1.89)	(1.92)
Δ USIND		-0.01	
		(0.03)	
Δ USIND (-1)		1.02***	
		(2.82)	
USINDDEV			0.03
			(0.07)
USINDDEV (-1)			1.10
			(1.62)
USINDDEV (-2)			-1.12***
			(2.81)
R^2	0.96	0.96	0.96
DW	1.78	1.82	1.82
AIC	4.69	4.64	4.65
SIC	4.75	4.73	4.76
SE	2.51	2.44	2.44
Observations	235	234	234

Δ absolute change operator; USINDDEV deviation from HP filtered trend of USIND; t values in brackets; *** significant at 99%; **significant at 95%; - level; AIC Akaike Criterium; SIC Schwartz Criterium; SE Standard Error of Regression

As far as the benchmark equation is concerned it explains already a great deal of the variance. A constant proved to be insignificant in this estimation. When adding the US indicator it turns out that there is some influence. Both information criteria used indicate an improvement over

the benchmark estimation in three out of the four cases by adding US indicators. In case of using the trend deviation to explain IFO, equation (3), progress is minor, the SIC does not even show an improvement.

Given the huge changes on global capital markets and the ever tighter trade and equity relations among economies, one should not be surprised to find structural breaks in above equations. Tests on structural stability (CUSUM, CUSUMQ and Chow) showed indeed that this may be the case. Equation (2) in Table 2 is a marginal case. While the CUSUM test did not reject the hypothesis of stability, CUSUM of squares only marginally rejects and the Chow test even indicates a structural break. The CUSUM test also does reject instability for the trend deviation equations (3). However CUSUM of squares and Chow tests do not. In order to overcome these problems the sample period was shortened for each equation until test results confirm a stable relationship. For equation of type (2) this was the case from 1994.01 onwards. CUSUM and Chow tests signalled stability for the whole rest of the sample while the CUSUM of squares indicated instability for 1999.01. But since the Chow test did not corroborate that result, stability was assumed. For equation (3) it turned out that a stable equation could only be derived for the rather short period from 1999.01 until 2002.04. Hence this period was selected for estimation. The results of the respective estimations are presented in Table 3.

The results show that the lead structure changes when the sample length is shortened. The lead of the US indicator seems to increase. Again also for these periods an improvement by the inclusion of the US indicator can be achieved. In contrast to the whole sample period even in case of trend deviation a reduction of the value of the information criteria compared to the benchmark situations is obtained. All these estimation results indicate that an estimation of an equation for the ifo indicator including the US indicator improves results.

Table 3

Granger Causality Test
US Outlook on German Confidence
- Dependent Variable: IFO Expectation Index -
Period after structural Break

Variable	(1) Benchmark	(2) Δ USIND	(3) Benchmark	(4) USINDDEV
	1994.01 – 2002.04		1999.01 – 2002.04	
CONSTANT	0.77***	0.23		
	(2.93)	(0.89)		
IFO (-1)	1.16***	1.05***	1.38***	0.88***
	(12.1)	(10.4)	(9.091)	(5.78)
IFO (-2)	-0.20*	-0.10	-0.41**	0.01
	(1.99)*	(0.99)	(2.15)	(0.09)
IFO (-5)			-0.46**	-0.30
			(2.27)	(2.02)*
IFO (-6)			0.65***	0.15
			(2.80)	(0.76)
IFO (-8)			-0.36***	-0.17
			(3.36)	(1.75)
IFO (-9)	-0.15***	-0.14***		
	(5.84)	(5.69)		
Δ USIND		0.69		
		(1.66)		
Δ USIND (-1)		0.50		
		(1.01)		
Δ USIND (-2)		1.07**		
		(2.47)		
USINDDEV				2.02***
				(5.42)
R^2	0.97	0.97	0.96	0.98
DW	1.95	1.99	2.03	2.15
SE	2.37	2.14	2.71	1.98
AIC	4.61	4.42	4.95	4.35
SIC	4.71	4.62	5.16	4.60
Observations	99	99	39	39

SE-Standard Error of Regression, AIC; Akaike Criterium, SIC Schwarz Criterium; *** significant at 99% - level; ** significant at 95% - level; *significant at 90 % - level; t- values in brackets

4. Estimation Results

To derive an optimal equation both variables with their lags up two twelve months were initially included into the estimated equation. In contrast to the previous estimation now all insignificant variables were removed from the estimation. So a general to specific approach was applied. Thus for the period from 1982.01 to 2002.04 the respective lags of both variables were removed from the equation when being insignificant or the AIC and SIC were improved by the omission. The results of the procedure are shown in table 4, columns (1) and (3).

