Germany's struggle for price competitiveness

Macroeconomic effects of wage and unit labour costs developments in Germany

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Abstract

The 2019 IMF country report for Germany points to the "meagre" wage growth in the last 20 years and to its contribution to the German current account surplus (IMF 2019). While the IMF concludes that mainly top income receivers benefitted from export success, other authors praise the wage developments as the reason for the turn-around from "Sick Man of Europe to Economic Superstar" (Dustmann et al. 2014). Germany has been struggling to improve cost competitiveness since the mid-1990s, as a reaction to a sudden loss in competitiveness due to effects of German unification. Increased non-wage labour costs coupled with an appreciated D-Mark in the wake of the currency crises in the European Monetary System in 1992/3 threatened the German export success. Repeated labour market reforms since the mid-1990s aimed at regaining lost cost competitiveness, culminating in the famous "Hartz-reforms". Yet, the negative effect of repeated reforms on labour income developments in Germany compressed effective demand and supported stagnation. We agree with the IMF's findings that the overall growth and income effects of this strategy were negative. Our article explains past developments with a focus on wage and labour cost developments and provides a simulation showing that better wage developments would have improved GDP growth and dampened net exports, yet, effectively only, once fiscal policy is supporting demand.

JEL classification

F16, J30-32

Key words

German exports, cost competitiveness, German unification, labour market reforms, Hartz reforms, unit labour costs, REER, wage-led economy

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Outline

1. Introduction

The 2019 IMF country report for Germany points to low wage growth in the last 20 years. According to the IMF, these developments contributed to external imbalances. They also reflect that only top income receivers benefitted from trade developments (IMF 2019). Yet, other authors praise the German system of industrial relations for allowing such wage developments. They consider the decrease in unit labour costs as the pivotal element behind the German turn-around from "Sick Man of Europe to Economic Superstar" (Dustmann et al. 2014). According to the authors, flexible German labour market institutions reacted to pressures from the mid-1990s onwards to allow for a more decentralized, firm-specific wage-setting process that increased wage inequality and reduced pay increases.

We try to show that the main trigger for Germany becoming the "sick man of Europe" is the inappropriate economic policy reaction to the costs of German unification. We will argue that the political decision about the way of financing unification costs implied shifting a large part of the burden of adjustment to non-wage-labour-costs (see Meinhardt/Zwiener 2005 and below). These costs together with the appreciation of the D-Mark due to the currency crises in the European Monetary System in 1992/3 threatened the German export success.

The focus on export success seems to be dominating German policies since the 1950s (see Riese 1987 and 1988 in Betz et al. 2001). He analyses all policy actions with effects on relevant nominal macroeconomic aggregates, like fiscal policy and wage policy. According to his findings, monetary policy defined in this broader sense has long-term effects on economic growth and development (Riese 1988 in Betz et al. 2001: 825).

While he analysed the effects on employment and development of the Bundesbank's efforts for an undervaluation strategy for the German Mark for the 1950s up to the 1980s, we will focus on the period since the mid-1990s, when Germany tried to regain cost competitiveness. Due to the upcoming introduction of the euro in 1999, and the irrevocable fixing of exchange rates in 1997, adjustment had to come via wage developments instead of exchange rate adjustments.

Repeated labour market reforms since the mid-1990s aimed at regaining lost cost competitiveness, culminating in the famous "Hartz-reforms". Reforms led to stagnating unit labour costs for the whole economy from the mid-1990s until 2007. As unit labour costs at most competing trade partners increased, stagnation in Germany contributed to increasing cost competitiveness and supported export success during the 2000s. Yet, the negative effect of repeated reforms on labour income developments in Germany compressed effective demand and furthered stagnation. This led to the label of Germany being the "Sick Man of Europe".

The next section 2 portrays developments in wages, unit labour costs, and cost competitiveness since the 1990s. The aim is to show the strong negative impact of the fall of the Iron Curtain and German unification on cost competitiveness of German companies. We

will stress that this mainly resulted from policy decisions. We will also discuss the resulting labour market reforms with a focus on the additional effect of the Hartz reforms in section 3. Section 4 points to the effects of these policies on overall growth by portraying the results of a macroeconometric simulation, showing that overall growth had benefitted from better wage developments. Yet, external imbalances, criticized by the IMF, would only have been lower once higher wages had been coupled with higher fiscal spending. Section 5 concludes.

