GED
Global Economic Dynamics

GED Study

Wage-setting strategies for the Eurozone

BertelsmannStiftung

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Executive Summary

In many industrial nations the economic crisis led to a sharp rise in public debt. Household and company income fell as a result, as well as tax revenues. In return, public spending rose due to unemployment, measures in support of economic activity, and various bailouts for the financial sector. Particularly in Eurozone countries, a so-called "double dip" recession was experienced. Subsequent fiscal consolidation measures by the state in the form of tax rises and/or cuts in public spending affected domestic demand and led to a renewed economic slump.

The question therefore arose as to whether an increase in exports would be a solution for countries affected by the crisis. If domestic demand is weak on account of consolidation measures, a boost in exports could stimulate investment activity and leads to a return to the growth path. Improving the price competitiveness of a national economy is generally considered to be an effective means of strengthening export performance. A slower rise in export prices compared with competition leads to an increase in the world market share and a corresponding rise in exports.

In Chapter 1, using a panel estimation, we study the empirical relationship between changes in a country's real effective exchange rate and its share of the total exports of all countries. Regression analysis shows that a one percent increase in the real exchange rate reduces the export share by approximately 0.3 percent. Germany's comparatively strong export dynamic is therefore partly due to the relative improvement of its price competitiveness.

In Chapter 2, based on the global economic model VIEW created by Prognos AG, the effects of wage moderation and wage promotion are simulated for a single country and two groups of countries. It is demonstrated that the effects of growth and employment are specific to each country and period of time. By way of example, depending on the initial situation and relative importance of key parameters (for instance, consumption share vs. export share of gross domestic product), wage moderation can decrease or increase the gross domestic product.

For further simulations, Eurozone countries are divided into two groups. Group A contains countries that currently experience comparatively good use of their production capacities. Group B includes countries currently undergoing crises (in the broadest meaning of the term). For the period from 2015 to 2020, we have presumed that the wage policy distribution range is underused or overused. We also assess which effects occur if the groups have wage strategies with opposite goals. Four scenarios are possible:

1) collective wage promotion,
2) collective wage moderation,
3) wage promotion in Group A, wage moderation in Group B,
4) wage moderation in Group A, wage promotion in Group B.

It is shown that collective wage moderation (Scenario 2) has the greatest long-term positive effects on gross domestic product in the Eurozone but is not advisable for a variety of reasons. The lowest-risk option is a wage strategy which aims to keep nominal wage dynamic in line with inflation and productivity gains. Existing imbalances in price competitiveness would, however, not be eliminated by adopting this wage strategy.

An alternative recommendation would be to exercise medium-term wage moderation in crisis countries in Group B, but combined with an obligatory investment campaign in the affected countries. In this way, further declines in domestic demand can be contained, and the increased productivity resulting from new capital stocks can also eventually lead to an improvement in international price competitiveness.

Introduction

The financial and economic crisis that began in 2008 led to a rise in public debt in all affected countries, sometimes a very sharp rise. In some countries private sector debt (households, businesses) was at a comparatively high level even before the crisis. The term "balance sheet recession[1]", which became popular among economists, explains the subsequent development of affected countries as follows: domestic stakeholders – the state, private households and businesses – were keen to reduce their level of debt by curbing spending. Since one person's expenditure is another person's income, this can perpetuate the economic slump. If domestic stakeholders are not willing or able to increase their spending, attention turns to the rest of the world, or foreign demand. The growth contribution of net exports (exports minus imports) can be large enough in some circumstances to break the contractionary mold and enable a return to a stable growth path.

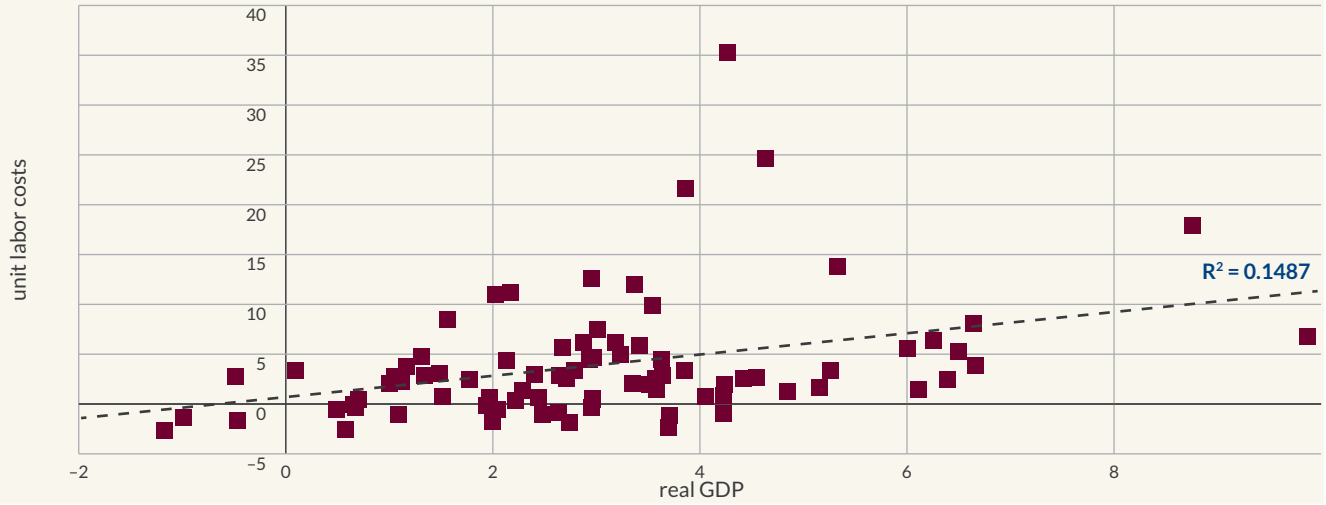
An increase in export performance is therefore a possible solution for crisis-affected countries in the European Union. Improving the international competitiveness of these countries or its companies is generally considered to be a prerequisite for increased export success. The price component of competitiveness can be demonstrated using the real exchange rate of a country. This parameter shows how a country's currency and product prices develop over time compared with a group of similar countries. If a country's real effective exchange rate increases, the nominal value of its currency has improved in comparison with the currencies of other countries (currency appreciation) and/or product prices rise more than in similar countries. As a result, exports in the affected country become more expensive and, depending on substitutability and price elasticity, are therefore less in demand.

For product prices maintained at the real exchange rate, other conceptual factors come into play. The unit labor costs that determine nominal hourly wages for employees in relation to total economic productivity (real gross domestic product per economically active hour) are well known. Unit labor costs are a non-dimensional parameter and can only be interpreted when they change. They reflect the share of general cost/price rises that results from the labor cost. A decrease in unit labor costs leads, with other things being equal, to a reduction in the inflation rate (disinflation) and, with some delay, to reduced prices (deflation). For an improvement in the relative price competitiveness of a country, it is sufficient, providing that a nominal exchange rate has been determined, for unit labor costs to rise more slowly than in comparable countries. This can result from either a weak wage dynamic and/or an increase in hourly productivity.

This study examines to what extent this is a promising strategy for European countries affected by the crisis, as well as other countries, in order to improve their relative price competitiveness. The comparison of changes in unit labor costs and real gross domestic product in several countries confirms the advantages of this strategy not at first glance. In fact, it is shown that in the past the countries that tended to enjoy higher economic growth also showed a higher increase in unit labor costs (see Figure 1). It is, however, by this point not clear whether there is a causal relationship between these variables, and if so, in which direction.

1 The concept was introduced by Richard Koo: Balance Sheet Recession: Japan's Struggle with Uncharted Economies and Its Global Implications 2003.

