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June 13, 2017

Approved By
European Department

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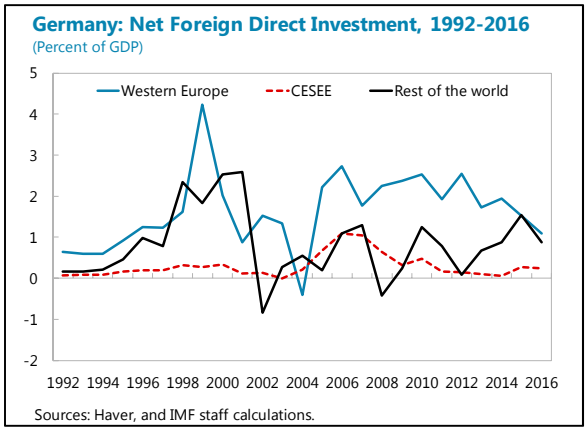
THE PROFITABILITY OF GERMAN FIRMS: LOCATION VERSUS OWNERSHIP[1]

A. Motivation

1. Over the past two decades, German firms have expanded their production outside of Germany through mergers and acquisitions as well as greenfield investments. Most of this foreign direct investment has taken place in Europe (see text chart), including through the building of supply chains in Central Eastern and Southeastern Europe (CESEE; see IMF, 2013). In the context of a relatively lackluster domestic investment, persistently large corporate savings, as well as only moderate wage growth despite a positive output gap at the current juncture, this paper addresses three simple questions: Have foreign activities in the rest of Europe been more profitable than domestic activities? Does this difference depend on the economic sector? Has the difference changed over the past ten years?



B. Data Sources and Sample

2. To answer these questions, we exploit data from the Orbis database, a very large database of corporate financial statements and ownership information[2] published by Bureau van Dyck, to compare the profitability of German-owned firms located in Germany with that of German-owned firms located outside of Germany. The study relies on data for all non-financial, non-mining firms in the Orbis universe that are incorporated in a European country, have average annual sales of at least USD 25 million during 2006–2014, and have financial information available for each year during that period. With no financial statements available at the establishment level, to have as strong a match as possible between the location where a firm is incorporated and the location of its production we exploit data from unconsolidated financial statements. If the unit issuing the unconsolidated financial statement is incorporated in country c, we consider the activity of that firm as located in country c too. Macroeconomic data are sourced from the IMF's WEO database.

[1] Prepared by Jérôme Vandenbussche and Peichu Xie (both EUR).

[2] The details of the procedure used to attribute ultimate ownership based on the Orbis raw data are available upon request.

3. Orbis coverage is generally considered to be good for continental European countries (see Kalemli-Özcan et al., 2015). For Germany, the coverage in our raw data (before applying any size filter) is between 45 and 55 percent of total sales, using data published in Deutsche Bundesbank (2016) as a reference. After comprehensive data cleaning and standard winsorization, our balanced (resp. full) sample contains about 34,000 firms (resp. 80,000 firms) covering the 2006–2014 period in 32 European countries.[3] The balanced sample is dominated by firms located in Italy (20 percent), France (17 percent), Spain (10.4 percent) and Germany (10 percent). Firms located in CESEE countries represent 21 percent of the balanced sample. We analyze both the full sample and the balanced sample to mitigate concerns about potential biases due to the lack of entry and exit when looking at the balanced sample only or to composition effects due to changing coverage by Orbis when analyzing the full (unbalanced) sample only.

4. We focus on three production locations (Germany, CESEE, and other advanced Europe) and two types of ownership (German and non-German). Within the group of German-owned firms producing in Germany, we further distinguish firms that are part of a group that owns other firms in the sample located outside of Germany (multinational firms) from those that are not. This differentiation allows us to test whether foreign operations are more (resp. less) profitable than domestic ones because of a positive (resp. negative) selection effect, i.e. more (resp. less) successful firms tend to be those that expand abroad and become multinational, rather than because of the inherent relative advantages of foreign production locations. To simplify the presentation of the econometric results below, we will refer to all German-owned firms located outside of Germany as part of a German-owned multinational group.

5. Our profitability measure is return on assets (ROA) defined as net profits divided by total assets, and is summarized in Table 1 below, both for the balanced sample and the full sample. The table shows that German-owned firms are more profitable on average than other firms, regardless of location and firm size. Comparing across locations, firms producing in CESEE are more profitable on average than those producing in Western Europe. This is the case both for German-owned firms and for other firms. However, the favorable profit differential between foreign and domestic activities is especially large between German-owned firms operating in the CESEE and in Germany.

6. In the rest of the paper, we explore whether these differences persist once we control for the sector of activity, two-firm-level characteristics (size and leverage), the economic cycle, and the type of firm (part of a multinational group versus national). We also investigate whether the difference is driven by sectors in which location decisions are likely driven by proximity to the consumer (retail) vs. sectors where production cost considerations are likely to dominate (manufacturing). Profitability in retail activities may also be affected by varying degrees of competition in national markets, while manufacturing activities are more likely dependent on market structure and competition at the European and global levels.

[3] The countries are: Austria, Bosnia and Herzegovina, Belgium, Bulgaria, Czech Republic, Germany, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Iceland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Russia, Slovenia, Sweden, Slovakia, Turkey, and Ukraine.

Table 1. ROA Summary

Location	Sample	German ownership		Other ownership	
		Obs	Mean	Obs	Mean
Germany	Balanced	22,111	4.9	8,003	4.4
	Full	55,862	4.8	23,571	3.7
CESEE	Balanced	5,199	7.3	57,369	5.5
	Full	8,991	7.0	122,577	5.0
Other Advanced	Balanced	11,463	5.6	198,372	4.4
	Full	18,770	5.3	320,851	4.2

Source: Orbis, and IMF staff calculations

C. Econometric Framework

7. For each of the two samples (full and balanced), we estimate the following OLS panel regressions, where we allow the standard errors to be clustered at the country level:

$$ROA_{i,j,k,t} = \alpha_{j,t} + \beta.y_{k,t} + \theta_1 \cdot size_{i,j,k,t} \cdot \delta_j + \theta_2 \cdot leverage_{i,j,k,t} \cdot \delta_j + \gamma_1.deuguo_{i,j,k,t} + \gamma_2.deuguo\_deu\_only_{i,j,k,t} + \gamma_3.deuguo\_cesee_{i,j,k,t} + \gamma_4.deuguo\_other_{i,j,k,t} + \gamma_5.ndeuguo\_deu_{i,j,k,t} + \gamma_6.ndeuguo\_cesee_{i,j,k,t} + \varepsilon_{i,j,k,t}$$

- where i denotes the firm, j denotes the NACE-2 sector, k denotes the country of location, and t denotes the year. In the regressions, profitability is explained by the following variables: $\alpha_{j,t}$, is a sector*year fixed effect, which controls for time-varying differences in regional factors affecting the profitability of the sector; $y_{k,t}$ is the output gap in the country where the firm operates, and controls for the effect of domestic cyclical conditions; $size_{i,j,k,t}$ is the firm's sales (in log U.S. dollars); $leverage_{i,j,k,t}$ is the firm's leverage (defined as the ratio of total debt to total assets); δ_j is a dummy variable for sector *j*; $deuguo_{i,t}$ is a dummy indicating German ownership; $deuguo\_deu\_only_{i,t}$ is a dummy indicating a firm that is German-owned, operates in Germany, and whose ultimate owner has operations only in Germany; $deuguo\_cesee_{i,t}$ is a dummy indicating a German-owned firm in a CESEE country; $deuguo_other_{i,t}$is a dummy indicating a German-owned firm in an advanced European country (other than Germany); $ndeuguo\_deu_{i,t}$ is a dummy indicating a foreign-owned firm in Germany; and $ndeuguo\_cesee_{i,t}$ is a dummy indicating non-German ownership in a CESEE country. By controlling for the output gap, we can interpret our regression coefficients as measuring the impact of the other variables on structural profitability, at least in a domestic sense.[4] We allow the effect of size and leverage to vary by industry, and therefore interact our size and leverage variables with sectoral dummies. We do

[4] Without information on firm's export activity, we cannot control for the cycle of Germany's relevant trading partners, and therefore cannot refer to a notion of structural profitability *stricto sensu*.

not include firm fixed effects as they would be highly correlated with firm ownership dummies, which vary little over time.

