

Horn, Gustav A.; Scheremet, Wolfgang; Zwiener, Rudolf

Working Paper — Digitized Version

German unification and its impacts on the US economy

DIW Discussion Papers, No. 65

Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

Suggested Citation: Horn, Gustav A.; Scheremet, Wolfgang; Zwiener, Rudolf (1993) : German unification and its impacts on the US economy, DIW Discussion Papers, No. 65, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:

<https://hdl.handle.net/10419/95854>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Diskussionspapiere
Discussion Papers

Discussion Paper No. 65

**German Unification and its Impacts
on the US-Economy**

by

Gustav-Adolf Horn, Wolfgang Scheremet,
Rudolf Zwiener*

Die in diesem Papier vertretenen Auffassungen liegen ausschließlich in der Verantwortung des Verfassers und nicht in der des Instituts.

Opinions expressed in this paper are those of the author and do not necessarily reflect views of the Institute.

Deutsches Institut für Wirtschaftsforschung

Discussion Paper No. 65

German Unification and its Impacts on the US-Economy

by

Gustav-Adolf Horn, Wolfgang Scheremet,
Rudolf Zwiener*

*) Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

Berlin, February 1993

Research on this project has been funded by the German Marshall Fund of the United States,
Grant No. TR-90715-04

Deutsches Institut für Wirtschaftsforschung, Berlin
Königin-Luise-Str. 5, 1000 Berlin 33
Telefon: 49-30 - 82 991-0
Telefax: 49-30 - 82 991-200

1. Introduction

The impact of the German monetary and economic unification (GEMU) on the world economy is considered far from obvious. On one side it is argued that the increased demand for capital needed to rebuild East Germany would lead to higher interest rates on capital markets worldwide. Since at the time of GEMU, 1990, most countries among them the US were in an economic recession, such a perception raised major concern. A recovery then would have been delayed if not prevented. On the other hand to rebuild the infrastructure in the East the German government had to follow an expansionary fiscal policy inciting higher imports. Furthermore, to satisfy the additional demand for western products in the East firms also had to increase imports. Hence there should also be a considerable expansionary impact on the world economy.

Our paper attempts to find out whether the contractive or the expansive impact prevails.¹ Special consideration is given to the impacts on the US economy. We use an econometric multi country model, QUEST², which incorporates all major bilateral trade relationships to capture the effects of GEMU on the world markets. We derive the conclusion that as far as the US economy is concerned, the expansionary impacts are prevailing. The basic argument is that the flexible DM Dollar exchange rate prevents major spillovers of higher interest rates in Germany whereas US exports to Germany increase significantly.

The paper is organised in 6 sections. After the introduction follows a short description of the transition process in Germany. Then a theoretical model is set up. In the fourth section the impacts for West Germany are discussed briefly. The fifth section contains the simulation results for the US and the world economy. The paper ends with a conclusion.

¹Research on this project has been funded by the German Marshall Fund, Grant No. TR-90715-04.

²QUEST has been developed by a research group at the EC Commission. However the authors are responsible for all errors and misunderstandings.

2. Economic Development in East Germany

In the course of the eighties it became clear that the economy of the GDR was at a standstill. The rigid framework of five-year plans prevented firms from developing innovations in the period between two plans. Even the desperate attempt to create incentive mechanisms at plant level had failed miserably: innovative firms were unable to translate their innovative activity into market success because both, the bureaucracy and the firms supplying inputs to the innovative enterprise systematically blocked changes to the plans. The main reason was that they did not benefit from rising profits out of innovations. Furthermore productivity growth was hampered by the economic system of the former GDR in which neither the structure of the produced goods nor the allocation of capital and labour was based on relative prices. Up to the late eighties the political system was able to conceal the economic troubles and to create an illusion of wealth which could only be financed to the debit of net-investment into capital equipment, infrastructure and environment. The opening of the markets which was combined with the monetary union and the resulting valuation of East-German products under market conditions shed light on the system-made deep lack of competitiveness.

The monetary union at a conversion rate of one between the two currencies of West and East Germany led to a revaluation of the East German Mark of about 300 p.c. Besides insufficient quality of the East German products the exchange rate shock induced a dramatic fall of international competitiveness of East German firms. But not only price effects caused the loss of domestic demand. After 40 years of a rationed demand, the East German consumers had a strong preference for western products. Hence firms lost their domestic customers almost completely. Additionally, the change from the Transfer Rouble into a convertible currency and the transition problems in Eastern Europe made East German producers loose most of their former export markets, too.

The consequence of the system-made lack of competitiveness and of the shocks induced by GEMU was a decline of the nominal value of industrial production of about 70 p.c. between 1989 and 1991. In the same period the decrease of real GNP was already about 40 p.c.

This economic collapse, the worst economic crisis Germany ever faced, affected the labour market dramatically. Unemployment rose up to the peak of 1,3 Mill. in January 1992. The corresponding unemployment rate was 17 p.c. But labour market analysis has to consider that the official

unemployment rate has widely lost its functions for disequilibrium situations on the labour market. The level and the development of unemployment in East Germany depends much more on administrative regulations and to what extent the instruments of the active labour market policy are used. Especially the latter prevented the East German labour market from an almost breakdown. Without these instruments the unemployment rate would have reached about 40 p.c.

The sharp decline in the production of goods and services in East Germany was not a result of a corresponding decline of domestic demand. Real private consumption increased each year after GEMU by about 5 p.c. The stabilisation of domestic demand was mainly financed by the massive financial transfers from the Federal government which sum up to 155 billions DM for 1992. As long as the East German industry is not able to meet the domestic demand, West-Germay and its main trading partners will benefit from the additional demand for investment and consumer goods.