FIGURE 1 **Changes in unit labor costs and real gross domestic product, 1995-2008 and 2009-2013, for 42 countries, in percent per annum**



Source: Prognos 2015

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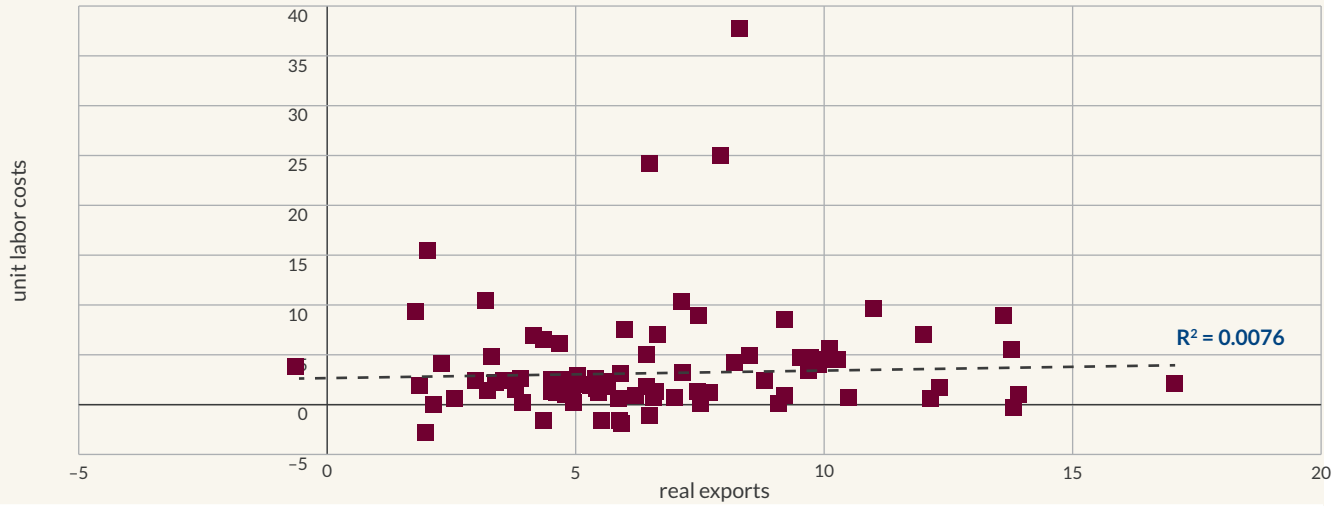
FIGURE 2 **Changes in unit labor costs and real exports, 1995-2008 and 2009-2013, for 42 countries, in percent per annum**



Source: Prognos 2015

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Despite the positive relationship observed between unit labor costs and the overall economic growth dynamic, it remains possible that comparatively small increases in unit labor costs or a relative improvement in price competitiveness can boost export performance. In this case, a simple comparison of both parameters, unit labor costs and export dynamic, does not have a clear outcome or does not demonstrate a direct link. This finding also applies to the use of the real exchange rate instead of unit wage costs.

The two simple comparisons shown here are further explored in the later chapters. What are the consequences of reducing unit labor costs? Does not higher price competitiveness lead to a greater export dynamic? And can worthwhile and transferable strategies be identified in this context?

To answer these questions, the historical development of price competitiveness, export performance and the overall economic growth dynamic are depicted for a number of countries. Furthermore, using computer simulations, we also explore whether and to what extent an increase in price competitiveness improves export performance and thereby potentially also a country's growth perspectives overall. For the latter, if so, under which circumstances?

1. Price competitiveness and export performance

The question of whether and to what extent changes in the price competitiveness affect a country's global market share can be illustrated with a regression analysis. In this section we therefore examine the relationship between price competitiveness and export performance by estimating an econometric model. We begin with the theoretically plausible assumption that an improvement in price competitiveness affects a country's export capacity and that a causal relationship between both parameters exists. This assumption allows us to state, based on the results of the estimation, to what extent the businesses in a country can increase their export capacity by improving price competitiveness.

1.1. Model and data

The starting point for this analysis is the model framework of Goldstein and Kahn (1985). They consider foreign demand and price competitiveness to be key factors affecting the flow of trade.[2] This model framework implies the following estimation equation:

$$(1)\ \log(Y_{i,t}) = \alpha_i + \beta\log(X_{i,t}) + \gamma\log(C_{i,t}) + \epsilon_{i,t}(x)$$

A country's export performance i at time t ($Y_{i,t}$) is thereby depicted with a measure of price competitiveness ($X_{i,t}$), with foreign demand for export goods from country i ($C_{i,t}$) as well as with a country-specific constant α_i, while $\epsilon_{i,t}$ represents the error term. Based on this, it is seen that greater price competitiveness and/or stronger foreign demand for export goods from country i leads to an increase in the country's global market share.

To measure price competitiveness ($X_{i,t}$), we also return to the concept of the real effective exchange rates (REER). These reflect exchange rate developments in a country in relation to selected partner countries and in consideration of relative price developments (see Box 1). The underlying data for the REER are provided by the European Commission, which calculated the REER for 37 countries annually from 1995 to 2013. This selection is also available as a sample for the estimation.

Box 1 **The concept of the real effective exchange rate (REER)**

The sales potential of a country's companies is determined, among other things, by price competitiveness. For example, a devaluation of the domestic currency can lead to an improvement in price competitiveness, since it is cheaper to export goods. Exchange rates, however, are established bilaterally. In order to establish a country's price competitiveness as comprehensively as possible, the concept of the nominal effective exchange rate (NEER) is used. This is a weighted average of bilateral exchange rates for a reference group of countries:

$$NEER_{i,t} = \prod_{j=1}^{N} (e_{j,i,t})^{wj}$$

$NEER_{i,t}$ is the NEER for country i with a reference group made up of N countries. $e_{j,i,t}$ is the bilateral exchange rate between currencies from countries j and i; w_j is a weighted measurement for country j. The weighting factor w_j results, greatly simplified, from the share of trade of country j out of the total trade between N countries. Third country effects (changes in the competitiveness situation between two countries in a third country) as well as exports to

2 This model framework generally serves as a basis for analyzing the determinant factors of export performance (see, for example, Carlin et al. 2001, Bayoumi et al. 2011, and Ca'Zorzi and Schnatz 2007).

countries not included in N are generally also taken into account.[3]

In addition to the exchange rate, local price and cost structures for exported goods also determine price competitiveness. For example, high unit labor costs compared with competitors affect a country's price competitiveness. This aspect is not considered in the concept of NEER. The above equation can easily be extended to establish the REER. NEER is therefore deflated with an appropriate measure:

$$REER_{i,t} = \prod_{j=1}^{N} \left(\frac{d_{i,t}\, e_{j,i,t}}{d_{j,t}} \right)^{w_j}$$

The concept of REER reflects a country's exchange rate development in comparison with selected partner countries while considering the relative price and cost structures. $REER_{i,t}$ is the REER for country i with a reference group made up of N countries. As described above, $e_{j,i,t}$ is the bilateral exchange rate between the currencies of countries j and i, and w_j is a weighted measurement for country j. It is also supplemented with country-specific price and cost structure indexes, represented by $d_{i,t}$ and $d_{j,t}$.

Price and cost structure indexes (price deflator)

A key aspect for calculating the real effective exchange rate is the choice of the price deflator ($d_{i,t}$ in the equation above). Theoretically the price deflator should adequately consider price differences between non-commercial and commercial goods and between countries (see Chinn 2006). Since such a perfect price deflator is not available, various approximations are generally used. The European Commission's REER measurement, for instance, is provided on the basis of (i) export prices, (ii) the gross domestic product deflator, (iii) consumer prices, (iv) nominal unit labor costs in the overall economy and (v) nominal unit labor costs for manufacturing industries.

3 Detailed information on establishing the REER, particularly with reference to trade weights, is available at http://ec.europa.eu/economy_finance/db_indicators/competitiveness/documents/technical_annex_en.pdf.