- The coefficients of the $deuguo_{i,t}$, $ndeuguo\_deu_{i,t}$, and $ndeuguo\_cesee_{i,t}$ dummies measure the profitability premium of a firm in the category captured by the dummy relative to a non-German-owned firm located in an advanced European country (other than Germany). The coefficient of the dummy variables $deuguo\_cesee_{i,t}$ (resp. $deuguo\_other_{i,t}$) indicates the size of the profitability premium of a German-owned firm located in a CESEE country (resp. another advanced European country ex Germany) relative to a German-owned firm located in Germany that is part of a multinational group. This coefficient, therefore, should capture the profitability advantage or disadvantage of locating production in the CESEE region (resp. other advanced European countries) for a German ultimate owner.

- In a second stage of the empirical analysis, we estimate the equation above for each of three subsectors: manufacturing (a sector where the decision of the production location is likely largely motivated by relative cost of production considerations), retail and wholesale trade (a sector where the production location is likely motivated by the need to be close to the customer), and other sectors.[5]

- Finally, in a third set of regressions we examine how the various premia evolve over time by allowing the coefficients of the various dummies to be time-varying. Specifically, we run the following OLS regression (again, with country-level clustering) for both samples:

$$ROA_{i,j,k,t} = \alpha_{j,t} + \beta.y_{k,t} + \theta_1 \cdot size_{i,j,k,t} \cdot \delta_j + \theta_2 \cdot leverage_{i,j,k,t} \cdot \delta_j + \gamma_{1,t}.deuguo_{i,j,k,t} + \gamma_{2,t}.deuguo\_deu\_nat_{i,j,k,t} + \gamma_{3,t}.deuguo\_cesee_{i,j,k,t} + \gamma_{4,t}.deuguo\_other_{i,j,k,t} + \gamma_{5,t}.ndeuguo\_deu_{i,j,k,t} + \gamma_{6,t}.ndeuguo\_cesee_{i,j,k,t} + \varepsilon_{i,j,k,t}$$

D. Results

All Sectors

8. Regression results for the two samples including all economic sectors are shown in column (1) and column (2) of Table 2. As expected, firm profitability is procyclical (*ygap* has a positive coefficient). Looking at the effect of location for non-German-owned firms, profitability is greatest in CESEE and lowest in Germany (the coefficient of *ndeuguo_cesee* is positive although not significant, while the coefficient of *ndeuguo_deu* is negative and significant in the full sample), which is broadly in line with the unconditional results shown in Table 1 above.

9. Turning to the effect of location for German-owned firms that are part of a multinational group, profitability is weaker in advanced European countries ex Germany relative to CESEE (the coefficient of *deuguo_cesee* is larger than the coefficient of *deuguo_advother*) and relative to Germany (the coefficient of *deuguo_advother* is negative).

[5] Manufacturing covers NACE 2 sectors #10–33, and retail and wholesale trade covers NACE 2 sectors #45-47.

The comparison between Germany and CESEE is less clear-cut: German-owned firms are more profitable in Germany in the balanced sample (the coefficient of *deuguo_cesee* is negative) but not in the full sample (the coefficient of *deuguo_cesee* is positive and insignificant).

10. Finally, the regression results confirm that there is a selection bias for firms belonging to a multinational: German-owned firms operating in Germany that are not part of a multinational group are less profitable than their peers that are part of a multinational (the coefficient of *deuguo_deu_only* is negative). The effect of size and leverage (results are not reported) indicate significant heterogeneity across sectors. While the effect of leverage on ROA is uniformly negative, the effect of size is only mostly positive, suggesting the absence of increasing returns to scale or decreasing returns to scale in some sectors (see also Hirsch et al., 2014, and references therein),

Sector-Level Regressions

11. We turn now to the sector-level regressions results (columns 3–8), where our focus is mostly on the effect of location for German-owned firms. We start by noting that, as expected, the effect of domestic cyclical conditions (the coefficient of *ygap*) is weakest for firms in manufacturing and largest for firms in retail and wholesale trade.

12. In manufacturing, German-owned firms that are part of a multinational group are least profitable in Germany and most profitable in CESEE (the coefficients of *deuguo_cesee* and *deuguo_advother* are both positive, and the former is larger). Furthermore, and perhaps surprisingly, the selection bias is the reverse in manufacturing: German-owned firms that are not part of a multinational group are more profitable than their multinational peers (the coefficient on *deuguo_deu_only* is positive).

13. In retail and wholesale trade, the situation is dramatically different. German-owned firms located in Germany and part of a multinational group are the most profitable by a wide margin, while those located in other advanced European countries are still less profitable than those in CESEE. Furthermore, German-owned firms located in Germany are much more profitable when they are part of a multinational than when they are not (the coefficient on *deuguo_deu_only* is very negative).

14. The pattern in non-manufacturing non-retail/wholesale sectors broadly follows that of manufacturing. The only difference is that German-owned firms that are not part of a multinational group are less profitable than their multinational peers, at least in the balanced sample.

15. In passing, we also note that for non-German owners, Germany as a manufacturing production location has been less profitable than other advanced European locations (the coefficient of *ndeuguo_deu* is negative in columns 3–4).

Table 2. Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All sectors		Manufacturing		Retail / Wholesale		Other sectors	
	Balanced	Full	Balanced	Full	Balanced	Full	Balanced	Full
deuguo	2.85***	1.33***	-0.5	0.11	7.52***	4.59***	0.06	-0.61
	(0.41)	(0.34)	(0.3)	(0.34)	(0.59)	(0.41)	(0.35)	(0.37)
deuguo_deu_only	-2.77***	-0.71***	1.63***	1.47***	-6.84***	-3.54***	-1.09***	0.14
	(0.37)	(0.14)	(0.09)	(0.06)	(0.35)	(0.2)	(0.18)	(0.12)
deuguo_cesee	-1.20***	0.35	2.17***	1.80***	-5.99***	-2.87***	1.68***	1.84***
	(0.29)	(0.25)	(0.34)	(0.24)	(0.5)	(0.41)	(0.31)	(0.43)
deuguo_advother	-2.11***	-0.66*	0.79**	0.16	-6.39***	-3.55***	0.77	1.41***
	(0.31)	(0.35)	(0.37)	(0.39)	(0.64)	(0.56)	(0.51)	(0.31)
ndeuguo_deu	-0.38	-0.80**	-0.65*	-0.86**	0.01	-0.44	-0.37	-1.06***
	(0.35)	(0.34)	(0.34)	(0.35)	(0.36)	(0.33)	(0.38)	(0.36)
ndeuguo_cesee	0.53	0.62	0.70*	0.65*	0.75	0.90*	-0.02	0.26
	(0.41)	(0.43)	(0.38)	(0.38)	(0.47)	(0.52)	(0.45)	(0.42)
ygap	0.10***	0.11***	0.05*	0.07**	0.16***	0.15***	0.08**	0.09***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)	(0.03)
sector*size	yes	yes	yes	yes	yes	yes	yes	yes
sector*leverage	yes	yes	yes	yes	yes	yes	yes	yes
sector* year dummies	yes	yes	yes	yes	yes	yes	yes	yes
# of observations	302517	550413	108099	183849	100944	188379	93474	178185
Adjusted R2	0.142	0.13	0.157	0.153	0.172	0.143	0.114	0.101