3. The Transmission of Unification Shocks

3.1 A Theoretical Model

The main purpose of this paper is to assess the impacts of unification on Germany's foreign trade with a special focus on the US-German trade balance. Therefore it is necessary to analyse the transmission channels for domestic shocks to foreign economies. In line with earlier attempts (cf. Masson, Meredith (1990) and Mc Kibbin (1990)) this is done running simulations on an econometric multi country model. The QUEST³ model which is used here, incorporates bilateral trade relationships among the major economies. Thus it is possible to analyse the effects to the unification shocks on the bilateral US German trade in a fairly detailed and consistent manner. However, the scope of this attempt must remain limited by the fact that developments in East Germany cannot be econometrically analysed for the time being. It will take several years until a sufficient number of data can be collected to estimate the respective behavioural relationships. The analysis thus can only account for spillover effects out of East Germany. These are fed into the model for West Germany whereas internal East German developments are neglected. Consequently the term "domestic" in this paper exclusively refers to West Germany.

To understand the way domestic shocks are spread to foreign economies, we start with a closer look on international transmission channels from a theoretical point of view. Economic policy action taken in due course of the German economic and monetary union (GEMU) can be interpreted as:

- an expansionary fiscal shock partly financed by higher public deficits,
- positive export and import shocks,
- increased labour supply.

In this section we focus on the first two issues which require a closer look whereas the effects of the last one are far more obvious⁴. Economic policy in the aftermath of unification immediately raises the question whether an expansionary fiscal shock mainly financed by higher public sector deficits, basically a demand shock, leads to an economic expansion in other countries too. Or if counteracting forces like higher interest rates prevail and induce a contraction of foreign economies instead. Thus we enter the longstanding debate between the protagonists of "locomoti-

³The QUEST model has been developed by a research group at the EC Commission.

⁴A higher labour supply will induce higher unemployment, wages and prices fall increasing German competitiveness.

ve" theories and their opponents. The outcome of the debate is far from obvious. In fact as Frankel (1988) has shown, multiplier in open economies must be ambiguous. This ambiguity is mainly caused by the exchange rate mechanism. As will be shown this is of major importance for the transmission of domestic shocks to the world economy. In particular trade relationships between Germany and the United States facing a flexible dollar mark exchange rate mechanism are subject to these considerations.

Since the Quest model does not incorporate an empirically estimated relationship for the determination of exchange rates, some kind of simulation rule has to be imposed. Its shape mainly depends on assumptions on capital mobility. The basic question is whether capital mobility is sufficiently high to constitute the major force behind exchange rate movements. As Frankel (1988) points out the answer implies specific assumptions on the balance of payments reactions to interest rate movements and the shape of the LM curve.

Suppose the demand for domestic financial assets by foreigners (A) is determined by the expected return in foreign currency in relation to the expected return of foreign assets. This means the decision to invest into domestic assets is influenced by the interest rate differential between domestic and foreign rates, the actual exchange rate and the expected exchange rate for the period the term of the assets ends. Hence one gets:

$$(1) A = A(i, e, E(e), i^*),$$

where i denotes interest rates, e the exchange rate and E the expectation. The $*$ signifies a foreign variable

For domestic financial investment into foreign assets it is correspondingly assumed:

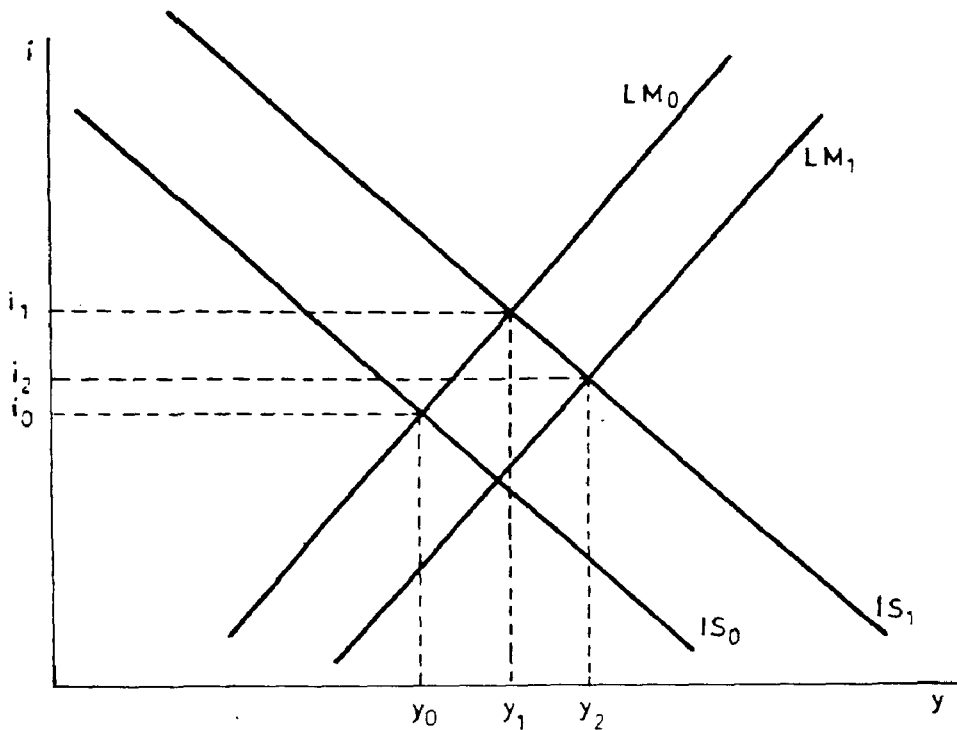
$$(2) A^* = A^*(i^*, e, E(e), i).$$

Hence the balance of capital flows resulting from financial investment (AB) can be written as:

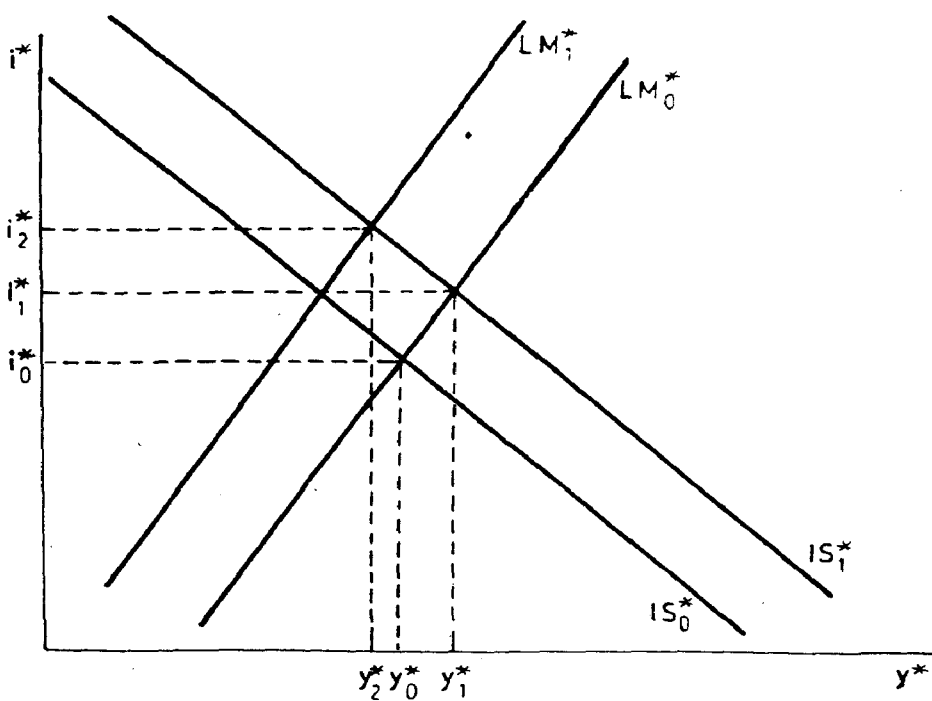
$$(3) AB := A - A^* = AB(i; e, E(e, i^*)).$$

The balance of payments (BP) is defined as:

Graph 1



Graph 2



$$(4) BP = -TB + AB = -(X-Q) + AB,$$

where X are exports and Q imports. The balance of payment can also be presented in the (i, Y) space:

$$(5) BP = BP(i, Y; e, E(e), P, P^*, i^*).$$

In line with these considerations we assume that exchange rates move such that the balance of capital flows stays on its equilibrium path. This seems to be an appropriate description of the dominant role of capital flows for the determination of exchange rates. The equilibrium condition then is:

$$(6) A(e, E(e); i, i^*) = A^*(e, E(e); i, i^*).$$

Equation (6) yields a pair of actual and expected exchange rates which determine the equilibrium level of capital flows. The adjustment process towards a new equilibrium after the occurrence of shocks may not work immediately but may rather need some time. Thus capital flows may be out of their equilibrium level for some periods.

For the purpose of this paper it is assumed that exchange rates especially between German mark and Dollar follow the path determined by (6). Although their short term movements may in fact be heavily influenced by speculative motives which could lead to a balance of capital flows further away from its equilibrium path. This mechanism is not an appropriate description of currency movements between EMS countries. These are limited by upper and lower bounds. Thus there exists no equilibrating mechanism between their balances of capital flows. For our analysis we have assumed that exchange rates between EMS countries remain on their baseline if shocks occur. In this setting an equilibrium can only be restored by interest rate movements induced by monetary policy actions.

3.2 The Effects of Unification

The basic effects of the unification on the US economy can be derived from the model presented in the previous section. The expansionary governmental spending policy which forms the main part of the unification shock can be interpreted as an upward shift of the IS curve. A new

domestic German equilibrium on the goods market establishes with higher GNP and higher interest rates. Graphically this can be shown as a move of IS_0 to IS_1 (cf. graph 1).

The unification shock is basically transmitted to the US as well as to other foreign economies outside the EMS by four channels:

- import resp export shock
- rise of German interest rates
- exchange rate reactions
- price reactions

Initially the higher imports to Germany lead to a shift of US goods market equilibrium too. In general the increase in foreign exports to Germany causes foreign GNP as well as foreign interest rates to rise. It is plausible to assume that effects on foreign GNP and interest rates are smaller than on the respective German variables. Financial transfers create some countervailing movements, though.

Higher interest rates in Germany attract additional capital flows. In graphical terms this means a downward shift of the German LM curve from LM_0 to LM_1 (cf. graph 1). Thus by this transmission channel German interest rates face downward pressure leading to a further expansion of its GNP. However, in foreign economies, US included, capital outflows turn the LM curve upwards from LM_0 (cf. graph 2). Rising interest rates then at least partly offset the expansionary GNP developments. Particularly these reactions cause the concern of foreign policy makers that German unification may lead to an economic slump in their countries.

These conclusions are not well justified as far as the US-economy are concerned since the exchange rate reactions are completely neglected by such considerations. According to our theoretical approach in the previous section interest rates are the major force for the determination of the exchange rates. The positive interest rate differential for Germany caused by unification then attracts more foreign financial investments. Furthermore German investors will shift from foreign to domestic assets. Thus the German balance of capital flows initially faces a positive impact.

According to (6) exchange rates move such to equilibrate capital flows. High demand for the German currency will thus appreciate the German mark. Foreign investors have to pay more in

foreign currency for German assets. Expected return on financial investments in Germany decline, lowering capital inflows. By the same reactions foreign assets become cheaper for German investors leading to a rise of German capital flows to foreign markets. This process will stop as soon as the balance of capital flows reaches its new equilibrium. This will be the case when the expected returns on domestic assets equal those of foreign assets. After its completion the exchange rate adjustment should lead to a balance of capital flows fairly close to its preunification level.⁵

The appreciation also affects the trade balance: Exports from Germany decline and imports to Germany get another expansionary push. Thus the exchange rate developments will reinforce the initial negative impact of the unification shock on the German trade balance.