2. Export orientation and cost competitiveness before the 1990s

According to Hajo Riese, monetary policy in a broad sense, comprising the central bank's action, wage policy and fiscal policy, has a long tradition of supporting export success. According to him, the undervaluation of the German Mark during the 1950s and 1960s had long-lasting effects on Germany's export success, as the cost advantage allowed for high investments that contributed to raising market shares, diversification of production, high quality standards and a powerful market organization. Economies of scale supported export market shares even in times of decreasing undervaluation (Riese 1978 in Betz et al. 2001; Riese 1988 in Betz et al. 2001: 804ff). The Bundesbank's aim of combining internal and external stability even in times of changing internal and global conditions ("Marktphase" as he termed it) in the 1970s and 1980s, resulted in negative effects on domestic investment and employment, yet, continued to support exports (Riese 1987 in Betz et al. 2001: 1175f, 1988 in Betz et al. 2001: 812ff).

We focus on the period since the mid-1990s, when the German unification and the upcoming introduction of the euro again changed external and internal market constellations. The introduction of the euro put an end to adjustments of the domestic exchange rate as a means to support exports, at least for exports to euro area countries, and shifted the burden to wage adjustments.

In order to judge the cost competitiveness, we use the real effective exchange rate (REER), a weighted average of indexed nominal bilateral rates between countries, adjusted for relative movements of price or cost indicators of the respective countries. A depreciating exchange rate can dampen rising national production costs in the eyes of foreign buyers.[5]

During the 1970s and 1980s, wage growth, and with it, unit labour costs growth was high, especially in the wake of the oil price shocks, but increases in Germany remained mostly below the rates of trading partners (see increases of compensation per employee according to the AMECO database). A system of collective wage and salary bargaining in combination with special labour market institutions dampened the effect (Behrens 2018), together with a German central bank that acted inflation-averse (Reference?).

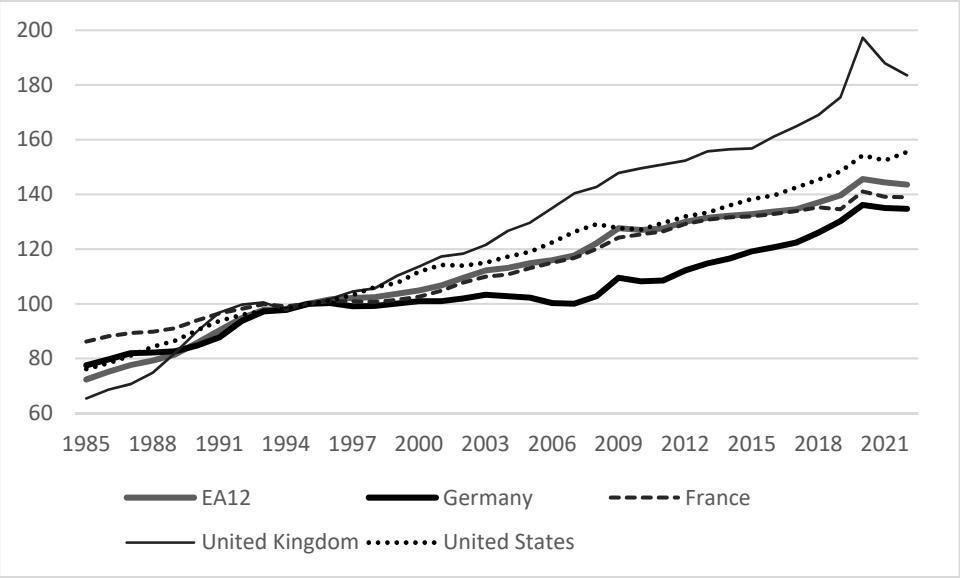
[5] Recent studies stress the explanatory and forecasting power of broad-based cost (or price) indicators over narrow defined ones. We therefore stick to REER based on total economy unit labour costs over CPI-based REERs (see e.g. Deutsche Bundesbank 2016b , Bayoumi et al. 2011).

Improving costs competitiveness measured by unit labour costs provoked repeated nominal appreciations of the German Mark, especially during the 1970s and 1980s. As can be seen in figure A1 in the appendix, Germany's nominal effective exchange rate[6] appreciated continuously against a basket of relevant trading partners, counteracting the moderate labour costs developments. Nevertheless, apart from a strong loss in cost competitiveness at the end of the 1960s/start of the 1970s, the real effective exchange rate (REER) improved against important EU-trade partner countries (see figure A1 in appendix).[7]

3. Effects of German unification on cost competitiveness

This development was reversed from 1992 onwards. As can be seen in figure 1, unit labour costs increased in Germany up to the year 1995, especially during the years 1991 to 1993, but then stagnated during the period from 1995 to 2007.