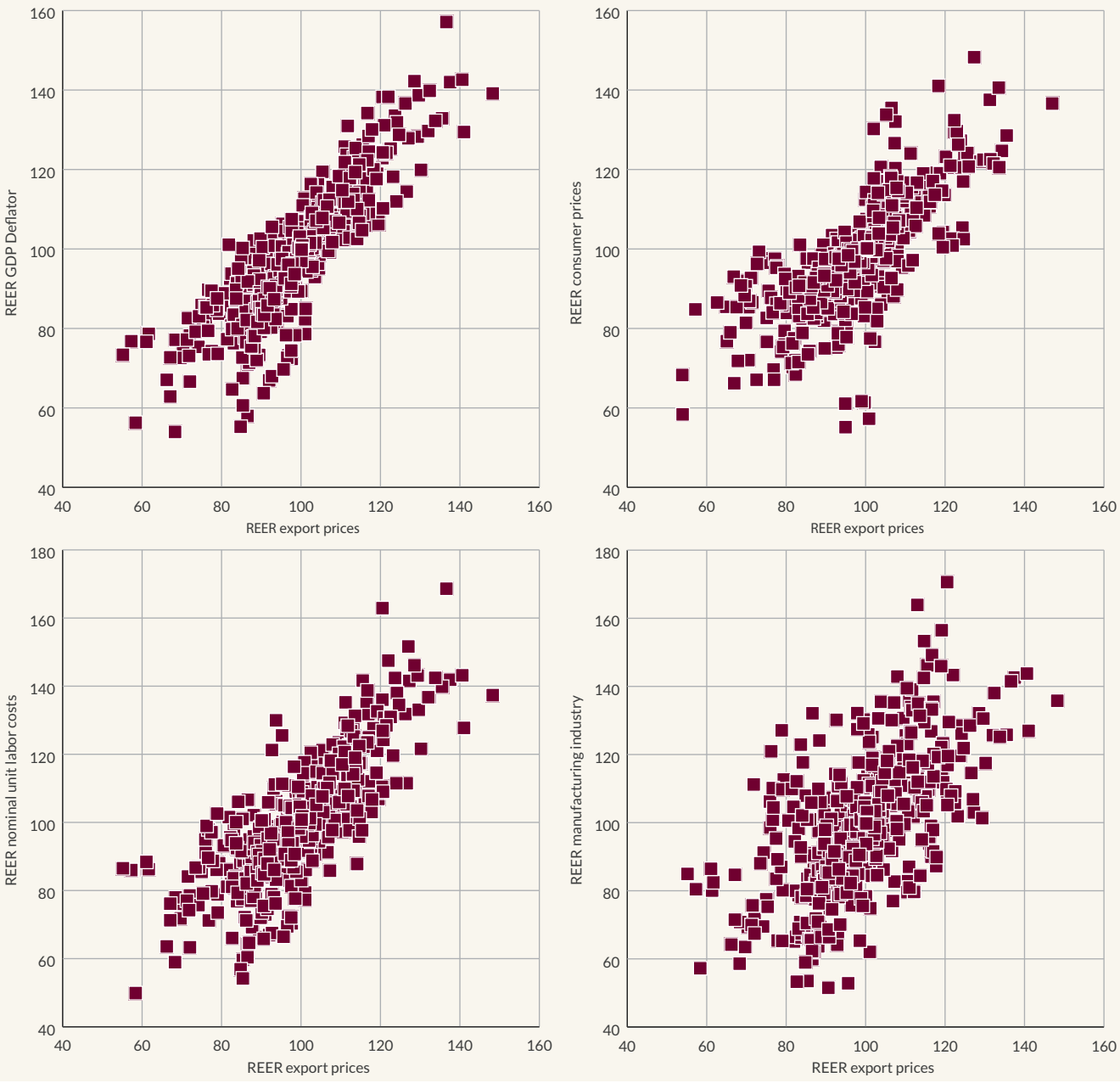
The reference to export development suggests a REER measurement whose price deflator is closely linked with the export economy. This is particularly true for the export deflator and less so for unit labor costs in manufacturing industries. However, Schmitz et al. (2012) highlight the sensitivity of data revisions, the lack of comparison between export prices and the limited sector coverage for unit labor costs in manufacturing industries. More closely related to price developments that are not relevant to exports are the GDP deflator, consumer price index and nominal unit labor costs for the whole economy. A comparison of REER measurements makes it clear that the means of deflation has a considerable influence on the course of price competitiveness (see Figure 3). Therefore, in the empirical analysis, REER measurements based on all five available deflators are considered, so as to test the robustness of the results.

To measure export performance ($Y_{i,t}$), a country's share of exports in relation to global exports, i.e., the export market share, is used. Global exports arise from a country's decision to establish a REER measurement. In other words, global exports are understood as the export capacity between these 37 countries. Exports to countries that are not part of this group are not considered, in order to have a common base for export capacity and price competitiveness. However, no complete export development data exist over time for Croatia, Cyprus, Malta and Luxembourg. Global exports are therefore calculated using the remaining 33 countries. This leads to an inconsistency between measurements of price competitiveness (based on 37 countries) and of global market share (based on 33 countries).

However, the relative economic power of the missing countries is negligible; the impact of this inconsistency on the estimation results is consequently very small. The 33 countries for which both price competitiveness data and global market share data from 1995 to 2013 are available are generally used below.

The change in foreign import demand for products from country i ($C_{i,t}$) is a result of the sum of weighted growth rates for the import capacity of the remaining 32 countries (in accordance with Danninger and Joutz 2008, who have established a similar measurement of the foreign export demand). Bilateral weights are based on the share of exports from country i to country j in the initial year of 1995.

FIGURE 3 **Comparison of various deflators (country sample n=37), 1995–2013**



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1.2. Model specification

The estimation of the model from the equation (x) at different levels carries the risk of spurious regression, so long as the variables are non-stationary. The results of the Panel Unit Root Tests of Im et al. (2003) suggest that ($Y_{i,t}$) and the different REER measurements ($X_{i,t}$) are non-stationary. One exception is the real effective exchange rate based on unit labor costs in manufacturing industries.

The results for foreign demand ($C_{i,t}$) are not clear. If the test equation is specified without a trend, the results suggest stationarity, and with a trend they suggest non-stationarity.[4] These less clear results point to more meaningful test statistics. A possible reason for this is the parameter concerning time and cross-section dimensions (T, N). Particularly if T<N, as is the case for the available data set, unreliable test results may occur (see Hlouskova and Wagner 2006).

Due to existing uncertainty about the stationarity characteristics of variables in the model, an analysis of the model's differences is undertaken on the following pages. Since the model variables are difference-stationary, there is no danger of spurious regression.[5] Differentiation leads to the following estimation equations:

$$(3)\ \Delta\log(Y_{i,t}) = \sum_{k=0}^{L} \beta_k \Delta\log(X_{i,t-k}) + \sum_{q=0}^{P} \gamma m \Delta\log(C_{i,t-m}) + \epsilon_{i,t}\ (p)$$

Δ is the difference operator and the delayed effects of changes in price competitiveness or foreign import demand can be taken into consideration using k and q. L=P=0 is established in the basic specification and the robustness of the results is tested via changes to this value. The model is closely linked to that of Carlin et al. (2001), which, however, does not control the impact of demand from abroad.

For the differentiation of equation (x), the country-specific constant α_i must not be included in the equation (p). However, Carlin et al. (2001) point out that the growth rates for the global export market share can be driven not only by price competitiveness and foreign demand, but by other factors such as geographical or political conditions. In order to avoid an erroneous specification of the model, country-specific effects are considered in the differential equation (p). Time-specific effects that can impact single global events are also included. The error term from (p) therefore results in:

$$(4)\ \epsilon_{i,t} = \alpha_i + \lambda_t + \vartheta_{i,t}$$

α_i represents the country-specific time-invariant factor, and λ_t controls for single global events that affect all countries identically. The inclusion of country-specific effects, however, carries the implicit assumption that a country's global export market share can be infinitely large. Therefore, the importance of country-specific and time-specific effects in avoiding erroneous specifications is tested using the Wald test for each estimation performed. We also test whether the consideration of further illustrative control factors leads to country-specific and time-specific effects becoming irrelevant.

4 Whether or not a trend is taken into consideration is a subjective decision and should be made based on an evaluation of the time course (see Wolters and Hassler 2006)

5 The disadvantage of such an approach is the elimination of long-term relationships between variables. A cointegration analysis that explicitly takes into account these long-term relationships would be ideal. However, the non-stationarity of all model variables is essential for such an analysis. The reliability of the Panel Cointegration Test also suffers from a small time dimension, particularly if T<N (Wagner and Hlouskova 2010).

1.3. Results

Price competitiveness contributes significantly to explaining the development of a country's global market share (see Table 1). The coefficients of the REER measurement have the expected signs, i.e., an increase in the real effective exchange rate (deterioration of price competitiveness) leads to a decline in the global export market share of a country. The selected REER deflator plays no role in the significance of this effect, but the effect for the export price deflator is most important. A one percent rise in the REER based on the relative export price leads to a decline in the global market share of just under 0.4 percent. The effect falls to 0.14 percent when relative consumer prices are used as a deflator for the REER. According to these results, price competitiveness has a considerable effect on export capacity. In the next section we shed further light on the export effects that result from changes in price competitiveness.

Trade-weighted foreign demand is also very important for a country's export economy. According to the results, elasticity is just under 1, i.e., an increase in the weighted import demand of trade partners of one percent leads to a rise in a country's global export market share of just under one percent. Country-specific and time-specific effects are also significant and must therefore be considered as part of the model to avoid an erroneous specification.

TABLE 1 **Results of the regression analysis according to estimation equation (3), various specifications, country sample n=33, period 1995–2013**

Dependent variables: $\Delta\log(Y_{i,t})$	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
$\Delta\log(X_{i,t})$ Export price	−0,38 (0,00)				
$\Delta\log(X_{i,t})$ GDP deflator		−0,19 (0,01)			
$\Delta\log(X_{i,t})$ Consumer price			−0,14 (0,03)		
$\Delta\log(X_{i,t})$ Unit labor costs				−0,16 (0,01)	
$\Delta\log(X_{i,t})$ Unit labor costs of manufacturing industries					−0,17 (0,00)
$\Delta\log(C_{i,t})$	0,98 (0,00)	0,92 (0,00)	0,89 (0,00)	0,89 (0,00)	0,90 (0,00)
LR test for redundancy of country-specific and time-specific effects (p value)	0,00	0,00	0,00	0,00	0,00
Adjusted R^2	0,19	0,16	0,16	0,17	0,18
Observations	593	593	593	593	593

Robust standard error. p values of t-test in parentheses.