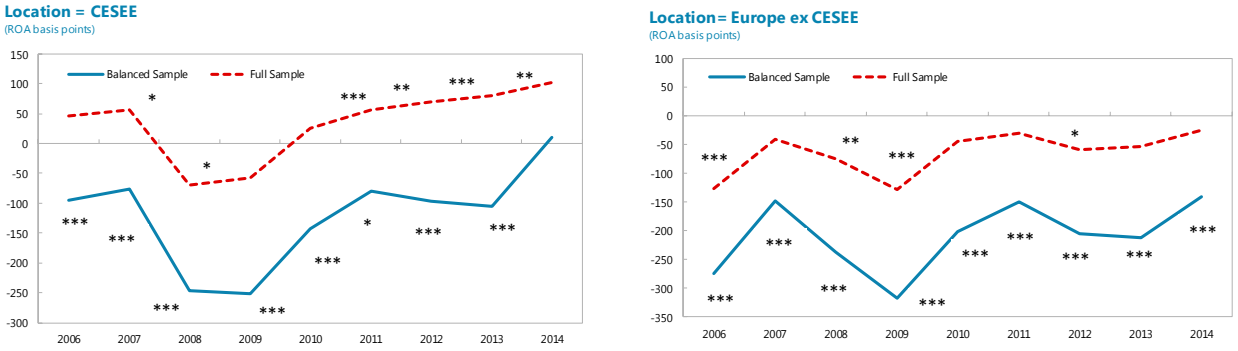
Note: The dependent variable is return on assets (ROA). Size is log of total sales in USD. Leverage is total debt divided by total assets. Estimation with OLS, standard errors clustered at country level. The full (resp. balanced) sample comprises about 80,000 (resp. 34,000) firms observed over the 2006-2014 period. *** (resp. **, *) indicates significance at the 1 percent (resp. 5 percent, 10 percent) level. Standard errors are reported in parentheses.

Evolution over Time

16. The evolution over time of the premia earned by German-owned firms producing outside of Germany (relative to German-owned firms producing in Germany and part of a multinational) is shown in Figure 1. The premium earned in CESEE has been negative in the balanced sample in every year but the last one, while it has been positive in the full sample in every year except those of the global financial crisis (2008–09) and, at 100 bps in 2014, is significantly above its pre-crisis level. The negative premia earned in other advanced European countries has shrunk modestly over time, but remains significant in the balanced sample (-150 bps in 2014).

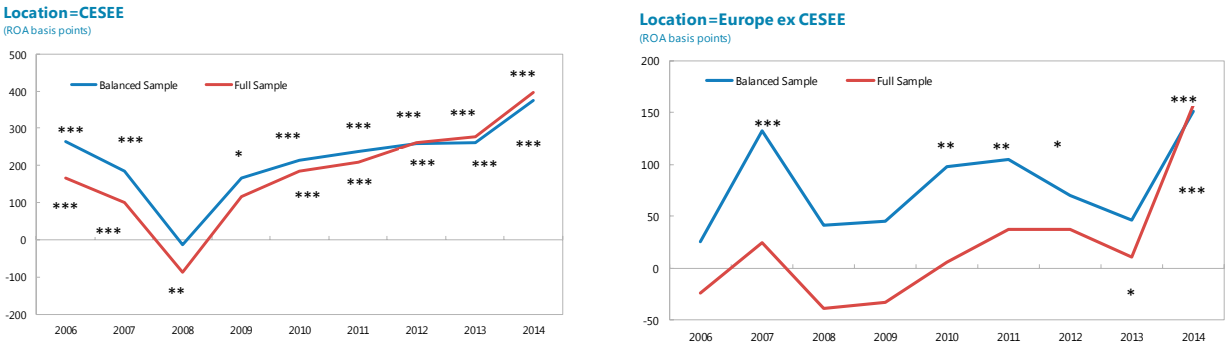
17. In manufacturing the premia reached a decade high in 2014 across regions and across samples. The CESEE premia dipped in 2008–09 during the global financial crisis, but rebounded strongly and are very large. Furthermore, the premia estimated in the two samples are very similar for CESEE.

Figure 1. Profitability Premium Earned by German-Owned Firms Abroad (All Sectors)
(by region of location, 2006–14)



Sources: Orbis and IMF staff calculations
Note: The premia are measured relative to same-size German-owned firms producing in Germany that are part of a multinational group. ***,**,* denote significance at the 1 percent, 5 percent, and 10 percent levels.

Figure 2. Profitability Premium Earned by German-Owned Firms Abroad (Manufacturing)
(by region of location, 2006–14)



Sources: Orbis and IMF staff calculations
Note: ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels.

E. Conclusion

18. Our analysis suggests that over 2006–2014, German-owned multinationals have been more profitable at home than in other European countries in the domestically-oriented retail/wholesale trade sector, and less profitable at home in the more outward-oriented manufacturing sector, where location decisions are more driven by production costs consideration. In manufacturing, the profitability gap has been particularly large when comparing Germany to CESEE countries as a production location, and was at a decade high in 2014. While subject to a number of caveats, such as the cross-country comparability of local accounting rules, possible profit shifting within multinational groups; see Goldbach et al., 2017), the relatively coarse industry groupings (the NACE 2 classification), the adequacy of the industrial classification in Orbis, or the representativeness of the Orbis data in general, our results suggest that German-owned manufacturing multinational firms are likely to find investing in CESEE financially more attractive than investing at home. If so, the threat of relocating production eastward, while perhaps less salient than in the past (Dustmann et al., 2014), could still be exerting downward pressures on domestic wages and investment at the current juncture.

References

Deutsche Bundesbank (2016), "German Enterprises' Profitability and Financing in 2015", Monthly Report, December, 57–76.

Dustmann, Christina, Bernd Fitzenberger, Uta Schonberg, and Alexandra Spitz-Oener (2014), "From Sick Man of Europe to Economic Superstar: Germany's Resurgent Economy", Journal of Economic Perspectives, Vol. 28, No. 1, Winter 2014, pp. 167–88.

Goldbach, S., Arne J. Nagengast, E. Steinmueller, and G. Wamser, "The Effect of Investing Abroad on Investment at Home: On the Role of Technology, Tax Savings, and Internal Capital Markets", Deutsche Bundesbank Discussion Paper No 14/2017.

Hirsch, Stefan, Jan Schiefer, Adelina Gschwandtner, and Monika Hartmann (2014), "The Determinants of Firm Profitability Differences in EU Food Processing", *Journal of Agricultural Economics*, 65(3): 703-721.

Kalemli-Özcan, Şebnem, Luc Laeven and David Moreno (2015), "Debt Overhang, Rollover Risk and Investment in Europe", paper presented at the Twenty-First Dubrovnik Economic Conference organized by the Croatian National Bank.