Figure 1: Nominal unit labour costs (ULC) in Germany and selected countries, 1995=100



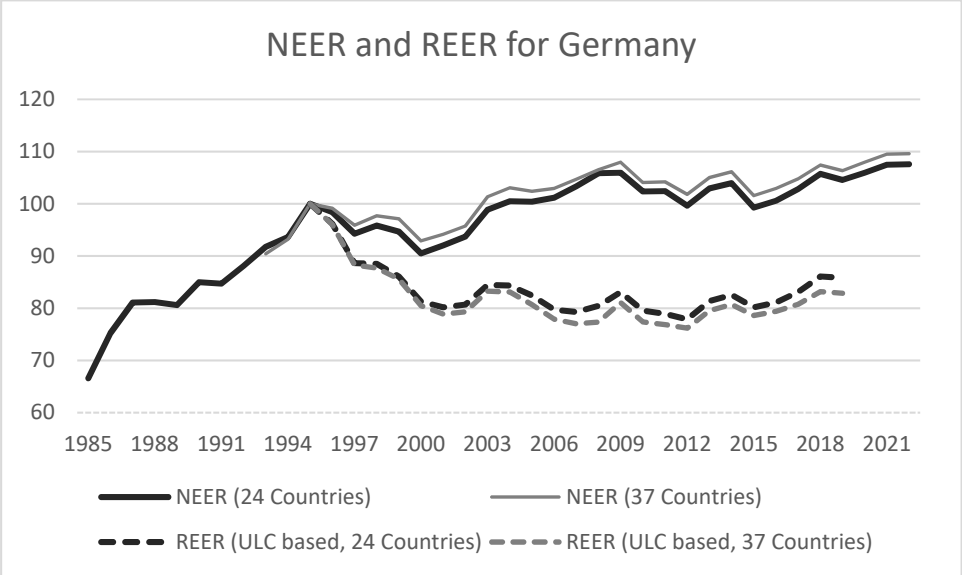
***Notes**: EA 12 comprises of Austria (AT), Belgium (BE), Finland (FI), France (FR), Germany (DE), Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Portugal (PT), Spain (ES) and Greece*
***Source**: AMECO, Nominal unit labour costs, total economy, accessed on Oct. 2021.*

Figure A1 in the appendix and figure 2 additionally present the effect on the real effective exchange rate.[8] An increase indicates worsening cost competitiveness, a decrease an improvement. The figure shows that cost competitiveness of German exporters worsened markedly against 24 (37, respectively) main trade partner countries until the mid-1990s, bottoming out in 1995 and indicating increasing cost competitiveness problems for German

[6] The nominal effective exchange rate (NEER) measures the value of a currency against a weighted basket of foreign currencies from countries that are relevant trading partners. An increase in the NEER indicates an appreciation of the local currency against the currencies of trading partners.
[7] Exchange rate appreciations dampened export success. The resulting effect on net exports might explain the seeming contradiction to Behringer et al. (2020) that consider the idea of a long-standing German export orientation as a "myth" as net exports never exceeded 4% of GDP before the introduction of the euro.
[8] REER data based on total economy unit labour costs against 24 (37) main trade partner countries is only available from 1993 (1995) onwards. For the previous period, figure A1 in appendix provides REER against 15 EU countries. Figure A1 shows that cost competitiveness already worsened from 1992 onwards.

exporters. Figure A1 (and figure 2 from 1993 onwards) show that the main reason for the change during the period 1990 to 1997 arose from exchange rate developments that were not mitigated by counteracting relative price developments during that period, as NEER and REER move in tandem.