1.3.1. Modeling of dynamic effects

Until now the model was evaluated under the assumption that an adjustment of price competitiveness is related to an immediate reaction regarding export capacity. This assumption is not unrealistic when using annual figures. Yet it is possible that the reaction of the export dynamic to changes in price competitiveness evolves gradually over a long time period. If the model is expanded in equation (p) to include delayed values of $(X_{i,t})$, i.e., if L>0 is used, the change in results is negligible. For L=2 the coefficients of the delay in competitiveness are not statistically significant. For L=4 there is a significant positive effect for $(X_{i,t-4})$. The elasticity of the global export market share compared with

price competitiveness therefore decreases, but the sum of the competitiveness effect remains significantly negative. If N>0 is used in equation (p), this also has only a small quantitative effect on the relationship between export development and price competitiveness.

1.3.2. Additional control factors

Until now there has been the assumption that only changes in price competitiveness and foreign demand, and time-invariant country-specific factors and global shocks had an impact on the development of a country's global market share. Below, model (p) is expanded to include control factors that can also theoretically affect a country's export dynamic. Three aspects will be considered: degree of openness, degree of product market regulation, and innovation capacity of the national economy.

The Heritage Foundation's trade freedom index is used to measure openness. This index covers both wage-related and non-wage-related trade obstacles that affect a country's external trade. Product market regulation is represented using the business freedom index from the same source. This index contains information on market entry barriers and bureaucracy that restrict business operations and competition. The indexes are constructed so that higher values reflect an increase in openness or a reduction in product market regulation. A country's capacity for research and development is represented by the proportion of GDP spent on research and development (R&D).

Since the dependent variable represents export development in relation to trade partners, relative measurements are also designed for these three control factors. Thus the corresponding value for country i at time t is placed in relation to the average for all countries at time t. A value of less than 1 is less than average and a value of more than 1 is higher than average. These relative values are used as growth rates for the model.

Theoretically it is to be expected that a higher degree of openness, a lower level of product market regulation, and an increase in innovation capacity will have a positive effect on a country's global export market share. However, a negative relationship is also possible, particular for product market regulation. Felbermayr and Prat (2011) show that stronger regulation of the product market in the form of an increase in bureaucracy-related fixed costs for businesses can lead to unproductive firms leaving the market, insofar as all companies are affected in a similar way by these costs (representing the socalled selection effect). In this case average company productivity rises, which is decisive for market opportunities in an international environment.

The results demonstrate no significant influence of the growth rate of relative openness and innovation capacity on the growth rate of the global export market share. The growth rate of the relative Business Freedom Index is, however, significantly negative. Therefore, a drop in regulation is linked to a fall in the global export market share. As described, the selection effect on the fate of unproductive firms on the market can lead to this result.

Overall the consideration of additional control factors does not substantially affect other results. The elasticity of the global export market share with respect to price competitiveness is very close to the values provided in Table 1.

1.4. Presentation of results in the literature

For the panel estimation we have closely followed the study by Carlin et al. (2001), who analyzed the importance of relative unit labor costs for a country's global export market share. The study is a useful starting point due to the similarity of the content and concepts to the analysis conducted here. The elasticity of the global market share with respect to price competitiveness reported in that study is between −0.2 and −0.3, and therefore close to the elasticity reported here.

Most studies that analyze the influence of price competitiveness on exports use absolute export numbers instead of the global export market share as the dependent variable. Elasticities in this model type correspond to a rough approximation of the elasticity of the global export market share minus one. The actual relationship depends of various factors, such as incomplete price transfers or changes in company profitability. Export elasticities are reported in the literature by Madsen (2008), Ca'Zorzi and Schnatz (2007) and Danninger and Joutz (2008) in the range of −0.2 to −0.6, while Bayoumi et al. (2011) report export elasticities in the range of −0.6 to −1.3, and Goldstein and Kahn (1985) in the range of −1.2 to −2.5. The wide spectrum of export elasticities is due to differences in time periods, the choice of countries, the methodology, the definition of variables and the specification of the model.

Overall the comparison with similar studies indicates that model (p) delivers conclusive results. The estimated coefficients have the expected sign and the estimated elasticity of the global export market share with respect to price competitiveness falls within a moderate range.

1.5. Effects of average unit labor cost dynamics

The regression model does not only establish a statistically significant negative link between price competitiveness and export development. The results can also be used to show how a country's exports could have developed along an alternative path of price competitiveness. In this section an alternative path is calculated, which adopts, for example, the Eurozone average as the development of price competition for 11 Eurozone countries.[6] Following the results of the regression analysis, a calculation is then made of how high annual exports would have been per country for the period 1996–2013[7] if price competitiveness had developed at the level of the Eurozone average. Such an approach is not considered a counterfactual analysis, since, for example, no adjustment reactions to the alternative price developments are considered. However, it paints a picture of the extent to which a Eurozone country's export capacity was influenced by price competitiveness during the study period.

The regressions show the effect of a change in the growth rate of price competitiveness on the growth rate of the global export market share. In order to calculate an alternative development for exports, several steps are necessary. First, for each of the 11 countries, the deviation of the growth rate of price competitiveness from the Eurozone average for the years 1996–2013 is determined. For each year the corresponding deviation is multiplied by the coefficient of price competitiveness from the estimation.[8] These calculations show the annual difference in the growth rate of the global market share between the

6 The analysis concentrates on Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain. The Baltic states, Cyprus, Luxembourg, Malta, Slovenia and Slovakia were not included due to the comparative insignificance of their economies.

7 Absolute values exist from the year 1995, and exchange rates on which the regression analysis is based from the following year.

8 The calculations are made for all five deflators. The results are only provided for the export price deflator.

actual development and the alternative path. For each year between 1996 and 2013, subtracting the corresponding term from the actual growth rate of the global market share gives the growth rate of the global market share for the alternative path. Afterwards, for each of the 11 countries the annual global market share for the alternative path is calculated, in which the corresponding value for 1995 is adjusted up to 2013 using the country-specific annual growth rate.

Based on global exports (for the 33 countries included in the estimation), absolute export values for 1996–2013 can be calculated for the alternative path for each of the 11 countries. A comparison of actual export capacity and export capacity for the alternative path shows which Eurozone countries could have benefited from the development of price competitiveness at the level of the Eurozone average.

Overall, nine countries demonstrated export development for the alternative path between 1996 and 2013 that was above the actual development. The development of price competitiveness along the lines of the Eurozone average would have led to a more dynamic export capacity. Greece and Italy, for example, could have increased their exports over this time period by approximately ten percent. In Germany and Finland, however, the deviation between the alternative path and actual development is negative. Between 1996 and 2013 Germany would have exported 231 billion euros less in goods and services using the alternative path. Regarding the actual cumulative export value over this period, this corresponds to a relative "loss" of two percent. In Finland, the relative effects are even more apparent than in Germany (see Table 2).

TABLE 2 **Cumulative absolute and relative deviation between actual and alternative export development, selected Eurozone countries, 1996–2013**

	Cumulative deviation, in billion euros	Cumulative deviation vs. cumulative exports, in percent
Germany	–230,7	–2 %
Finland	–31,9	–5 %
France	1,9	0 %
Austria	19,8	1 %
Greece	20,5	9 %
Portugal	20,6	4 %
Belgium	60,5	2 %
Ireland	61,4	5 %
Netherlands	65,0	2 %
Spain	139,2	6 %
Italy	404,1	10 %

Source: Prognos 2015

1.6. Conclusion

The regression analyses show that, unsurprisingly, there is a negative relationship between a country's price or cost dynamic and its export dynamic. This result does not preclude other, country-specific factors from being relevant for corresponding export success (e.g., quality level, specific technology, expertise, local proximity, etc.). For the Eurozone, it is observed that before the financial and economic crisis a considerable proportion of the growing service imbalances was related to the sometimes very heterogeneous unit labor cost dynamic between individual countries.

The results also show that countries with an unfavorable price competitiveness have a high potential for an increase in export capacity. Adjustment to the Eurozone average can considerably stimulate foreign trade. These results are to be seen by reducing the disregarded adjustment effects of countries to an altered development of price competitiveness. More favorable development of price competitiveness in Greece, for example, would presumably have led to adjustment reactions in the country as well as abroad (e.g., in the form of alternative wage development). Demand-side restrictions in this context would also have been disregarded. Nevertheless, the results show that the export dynamic, at least in countries with a very unfavorable relative development of price competitiveness, can be considerably improved, for example, by increasing productivity or a slower rise in wage costs.

2. Wage impulse and growth performance – a simulation analysis

The previous chapter showed the relationship between relative price competitiveness in the countries studied and their export performance based on econometric analyses using historical data. Two important questions remain, however:

- How advantageous, in terms of being achievable economic policies, are a wage moderation strategy and an accompanying improvement in export performance for a national economy generally (e.g., measured as GDP)?

- Does the success of such strategies depend on foreign economic conditions or the wage strategies of other countries?

These questions cannot be answered using statistical regression analyses and simple counter-factual assumptions, as in the first chapter. Only in a simulation model covering the whole economy all relevant reactions and feedback loops can be taken into account. A dynamic model for several countries is also necessary to answer the above questions, since there can be no assumption of constant foreign economic conditions. Developments in country A have consequences for other countries and trigger adjustment reactions there, which in return affect country A.

