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Article

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AT A GLANCE

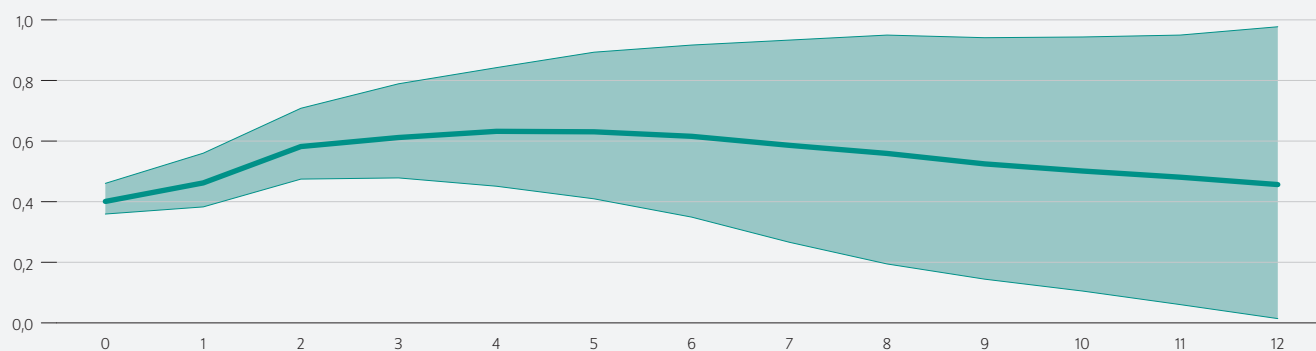
German and euro area economies will benefit from a U.S. interest rate hike in the short term

By Max Hanisch

- Empirical analysis of the effects of restrictive U.S. monetary policy on the business cycles of euro area member states
- U.S. interest rate hikes could have an expansive effect in the short term due to exchange rate movement and increased trade within the euro area—for Germany in particular
- The findings alleviate concerns that a restrictive U.S. monetary policy could trigger an inhibiting effect in the euro area similar to the one in the U.S. itself

One year after an interest rate increase in the U.S., Germany's GDP rose sharply—the reaction of German GDP to a restrictive U.S. monetary policy shock

Median reaction between 1999 and 2015, percentage change in quarters; 68-percent confidence bands.



Source: Author's own calculations.

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FROM THE AUTHORS

“Even if the positive effect is only temporary, these results should help reduce the fears that an increase in the U.S.’s benchmark interest rate will cause an economic slowdown in the euro area.”

— Max Hanisch —

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ABSTRACT

To accompany the economic upturn in the U.S., the Federal Reserve Bank has been raising its benchmark interest rate incrementally. In an increasingly globalized world in which the American economy plays a key role, an action like this has spillover effects on the international level. Based on a dynamic factor model, the present study shows that the member states of the euro area—Germany in particular—can temporarily benefit from a restrictive U.S. monetary policy. The devaluation of the euro against the U.S. dollar will improve the euro area's balance of trade and trigger an economic upturn, primarily in the member states in which the U.S. has captured a substantial portion of exports.

To counteract the consequences of the 2008 global financial crisis, the monetary policy of many developed economies has since then been highly expansionary, with interest rates hovering around zero and massive bond purchases. With improving economic data, the American Federal Reserve Bank's Federal Open Market Committee (FOMC) took the first step by raising the federal funds rate—its own benchmark interest rate—by 25 base points in December 2015. Since then, it has taken five more steps, targeting an increase between 1.25 and 1.5 percent (as of the beginning of February 2017).¹ These decisions were made with the American economy in mind. Yet their effects are perceptible on an international level. The U.S. economy is the world's largest and it supports the U.S. dollar, the world's main reserve and anchor currency.² Hence, the United States enjoys a dominant economic position, allowing national events there to spill over into the international arena via any number of channels.

From the euro area's viewpoint, with just under 14 percent of exports, the U.S. is its largest market and even more important than the UK (Table 1). The route along which the exchange of goods and services occurs is called a *trade channel*. And the euro area is also closely tied into the U.S. financial markets via the *financial channel*. For example, the multi-layered business of internationally active banks was one of the catalysts that triggered the global financial crisis in 2008/2009. The member states of the currency union can react sensibly to changes in the American economy and the corresponding monetary policy reactions of the Fed via these channels. The present study analyzes how euro area member states are affected by these channels.