Considering these exchange rate adjustments the impact on foreign economies is less negative than previously supposed. Exchange rate movements will stop the shift of capital investment after some time. In graphical terms this change of capital flows means that German as well as the foreign LM curves shift towards their preunification location. Thus interest rates in Germany rise again while those in other countries go down. Exchange rate movements may compensate the impacts of the capital flows. Furthermore the deterioration of the German trade balance shifts IS curves again. The German IS curve moves leftwards due to lower exports whereas the foreign curve moves to the right due to higher exports to Germany. To sum up, positive impacts for Germany are smaller and positive impacts for the US are higher when exchange rates adjust.

However some caveats have to be made. Implicitly it has been assumed that the expected exchange rate does not change throughout this process. In fact it may do so. If there exists e.g. the perception that a united Germany will gain economic strength in future times such that financial investment in Germany becomes less risky, expectation may show a further appreciated German mark. In this case expected returns on financial assets increase as well as the expected future "price" of these assets. Consequently foreign demand for German assets will be higher than in the previously described situation. To restore equilibrium then actual appreciation of the German mark must be higher too enhancing the positive impacts for foreign economies.

⁵A deviation from equilibrium may occur since expectations may also have changed throughout the process.

If - what seems at least equally probable - the perception prevails that financial investment in Germany becomes more risky by the unification process because the German economy may lose strength, the expected exchange rate will depreciate lowering demand for German assets. The appreciation of the actual rate then may be quite small. This means foreign countries will benefit to a lesser extent and the contractive impacts in Germany will be smaller.

Another effect counteracting exchange rate movements are the price effects of the unification shock. The benefits of a depreciation have to be "bought" with higher inflation due to rising import prices. Thus foreign economies also will face contractive impacts caused by a lower real wealth. This could especially dampen investment and consumption.

The effects described in this section only refer to international trade relation in presence of flexible exchange rates. Trade among EMS countries follows different rules. Higher German interest rates cannot be offset by an appreciation of the German mark. To restore equilibrium of capital flows between these economies interest rates have to adjust. In this case the expansionary fiscal policy not only raises demand for imports from other EMS countries, but also induces their interest rates to climb. Whether the overall effects for foreign economies are positive or negative now depends on the estimated parameters for the trade equations as well as on the interest rate elasticities of domestic demand.

4. Impacts on the West German Economy

The results presented here are based on an econometric analysis using the multi-country model QUEST in which the macroeconomic variables of the most important OECD countries are included. As far as West Germany is concerned the introduction of the D-Mark in the former GDR directly affected government transfers to East Germany and the increase in taxes and social insurance contributions, "exports" to East German and imports from abroad, the labour market and the money, capital and foreign exchange markets.

The benchmark for the calculation is provided by a status quo simulation covering a period of five years. This describes how the West German economy might have changed over time if German unification had not taken place. Using a number of assumptions (see Table 1) the effects of unification were estimated in an alternative scenario.

During the first year following monetary union public funds of around DM 110 billion were transferred from West to East Germany. Support of this order of magnitude will be required yearly during the simulation period to support state and local government in East Germany, to meet the deficits in the social insurance system there and to finance the development of an efficient infrastructure in the new federal states. In the short run these transfers will even exceed this amount. Goods and services sold from West Germany to East Germany are counted as "exports" and did rise from 18 to DM 130 billion during the first year of unification. A large proportion is spent on imports from other Western countries (including the USA) which are then channelled into the former GDR (the new Länder). Therefore we have assumed on top of the normal "import reaction" of the model additional imports of DM 50-60 billion. The saving in the foreign trade position will amount to about DM 100 billion.

It is extremely difficult to forecast changes in the level of West German exports to East Germany for future periods. Initially, in 1991, they were increasing, but we can expect, that in line with the modernisation of the capital stock East Germany itself will rise its very low exports to West Germany. Therefore DM 110 billion was set as a constant parameter representing the value of net exports to East Germany in each year.

Considering the labour market effects of German unification, the importance of migration declines, but cross border commuting will increase as long as job opportunities and income levels are not as good in the East as they are in the West. For our analysis we assumed that all groups together (migrators and commuters) are assumed to raise labour supply in West Germany by 1.5 million within 5 years.

Our assumptions on the interest rates shocks are essential for the outcome especially for the EMS countries. On February 7th 1990 the Federal Government announced that it was seeking the rapid unification of the two German states. Within short notice of this announcement led to a rise in capital market rates by a full percentage point. This was based on the expectation that the process of unification would require immense financial resources and that demand for capital would rise accordingly. Following to our theoretical approach outlined in the previous section this must lead to an appreciation of the DM towards all other currencies. Under the EMS regime however a realignment of the currencies of the member states is not desirable. Therefore the other member states are assumed to allow their interest rate to rise in order to avoid currency depreciation. On one side this reaction constitutes a dampening shock for their economy. On the

other hand it meant they could "import" price stability by increasing the external value of their national currency against countries outside the EMS.

As reactions on the foreign exchange markets have shown the DM was not considered as a "strong" currency at the beginning of 1991 any longer. Obviously the growing difficulties of the unification process let markets perceive German assets as riskier than previously. On the foreign currency market expectations of a DM depreciation increased. As equation (6) shows to maintain the exchange rate within the EMS a risk premium had to be paid on German assets. Alternatively - and this is what we assumed - the other EMS members could lower their interest rates again to their baseline values.⁶ So after one year an interest rate differential between Germany and the other EMS countries would be sustainable without any pressure for a realignment of the currencies.