Figure 2: Germany's nominal (NEER) and real effective exchange rates (REER), 1995=100



***Notes**: Nominal (NEER) and real (REER) effective exchange rate; increase implies an appreciation. Exchange rates are weighted by main trade partner countries, comprising of 24 and 37 countries, respectively.*
REER: Nominal exchange rates are corrected for relative unit labour costs developments (ULC). Euro developments linked to former German Mark series.
***Source**: AMECO, own presentation, data access Oct. 2021.*

These effects were driven by unification in Germany, that worsened cost competitiveness of German exporters, owing to the combination of two effects: First, the German Mark appreciated against several European currencies in the wake of the 1992/3 crisis in the European Monetary System (EMS), the precursor of the European Monetary Union (see figure 2). The EMS was a system of fixed exchange rates between selected European countries. German unification had indirectly provoked an EMS crisis, as the resulting demand boom in Germany prompted interest rate hikes by the Bundesbank to fight potential inflation expectations. This attracted net capital inflows and, as a result, produced upward pressure on the Mark. Other European countries were in a less favourable economic position but had to follow German interest rate hikes in order to keep their currencies in the system. As this dampened economic activities in these countries even further, speculative attacks provoked several currency realignments and the Pound Sterling left the system entirely. Consequently, German companies were confronted with a strong appreciation of the German Mark against European trading partners' currencies (Reference EMS crisis).

Second, figure 1 shows a stronger increase in unit labour costs between 1991 and 1993 compared to the previous period. This implied that wage developments, unlike before, were increasing at similar rates as in trade partner countries. As they no longer offset exchange

rate appreciations, not only did the nominal effective exchange rate appreciate, but also the real effective exchange rate (REER) rose up to 1995, as figure 2 shows. The increase in unit labour costs was due to higher wage increases and the financing of unification costs in the form of rising social security contributions, owing to jumps in unemployment and massive recourse to early retirement schemes. Instead of financing this cost via taxation, affecting not only employees and employers but also public servants and the self-employed, the government decided to rely on increasing social security contributions. This wholly inadequate way of financing unification costs pushed up non-wage labour costs (see Meinhardt/Zwiener 2005). At the same time, trade unions tried to align wage levels in East Germany with those in West Germany. The combination of the nominal appreciation of the German Mark, and no-longer counteracting wage developments, brought about a soaring real effective exchange rate (figure 2).

4. Labour market reforms in Germany

As East German output and employment declined after unification, unemployment increased even further and the debate about excessive labour costs and the disadvantages of producing in Germany intensified in the mid-1990s.[9] Given generally high unemployment rates in Europe, the OECD intensified the call for structural labour market reforms that would encourage deregulation and increase flexibility (see e.g. OECD 1993: xiv-xv). This, together with rising non-wage-labour-costs, intensified the debate about necessary labour market reforms required to lower unemployment in Germany.

The OECD employment database for labour market policies and institutions indicates several reforms that had already started in the 1980s and intensified during the mid-1990s (Bassanini/Duval 2006; Bothfeld 2007; Ebbinghaus/Eichhorst 2006; Deutsche Bundesbank 2005: 25). In addition, and starting from the mid-1990s, cuts in public expenditure were implemented in order to fight high indirect unification costs, mainly provoked by high unemployment. To enhance employment prospects, tax incentives for companies were combined with lower social security contributions (reference?).

The labour market reforms dampened the bargaining power of labour unions, as Dustmann et al. (2014) rightly mention. They also mention access to low-wage neighbouring East European countries as an additional pressure on labour (an element also discussed in Möller 2012: 14). Lower trade union density as well as the declining membership of companies in employers' associations led to an increase in escape clauses in collective wage and salary agreements.

The effects of these reforms can be seen in unit labour costs developments and the resulting real effective exchange rate (figure 1 and 2): After the mid-1990s, cost competitiveness measured by REER improved up to the early 2000s, slightly worsening thereafter with the

[9] "Only a minority of German manufacturing companies engaged in offshoring (Kinkel and Lay 2003). Nonetheless, the credible threat of offshoring increased the workers' willingness to make concessions in order to avoid firm relocation." (Baccaro 2018: 34 in Marin 2018, chapter 2).

temporarily strong nominal appreciation of the euro. From then onwards, cost competitiveness has fluctuated.

Dustmann et al.'s appraisal that the greater number of firm-level deviations from industry-wide agreements signalled the flexibility of the German system is arguably rather evidence of this system's erosion (see Bispinck/Schulten 2003, Brandt/Schulten 2008). What we want to stress is the political pressure on those institutions, the labour market reforms, the high unemployment figures, and the spending cuts that provoked this "flexibility".

Many in science, politics and the media consider the focus on neoliberal supply-side policies implemented in Germany in the last decade, culminating in the Agenda 2010, to be a model of economic success to this day (FAZ 2012; Blum et al. 2008; Klinger et al. 2013, Möller 2012). The reforms of the labour market and the welfare state in Germany as well as the long-term stagnation of real wages and restrictive fiscal policy were put forward as propitious.