¹ At press time, we estimated a high probability of a further interest rate hike as part of the upcoming Federal Open Market Committee (FOMC) meeting on March 20–21 due to the surprising price jump in the U.S. recently.

² Ethan Ilzetzki, Carmen M. Reinhart, and Kenneth S. Rogoff, "Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold?" *NBER Working Paper* 23134 (2015).

U.S. monetary policy and international transmission channels

The trade channel: negative demand vs. positive devaluation

Tighter monetary policy typically inhibits economic growth. Higher interest rates make it more expensive to take out loans and investment becomes less profitable, resulting in a drop in aggregate demand. For the trading partners of a strong import country such as the U.S., this means a decline in exports and lower aggregate demand for its goods. A decline in American demand can influence the international economy through this channel. Given the significance of the U.S. as a consumer of euro area exports, the member states should also anticipate a weakening economy. In the context of rising U.S. interest rates, this scenario often gives rise to concern.

At the same time, higher U.S. interest rates attract capital. When it comes from abroad, the influx of capital makes the U.S. dollar appreciate in value. However, this process leads to the opposite effect: a strong currency makes a country's exports abroad comparatively more expensive and its own imports cheaper. If the U.S. dollar appreciates and imports to the U.S. become relatively cheaper, this will lead to a shift in U.S. demand toward more imports. At the same time, imports to the U.S. are the exports of foreign countries, including those of the euro area. Restrictive monetary policy in the U.S. can therefore temporarily lead to growth in the demand for foreign goods in exporting countries, becoming a macroeconomic stimulus on the international level. The opposite effects—lower demand due to higher U.S. interest rates and more demand due to the U.S. dollar appreciating—are ambiguous in terms of their relative strength, and the overall effect is unclear a priori.

The financial channel—the U.S. drives the global financial system

Since the U.S. economy is highly developed and its financial markets are strongly integrated on the global level, the FOMC decision on interest rates could spill across national borders via the financial channel. The global financial cycle plays a key role in this context, as premised on the observation that many national and international financial variables such as credit flow, risk premiums on government bonds, and the level of investor risk aversion are driven and directed by a few common factors.³ One of them is the global financial cycle. Recent studies show that the financial cycle is primarily driven by U.S. monetary policy.⁴ Hence interest rate hikes can lead to a deterioration of financing terms on the international level as well as in the U.S. On the other hand, expansionary U.S. monetary policy can lead to higher lending and lower risk aversion on the part of investors, including

Table 1

Euro area export share compared to the relevant trading partner in 2016 Percentages

Partner	Export share
USA	13.70
United Kingdom	13.50
China	6.80
Switzerland	5.70
Poland	5.70

Source: Eurostat.

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those outside the U.S. In both cases, FOMC interest rate decisions are “exported,” triggering spillover effects in the international financial markets and potentially monetary policy countermeasures as well. Because the economic situation in the U.S. is not necessarily in line with that of other countries, the Fed's interest rate decisions can be too restrictive or too expansive for other countries, leading to distortions and instability abroad.

Integrating the euro area complicates analysis

In principle, profound interdependency between countries leads to the intensified spillover of economic effects.⁵ In the course of implementing the euro in 1999, the member states vowed to dismantle internal trade barriers and drive the economic and political integration of the euro area forward. This complicates the analysis of the relationship between the U.S. and the euro area. After all, a priori the extent to which the profound interdependence of the member states *to each other* affects the euro area's sensitivity to external shocks is ambiguous. Based on the argument above, it is conceivable that with globalization as many countries become more interdependent, this would *intensify* any spillover effects. On the other hand, it is necessary to examine the extent to which greater interdependence among the euro area states and the associated convergence processes *reduce* their sensitivity to external influences.

As these considerations demonstrate, various potential transmission channels allow U.S. monetary policy to trigger spillover effects in the euro area. They can vary from country to country depending on foreign trade or the significance of their financial markets.

³ Geert Bekaert, Marie Hoerova, and Marco L. Duca, “Risk, uncertainty and monetary policy,” *Journal of Monetary Economics* 60 (2013): 771–788.