IMF (2013), "German-Central European Supply Chain-Cluster Report", Country Report No. 13/263

WAGE AND INFLATION DYNAMICS IN GERMANY AND IMPLICATIONS FOR EUROPEAN RECOVERY AND REBALANCING[1]

A. Introduction

1. In the staff's baseline forecast, inflation in the euro area (EA) raises gradually over time and returns to the ECB price stability target—with Germany in the lead. EA inflation is expected to converge to the ECB's price stability objective—defined as inflation below but close to 2 percent—as output growth remains above potential in the near future. In this scenario, the ECB would be able to phase out its asset purchase program and progressively normalize interest rates. In the forecast, Germany's inflation is expected to be persistently higher than in the rest of the euro area (ROE), reflecting a better starting cyclical position and higher inflation expectations. This would be a departure from the past. In fact, since the creation of the euro, the ECB has achieved its price stability objective with, for the most part, lower inflation in Germany than in the ROE (see Staff Report, Figure 9).

2. This paper addresses the question of what wage developments are needed to underpin the expected sustained increase of inflation in Germany, as well as what might be the consequences if such an increase fails to materialize. We first show (Section B), with the help of a panel cointegration analysis using data for 14 EA countries, that wages in Germany have generally grown in line with fundamentals, but with the notable exception of the wage moderation period in the mid-2000s. Then, we estimate a marginal cost-based New Keynesian Phillips curve (Gali et al., 2001) and show that real wages need to grow by more than 1 percent for a sustained period (nominal wage growth should exceed 3 percent) to bring inflation beyond 2 percent as anticipated in the baseline forecast.

3. We then illustrate and quantify what would be the consequences for Germany and the rest of the euro area if price and wage inflation expectations failed to pick up as foreseen in the baseline forecast. For the upswing in Germany and the EA to continue as expected in the baseline—allowing a timely normalization of monetary policy—price and wage inflation expectations must rise in line with the tightening of goods and labor market. To illustrate the importance of this mechanism, we perform two experiments using G20MOD—a general equilibrium model developed in the Research Department of the IMF (Section C). In the first experiment, we assume that—due to sluggish expectations—wages and prices inflation developments are temporarily more subdued than justified by the degree of labor and good markets tightness *in Germany*. In the second experiment, expectations are assumed to be sluggish *in the rest of the euro area* as well. In both scenarios, inflation and output growth in the EA as a whole slow down significantly with respect to baseline, delaying the normalization of monetary policy. In the first scenario, Germany experiences lower investment and potential output, but also a temporary boost

[1] Prepared by Zoltan Jakab (RES), Aiko Mineshima (EUR) and Jean-Marc Natal (EUR). The authors would like to thank Anvar Musayev for superb research assistance.

to growth because of gains in competitiveness. The latter exacerbates imbalances within the monetary union.

B. Wage Dynamics and Inflation in Germany

4. In the long-run, nominal wage growth should reflect labor productivity growth and inflation. To explore whether this has been the case in Germany, we estimate an Engle-Granger cointegration reduced-form relationship among nominal wages, prices, and productivity.[2] Given the annual wage-negotiation practice in Germany and with only a few business cycles since reunification, we rely on panel data to obtain a sufficiently large sample. Specifically, we use an unbalanced annual panel data set of 14 euro-area countries (excluding offshore financial centers) covering the period 1995–2016.[3] As part of robustness check, we also applied the cointegration approach to quarterly time-series data for Germany for Q1:1995 to Q4:2016. The model produces estimates for long-run wage levels for Germany that are consistent with fundamentals (i.e., labor productivity and price level) and short-run dynamic wage adjustments. The long-term equation is:

$$ln(wage_{it}) = \beta_1 ln(price_{it}) + \beta_2 ln(productivity_{it}) + e_{it}$$

where *i* and *t* index countries and time, *wage* denotes nominal compensation per employee, *price* is the GDP deflator (we also use the consumer price index (CPI) as an alternative indicator), *productivity* is measured by real output per worker, and *e* is the error term. Compensation per employee is the most encompassing measure of labor cost, and therefore the most relevant for inflation. In particular, compensation per employee captures the non-wage component of labor costs (e.g., fringe benefits), which has been increasing in Germany. The short-term relationship is:

$$\Delta ln(wage_{it}) = \mu_i + \theta_1 \Delta ln(price) + \theta_2 \Delta ln(productivity_{it}) + \gamma \hat{e}_{it-1} + \varepsilon_{it}$$

where $\hat{e}_{it-1}$ is the error-correction term, and γ measures the speed of adjustment to a random shock. The convergence condition requires γ to be between 0 and 1 with a negative sign. In addition, some short-term specifications also include the unemployment gap defined as percentage deviations from the non-accelerating wage rate of unemployment (NAWRU).

[2] Our approach follows former studies by, among others, Nickell, 1987; Manning, 1993; Bell, Nickell, Quintini, 2002; Nunziata, 2005; and EC 2013.

[3] The 14 countries are Austria, Belgium, Estonia, Finland, France, Germany, Greece, Italy, Lithuania, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Regression Results

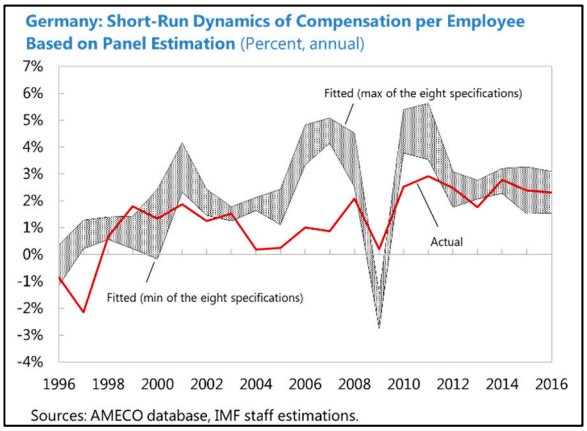
Long term 1/						Short term 2/								
							no trend	l. trend	no trend	l. trend	no trend	l. trend	no trend	l. trend
Dependent variable	***log wage***					***Δlog wage***								
Regressors	log productivity	1.42 ***	1.44 ***	1.45 ***	1.48 ***	Δlog productivity	0.82 ***	0.83 ***	0.87 ***	0.88 ***	0.91 ***	0.92 ***	0.95 ***	0.96 ***
	log GDP def	0.68 ***	0.52 ***	...	...	Δlog GDP def	0.88 ***	0.86 ***	0.69 ***	0.67 ***	...	...	...	...
	log CPI	...	...	0.63 ***	0.50 ***	Δlog CPI	...	...	...	...	0.76 ***	0.74 ***	0.54 ***	0.52 ***
	Constant	-5.37 ***	-4.83 ***	-5.30 ***	-4.85 ***	UE gap 3/	...	...	0.00 ***	0.00 ***	...	...	-0.01 ***	-0.01 ***
	Trend (linear)	...	0.00 ***	...	0.00 **	EC_{t-1}	-0.21 ***	-0.21 ***	-0.15 ***	-0.15 ***	-0.23 ***	-0.23 ***	-0.19 ***	-0.19 ***
						Constant	0.00 *	0.00 **	0.01 ***	0.01 ***	0.00 *	0.00 **	0.01 ***	0.01 ***
	Cross-section FE	yes	yes	yes	yes									
	Adj. R-squared	0.99	0.99	0.99	0.99	Adj. R-squared	0.69	0.69	0.71	0.71	0.65	0.64	0.69	0.69
	Prob (F-statistic)	0.00	0.00	0.00	0.00	Prob (F-statistic)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1/ The results for various panel cointegration tests broadly support the existence of cointegrations. For the Pedroni residual cointegration tests, panel and group PP-statistics and ADF-statics support the existence of cointegration when allowing for individual intercepts. The Kao residual cointegration test also suggests the existence of cointegration. Estimations for Germany are done with quarterly data. '***' and '**' denote statistically significance at 1 percent and 5 percent, respectively.