Prognos AG provides with VIEW a simulation and prognosis model for currently 42 countries (for details see Prognos AG 2013). These countries cover more than 90 percent of current global GDP. Interactions and feedback between countries are explicitly taken into account in VIEW. For example, a country's exports can only increase to the extent that import demand in the other 41 countries and/or the exporting country's share of imports from the other countries increase. In VIEW this share of import demand from other countries or a change thereto depends, among other things, on the development of the said country's REER.

2.1. Effects of an isolated wage impulse

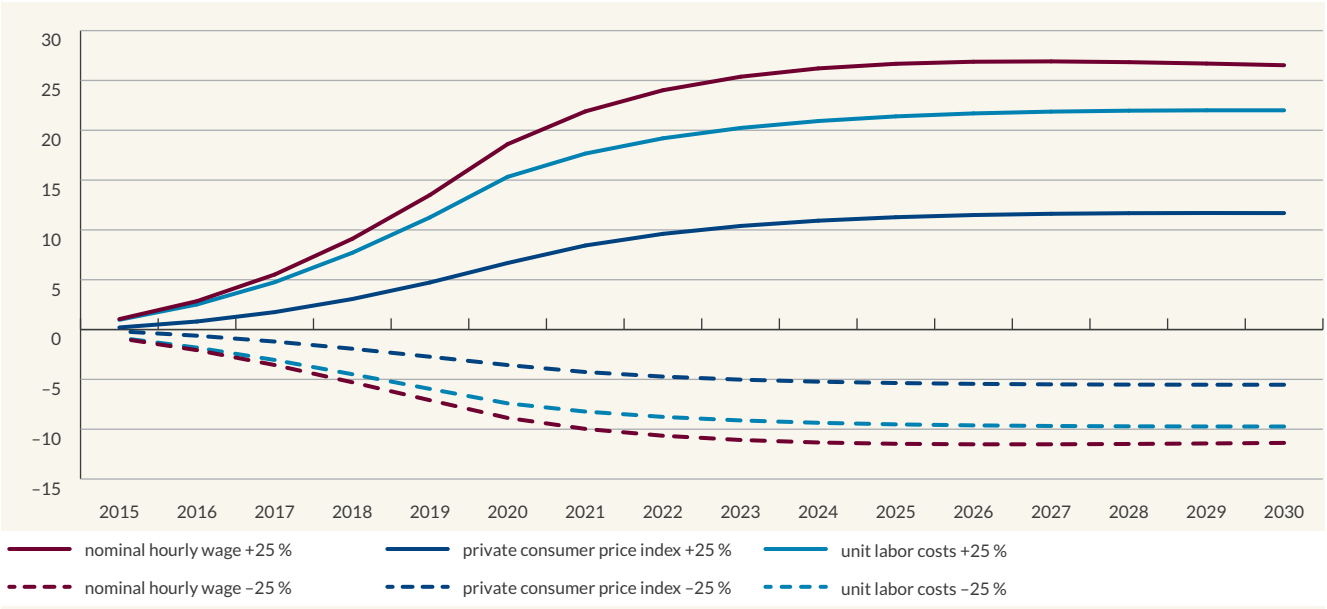
Below we show, for example, the effects of wage moderation and wage promotion in Germany. It is presumed in the reference scenario for the period 2014–2030 that in Germany and the rest of the Eurozone countries the change in the nominal hourly wage is fully exploited in the distribution range.[9] In both alternative scenarios, it deviates in Germany by +/–25 percent between 2015 and 2020. After 2020 it is again fully exploited in Germany, and the shock is therefore temporary. Unit labor costs that are involved in REER and affect export performance in Germany are therefore below/above the reference values. Unit labor costs can also vary depending on the deviating development of productivity, but this parameter is difficult to assess in terms of economic policy and is therefore not suitable for policy simulations.[10] In the other 41 countries covered by VIEW no further changes were included in the scenarios, only the information on the alternative development in Germany.

Over-exploitation of the distribution range accelerates the wage-price dynamic. The latter points to a specific moment of inertia, so that even after the assumed expiry of wage promotion in 2021, the deviation from reference values still increases slightly. From the mid-2020s the differences stabilize and the rate of change of individual parameters is once again almost identical to those in the reference scenario. Businesses only partly pass on the nominal cost shock to their prices, so employees experience a real gain

9 The distribution range is defined here as the inflation rate in private consumption plus the development of real hourly productivity. Full exploitation implies approximately a constant primary income distribution between employment and capital.

10 The wage dynamic is also described according to the official definition of the tariff system as affected more or less badly by the state. There is also an indirect possible influence, for example, in that earnings replacement performance and thereby the reservation wage are adjusted. In this respect, the socalled Hartz reforms have had an attenuating effect on the wage dynamic of the whole economy in Germany.

FIGURE 4 **Effect on wage level, price index and unit labor costs in Germany, deviation from reference scenario**



Source: Prognos 2015

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in wages. This also applies to the case of wage moderation, whereby the nominal cost decrease is not fully transferred to prices and employees suffer from a real loss in wages (see Figure 4).

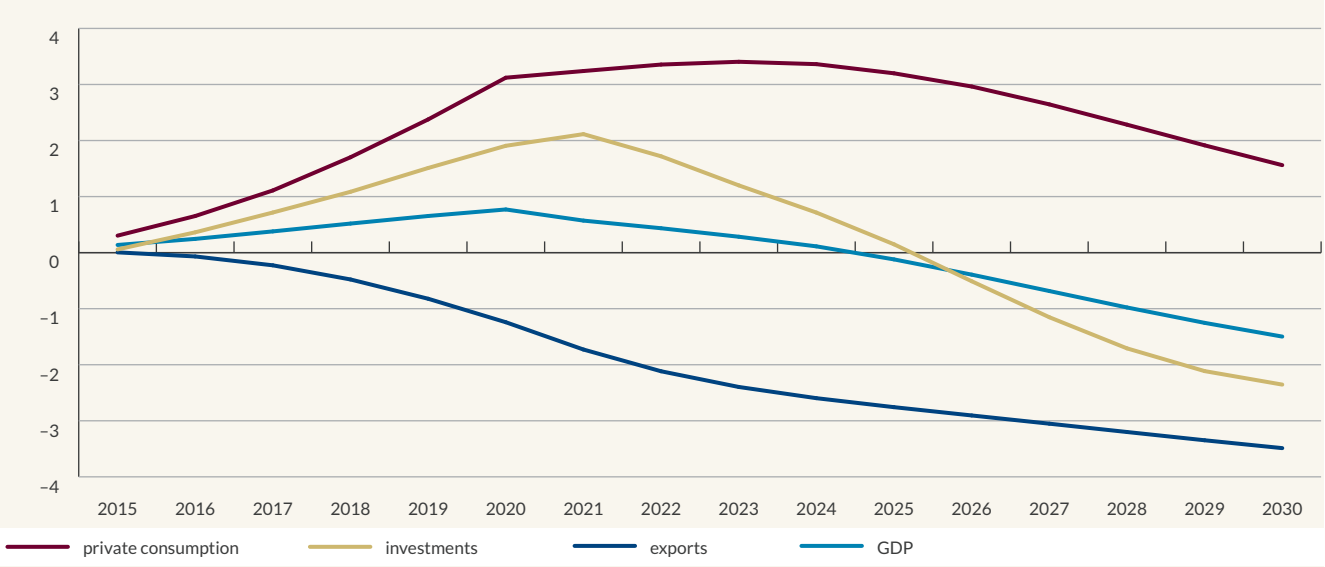
How do wage impulses affect expenditure components of GDP?[11] Private consumption is divided in VIEW between consumption from wage revenue, from profit and asset income and from transfer income. Increasing real wage costs lead to a fall in the demand for employment from businesses, but the effect on the real wage sum (product of higher real hourly wage and lower working volume) is positive in an over-exploitation scenario; consumption from wage income therefore remains over the reference level. The same applies for transfer income, which is linked to the wage dynamic. Primary income distribution shifts in the direction of labor income in the +25 percent scenario, and consumption from profit and asset income falls correspondingly. In total, private consumption is always above the reference level in the time period under consideration, but approaches the reference level again at the end of the simulation horizon.

Due to the positive wage shock and the unfavorable REER, exports experience an immediate and lasting decrease of almost 4 percent (see Figure 5).

Investors react positively in the model to the utilization situation of the capital stock (or effective demand) and the return on investment, and negatively to the real interest level. Positive consumer shock also results in higher

11 In order to simplify the answer, only the effects of the +25 percent scenario will be described; the effects of the –25 percent scenario are a mirror image.