⁴ Silvia Miranda-Agrippino and Helen Rey, “World asset markets and the global financial cycle,” *NBER Working Paper* 21722 (2015).

⁵ Georgios Georgiadis, “Determinants of global spillovers from US monetary policy,” *Journal of International Money and Finance* 67 (2016): 41–85.

Box

A structural dynamic factor model

The results of the present study are based on a structural dynamic factor model. A dynamic factor model has two key properties that make it useful within the current context. First, the number of indicators that can be considered at the same time is theoretically unlimited. The model therefore enables the simultaneous detailed analysis of many potentially important transmission channels on the national level. Second, the basic assumption of a dynamic factor model is that the movement of many variables is the consequence of a few common sources of variation. In an international context, this corresponds to the previous observation that in general, the key indicators of many countries trend together in similar directions. The factor model includes these facts and identifies one of the common variation sources as restrictive U.S. monetary policy.

A multitude of other factors influence GDP, prices, etc. in reality. National factors, such as individual economic and political conditions, as well as other international variables of influence such as oil prices, can conceivably have an effect. The factor model plucked the relationship between American monetary policy and the individual member states of the euro area from the pool of potential driving forces. This form of structural analysis should not be mistaken for a forecast, which aims to predict actual future GDP, prices, and other quantitative indicators.

Empirical evidence

International model framework

As part of an empirical analysis, it is important to consider as many of the international transmission channels mentioned in the previous section as possible. Because the significance of individual channels varies from country to country, it is also informative to examine each recipient country individually instead of using aggregate data that map the euro area as a whole. This method highlights the differences and common features between countries. Further, in an increasingly globalized world it is essential to consider how different trading partners react to the same shocks.⁶ In order to analyze the influence of a U.S. monetary policy shock on Germany, for example, it is important to include the reactions of Germany's other trading partners—primarily the other euro area member states—in addition to the U.S. If an external stimulus triggers a reaction there, the resulting feedback mechanisms for the German economy must be included in the examination as a means of obtaining adequate results (see Box).

How euro area countries benefit

We found that raising the federal funds rate by 50 base points would initiate a short-term expansive effect in the euro area (Figure 1).^{7,8}

In all major economies, GDP had an immediately positive reaction. But the magnitude of the reaction varied greatly. In Germany, GDP rose more sharply than in most of the other countries, reaching its maximum value of 0.6 percent after four quarters. To improve our understanding of the findings, we examined the international transmission channels that transport the FOMC's monetary policy decisions.

Net exports grow via the trade channel

The present study shows that interest hikes in the U.S. go hand in hand with an appreciating U.S. dollar. This is equal to a devaluation of the euro against the dollar (Figure 2).

Via the trade channel, such devaluation can lead to greater demand for export goods, since they automatically become comparatively cheaper in the global market.

The reaction of net exports confirms that the trade channel plays an active role in the spillover from the American interest rate decision (Figure 3). In all member states, the devaluation of the euro led to an increase in exports, serving as a possible explanation for the economic expansion observed. However, its relative strength varied depending on the reaction of GDP.

Notably high export growth for Germany

While German and Italian net exports have the highest growth, foreign trade in the remaining euro area countries reacted more modestly. A closer look at the significance of the U.S. as a trading partner of the respective country helped situate this finding.

As indicated above, the U.S. is the euro area's main export consumer. From the viewpoint of the individual member states, however, the U.S. is only the largest single export market for Germany (Table 2). The other euro area countries are more important for the member states. Overall, the euro area is the largest export market for the euro area countries. Given the circumstances, it is plausible to assume that German net exports will react most strongly to American stimulus. Further, we can presume that the observed upturn in the foreign trade of the individual euro area countries is not solely the result of increased demand from the U.S. Currency devaluation against the U.S. dollar not only means a relative improvement in position with respect to the U.S. Instead, it improves the position of all countries that directly use the dollar as a means of payment or have coupled their

⁶ Georgios Georgiadis, "To bi, or not to bi? Differences between spillover estimates from bilateral and multilateral multi-country models," *Journal of International Economics* 107 (2017): 1–18.