2/ The columns with "no trend" show the estimation results of short-term equations with corresponding long-term equations estimated without trend. Likewise, the columns with "l.trend" show the results of short-term equations with corresponding long-term equations estimated with a linear trend.

3/ The unemployment gaps are defined as percentage points deviations of actual unemployment rates (ILO definition) from the non-accelerating wage rate of unemployment (NAWRU) from the AMECO database.

5. Cointegration analysis suggests that, after prolonged wage moderation, nominal wages have been growing generally in line with the pace implied by labor productivity growth and inflation since 2012. In the mid-2000s, when various labor markets reforms took place, nominal wage growth remained notably below what would have been predicted by fundamentals. This came to an end with the 2009 recession, when labor-hoarding resulted in a large negative spike in labor productivity, which was then quickly reversed in the following two years. Since 2014 labor compensation has been growing at about 2½ percent per year, which is generally in line with, or in some cases even faster than, the pace implied by fundamentals. Mirroring such dynamics, Germany's wage level—which fell below the long-run fundamental-implied level in 2004—is gradually returning to the long-run equilibrium.



6. The estimation results using quarterly German time-series data are less robust. The cointegration approach works properly—meaning the sign for the coefficients are in line with economic explanation and/or the error-correction term is statistically significant—only when using GDP deflator as a price indicator and including the unemployment gap in the short-term equation. The results from this specification, however, are in line with the main findings of the panel analysis: a negative gap in wage levels emerged during 2004–10, following a period of wage overvaluation vis-à-vis fundamentals; and the negative gap has been narrowed and even turned positive in recent years thanks to wage growth that is slightly above the pace implied by fundamentals. Using CPI not

only provides a counter-intuitive sign (i.e., negative) for the coefficient for productivity in the long-term equation, but also leads to the error-correction term in the short-run dynamics being statistically insignificant.

7. Wage-inflation linkages can be analyzed with a real marginal cost-based New Keynesian Phillips Curve (NKPC). In this framework, prices are set at a markup over marginal costs as firms enjoy some monopolistic power due to imperfect substitutability across goods. A rise (fall) in real marginal costs from its steady-state level creates inflationary (disinflationary) pressures.[4] The key equation is:

$$\pi_t = \beta E_t\{\pi_{t+1}\} + \gamma \widehat{MC}_t \cdots (1)$$

where π_t is inflation at time t, $E_t\{\pi_{t+1}\}$ is future inflation at t+1 anticipated at time t, and $\widehat{MC}$ is the real marginal cost (MC) expressed in percent deviation from its steady state. For simplicity, we follow Gali et al. (2001) and abstract from capital accumulation to compute firm's real marginal costs as follows:[5]

$$Y_t = A_t N_t^{1-\alpha}$$

$$MC_t = \frac{W_t}{P_t}\frac{1}{MPN_t} = \frac{W_t}{P_t}\frac{1}{(1-\alpha)(Y_t/N_t)} = \frac{labor\ share_t}{1-\alpha}$$

where A_t is a common technological factor, N_t is employment, W_t is nominal wage, P_t is the GDP deflator, Y_t is output, MPN_t is the marginal productivity of labor.

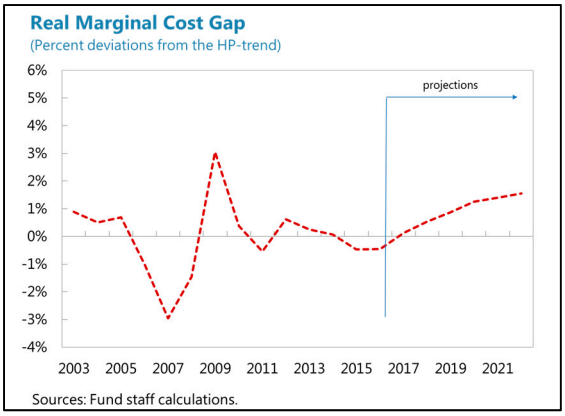
8. NKPC estimation suggest that inflation in Germany is well explained by expected future marginal costs. Let Z_t denote a vector of variables observed at time t, then under rational expectations, equation (1) defines the set of orthogonality conditions as follows:

$$E_t\{(\pi_t - \beta\pi_{t+1} - \gamma\widehat{MC}_t)\,\boldsymbol{Z_t}\} = 0$$

[4] In contrast to the literature, we do not compute the real marginal cost gap in deviation from its historical mean but in deviation from a HP-filter trend. In Germany, the labor share declined steadily from the late-1990s to mid-2000s, in part due to the labor market reforms and increased participation in global value chains. By computing the real marginal cost gap as percent deviation from an HP-trend, we explicitly attribute the drop in the labor share to structural factors. The filter is applied to quarterly data for 1990:Q1–2022:Q4 (2017–2022 are staff projections) to mitigate the well-known "end-sample problem," with a smoothing parameter of 1,600.

[5] Sbordone (2002) shows that reasonably accurate estimates of real marginal costs can be computed while abstracting from capital accumulation in production. In principle, lower real interest rates—*ceteris paribus*—decrease total real marginal costs, but they also stimulate domestic demand, a channel that cannot be captured in a single equation reduced form Phillips curve where measures of slack are taken as exogenous. Existing literature (Ravenna and Walsh, 2006, Sbordone, 2002, Woodford, 1996) that explicitly models general equilibrium effects has shown that i) the real unit labor cost is a good approximation of real marginal costs and, ii) decline in interest rates have a positive effect on inflation for reasonable parameterizations.

Following Gali et al. (2001) we estimate the model by applying a generalized method of moments (GMM) model, with the following instruments: four lags of inflation, two lags of the real MC gap, three lags of output gap (as measured by percent deviations from ah HP-trend), and two lags of wage inflation.[6] The estimation results of the NKPC fitted on German data are shown below, with standard errors in parenthesis. The results are comparable to those from Gali et al (2001), who estimate the same equation for the euro area.[7]



$$\pi_t = 0.976 E_t\{\pi_{t+1}\} + 0.031 \widehat{MC}_t$$

(0.04) (0.005)

Iterating equation (1) forward allows to compute the fundamental inflation rate (see Sbordone, 2002):

$$\pi_t = \gamma \sum_{k=0}^{\infty} \beta^k E_t\{\widehat{MC}_{t+k}\} \equiv \pi_t^*$$

where the current inflation is expressed as a discounted stream of expected future real marginal cost gaps. Since expectations of future marginal cost are not observable, a direct measure of π_t^* cannot be constructed, but it can be forecasted based on current and past data for marginal cost and inflation. Under the assumption of an unbiased VAR forecast, fundamental inflation can then be estimated as follows for all periods t:

$$\pi_t^* = \gamma \sum_{k=0}^{\infty} \beta^k E_t\{\widehat{MC}_{t+k} \mid W_t\}$$

$$W_t = \left[\widehat{MC}_t, \widehat{MC}_{t-1} \ldots, \widehat{MC}_{t-q}, \pi_t, \pi_{t-1,} \ldots, \pi_{t-q}\right]'$$