The simulations are based on the assumption that with financial investments maturing on average after 6 years, the 1 percentage point interest-rate differential would initially induce a currency appreciation of 5.5%. It is assumed that a subsequent gradual depreciation is gradual. In the model these assumptions have the effect that after one year the interest and exchange rates of the EMS countries return to the status quo path.

5. US - German trade since GEMU

Between 1985 and 1990 trade between the US and Germany was characterized by heavy fluctuations. In 1986 and 1987 the imports of the U.S. decreased as consequence of the revaluation of the DM. But generally the development of the exchange rate and the economic growth in Germany created favourable conditions for US exports to Germany.⁷

Initially after GEMU the imports did not rise, but rather decreased by 0.5 percent in the second half of 1990 compared to the first half of 1991. However in the first half of 1991 the US imports, seasonally adjusted were 12.8 percent higher than in the previous year. German exports to the

⁶In another paper we run several simulations assuming different interest rates path to check the sensitivity of the outcome. In fact for EMS countries the results were quite different. For the USA however these considerations played only a minor role. See Horn/Scheremet/Zwiener (1992).

⁷See Wochenbericht 9/1991.

U.S. decreased continuously since 1986 for the very reasons mentioned above. The announcement of the currency union at the beginning of 1990 further decreased the competitiveness of German firms on the US market. Consequently total exports from Germany to US decreased by 12 percent in 1991. As the result of these changes in US-German trade the bilateral US-BRD balance of trade shifted from a surplus of DM 28.5 billions in 1986 to a deficit of DM 1.2 billions in 1991. In the following section we try to assess to what extent the currency union resp already its announcement contributed to these developments.

Looking at the simulation results (Table 3), one easily realizes that the major impact of unification on the US economy consists in higher exports compared to the baseline. Imports rose only slightly. In sum this led to an increase of real GNP by about 0.4 in the first year and less than one third of a percentage point thereafter. In other words in contrary to the European countries especially France, the US economy was not that much exposed to the economic shocks triggered by the political events in Germany.⁸

One of the most important finding in fact may be the absence of any negative impact induced by rising interest rates. Long term rates increase only slightly due to some minor inflationary pressure by rising import prices. The result is completely in accordance with our theoretical consideration in section 3 which concluded that the higher interest rates in Germany would not or rather to very limited extent spill over to the United States. The reason for this is the exchange rate adjustment. The German mark was appreciated from the fourth quarter 1989 to the first quarter 1990 by almost 8pc (see Table 5). In our simulations we attributed 5.5 pc to the effect of GEMU announcement. Consequently the expected return on German assets diminished by that percentage rate for any buyer at that time. In addition to that we assumed that for the future rather a depreciation of the German mark would be expected. This further deteriorates the expected returns on German assets. Given these developments there should not remain a significant incentive for US capital flows to be attracted by German financial demands originating from GEMU. In terms of our IS-LM graph this means that the LM curve more or less remains unchanged and therefore US interest rates should not rise significantly. They should move only to that extent the inflation rate changes.

Looking at the figures of Table 5 this exactly what happened. During the first three quarters of 1990 interest rates rose. But then in line with the expected depreciation of the German currency

⁸For the results for the major European countries see Horn/Scheremet/Zwiener (1992).

interest rates even declined. This basically is the picture of our simulation results too. From this we may conclude that higher German interest rates may be an important issue for the EMS countries, but they should not cause major concern for the US economy.

Thus foreign trade is the main channel of influence. Not surprisingly higher US exports during the respective periods mainly result from higher US supplies for Germany (see Table 6). In the first year after GEMU impact was almost 19 pc according to our simulations. During the following it declined slightly. But exports remain at least 15pc above baseline. Comparing these figures to the actual statistics, one must acknowledge that the simulation does not seem to grasp the time structure correctly. Actual exports from the US did not rise significantly until the second quarter of 1991. So the simulation probably did not capture the time lag between orders and delivery in an appropriate manner. Since the initial simulation period should cover the period from July 1990 to July 1991 the model seems to be about three quarters ahead of reality.

However, in the second quarter of 1991 exports rose by almost 20pc compared to the second quarter 1990. This is almost exactly what the model predicted. In the following quarters the increase is smaller so that in the end the increase of exports of 12.8 p.c. was below the value obtained from the simulation. This may be partly due to the fact that the actual devaluation - as its appreciation in the first quarter of 1990 - of the DM was greater than assumed by the model. So the competitiveness of US exporters was diminished to a larger extent. In the end the exports were about only 5pc higher than in 1990 before unification.

In our simulations not only US exports to Germany increased but also those to most other countries. Particular French and British customers increased their demand for US products significantly by more than 2pc in the first period and well above one thereafter. There are two reasons for this. Firstly the appreciation of European currencies in line with the DM increased US competitiveness compared to all other European countries.⁹ Secondly GEMU led to an increase of imports to Germany from all other European countries. This had at least during the first year a stimulating impact on the European economies leading to higher import demands in due course. From this the US economy also benefited according to its share of foreign trade with these countries. These positive effects faded after the initial period so that the exports to these countries are closer but still well above baseline after two periods.

⁹As a matter of fact this argument does not apply for the results of US Japanese trade.

The Japanese trade benefit from the second effect mentioned above as well as from their increased competitiveness due to the appreciation of European currencies. Both economies were stimulated by high imports demand from Europe. Consequently their demand for imports rose too. Thus not only US exports to Japan increased but also US imports from there. Since the effect are roughly the same in numerical values the trade balance between both countries is not affected to a considerable extent. However the US Japanese trade may serve as an instructive example of the significant secondary effect GEMU had on trade between industrialised countries. These may have been underestimated by previous studies which did not incorporate the bilateral trade relations.