Table 4

Estimation Results
Dependent Variable: IFO-Expectation Indicator

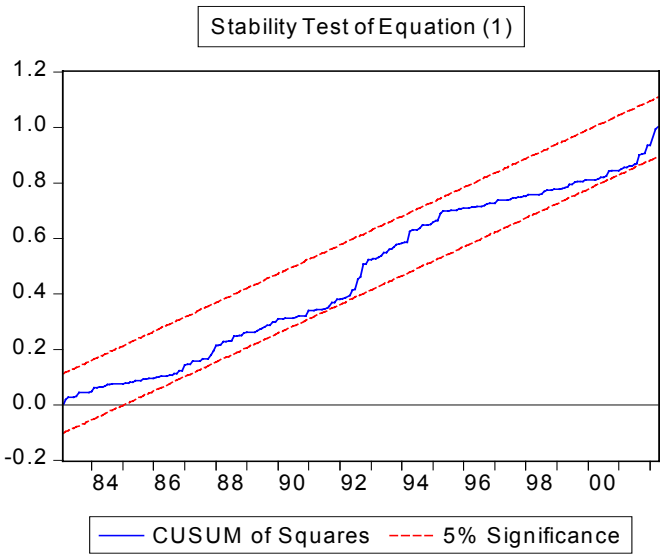
	(1)	(2)	(3)	(4)
Variable	1982.01 – 2002.04	1994.01 – 2002.03	1982.01 – 2002.04	1999.01 – 2002.03
IFO (-1)	1.08*** (43.8)	0.95 (54.6)	1.10 (39.62)	0.72*** (14.01)
IFO (-5)	-0.22*** (2.97)		-0.24*** (3.14)	
IFO (-6)	0.15* (1.86)		0.15* (1.86)	
IFO (-8)	-0.11*** (2.67)			-0.30*** (8.43)
IFO (-9)		-0.14*** (8.95)	-0.22*** (2.8)	
IFO (-10)			0.23* (1.92)	
Δ USIND		1.04*** (3.02)		
Δ USIND (-1)	1.04*** (3.93)			
Δ USIND (-2)		1.55*** (4.60)		
USINDDEV				1.39*** (2.77)
USINDDEV (-1)			0.88*** (4.18)	1.23* (1.92)
USINDDEV (-3)			-1.69*** (3.64)	
USINDDEV (-4)			0.88*** (2.44)	
R^2	0.96	0.97	0.96	0.98
SE	2.42	2.14	2.41	2.00
DW	1.86	1.82	1.89	2.00
AIC	4.63	4.40	4.64	4.33
SIC	4.70	4.50	4.76	4.50
Structural Break	1994.01	- -	1996.01/1999.01	- -
Observations	236	99	234	39
Log Likelihood	-541,3	-213.8	-534.7	-80.4

SE-Standard Error of Regression, AIC; Akaike Criterion SIC Schwarz Criterion; *** significant at 99% - level; ** significant at 95% - level; *significant at 90 % - level; t- values in brackets

No constant was significant in above estimations. It turns out that the one period lagged value of the absolute change of the US indicator was clearly significant in the first estimation. So again this speaks for some informational content of US outlook on German business expectation. At the first glance the same applies to the trend deviation. But several lags of this variable also prove to be significant with an opposing sign. Moreover, the sum of coefficients is not significantly different from zero. Therefore these estimations indicate that rather the change of trend deviation feeds into the expectation formation than the trend deviation itself.

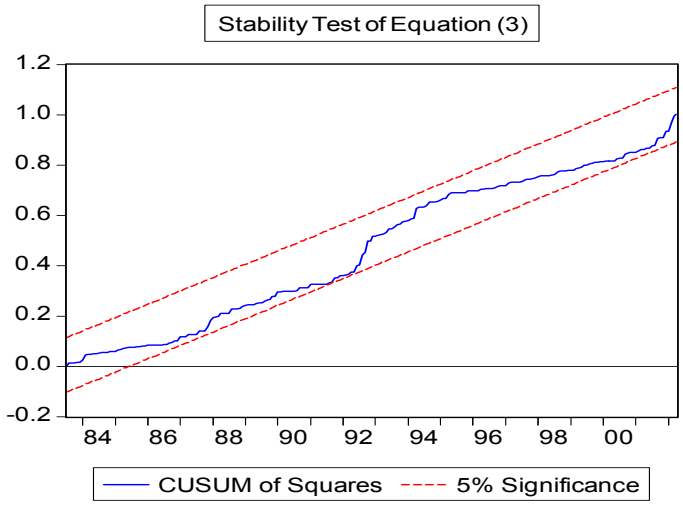
It is at least surprising that it takes up to four months (equation 3) until firms use information on the US outlook when at the same time the contemporaneous value is not significant. This is

only rational when the US indicator would not be available in a timely fashion. But given the publication structure outlined above the contemporaneous value of USIND should be significant in all estimations. In fact they were insignificant in both estimated approaches. The second point to be taken into consideration is that both equations show some signs of instability.