FIGURE 5 **Effects of selected usage components and GDP in Germany, deviation in the +25 percent scenario vs. the reference scenario**



Source: Prognos 2015

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investments in the short-term, but the lower amount of exports works against this. Lower profit rates also have a negative effect, as do higher interest rates. After the wage promotion expires, the negative effects gradually predominate and in the long term investments fall below the reference values (see Figure 5).

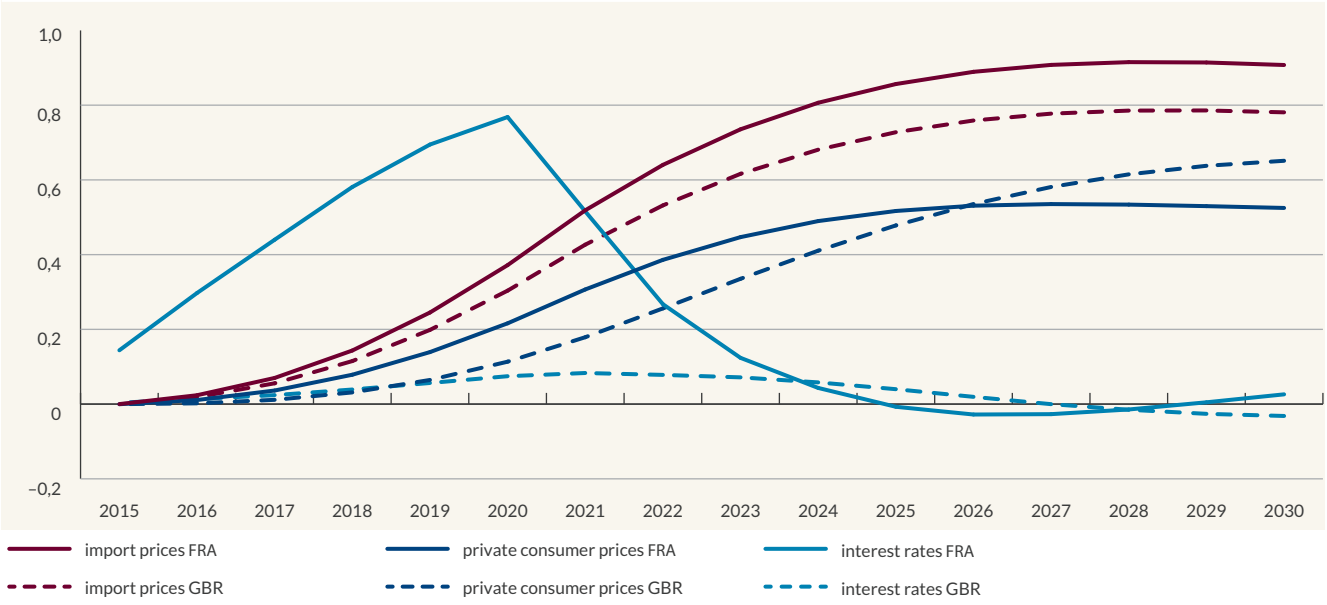
In the model, the state's consumer expenses are determined using the population dynamic and growth trend for GDP. The budget situation is also relevant in the short term. The higher interest rate impede the state's debt servicing and leaves less of the budget for other state expenses. The effect on state consumption is also negative.

Imports approximately follow the dynamic of the other usage components. Overall, a higher GDP can be established in the short term owing to the positive wage promotion.

After the shock expires, however, negative effects in terms of exports and investments are dominant (see Figure 5).

The effects outlined above behave like mirror images in the case of a wage moderation: the latter promotes exports, weakens private consumption, and the positive overall effect on GDP is positive in the long term. Here the extent of the effect is, however, less than in the over-exploitation scenario: Germany's production potential in 2015 is comparatively highly utilized. In this case, positive wage promotion and a higher short-term GDP lead to the utilization of production factors above the trend utilization. Therefore the price-wage dynamic is also accelerated, with resulting negative consequences. Import demand also increases with greater capacity utilization; this also results in a stronger negative effect in the case of the over-exploitation scenario.

FIGURE 6 **Effects of selected variables in France and Great Britain, deviation in the +25 percent scenario vs. the reference scenario**



Source: Prognos 2015

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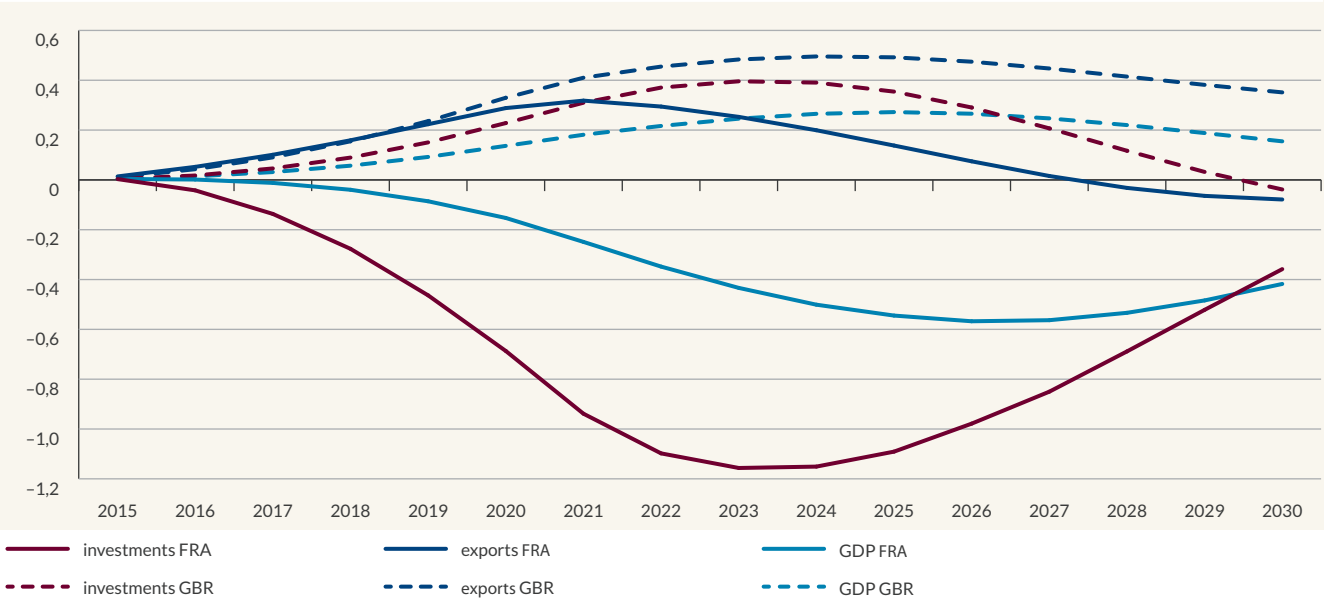
What do the alternative developments in Germany mean for the other countries in VIEW? In the case of the over-exploitation scenario (+25 percent), Germany's price competitiveness decreases and the other countries can increase their share of trade to Germany's detriment. Depending on Germany's importance as a trade partner, import prices in the other countries will increase as a result of the positive wage impulse. In the Eurozone the interest rate rises, since all three parameters that are relevant here – real GDP growth, inflation rate and output gap – are higher than the reference level in the short term. In the first years of the simulation, all countries can export more to Germany as a result of Germany's higher import demand, but after expiry of the wage impulse sales opportunities in Germany fall. Figure 6 demonstrates the corresponding effects for prices and the real interest rate in France and Great Britain.

In the case of over-exploitation of the distribution range in Germany, both countries could experience nearly the same positive boost in exports in the first years (see Figure 7). Import demand in Germany is above the reference level and their share of imports to other countries increases even higher to the detriment of Germany. Although British investment benefits from higher demand and there is a positive effect on GDP throughout the entire simulation period, France's investment gains are weakened by the higher real interest rate. The positive effect on exports is too small to achieve overall gains in GDP. A positive wage and price shock for Germany reduces investment capacity in the other Eurozone countries indirectly due to the interest policy reaction of the European Central Bank, with on the whole negative effects on economic performance in the Eurozone. Countries outside the Eurozone, on the

FIGURE 7 **Effects of investments, exports and GDP in France and Great Britain, deviation in the +25 percent scenario vs. the reference scenario**