Looking at the total imports to US, our simulation suggests that only minor effects should occur. The regional split up however reveals that the appreciation of European currencies obviously had an adverse impact on demand for European imports. As soon as exchange rates return to baseline these effects vanish. Import demand then rises because of the slightly higher economic activity in the US. So in the end US trade balance should be improved by GEMU to a considerable extent.

6. Conclusion

Our results show that main effect of GEMU on the US consists in improving the current balance for the US via higher exports. These additional exports not only flow to Germany but also to other European countries. Interest rate in the US raised but slightly. This is mainly due to the fact that a flexible dollar DM exchange rate may equilibrate capital flows without leading to interest rate adjustments. The later one is the case for all EMS member states where interest rates must adjust to restore an equilibrium on the capital market.

Given all this we find that the "locomotive" approach is appropriate to describe the impacts of GEMU on US German trade relations. This finding should not be interpreted as prescription for future economic stabilization programmes. However despite the immense increase in Germany's public spending the ultimate effects on US GNP are minor. So, if Germany is a locomotive, it is a rather weak one not to be used to carry the burden of a world wide recovery.

Table 1

Exogenously Determined Parameters für the Alternative Scenario for West Germany

Deviations from the status quo in DM billions

Variable	Deviation/Year*	Explanation
"Exports" (to East Germany)	+110	Investment and consumer goods; income from tourism
Imports (from abroad)	+56	Increased imports needed to meet demand from East Germa- ny
Government transfers to East Germany	+110	State aid from West for East Germany
Taxes and social contributions	+50	Increases in taxes and insurance contributions during the period as already decided; in addition an increase in VAT by 1%-point in the third year
Current Government spending	-10	Minor cuts
<i>memo item:</i> Labour supply (persons)	+ 500 000 1st year + 170 000 each subsequent year	East German citizens working in West Germany plus those sett- ling there
Population (persons)	+ 360 000 1st year + 170 000 each subsequent year	East German citizens settling in West Germany

* Nominal

Source: DIW estimates

Table 2
Economic Effects of the Unification for West Germany
 Deviations from Baseline

		Period ^{a)}				
		1	2	3	4	5
Nominal GNP	P	1.8	2.3	2.0	3.0	3.6
Real GNP	P	2.3	1.9	0.9	1.9	3.1
GNP Deflator	D	-0.5	0.9	0.6	0.0	-0.5
Consumers Expenditure Deflator	D	-0.5	1.2	0.5	-0.0	-0.4
Compensation per Employee	P	0.3	1.5	0.5	0.2	-0.1
Real Compensation per Employee	P	0.8	0.8	-0.6	-0.9	-0.8
Employment	P	0.7	1.0	1.0	1.4	2.1
Unemployment (perc. of labour force)	PPD	0.6	1.5	2.3	2.7	2.8
Real Government Expenditure	P	-2.0	-1.9	-1.9	-1.8	-1.8
Real Consumption	P	1.3	0.8	1.0	2.5	4.2
Real Investment	P	3.9	0.6	-4.2	-3.0	-1.2
Real Inventory Investment	DG	0.2	-0.0	-0.2	-0.0	0.1
Real Domestic Demand	P	1.2	0.1	-0.9	0.5	2.0
Real Exports of Goods and Services	P	16.3	17.8	16.7	17.2	17.7
Real Exports Abroad ^{b)}	P	-1.5	1.0	1.6	1.8	2.3
Real Imports of Goods and Services	P	14.1	14.6	13.5	14.5	15.7
Real Gross Domestic Product	P	2.2	1.7	0.8	1.8	3.0
Broad Money (M3)	D	0.0	1.1	0.0	0.5	1.1
Real Interest Rate	PPD	1.0	1.0	1.0	1.0	1.0
Public Sector Deficit	DG	5.2	3.9	4.7	5.0	5.0
US-\$ Rate	P	-5.5	0	0	0	0

P = Percent Difference from Base

PPD = Percentage Point Difference from Base

D = Difference from Base Rate of Change

DG = Difference from Base as a Percent of GDP

a) 1 July of each year to 30 June of the following year.

b) Without trading with East Germany; only goods.

Simulation period: 1st quarter 1983 to 4th quarter 1987.

The exogenous impulses (see table 1) have been deflated.

Source: DIW estimates

Table 3

German foreign trade with the U.S.A.

		Real GDP		Exports	Imports	Gross Domestic Purchases		Exchange Rate	Interest Rate	Inflation Rate	Personal Income
		1987 Dollars	Growth rate	1987 Dollars	1987		Growth rate	1 US-\$ = ... DM	(short-term) Certific. of Depos.	all Items 85 = 100	Growth rate
		Mrd.US-\$		Mrd.US-\$	Mrd.US-\$	Mrd.US-\$					
1988	I	4655,3	4,38	407,1	520,5	4768,7	3,44	1,6758	6,72	3,95	7,62
1988	II	4704,8	4,20	417,2	515,2	4802,8	3,03	1,7075	7,22	4,00	8,41
1988	III	4734,5	3,84	424,1	526,1	4836,5	2,92	1,8661	8,17	4,14	8,71
1988	IV	4779,7	3,33	438,2	540,9	4882,4	2,54	1,7756	8,80	4,38	7,59
1989	I	4809,8	3,32	451,2	532,4	4891,0	2,56	1,8493	9,60	4,82	8,88
1989	II	4832,4	2,71	469,5	541,3	4904,2	2,11	1,9339	9,58	5,22	8,17
1989	III	4845,6	2,35	470,5	550,3	4925,4	1,84	1,9242	8,73	4,70	7,06
1989	IV	4859,7	1,67	485,8	555,7	4929,6	0,97	1,8128	8,44	4,56	6,76
1990	I	4880,8	1,48	496,2	552,2	4936,8	0,94	1,6908	8,24	5,22	6,26
1990	II	4900,3	1,41	502,1	554,5	4952,7	0,99	1,6780	8,33	4,52	6,36
1990	III	4903,3	1,19	501,6	567,4	4969,1	0,89	1,5934	8,04	5,52	6,58
1990	IV	4855,1	-0,09	522,5	553,7	4886,3	-0,88	1,5008	7,97	6,24	6,33
1991	I	4796,7	-1,72	515,9	533,8	4814,6	-2,48	1,5307	6,71	5,29	3,96
1991	II	4817,1	-1,70	536,1	553,5	4834,5	-2,39	1,7342	6,01	4,91	3,59
1991	III	4831,8	-1,46	544,2	575,8	4863,4	-2,13	1,7440	5,70	3,84	3,27
1991	IV	4838,5	-0,34	561,4	581,8	4858,9	-0,56	1,6287	4,91	2,98	3,27