A CUSUM test of equation (1) showed no instability. However, the CUSUM of squares test of the same equation yields the result that the estimated equation is stable at the margin only. In order to test the result another estimation was done starting 1992.01, when the CUSUM of squares test is at the margin. Testing this equation leads to an indication for a break in 1994. An additional Chow test leads to the conclusion that a structural break in 1994.01 can not be rejected at the 1 % confidence level. The above procedure for finding an equation was applied again for the period from 1994.01 onwards. The search ended up with equation (2) in table 4. Stability tests of this equation showed that CUSUM again did not indicate any instability whereas CUSUM of squares delivered results at the margin. But in this case additional Chow tests did not give any hint for a structural break. Hence this equation was taken to be stable for the rest of the sample period.

For equation (3) the results are similar. Again 1992 the CUSUM of squares test shows that stability is at the margin. While the CUSUM test also in this case indicated stability. The respective Chow test however cannot reject the hypothesis of a structural break for 1992.01 at the 5 % level.



Further estimations from 1992 onwards were unable to detect a stable relationship before 1999.01. Therefore this period from 1999.01 onwards, although rather short, was finally used to estimate an equation (4) in Table 4 which in the end proved to be stable.

Looking at the results of equations (2) and (4) one realises that in each equation the contemporaneous US indicator is highly significant. So for the periods in question an immediate spill over of US forecast to German producer sentiment is present. What is striking is that the influence of the US indicator has increased markedly. The long term impact[9] of a one point increase of the US indicator on the ifo expectation index is 10.4 for equation (1) and 13.3 for equation (2) a rise of more than 30 %. Even more pronounced is the higher influence for equation (3) and (4). The long term impact for a one percentage point higher trend deviation in equation (3) is 0.875. For equation (4) the respective value is 4.57 more than 5 times the previous one. A symmetric estimation of first part of the sample, starting 1982 and 1993 rsp. 1998, corroborates the conclusion (cf Table A- 1 in the appendix). For these estimations no significant relation between the USIND indicator and IFO could be derived. For USINDDEV there was a significant impact but the long term impact is 3.44, which is lower than for the period since 1999. One has to consider in this case that the estimation ends not earlier but 1998.12. Furthermore the impact occurs faster more recently. During the earlier parts of the respective sample it takes one month and more until the US information becomes relevant. In later part of the sample there is a strong contemporaneous influence and only up to one month

[9] Cf. For calculation see Appendix.

lagged information is relevant. From all this one can conclude there is a stable relationship since at least since the mid nineties.

It is not rational that people use "old" information. Even if one allows for the fact that US information was at times later in the month available than the ifo indicator no longer lags than two should occur. Using latest available information implies one month lag. If the change of the indicator is considered relevant the lag should be extended by just one more period. From this one may conclude that those estimation which show a first significant impact only after more than two months are not very plausible. Then all estimation results for equations starting in the eighties are not very convincing. A more rational form of spill over can then only be traced since the mid nineties.

These results indicate that the connection between the US outlook and expectations of German firms have not become just closer since the mid nineties it may have been established only then. But now since it exists any worsening of the US outlook will feed into sentiments of investors in Germany. This will have consequences for the business cycle in Germany. Given the good forecasting properties of the ifo expectation[10] it implies that business cycles fluctuation in the US and Germany, should be more in line with each other than previously. Some analyses exactly come to such a conclusion.[11]

5. Asymmetric Effects

A major question is whether the impact from the US development differs according to the nature of these influences. Firms may react differently with their expectations when the outlook turns negative compared with a situation when it is positive. From theoretical considerations this hypotheses is justified when the aggregate short run supply curve is convex.[12] Such a shape implies that a positive shock produces a relatively higher impact on prices than on quantities. Since in that case there may be capacity constraints and firms then prefer to rise their prices rather than to increase their production. Accordingly a negative impact shows more effects on quantities than on prices. Instead of lowering prices firms choose not to use their full capacities. In such an environment also confidence should react asymmetrically depending on the nature of the news. If leading indicators for the US have a negative sign there should be a more pronounced reduction of expectations on the further development of the

[10] Cf. Fritsche/ Stephan, (2002).
[11] SVR (2001), IMF (2001).