In the first decade of this century, Germany's supply-side policies had focused primarily on reducing costs for companies - wages, social security contributions and taxes - with the aim of giving employers an incentive to create more jobs. The labour market reforms had the explicit goal of reducing wages, especially for low-wage earners, and indeed expanding the German low-wage sector. In addition, the reforms of unemployment insurance, health insurance and pensions aimed also at reducing non-wage labour costs. As Dustmann et al. show in their figures for indexed wage growth, this was "successfully" achieved by 2004: wages for the lowest 15th percentile started to decline in absolute terms, and not only for the non-tradable sector but also for tradable services and manufacturing (Dustmann et al. 2014: 170-2). Similarly, Möller shows as regards wages developments by skill level that wages for the low-skilled largely started to go down from 2004 onwards (Möller 2012: 15).

We see the wage development as a key factor in dampening unit labour costs from 2004 onwards, as decreasing wages in lower percentiles (and for low skilled workers) compensated hiking wages for high-wage earners (and the high skilled workers). The wage spread significantly increased via the Hartz legislation after 2004.[10]

The period 1995 to 2007 is one with notably low increases in or even stagnation of total unit labour costs (see figure 1). Second, the period begins at the very end of a long phase of appreciation in the D-Mark with a subsequent five-year devaluation period (of the D-Mark/see euro, see figure 2). The latter certainly had a considerable influence on export success during that time.

[10] As the reform led to a long-lasting effect on wage dispersion, we are more sceptical than Behringer et al. (2020) who seem to be convinced that the effects on net exports can be easily removed.

5. Macroeconomic effects of wage developments

During 1995 and 2007, employment subject to social security contributions in Germany fell from 28.1 million to 26.5 million persons, i.e. by more than 5 %. At the same time, the number of mini-jobbers increased significantly. This period was still marked to a considerable extent by mastering problems associated with German unification and the start of European Monetary Union and can rightly be considered an example of economic failure.

In the following period until 2017, employment subject to social security contributions rose to 32.2 million, i.e. by over 20%, and the number of mini-jobbers fell. During this period, wages and unit labour costs increased significantly (Albu et al. 2018). Consequently, the period after the financial crisis and worldwide recession is the one where higher wage increases had been in line with greater employment creation and stronger economic prosperity.

The comparison between these two periods in Germany illustrates that real wage increases below productivity gains support the cost competitiveness of exports, but must be balanced against the negative effect of lower domestic demand. For large economies like Germany, higher export growth cannot offset this negative effect, as Bhaduri/Marglin (1990) show theoretically. Stockhammer et al. (2011) provide empirical simulations for Germany, showing that the demand effect of wages outweighs the cost effect.

This is in line with studies stressing that export growth depends not only on price/cost competitiveness, but also on factors like non-price competitiveness, the structure of export products, growth in export destination countries, and, as a result, demand from these countries (see Altomonte et al. 2013, Karadeloglou/Benkovskis 2015 for overviews). Strong world demand for German products from 2003 up to the financial crisis in 2008/9 is seen as the key factor for exports success by Allard et al. (2005), Horn et al. (2017), Herzog-Stein et al. (2013) and Storm/Naastepad (2015). Gros (2016) also points to the weight of domestic demand for divergences in competitiveness and the low impact of competitiveness on export development.[11] In addition, increasing integration of German companies into global value chains contributed to export success as well as import demand (Loschky/Ritter 2007: 485).

While studies find a statistically significant role for cost competitiveness measured by REERs based on unit labour costs (see Leigh et al. 2017, Bayoumi et al. 2011, Deutsche Bundesbank 2016b, Cerra et al. 2003, Neary 2006), at least for manufacturing exports, the magnitude of

[11] „The evidence so far thus suggests that the divergences in competitiveness up to 2007 were not due mainly to a German policy of wage restraint and low productivity in the periphery. The key driver seems to have been relatively strong domestic demand growth in the periphery (compared to Germany) which led to tight labour markets and thus, high wage and price increases. … An implicit element in the conventional narrative is that competitiveness is a key driver of trade performance. But the evidence for this proposition is also surprisingly weak, whether one takes time series or cross-section data“(Gros 2016: 10).

the effect differs over studies, but is generally rather low (see Storm and Naastepad (2015: 15, Carlin et al. (2001).