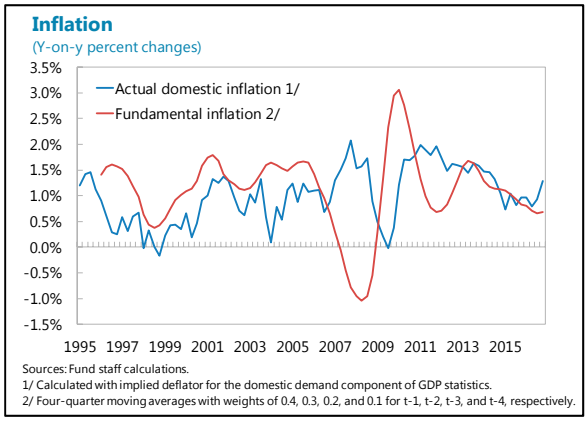
[6] Our framework closely follows Galí, Gertler, and López-Salido (2001). Real ULC is constructed by deflating nominal ULC with the GDP deflator. Inflation is measured as quarterly percent changes in the GDP deflator from the historical mean (1.1 percent). The main reason to use the GDP deflator, instead of CPI, is that it is the closest representation of the price of domestic production. In the long run, however, the GDP deflator and CPI tend to move in a similar way. The estimation weighting matrix follows HAC (Newey-West) with the number of lags determined by AIC. The p value associated with the J statistic (p=0.423) suggests our model is not misspecified.

[7] As an alternative specification, we also estimated specifications with (i) lagged actual inflation, and (ii) lagged demeaned import price inflation. The former confirms that inflation in Germany is largely forward looking: the coefficient is 0.27 for π_{t-1} and 0.72 for π_{t+1} (both are statistically significant). The latter provides similar coefficients for inflation expectation and real marginal cost—0.96 for π_{t+1} and 0.04 for MC_t (both are statistically significant)—and a statistically significant coefficient for the demeaned import price inflation (0.02), but the p-value associated with the J statistic suggests a possible misspecification problem. Although applying GMM is a standard approach to estimating NKPC, its robustness is often questioned (e.g., Rudd and Whelan, 2005). In response, Galí, Gertler, and López-Salido (2005) show that their original approach, including the forward-looking behavior—is robust to using a variety of estimation procedures, including GMM estimation of the closed form and nonlinear instrumental variables.

Let *A* denote the companion matrix of the VAR(1) representation of a four-lag (q=4) VAR model for inflation and real marginal cost gaps, we can write $E_t\{\widehat{MC}_{t+k} \mid W_t\} = e_1' A^k W_t$, where e_1 is a vector with a 1 in its first position and zeros elsewhere. If the model is correct, the fundamental equation can be expressed as follows:

$$\pi_t^* = \gamma e_1'(I - \beta A)^{-1} W_t$$

9. Based on NKPC estimation results, nominal wages would have to grow by over 3 percent per year for inflation to be consistent with staff's baseline forecast. Using coefficient estimates for the NKPC equation fitted to German data, real wages would have to grow by 1.3 percent per year on average (implying that nominal wage growth would increase to 3.3 percent) if fundamental inflation—a measure of underlying inflation driven by labor costs—is to reach 2.3 percent by 2022, as projected by staff.[8]



C. Sluggish Wage and Price Inflation Expectations: G20MOD Simulations

10. This section analyses the effects on the German economy and the rest of the euro area of a failure of wage and price inflation expectations to increase as fast as in the baseline. We run two experiments using G20MOD. In the first experiment, we assume that—due to sluggish expectations—wages and prices inflation developments are temporarily more subdued than justified by the degree of labor and good markets tightness *in Germany*. This may occur if, for example, following years of wage moderation and low inflation, social partners are reluctant to let nominal wages accelerate, even in the presence of tight labor markets.[9] In the second experiment, inflation expectations remain sluggish *in all euro area countries,* where years of recession and low inflation may delay the normal pick-up in wages and prices as goods and labor markets gradually tighten.

11. Sluggish expectations are simulated through negative shocks to wage and price inflation expectations in a macroeconometric model. To simulate the effect of more sluggish wage and price inflation expectations than in the baseline, we introduce a series of fully anticipated negative shocks to the wage and price inflation expectation formation processes, that are otherwise rational and model consistent in G20MOD, a multi-region, forward-looking semi-structural global model consisting of 24 regions/countries. The shocks are calibrated to stabilize price and wage inflation at current levels for the next three years—or about 1 percentage point lower than in the baseline by 2019. Beyond 2019, the expectation formation process returns to normal. G20MOD has been developed in the Modeling Division of the IMF's Research Department, and is one of the

[8] Real marginal cost-based NKPC are known to produce volatile inflation projections around crisis time as labor hoarding could give rise to sharp drops in labor productivity, as appears to be the case in 2009 and 2010.

[9] In Germany, increased demand for alternative benefits that are not captured by compensation of employees (e.g., increased flexibility) could also have slowed down wage increases. This could continue to play a role in the near future.

modules of the flexible system of global models (FSGM). The model is based on micro-founded relationships and has been designed to conduct policy experiments in a general equilibrium and global setting (Andrle et al., 2015). Throughout the simulations, monetary policy is assumed to be constrained at the zero lower bound, and therefore not to react to shocks that bring inflation down relative to the baseline.