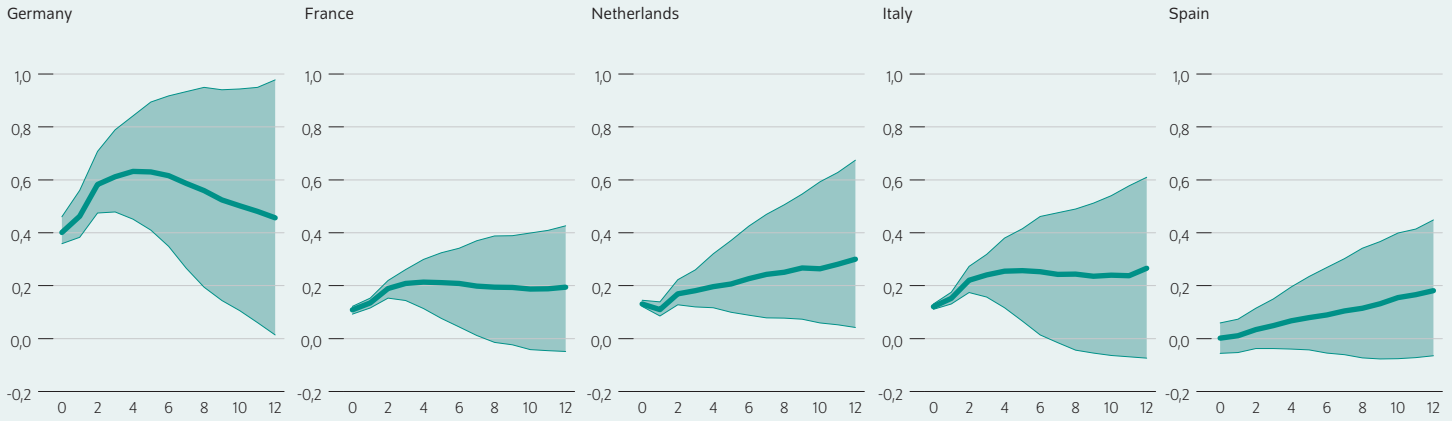
⁷ Max Hanisch, "US Monetary Policy and the Euro Area," *DIW Discussion Paper* 1701 (2017).

⁸ In the U.S. itself, raising the interest rate would trigger a recessionary effect: production and prices fell along with stock market indexes and the real exchange rate appreciated. See Max Hanisch, *supra*.

Figure 1

The reaction of GDP to a restrictive U.S. monetary policy shock

Median reaction between 1999 and 2015, percentage change in quarters; 68-percent confidence bands



Source: Author's own calculations.

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An increase in the U.S.'s benchmark interest rate will have an expansive effect in the short term on all major economies in the euro area.

own currency to the dollar. Recent studies quantify the proportion of currencies aligned with the U.S. dollar at up to 80 percent.⁹ For an export-oriented economy like Germany's, trade is truly an effective transmission channel.

The financial channel has a delayed restrictive effect

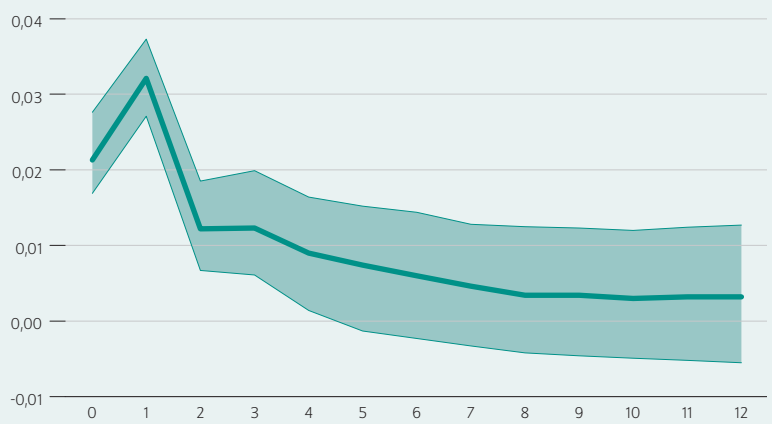
Alongside foreign trade, financial markets could play a role in the spillover of American monetary policy. Indeed, interest rates are also rising in the euro area (Figure 4).