Source: Prognos 2015

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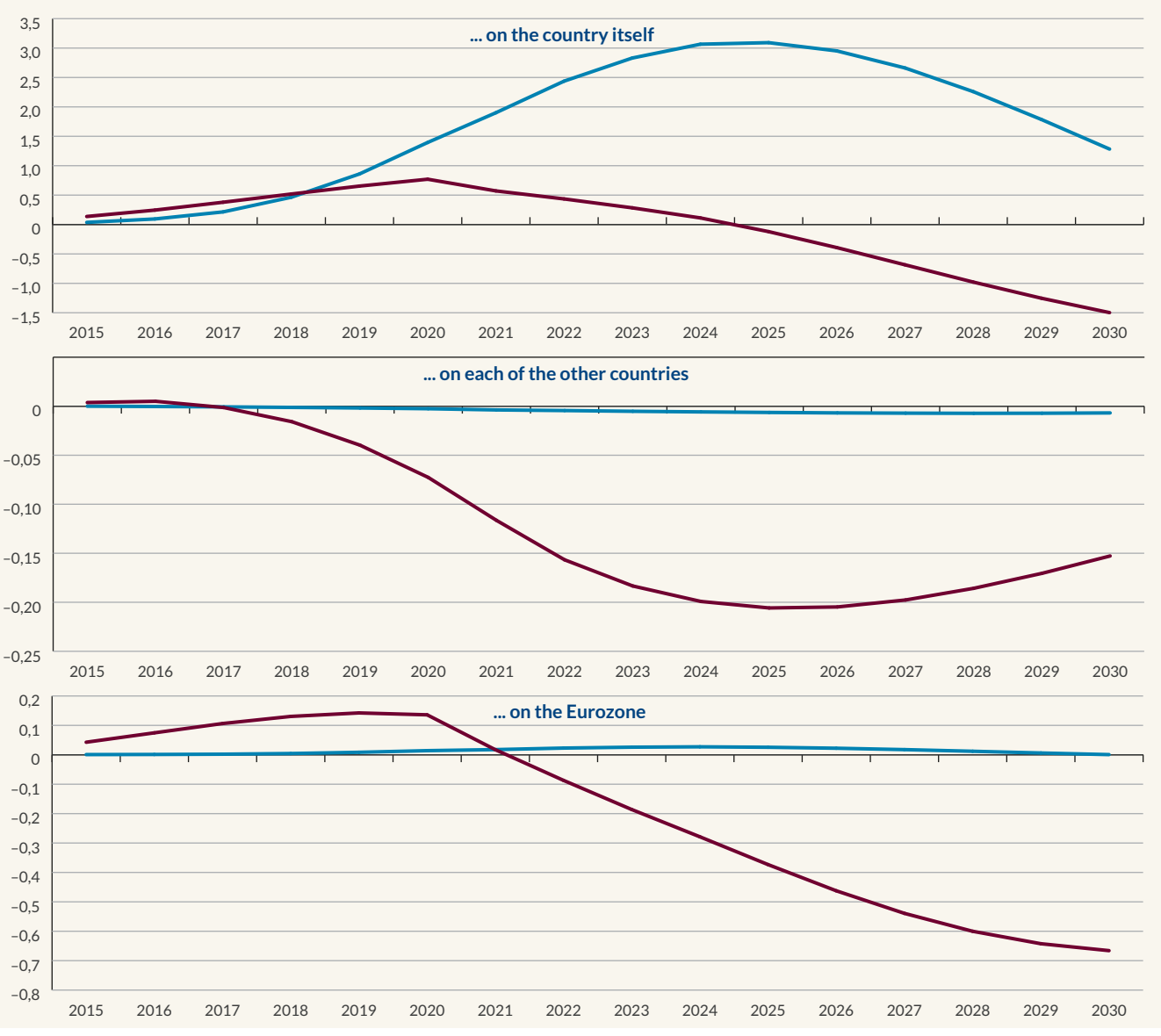
other hand, benefit from the expansive wage strategy in Germany.

It must be stressed that the results outlined here are specific to the country in question (Germany) and the given historical starting situation. The basic functional relationships are identical in all VIEW countries. Deviating historical weightings regarding expenditure components (especially private consumption vs. exports) or differing interest elasticity of investment can alter the overall effect on GDP. Countries with a lower weighting for the Eurozone can also not have a positive interest boost to such an extent that it works negatively on investment capacity in other Eurozone countries.

To illustrate the historical sensitivity of the results expressed above, we used the same scenario for Finland (see Figure 8): in the period from 2015 to 2020, wage exploitation was at +25 percent and subsequently there was full exploitation as in other Eurozone countries. Finland is currently in an under-utilization situation and its weight for the Eurozone is much smaller than Germany's. It is therefore to be expected that the effects on GDP are all positive.

The simulation confirms the above expectations (see Figure 8). Thanks to the under-utilization situation, acceleration of the wage-price spiral in Finland is much smaller, like the increase in the interest rate due to a smaller Finnish weighting for the Eurozone. In Finland itself, the positive utilization effect dominates the reaction of investors and

FIGURE 8 **Effect on GDP in Germany, Finland and the Eurozone, deviation in the +25 percent scenario vs. the reference scenario, differentiated according to the incentivizing country**



Source: Prognos 2015

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overall leads to more apparent gains for Finnish GDP, which is also greater than zero at the end of the simulation period. The positive wage impulse experienced in Germany has negative consequences, however, for Finland due to the described interest effect, whereas Germany is only mildly negatively affected by a similar incentive in Finland (Figure 8, middle diagram). This also applies for the effects on Eurozone GDP as a whole. The long-term results include clearly negative effects in the event of an expansive wage strategy in Germany, whereas the same strategy in Finland has few positive effects on industry in the Eurozone in general.

Table 3 summarizes the effects of both wage strategies in Germany on selected German variables and the GDP of other countries as a percentage deviation from the reference situation.

TABLE 3 **Effects on selected variables in Germany and GDP of third countries, differenciated according to the wage impulse in Germany, deviations vs. the reference scenario in percent**

	–25 % scenario		+25 % scenario	
	2020	2030	2020	2030
... in Germany				
Private consumption, real	–1.6	–0.7	3.1	1.6
Public consumption, real	0.3	1.2	–0.9	–2.5
Investments, real	–1.0	1.3	1.9	–2.4
Exports, real	0.7	1.9	–1.2	–3.5
Imports, real	–0.6	0.6	1.3	–1.0
GDP, real	–0.4	0.9	0.8	–1.5
Labor force	0.8	1.1	–1.6	–3.0
Net exports	10.3	10.0	–18.8	–19.0
... GDP of third countries				
Rest of Eurozone	0.0	0.2	0.0	–0.4
Total Eurozone	–0.1	0.3	0.1	–0.7
Other VIEW countries	0.0	–0.1	0.1	0.2
All 42 VIEW countries	–0.1	0.1	0.1	–0.1

Source: Prognos 2015

2.2. Wage scenarios for the Eurozone

The above simulations have shown that the effects of wage shocks vary according to place and time. The question therefore arises as to whether current circumstances in the Eurozone as a whole enable us to identify a wage policy strategy that is "better" than the reference solution – full exploitation of the distribution range in all Eurozone countries – in terms of long-term GDP in the Eurozone.

To answer this question we have designed a series of scenarios using the VIEW model. In the first two alternative scenarios exploitation of the distribution range varies in all Eurozone countries by +/–25 percent. The Eurozone as a whole implements wage promotion or wage moderation strategies. As shown in the previous section, the current utilization situation in terms of the production capacity plays an important role for the direction and strength of effects on GDP. We have therefore divided the Eurozone into two blocks for further alternative scenarios. Based on the European Commission's capacity analysis, the first group contains countries with a capacity gap[12] of more than –2 percent for the year 2014. The second group includes countries such as Greece or Italy with a larger negative capacity gap due to the current crisis. Both blocks have contrasting wage strategies in the additional two alternative scenarios. Four alternative scenarios with the following country groups, A and B, are therefore created (see Table 4):

12 The capacity gap is defined as the percentage deviation of the current national economic output from that that would correspond to trended full utilization of production factors, under the given technological conditions.

TABLE 4 **Presentation of scenarios and group formation of the 16 Eurozone countries included in VIEW**

		1	2	3	4
Group A (> –2 % capacity gap)		+25 %	–25 %	+25 %	–25 %
Group B (< –2 % capacity gap)		+25 %	–25 %	–25 %	+25 %
Group A		**Group B**			
Country	Capacity gap (%)	Country	Capacity gap (%)		
Latvia	1.4	Greece	–9.4		
Estonia	1.3	Spain	–6.4		
Lithuania	0.6	Portugal	–5.1		
Ireland	0.1	Italy	–4.2		
Germany	–1.0	Netherlands	–3.0		
Austria	–1.2	Slovakia	–3.0		
Belgium	–1.3	Finland	–2.9		
		Slovenia	–2.7		
		France	–2.3		

Source: European Commission, Prognos AG

Group A represented 40 percent of total economic performance for the Eurozone in 2014. The division of countries should be as balanced as possible and since there is a comparatively large gap between the "worst" country in Group A (Belgium with –1.3%) and the "best" country in Group B (France with –2.3%), this presentation is suitable. If France were to slide into Group A, this group would have a comparatively large weighting.

Figure 9 shows the results of the computer simulation for the complete time period from 2015 to 2030. The Eurozone, both as a whole and differentiated into each of the two country groups, benefits most in the long term from a collective wage moderation strategy. The other VIEW countries fare worse than the reference solution (–0.3% in 2030) only in this scenario. The "price" for this, however, is that crisis countries in Group B in particular remain below the reference level for a comparatively long time (until 2026).