Simulations with the IMK macro model[12] show that if Germany had adopted a macroeconomically-oriented wage policy between 2001 and 2015, even though the growth in real net exports would have been substantially weaker, this would not have reduced overall economic growth. The higher nominal wages in the model generate a rise in disposable income, as well as causing domestic prices and foreign trade prices to go up as a result of rising unit labour costs. But the price reaction is not strong enough to prevent a positive impact on real private consumption which outweighs the negative effects of exports. Economic growth would have been a bit larger (Scenario I in table xxx).

Higher wages produce a clear quantity effect: real exports fall and real imports rise, leading to a decline in real net exports relative to the baseline. The response of nominal net exports, on the other hand, depends on whether the price effect is stronger than the quantity effect or vice versa. In the IMK model, the price elasticity of export demand is smaller than one. This means that the price effect outweighs the quantity effect, causing nominal exports to increase when prices go up.

A macroeconomically-oriented wage policy would have made a major difference by delivering stronger domestic growth and having a tangible, positive impact on the distribution of income between capital and labour – the wage share would have been significantly higher than in the baseline. In addition, higher nominal and real growth and employment would have boosted government tax revenue.

A macroeconomically-oriented wage policy would therefore have widened the budgetary leeway for fiscal stimuli. The higher wage increases seen in Germany since the financial crisis compared to the years before it demonstrate that this is a realistic notion – they have made a major contribution to the improvement in the public finances.

If, as in Scenario II, fiscal policy measures are introduced without increasing the debt to GDP ratio that would stimulate overall growth and imports without hurting exports[13]. In addition to a significant fall in real net exports there is also a modest dampening effect on nominal net exports and thus on the current account balance. What is the reason for this? Net exports decline by more in II than in Scenario I because the fiscal policy measures cause household and government consumption to rise, stimulating real imports. However, since the fiscal stimulus does not directly affect prices, there is no change in real exports or the export value. The value of imports, on the other hand, does rise because real imports go up while import prices remain stable. This is why nominal net exports respond faster and more strongly in Scenario II than in Scenario I.

[12] see Appendix 2 and K. Rietzler: A Structural Macro-Econometric Model, IMK Studies, Nr. 29, 2012.

[13] See Zwiener (2018) for details of the fiscal stimulus.

In summary, it has been shown that a macroeconomically-oriented wage policy would have enlarged the fiscal leeway to introduce fiscal stimuli. A stability-oriented wage policy supported by fiscal policy measures that made use of the fiscal leeway resulting from higher wage increases would have been able to induce a strong growth effect and a stronger decline in the balance of trade surplus than wage policy on its own.

Table 1: Macroeconomic effects of higher wages

abs. respectively relative deviation to basis simulation after 15 years

Exogenous wages without/ with fiscal impulses to reach public debt neutrality 1) (bil. euros, in prices of 2015)	**I wage impulses**	**II wage with fiscal impulses**
Investments in public infrastructure		16
Government consumption: education, administration, care		16
Transfer payments for pensions and nursing care		16
Housing: new construction and purchase of existing flats		16
Macroeconomic effects (%)		
Real GDP	1,5	6
Employment	1,5	4,5
Nominal GDP	8,8	13,5
Real government consumption	1,5	6
Real private consumption	6,1	11,5
Real capital investments	0,8	6
Real exports	-2,7	-2,5
Real imports	1,5	4
Nominal wages per capita, exogenous	13,5	13,5
Profits	0,2	16
Transfers to private households	13,8	17
Private consumption price index	3,3	3
Deflator of GDP	6,5	7
Unit labour costs	12,8	12
Nominal government revenue	11,3	16,5
Nominal government expenditure	10	17
for information purposes only: (abs. deviation)		
Current account balance (in % GDP)	-1,2	-2,7
Government expenditure ratio (in % of GDP)	0,5	1,4
Wage share (in % of national income)	2,9	0,6
Deficit ratio (in % of GDP)	0,5	0,3
Debt ratio (in % of GDP)	-12,1	-4,7

Source: Simulations using the IMK macro-econometric model.

Notes: *1) The simulations were carried out for the years 2001 to 2015. Therefore, the impulses have been reduced in line with past inflation developments, thus ensuring comparability with measures taken today.*
Source: *Simulations using the IMK macro-econometric model.*

If Germany had adopted this combination of a macroeconomically-oriented wage policy supported by fiscal stimuli during the period 2001-2015, its economic growth would have been much stronger. Trade and current account surpluses would not have grown as strongly. And the wage share would not have declined so much.