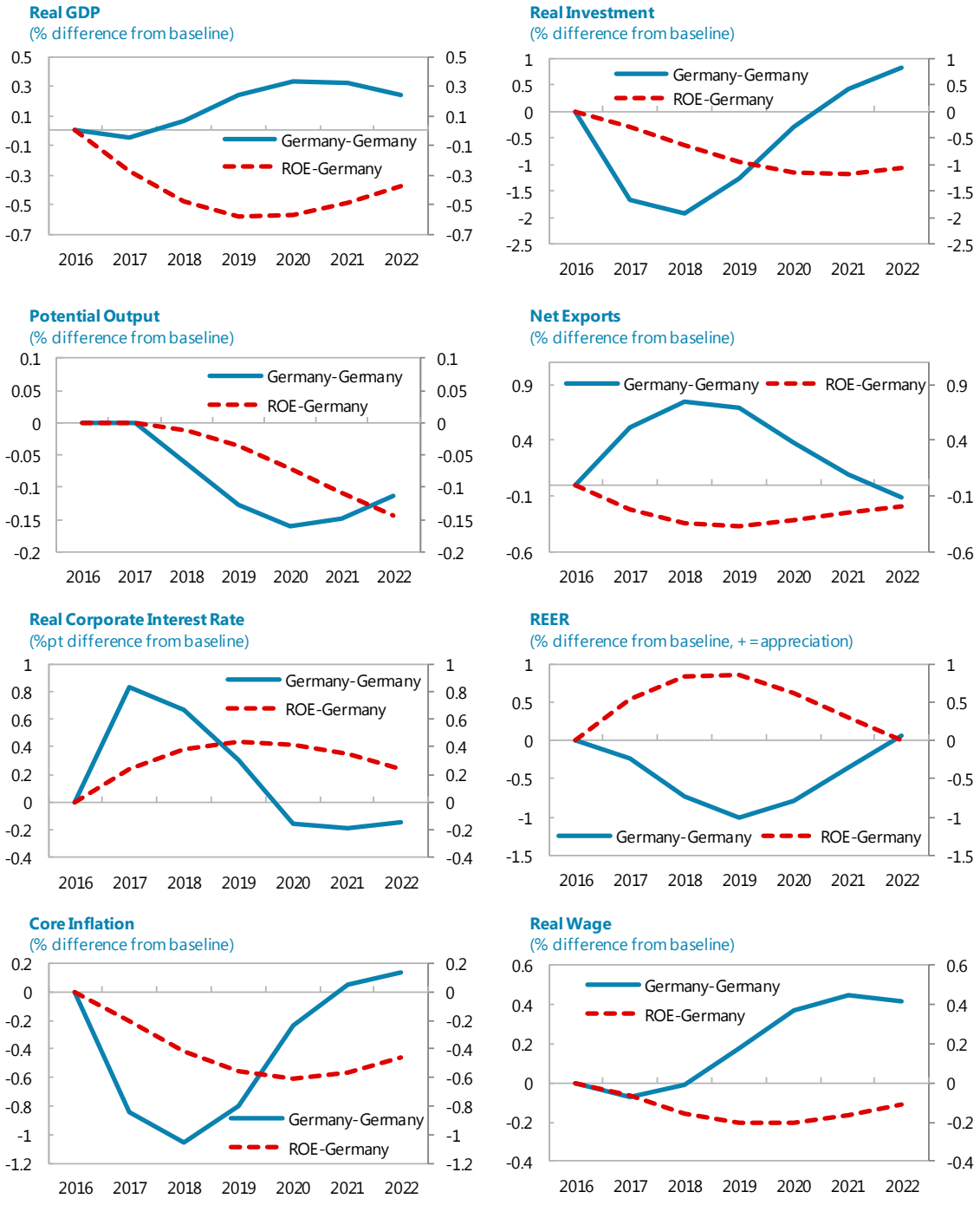
12. The simulations show that sluggish wage and price growth expectations in Germany would have an adverse impact on the rest of the EA and delay the normalization of monetary policy. In the first experiment, we assume that agents anticipate wage and price inflation to remain constant at the current level for the next three years. With respect to the baseline, it is a significant drop in inflation expectations. Because we assume that monetary policy does not respond to lower inflation due to the effective lower bound (ELB) on nominal interest rates, lower inflation expectations lead to higher real interest rates (lower Tobin's Q) and lower investment and potential output in Germany. At the same time, lower wage and price inflation improves Germany's competitiveness with respect to its main trading European partners (lower REER) and boosts net exports, so much so that, at the end of the forecast horizon (2022), the positive impact of lower REER on net exports outweighs the initial negative impact of higher real interest rates on investment. While competitiveness gains help shore up German GDP, the rest of the EA is hit by a combination of real appreciation and higher real interest rates. The overall impact on the EA is contractionary, which would keep inflation low and prevent the ECB from normalizing the monetary stance. External imbalances within the euro area would also be exacerbated in this scenario (see Figure 1).

13. Sluggish wage and price expectations in the whole EA would have an unambiguously negative impact on all countries in the region, including Germany. In the second experiment, we submit all EA countries to the same price and wage inflation expectations shocks, calibrated as explained above to ensure that inflation remains stable at the current level. The effect on output is unambiguously negative for all countries. Because of the lower bound on nominal interest rates, lower inflation expectations lead to higher real interest rate and lower investment. Lower real wages, output and employment also exert a negative effect on private consumption. Higher real interest rates lead to real appreciation and a deterioration of EA's competitiveness with respect to the rest of the world; net exports drop (see Figure 2).

D. Conclusion

14. For the recovery to continue in the euro area, it is key that higher wage and price inflation expectations rise together with improvements in the goods and labor markets. In this regard, developments in Germany are key, given that Germany accounts for some 28 percent of the currency union economy. The staff baseline scenario predicts that German wages and prices will soon accelerate, and for inflation in Germany to remain above the average of the EA for some time, in contrast with the pattern observed in the early years of the single currency. Should wages and prices remain sluggish, the euro area recovery could be postponed and with it the normalization of the ECB's monetary policy. Although wage setting is decentralized and left to social partners in Germany, the authorities could usefully emphasize in their public communication the importance of robust wage and price growth in the current conjuncture.

Figure 1. Transmission of Fully Anticipated -3 Years—Price and Wage Inflation Expectation Shocks in *Germany* (G20MOD Simulations)

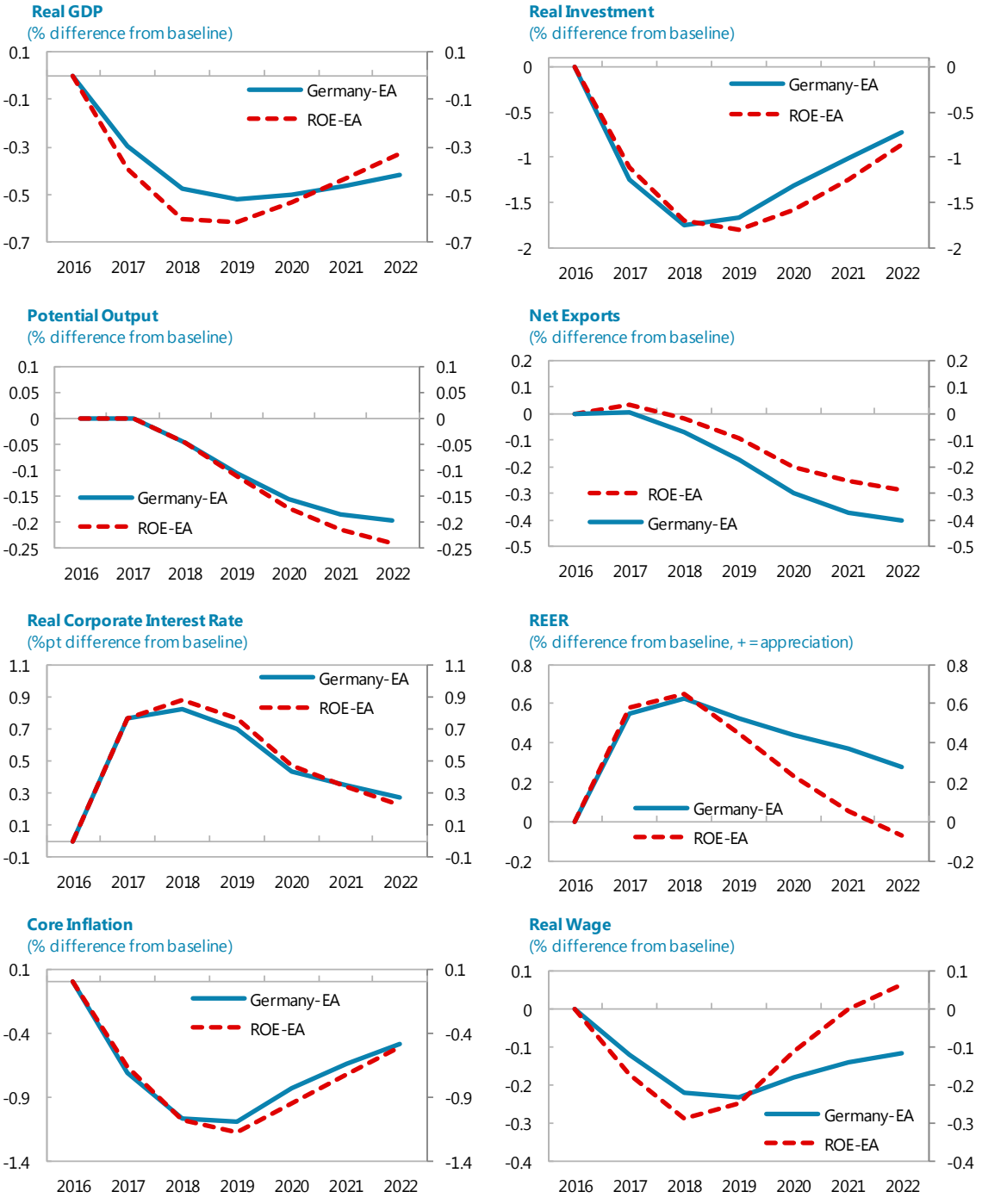


* ROE - Rest of euro area

* Effect of three years negative price and wage inflation expectation shocks

Source: IMF staff simulations

Figure 2. Transmission of Fully Anticipated -3 Years—Price and Wage Inflation Expectation Shocks in *All Euro Area* Countries (G20MOD Simulations)