With a collective over-exploitation of the distribution range in the Eurozone (+25 percent scenario), short-term gains are largest, but this also applies to long-term losses. The reason for this is the combined effect on export losses and an accelerated wage-price spiral with a corresponding increase in the interest rate and negative effects for investments.

In the case of the third alternative scenario, countries in Group A implement a wage promotion strategy (+25%) and those in Group B a wage moderation strategy (–25%). This scenario is less successful, particularly for the latter. The negative effect on private consumption weakens internal demand and interest reductions remain in place due to the strong wage-price dynamic in Group A. GDP in the other VIEW countries and that of all 42 VIEW countries roughly corresponds to the reference level.

The effects appear more favorable in the fourth alternative scenario, in which countries in Group A follow an under-exploitation strategy (–25%) and the crisis countries of Group B implement wage promotion (+25%). The resulting negative interest rate effects for the Eurozone as a whole are thus largely avoided and the crisis countries benefit from short- and medium-term increases in internal demand. For VIEW countries as a whole this strategy has long-term positive effects and for Germany the effect in 2030 is practically neutral.

FIGURE 9 **Effect on GDP in Germany and selected country groups, deviation vs. reference scenario, differentiated according to the wage scenario for the Eurozone**

Source: Prognos 2015

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2.3. Overall evaluation of wage scenarios

It is difficult to make wage policy recommendations based on the simulations presented here. Among other things, the sign and value of the effects change over time. The effect on GDP in the last year of the wage impulse (2020) is generally very different from that one at the end of the simulation time frame (2030).

At first glance, the question of the relevant analysis year and the "best" scenario should be easy to answer. The incentive is, as described above, of a temporary nature; the long-term effects in 2030 are decisive. Therefore Scenario 2 with collective wage moderation in the Eurozone is the most advantageous.

A recommendation for Scenario 2 would, however, carry many risks. The model calculations leave out possible wage policy reactions from other countries. What happens if they react to wage moderation in the Eurozone with the same strategy? The danger of a race to the bottom or revival of the beggarthy-neighbor policy of the 1930s should at least be taken into account. Furthermore, the advantage of a collective wage moderation strategy is limited if it leads to an increase in the current account, at least in some Eurozone countries compared with the other VIEW countries. Current account imbalances represent a huge stability risk for the global economy. Another threat is the risk that foreign assets must be written off in the case of national bankruptcy.

Another prerequisite for the success of the strategy in Scenario 2 is for countries outside the Eurozone to experience a higher growth in the future and generate sufficient internal demand. Potential exchange rate reactions, revaluation of the euro, are also possible, which would compensate for the advantages of the strategy. Finally, the political component should be taken into account, namely, that to people in countries in Group B would be recommended a strategy that would worsen their situation in the next few years again (!) before gains were seen much later.

From a global perspective, Scenario 4 appears at first glance to be less controversial, strategic for the Eurozone, with fewer related risks, and comparatively favorable regarding the effect on GDP. Countries in Group A, which for the moment have experienced comparatively good utilization, implement wage moderation strategies (−25%), and crisis countries in Group B experience over-exploitation of the distribution range (+25%). A higher interest rate in the Eurozone would be avoided and countries in Group A could partly compensate for their weaker private consumption by increasing exports to Group B. The other VIEW countries also benefit from this strategy in the short and long terms. However, this strategy carries a decisive disadvantage: the current account of countries in Group B are (still) much more in deficit, their external level of debt directly in relation to the countries in Group A increases, and the long-term stability of the Eurozone is undermined. This scenario can only be stabilized in the long-term through transfers.

In Scenario 3, where the reverse is the case (Group A: +25%, Group B: −25%) the effects are much more unfavorable for crisis countries in Group B. Their internal demand is weakened and interest rate reductions remain in place due to the opposing wage strategy in Group A. The improved competitiveness of B countries and the increased internal demand in countries in Group A are not sufficient to compensate for internal losses. The reference level is only achieved again in the last year of the simulation.

An acceptable regulation would only be thinkable if the institutional structure of the Eurozone changed. The ECB would have to accept a higher inflation rate for the whole Eurozone and not initially increase interest rates. There would also be room for initially favorable GDP development on the one hand. However, a reduction in

competitiveness between A and B countries may occur. The last point in particular offers a considerable advantage over the other three strategies. In addition to the question of enforceability – employees in B countries would have to undergo further wage moderation unilaterally – these strategies and the accompanying monetary measures would lead to problems.

A deviation by the Central Bank, albeit short-term, from the established inflation target could also raise the long-term inflation expectation of wage policy stakeholders, since the inflation target would now seem negotiable. The ECB's credibility would be badly hit. There would be a danger of a wage-price spiral, in both the A and B countries, and higher inflation rates in the long term. Accelerated inflation would in turn basically act as a brake on economic development and would have to be roped in again, if necessary at the price of a stability crisis.

As a modification to the third scenario, it is possible to launch an investment program to increase long-term price and non-price competitiveness in B countries in addition to wage moderation, and to avoid additional demand incentives from A countries. Inflationary pressure from A countries would thus be avoided and the ECB would not be forced to act. Investments increase competitiveness through higher productivity. The nominal wage increases could therefore be greater than the baseline scenario despite wage moderation. Increased competitiveness must not come at the cost of poorer private consumer demand (or only minimally so). There is also the chance for B countries to increase their competitiveness for highly specialized products through appropriate investments. The most complex products are manufactured in a few countries and by a few producers, which goes along with less competitive pressure and an economy that is more robust against employment market shocks (Felipe et al. 2012).

The collective over-exploitation strategy in Scenario 1 is less attractive especially in countries with a lower negative capacity gap. Corresponding wage impulses increase above all the wage-price dynamic and the real effects are rather quickly felt to be negative. Countries in Group B would lose more in terms of price competitiveness and their performance balance, which is generally already negative, would further deteriorate.

The assumptions of the basic scenario remain optimal in the long term for the development of the Eurozone as a whole. If the wage amount rises to the target inflation and country-specific productivity trend,[13] nominal unit labor costs also increase to the target inflation rate. Due to the very close relationship between nominal unit labor costs and inflation, it can largely be concluded that comparable economic development will occur in accordance with the Central Bank's inflation target (Flassbeck and Spiecker 2011).

In the context of alternative wage strategies, there is currently no recommended silver bullet. The strategy of the basic scenario is linked to the fewest risks. It may not, however, help to reduce existing imbalances in the Eurozone. The outlined approach, i.e., wage moderation in B countries along with an investment campaign, shows that the path to greater competitiveness and increased wealth must always go by way of a rise in productivity.

13 Orientation around actual productivity development would be theoretically ideal. This, however, fluctuates greatly and is difficult to predict. This makes the productivity trend, i.e., the average productivity over a recent period, a better recommendation for trade unions and management.

2.4. Implications for economic policy in the Eurozone

What conclusions can be drawn from these findings for European wage policies? It must first be stated that productivity-oriented wage policies are the best solution in all countries.

A temporary deviation from this strategy can help accelerate the overhaul of economically weak countries. However, such an approach is also associated with unfavorable effects that must be taken into account.

The intuitively best strategy to improve the competitiveness of crisis countries (economically strong countries have wage strategies beyond productivity measures, and economically weak countries have no wage reserves) is the most unfavorable solution from the point of view of crisis countries. There are two reasons for this. Wage reserves reduce internal demand in crisis countries and weaken growth in terms of demand. In economically strong countries, the price-increasing effect of wage promotion leads to a rise in interest rates in the Eurozone, which reduces investments in all Eurozone countries.

To quickly improve the international competitiveness of crisis countries, this strategy is only possible when extensive economic measures are put in place:

- Moderate wage promotion in economically strong countries increases internal demand and growth there. Economically weak countries benefit from this because demand for imports also rises in the economically strong countries. Higher demand leads to a price rise, to which the ECB reacts with interest rate rises, which negatively affect investments in the entire Eurozone. To counter a decline in investments, the ECB must accept a higher inflation target (which prevents otherwise necessary interest rate rises). Economically strong countries, including Germany, would therefore have to accept a decline in exports.

- Moderate wage reservation in economically weak countries increases their international competitiveness but weakens internal demand. To compensate for this, investments must be increased. To finance these investments it would be possible for the EU to launch in economically weak countries an investment program to promote private and public investments. Productivity would therefore be increased and international competitiveness further enhanced. Accompanying measures must also be taken to increase non-price competitiveness (infrastructure, R&D, training systems, etc.). EU transfer payments must be part of this.

In conclusion, the following may be asserted. Temporary wage reservation in economically weak countries is only then an element in restoring competitiveness when it is accompanied by economic policies. Accompanying measures include in particular wage promotion in economically strong countries, transfer payments to promote investments, and at least temporary acceptance of higher inflation rates in the Eurozone.

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