This process led to a similar effect as in the U.S.: a slow-down in growth. However, the effect took hold with a delay of approximately three quarters. As a result of the delay, the increase in export demand caused by the devaluation of the euro managed to trigger a short-term expansive effect before the inhibiting interest rate hike counteracted the expansion in the euro area. Thus the European Central Bank (ECB) actually took its cue from the American stimulus. The stock markets show a similar trend.¹⁰ Here as well, the temporary real economic upturn was accompanied by a short-term expansion. In the medium term, however, the stock markets declined in line with the national and international deterioration of the financial market situation.

Figure 2

The reaction of the nominal euro-to-dollar exchange rate to a restrictive U.S. monetary policy shock

Median reaction between 1999 and 2015, change in Euro; 68-percent confidence bands



Source: Author's own calculations.

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⁹ Ethan Ilzetzki et al, supra.

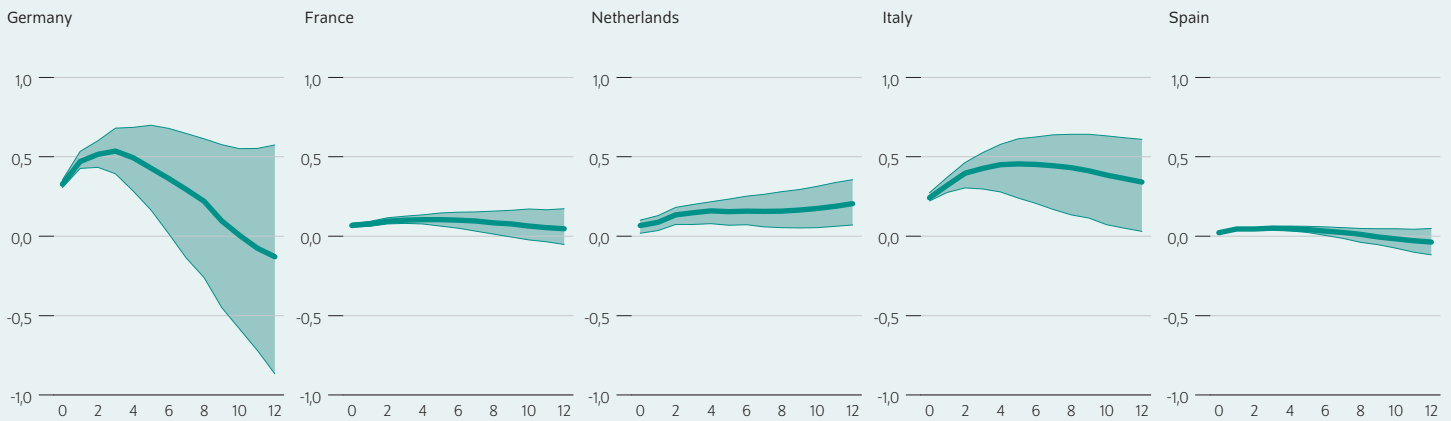
¹⁰ Max Hanisch, supra.

INTEREST RATE INCREASE IN THE U.S.

Figure 3

The reaction of net exports to a restrictive U.S. monetary policy shock

Median reaction between 1999 and 2015, percentage change in quarters; 68-percent confidence bands



Source: Author's own calculations.

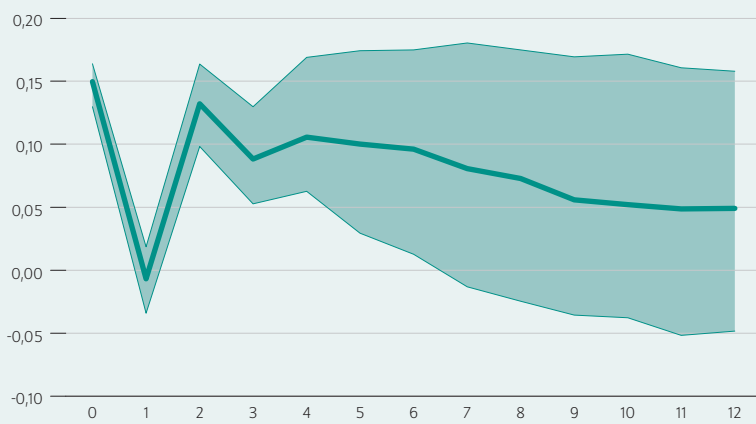
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Most notably, German and Italian exports are reacting expansively.