German economy than in the symmetric case. An expected positive development in the US should incite an absolutely lower reaction of expectations for Germany.

Furthermore, there could be psychological reasons why negative news are more impressive than positive news, because people are more afraid of the former than they are happy with the latter. Therefore in the following the relationship between IFO and USIND is analysed to detect possible asymmetries.

To do so two dummy variables for each equation are constructed. The first one (DUMPOS) is one as long as the shock is positive and zero, when it is negative. The second one (DUMNEG) is simply equal to 1- DUMPOS. That means its value is one when the shock is negative and zero when it is positive. The respective USIND and USINDEV transformations are then multiplied by two dummies and enter the estimation equation as USINDPOS (USDEVP) or USINDN (USDEVN) respectively. They express the respective value of USIND in phases were this variable is positive or negative. The times series properties are not changed by these transformations.

$$(3)\quad IFO_t = \sum_{i=1,5,6,8} \alpha_{1i} IFO(t-i) + \beta_{1p1}\Delta USINDP(t-1) + \beta_{1n1}\Delta USINDN(t-1)$$

$$(4)\quad IFO_t = \sum_{i=1,9} \alpha_{2i} IFO(t-i) + \beta_{2p0}\Delta USINDP + \beta_{2p3}\Delta USINDP(t-3) + \beta_{2n1}\Delta USINDN(t-1)$$

$$(5)\quad IFO_t = \sum_{i=1,5,6,9,10.} \alpha_{3i} IFO(t-i) + \beta_{3n0} USDEVN + \beta_{3n2} USDEVN(t-2) + \beta_{3n7} USDEVN(t-7) + \beta_{3n8} USDEVN(t-8)$$

$$(6)\quad IFO = \sum_{i=1,8} \alpha_{4i} IFO(-i) + \beta_{4p1} USDEVP(-1) + \beta_{4n0} USDEVN$$

The subscript p and n denote the coefficient for positive and negative signals from the US. The equations were derived starting from the results in Table 4. But the indicator variable USIND (USINDDEV) was replaced by USINDP (USDEVP) and USIND (USDEVN). A positive coefficient was expected for each of the both variables. When it turned out that the estimated coefficient was insignificant it was left out of a further estimation when information criteria also worsened. Estimations led to the following results.

[12] Cf. Ball/Mankiw (1994).

Table 5

Asymmetric Effects

	(1)	(2)	(3)	(4)
Variable	1982.09-2002.04	1994.01-2002.03	1982.09-2002.04	1999.01-2002.04
IFO (-1)	1.08*** (43.7)	0.95*** (53.4)	1.11*** (37.9)	0.72*** (14.7)
IFO (-5)	0.22*** (2.94)		-0.22*** (2.87)	
IFO (-6)	0.15* (1.82)		6.12 (1.50)	
IFO (-8)	-0.11*** (2.61)			-0.27 (8.88)
IFO (-9)		-0.15*** (3.09)	-0.22*** (2.76)	
IFO (-10)				0.13* (1.97)
Δ USINDP		1.14*** (2.79)		
Δ USINDP (-1)	0.90*** (2.98)			
Δ USINDP (-3)		1.68*** (3.82)		
Δ USINDN (-1)	1.41*** (2.89)	2.11*** (3.67)		
Δ USINDN (-3)				
USDEVP				2.31 (5.89)
USDEVP (-1)				
USDEVN			0.91*** (3.83)	0.98** (3.39)
USDEVN (-2)			0.70*** (2.79)	
USDEVN (-7)			-97** (2.29)	
USDEVN (-8)			0.87** (2.14)	
R^2	0.96	0.97	0.96	0.98
SE	2.42	2.24	2.41	2.03
DW	1.86	1.91	1.88	1.95
Observations	236	99	233	39
Log Likelihood	-540.9	-213.3	-531.8	-80.31
AIC	4.63	4.41	4.64	4.37
SIC	4.72	4.54	4.78	4.59

SE-Standard Error of Regression, AIC; Akaike Criterium, SIC Schwarz Criterium; *** significant at 99% - level; ** significant at 95% - level; *significant at 90 % - level; t- values in brackets

At a first glance it seems that the negative coefficient are greater in value than the positive ones. For some equations, (5) and (6), the positive impacts proved to be insignificant altogether. Just applying these coefficients for simulation purposes would lead to the impression of existing asymmetries. In order to precisely assess whether there is an asymmetry or not a Wald test for equality of the respective coefficients is done. Thereby it will be checked whether the observed differences are significant. Coefficients in question are shown by the following equations, which are ordered according to the columns in Table 5.