Source: OECD, Main Economic Indicators.

Table 4

Economic Effects of the Unification for United States

Deviations from Baseline

		Period ^{a)}				
		1	2	3	4	5
Nominal GNP	P	0.43	0.47	0.28	0.40	0.54
Real GNP	P	0.44	0.32	0.01	0.14	0.26
GNP Deflator	D	-0.01	0.17	0.12	-0.00	0.01
Consumers Expenditure Deflator	D	0.05	0.09	0.12	0.01	0.01
Compensation per Employee	P	0.12	0.28	0.29	0.32	0.40
Real Compensation per Employee	P	0.07	0.14	0.04	0.06	0.13
Employment	P	0.19	0.25	0.06	0.06	0.14
Unemployment (perc. of labour force)	PPD	-0.15	-0.21	-0.05	-0.05	-0.12
Real Government Expenditure	P	0.00	0.00	0.00	0.00	0.00
Real Consumption	P	0.18	0.15	-0.05	0.03	0.12
Real Investment	P	0.64	0.42	-0.38	0.03	0.38
Real Inventory Investment	DG	0.04	0.02	-0.02	-0.00	0.01
Real Domestic Demand	P	0.25	0.19	-0.11	0.02	0.16
Real Exports of Goods and Services	P	1.82	1.66	1.40	1.59	1.74
Real Imports of Goods and Services	P	0.06	0.43	0.11	0.33	0.61
Real Gross Domestic Product	P	0.40	0.28	-0.02	0.11	0.24
Net Factor Income from Overseas	DG	0.04	0.03	0.03	0.03	0.03
Real Gross National Product	P	0.44	0.32	0.01	0.14	0.26
Broad Money (M3)	D	0.11	0.24	-0.10	0.08	0.12
Long Term Interest Rate	PPD	0.01	0.20	0.07	-0.03	0.05
Public Sector Deficit	DG	-0.12	-0.16	-0.07	-0.07	-0.12

^{a)} 1 July of each year to 30 June of the following year

Table 5

U.S. Economic Development

	real GNP ¹⁾	growth rate ¹⁾	exchange rate 1 US \$	interest rate ²⁾	gross domestic purchases ³⁾	inflation rate ⁴⁾	personal disposable income ³⁾
1.Qt. 1988	3970,2	5,1	1,6758	8,42	1,6	3,9	7,3
2.	4005,8	3,6	1,7075	8,91	3,0	4,7	2,7
3.	4032,1	2,7	1,8661	9,10	3,2	5,5	4,9
4.	4059,3	2,7	1,7756	9,96	2,4	4,4	2,3
1.Qt. 1989	4095,7	3,6	1,8493	9,21	1,2	4,9	4,2
2.	4112,2	1,6	1,9339	8,76	1,8	4,6	-1,2
3.	4129,7	1,7	1,9242	8,10	2,8	3,1	2,7
4.	4133,2	0,3	1,8128	7,91	-1,2	3,8	1,2
1.Qt. 1990	4150,6	1,7	1,6908	8,43	0,5	6,6	2,5
2.	4155,1	0,4	1,6780	8,67	1,3	3,9	0,3
3.	4170,0	1,4	1,5934	8,70	1,6	4,2	-0,7
4.	4153,4	-1,6	1,5008	8,39	-5,1	4,7	-3,5
1. Qt. 1991	4124,1	-2,8	1,5307	8,02	-4,3	5,2	-1,5
2.	4128,4	-0,4	1,7342	8,12	2,9	3,0	1,2

1) United States Department of Commerce. Billions of 1982 dollars, seasonally adjusted