Figure 4

The reaction of the ECB benchmark interest rate to a restrictive U.S. monetary policy shock

Median reaction between 1999 and 2015, percentage change in quarters; 68-percent confidence bands



Source: Author's own calculations.

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The financial channel has a dampening effect only after a delay of about three months.

Medium-term decline in growth rates

Taken together, the findings confirm the international influence of the U.S. interest rate decision on global markets. The expansion caused by the reaction to the exchange rate can (over)compensate for the negative demand effect from the U.S. in the short term. However, in the medium term, the interest rate hike will have an international impact, canceling out the upturn.¹¹

Economic policy implications

Continuation of integration process can absorb some of the influence of external shocks

U.S. monetary policy does not have a purely national effect. The various channels discussed here ensure a degree of international spillover. In the scenario presented, the effect on the euro area is even positive in the short term. An ad hoc conclusion would be deliberately allowing the expansive effect to take hold: after all, the euro area and Germany in particular would benefit. However, this conclusion is myopic. Central banks and governments aspire to establish and maintain stable paths to economic growth, adjusting their monetary and fiscal policies accordingly. In the case of the euro area, the actors are the ECB and the governments of the individual member states. A stimulus like the U.S. decision on

¹¹ The study presented here examined the *average* relationship between U.S. monetary policy and the euro area between 1999 and 2015. In reality, a number of variables affect the euro area's GDP, exchange rate, etc., and this study focused on the key variable of U.S. monetary policy. As a consequence of the Fed's interest rate hike, it is not certain that the relationships presented here will actually manifest because the effect can be inhibited or even countered by other influences. Take America's recent decision to levy punitive tariffs on selected imports, for example. Such measures can significantly impair the trade channel's effect.

Table 2

Main trading partner of the respective euro area member states (according to export share) in 2016
Percentages

Germany	1. USA	8.85
	2. France	8.25
	3. United Kingdom	7.02
France	1. Germany	16.13
	2. Spain	7.50
	3. USA	7.39
Netherlands	1. Germany	22.23
	2. Belgium	10.31
	3. United Kingdom	8.99
Italy	1. Germany	12.64
	2. France	10.53
	3. USA	8.86
Spain	1. France	15.31
	2. Germany	11.29
	3. Italy	7.97

Source: Eurostat.

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interest rates is an external shock and as a rule, an unexpected one. It is therefore a threat to the projections the ECB and national economic planners create for the near future and could steer the euro area economy in an unpredicted direction. Indeed, our findings show that interest rates in the euro area are rising, forcing the ECB to react to unforeseen circumstances. The special constellation within the euro area implies that the reaction to interest rate changes is the same for all member states. However, the empirical findings show that the individual countries in the euro area react heterogeneously to external stimuli. The asymmetrical effects within the euro area harbor risk: a common countermeasure might not cover all the member states to the same extent and could even amplify the unequal distribution of the effects. For this reason, the policy goal should be to reduce the influence of such external stimuli—despite the short-term expansion documented in the present scenario.

This would counter the risk of distortions in the individual member states becoming amplified given the asymmetrical effects of a necessarily symmetrical ECB action.

A further partial result of the analysis is that in general, the implementation of the euro in 1999 reduced the magnitude of the asymmetrical reactions.¹² To the extent that this development is the result of the measures for more intensely integrating the euro area economically and politically, the finding implies that euro area economic policy should speed up the convergence process. The numbers actually show that the euro area is the key market for the member states. If concentration within the currency union leads to reducing the influence of external shocks, it will potentially be more advantageous to continue the integration process than reap the short-term heterogeneous benefits of external shocks.

Conclusion

U.S. interest rate hike no reason for excessive concern in the euro area

American interest rate increases or anticipation of the Fed taking such a step often gives rise to the concern that the resulting slowdown in U.S. economic momentum could spill over into the global economy. The present study shows that such concerns about the euro area are only partially justified. The euro member states could actually benefit from an interest rate hike temporarily. Thanks to the devaluation of the euro, their exports would grow to the extent that they are able to overcompensate for the negative demand effect from the U.S. This applies to Germany in particular. In the medium term, the interest rates in the euro area would follow those of the U.S., leading to a decline in its growth rates as well. The positive effect would only be temporary. However, this finding should also contribute to reducing the concerns that typically arise when the American benchmark interest rate goes up.

¹² Max Hanisch, *supra*.

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