6. Conclusions

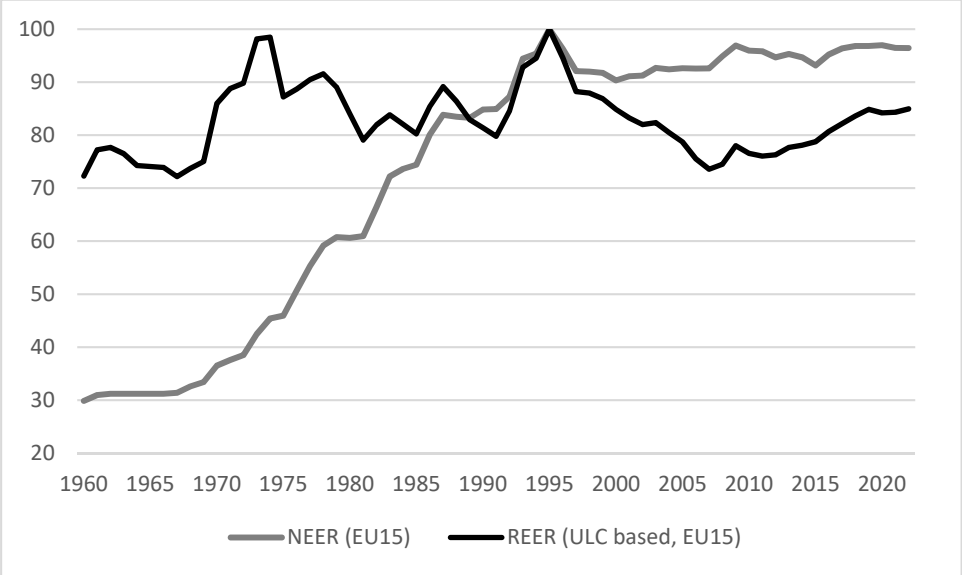
We consider the macroeconomic effects of wage developments in the last decade as problematic for German GDP growth and employment, as well as for stability in the euro area. Depressed wage increases in Germany inevitably entailed considerable follow-up costs within a currency union.

With Germany's excessive fixation on greater competitiveness, domestic demand has been neglected with negative effects on growth and employment. Although real wage cuts increased exports, the effect was low. At the same time, this reduced consumption (and residential property investments) and ultimately even growth. It increased the current account surplus with higher exports and lower imports via demand. Within a monetary union, unemployment was thus exported abroad and an unstable situation generated, the solution of which has come with high costs for all parties involved as post-2009 development have demonstrated. In the context of Germany's high current account surpluses - EUR 255 billion in 2017 - international institutions such as the IMF (2019) insist that it should increase wages in order to relieve the burden on other European countries and stabilise EMU.

Economic development post-2007 and comparison with other EMU countries suggest: Real wage cuts were detrimental to GDP growth in Germany and did not benefit employment creation.

Appendix 1: Indicators for cost competitiveness starting in 1960

Figure A1: NEER and REER for Germany, 1960-2021, 1995=100



***Notes**: Nominal (NEER) and real (REER) effective exchange rate; increase implies an appreciation. Exchange rates are weighted by trade with EU-15 countries.*
REER: Nominal exchange rates are corrected for relative unit labour costs developments (ULC). Euro developments linked to former German Mark series.
***Source**: AMECO, own presentation, data access Oct. 2021.*

As manufacturing goods dominate German exports, some authors argue that unit labour costs of the exporting manufacturing sector would be a better cost indicator, especially after taking into account the cost saving effects of inputs from other domestic sectors as well as imported inputs (Dustmann et al. 2016). Yet, Albu et al. show in an input-output analysis of unit labour costs for the exporting manufacturing sector that total economy unit labour costs are adequately reflecting costs of the exporting manufacturing sector in Germany (Albu et al. 2018).[14]

As demand reacts to price levels (and not to production costs), the concentration on unit labour costs ignores that there is no full pass-through of unit-labour costs to final prices, as international trade is characterized by imperfect competition and pricing-to-market strategies (see e.g. Krugman 1986). Several studies find evidence for an incomplete pass-through, be it for exchange rate movements (Anderton et al. 2004) or be it for unit labour costs (Herzog-Stein et al. 2015: 8-13, IMF 2013, EC 2013).

Appendix 2: Assumptions of macro model simulations

With the help of counterfactual simulations with the macro model of the IMK[15], the following section will examine how growth and employment would have developed between

[14] We therefore disagree with the findings of Dustmann et al. 2016.
[15] see Rietzler (2012).