2) in percent point

3) changing from previous period in percent point

4) measured by fixed weighted price index of the GNP in percent point

Table 6

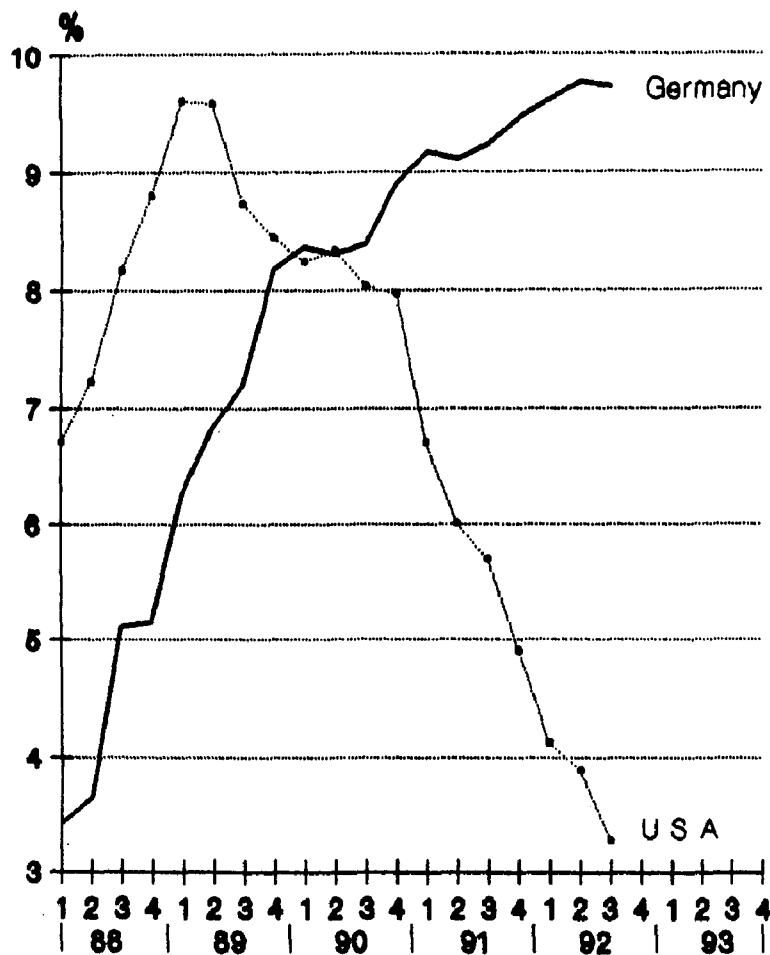
Economic Effects of the Unification for US' bilateral Trade

Difference from Baseline in %

		Period ^{a)}				
		1	2	3	4	5
Exports:	P					
Germany		18.93	17.01	15.39	16.35	17.34
France		2.40	1.11	1.21	1.25	1.23
Italy		-0.43	-0.20	-0.21	-0.25	-0.26
U.K.		2.05	2.05	1.25	1.40	1.59
Japan		0.57	0.75	0.61	0.66	0.78
Imports:	P					
Germany		-4.39	-0.57	-0.06	0.33	1.06
France		-2.06	0.40	0.15	0.35	0.57
Italy		-2.43	0.35	-0.22	-0.22	-0.15
U.K.		0.59	0.01	-0.39	-0.39	-0.18
Japan		0.85	0.72	0.18	0.44	0.71
^{a)} 1 July of each year to 30 June of the following year						

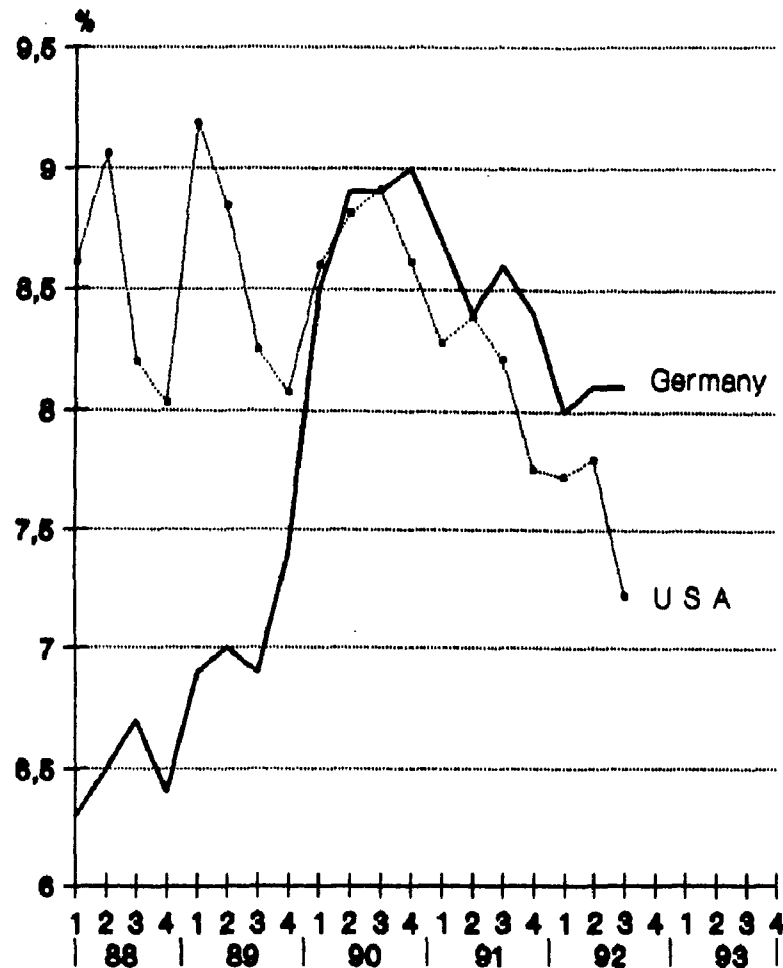
Interest Rates

Short-term Interest Rates of 3-month treasury bonds



Source: OECD, Main Economic Indicators.

Long-term Interest Rates of 10-years Govt. bond yields



DIW 13193

References

Frankel, J.A.:

Ambiguous Policy Multipliers in Theory and in Empirical Models, in: Bryant, R., P. Henderson, G. Holtham, P. Hooper, S. Symansky, *Empirical Macroeconomics for Interdependent Economies*, Brookings (1988).

Horn, G.-A., W. Scheremet and R. Zwiener:

Domestic and International Macroeconomic Effects of German Economic and Monetary Union, *Journal of Forecasting*, Vol. 11, 459-490 (1992).

Lahmann, H.:

Rückläufige Exporte in die USA, *DIW-Wochenbericht*, 58. Jg., Nr. 9 (1991).

Masson, P. R. and G. Meredith:

Domestic and International Consequences of German Unification, in Lipchitz, L. and D. McDonald (eds), *German Unification, Economic Issues*, International Monetary Fund Occasional Papers No. 75, Washington D.C. (1990).

McKibbin, W.:

Some Global Macroeconomic Implications of German Unification, *Brookings Discussion Papers* No. 81 (1990).