The applied Wald test will check whether the coefficients for the positive impact are the same as for the negative ones for the respective equations, this means the following hypotheses are tested.

(7) $\beta_{1p1} = \beta_{1n1}$

(8) $\beta_{2p0} + \beta_{2p3} = \beta_{2n1}$

(9) $\beta_{3n0} + \beta_{3n2} + \beta_{3n7} + \beta_{3n8} = 0$

(10) $\beta_{4p1} = \beta_{4n0}$

The following table contains the respective probabilities of rejection for the hypotheses. The results unanimously lead to the conclusion that there is no asymmetry of reaction. For all equations and for all sample sizes analysed the impact of positive and negative shocks were not significantly different. In particular this applies for the most recent periods and thus for the more reliable estimations.

Table 6

Wald Test on Asymmetry

Equation	5	6	7	8
Probablity	0.36	0.28	0.51	0.27

The asymmetries which have been detected in other investigations cannot be confirmed by these results.[13] One reason could be that here another transmission channel, production expectation is analysed and not production or the output gap as in the SVR paper. But if there would be a difference it would imply that confidence transmission is not rational since it ignores the existing asymmetries. A more convincing explanation is that in the SVR papers a different method is used to show the asymmetries. There were two different VAR estimations one including positive shocks from the US another containing negative shocks. The asymmetry was measured as the difference between the two response functions of both estimations. Following this method some of above estimations would lead to the same result. The estimated impact of negative shocks is greater than the positive ones in estimation (1) and (3) in table 4. For the more recent period however results in estimation (2) and (4) are the other way round. The

[13] Cf. SVRt (2001), Ziffer 466..

point is, the Wald tests reveal there is no significant difference between the impact – a test not being done in the SVR paper.

6. Conclusion

Above results confirm, there is a confidence channel at least between Germany and the US. The hypothesis that the ifo expectation indicator for the German economy contains information on the outlook of the US economy cannot be rejected, at least not since mid nineties. There are indication that this relationship has become closer recently. But asymmetries between phases of economic upturns and downturns could not be detected in contrast to other studies.

This finding does not prove any real economy impact of confidence changes. The aim of the paper was less ambitious. In order to measure transmission of confidence to production several channels like exports, interests rate movements and share prices would have to be analysed. But before doing so one should try to expand this research to other countries than Germany. If firms consider the outlooks of major economies. Then this should happen on a global scale. In a further step it should be analysed how these informations affect the real economy.

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Appendix

1. Calculation of long term impact (LTI).

The LTI is defined as $LTI \equiv \frac{\Delta Y_t}{\Delta X_t}, t \to \infty$

Consider the equation where Δ is the discrete differential operator:

$\Delta Y_t = \sum_{j=1}^{K} \alpha_j \Delta Y_{t-j} + \sum_{i=0}^{N} \beta_i \Delta X_{t-i}$, then the LTI for $t \to \infty$ is

$$\frac{\Delta Y_t}{\Delta X_t} = \frac{\sum \beta_i}{1 - \sum \alpha_j}$$

Table A-1

Estimation Results: Earlier Periods
Dependent Variable: IFO-Expectation Indicator

	(1)	(2)
Variable	1982.09 – 1993.12	1983.01- 1998.12
IFO (-1)	1.04*** (45.21)	1.06*** (37.01
IFO (-2)		-0.15*** (8.25)
IFO (-8)	-0.13*** (3.01)	
Δ USIND (-1)	0.72 (1.54)	
Δ USIND (-3)	0.65 (1.43)	
Δ USIND (-2)	-057 (2.63)	
		0.69*** (-3.01)
USINDDEV (-1)		
USINDDEV (-3)		-1.18*** (3.02)
USINDDEV (-5)		1.58** (2.46)
USINDDEV (-6)		-1.29** (2.35)
USINDDEV (-9)		0.64* (1.89)
USINDDEV (-11)		-0.99* (1.76)
USINDDEV (-12)		0.86 (2.12)**
R^2	0.95	0.96
SE	2.44	2.32
DW	1.88	1.98
Observations	1.36	1.92
log likelihood	-311.36	-429.84