2001 and 2015 if wage increases had been stronger. In contrast to many other macro models for Germany, the IMK model is Post-Keynesian oriented. Especially for the long-term relationships of the model, economic theory hypotheses play an important role. Basically, the specifications of the model follow a Keynesian perspective. The economy is characterized by nominal rigidities. Unemployment can persist even in the long run; there is no model-immanent process that automatically reduces unemployment. Economic policy has not only short but also long-term effects on the real economy. Accordingly, variables that are typical for neoclassical models, such as potential output and NAIRU or natural unemployment rates and that suggest an artificial separation between business cycle and structure, are deliberately not modelled. Rational expectations in the sense of model-consistent expectations with the derived ability to make reliable prognoses on which current decisions can be based, are also explicitly not present in the IMK model. In particular, consumption is largely determined by current, not by expected future income.

The wage equation estimates the influences of inflation, productivity and the level of unemployment - the latter as an indicator of the unions' reduced bargaining power when unemployment is high. The elasticity of nominal wages (per capita) in relation to the GDP deflator is one, while productivity changes affect wages only to a good third, and an increase in unemployment reduces effective wage increases. The price index of private consumption is highly dependent on changes in unit labor costs and price changes in the European Monetary Union due to pricing-to-market strategies of companies. In addition, changes in oil prices have an impact. In the model, real private consumption is cointegrated with the real disposable income of private households and short-term interest rates and is still influenced in the short term by changes in the wage ratio; a rise in the wage ratio increases private consumption. The effects of personal income distribution cannot be represented by the model. The government sector is included in full, so that the net lending/borrowing of the state - local authorities plus social security funds - is calculated automatically in all model simulations. All aggregated public revenue and expenditure variables are explained endogenously in the model.

The macro model of the IMK uses a Keynesian oriented employment equation, in which the decision about the demand for labor is made downstream (detailed description in Herr et al. 2019, appendix A4). In principle, therefore, the demand for labor depends on economic growth. Productivity effects that change this relationship are mainly caused by additional investments. Wage developments affect the demand for labor by influencing economic growth, prices and, via these, investment activity and thus the capital stock. In the short term, companies cannot substitute "arbitrarily" between labor and capital, but only to the extent that they have previously geared their investments to saving labor. Investments, which in the model are essentially determined by total demand and real interest rates, then have the effect of increasing demand and employment in the model as a component of GDP, especially in the short term, but then, by increasing the capital stock, they increase productivity in the long term and therefore potentially reduce employment. In addition, the employment equation contains an autonomous productivity term, which is based primarily

on improved work organization and a better level of training for employees. It is represented by a trend variable. In contrast, the development of real wages in Germany has no significant influence on the employment equation, in contrast to other models.[16]

Two scenarios were selected for the counterfactual simulations with the IMK model. In both scenarios, a wage increase according to medium-term productivity increase and the ECB inflation target of just under 2% has been assumed. The additional government expenditure in scenario II has no counter-financing through discretionary tax or duty increases but is financed through the additional public revenue generated by the higher induced (nominal) tax base for direct and indirect taxes. However, the additional expenditure is to some extent self-financing, as higher economic output endogenously leads to higher government revenues and further reactions in government expenditure.

In the model, the European Central Bank (ECB) is not directly reacting to the German inflation rate. Only if ECB inflation rate is rising significantly above the ECB's inflation because of a higher inflation rate in Germany, the central bank raises the interest rate, thereby dampening private investment. In the simulations that follow, this mechanism is hardly ever applied because the impulses are hardly sufficient to increase inflation in the euro zone as a whole significantly.

In the IMK model, import demand does not depend on the development of aggregate GDP, but on the individual GDP components, which have very different import contents (Horn and Lindner 2016). This ensures that, for example, the domestic and foreign trade effects of an expansion of public investment, which consists mainly of construction investment and therefore has a low import content, are correctly recorded. The development of the nominal exchange rate is exogenous.

[16] Analyses of wage simulations with the multi-country model NiGEM, which were carried out by the Deutsche Bundesbank (2013) and the German Council of Economic Experts (SVR 2010), among others, show that these were largely based on unrealistic assumptions. If one estimates the employment equation used in the NiGEM model (largely) unrestrictedly, then no significant influence of real wages on employment can be seen (Theobald et al. 2020).

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