* ROE - Rest of euro area

* Effect of three years negative price and wage inflation expectation shocks

Source: IMF staff simulations

References

Andrle, Michal, Blagrave, Patrick, Espaillat, Pedro, Honjo, Keiko, Hunt, Benjamin, Kortelainen, Mika, Lalonde, René, Laxton, Douglas, Mavroeidi, Eleonora, Dirk Muir, Susanna Mursula, and Stephen Snudden (2015), "The Flexible System of Global Models – FSGM," IMF Working Paper 15/64.

Galí, Jordi, Mark Gertler, and J. David López-Salido (2001), "European Inflation Dynamics," NBER Working Paper 8218.

Galí, Jordi, Mark Gertler, and J. David López-Salido (2005), "Robustness of the Estimates of the Hybrid New Keynesian Phillips Curve," mimeo.

European Commission (2013), "Benchmarks for The Assessment of Wage Developments," European Economy, Occasional Papers 146, May 2013.

Manning, Alan (1993), "Wage Bargaining and The Phillips Curve: The Identification and Specification of Aggregate Wage Equations," Economic Journal, Royal Economic Society, vol. 103(416), pages 98–118, January.

Nickell, Stephen (1986), "Dynamic Models of Labour Demand," Handbook of Labor Economics, in: O. Ashenfelter and R. Layard (ed.), Handbook of Labor Economics, edition 1, volume 1, chapter 9, pages 473–522 Elsevier.

Nunziata, Luca (2005), "Institutions and Wage Determination: a Multi-country Approach," Oxford Bulletin of Economics and Statistics, Department of Economics, University of Oxford, vol. 67(4), pp. 435–466, 08.

Ravenna, Federico, and Carl E. Walsh (2006), "Optimal Monetary Policy with The Cost Channel," Journal of Monetary Economics, 53(2), 199–216.

Rudd, Jeremy and Karl Whelan (2005), "New Tests of the New Keynesian Phillips Curve," Journal of Monetary Economics.

Sbordone, Argia M. (2002), "Prices and Unit Labor Costs: A New Test of Price Stickiness," Journal of Monetary Economics, Volume 49, Issue 2, March 2002, pp. 265–292.

INCOME DISTRIBUTION AND LABOR MARKET DEVELOPMENTS IN GERMANY[1]

A. Introduction

1. Creating more and better jobs, reducing inequalities and promoting inclusive labor force participation is at the center of the G20's domestic and global agenda (G20 Communiqué, 2016). The IMF has supported this effort through an enhanced analytical and policy focus on inequality and inclusive growth (Loungani, 2017). The German federal government's attention to issues revolving around the theme of inclusive growth is also reflected in the focus of its 2017 Annual Economic Report (BMWi, 2017) and its recent publication of the Fifth Poverty and Wealth Report (BMAS, 2017).

2. Against this background, this paper reviews selected developments in the income distribution and the labor market in Germany over the past two and a half decades. It pays particular attention to developments since the mid-2000s, when Germany implemented a comprehensive set of labor market reforms (the so-called Hartz reforms) which made the labor market more flexible. Analyzing the recent German experience can help revisit, and perhaps qualify, the hypothesis that there is a trade-off between less wage inequality and more labor market flexibility in advanced economies (Krugman, 1994).

B. Developments in Income Distribution During 1992–2014[2,3]

3. Market income inequality rose from the time of the reunification and reached a plateau in 2005. Figure 1 shows the evolution of the Gini coefficient of equivalized market income, a standard aggregate measure of income inequality.[4] The Gini rose almost continuously through the 1990s and the first half of the 2000s, and has been broadly stable since then around a level of 0.48. Because Germany has a well-developed public pension system, many seniors have no or little labor income, and low levels of wealth and capital market income. Thus, population ageing boosts the market Gini index and may potentially distort the interpretation of the evolution of the index over

[1] Prepared by Jérôme Vandenbussche (EUR) and Nils Grevenbrock (Goethe University Frankfurt). The authors wish to thank Bodo Aretz, Markus Grabka, Stefan Profit, Daniel Radowski, and Volcker Schmitt for providing and helping interpret some of the data used in this paper.

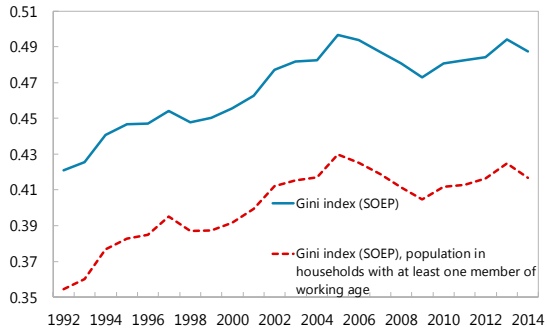
[2] Recent analyses of developments in income inequality in Germany include GCEE (2016), BMAS (2017), and Grabka and Goebel (2017). The former two papers also review the evolution of wealth inequality, which is not discussed here.

[3] Our analysis of income distribution is based on data from a large German household survey, version 32 of the German Socio-Economic Panel (SOEP). Calculations of various income and inequality measures are our own, but they match closely those reported in other publications (e.g. Grabka and Goebel, 2017). The latest survey was conducted in 2015 and provides income data for the years up to 2014.

[4] Equivalized income is computed based on total household income and through adjustments based on an equivalence scale that considers household structure (United Nations, 2011).

time. To get around this issue, we compute the market Gini for the population in households with at least one member of working age (see the red dotted line on Figure 1). This measure is significantly lower than the raw market Gini, but follows the same dynamics, indicating that the effect of the public pension system has been broadly neutral on the evolution of inequality. Looking at the cross-section of EU countries using Eurostat data, market inequality appears to be slightly above the European median.

Figure 1. Gini Index of Equivalized Market Income, 1992–2014 (Index between 0 and 1)

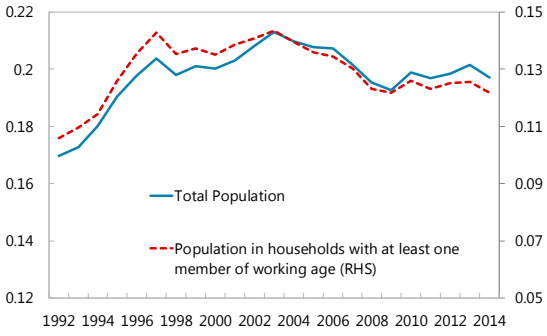


Sources: SOEP, and IMF staff calculations

4. This evolution appears to have been mostly driven by labor market income rather than capital income. Biewen and Juhasz (2012) and GCEE (2016) find that a large part of the increase in inequality until 2005 was due to increasing inequality in labor income as well as changes in employment outcomes. We will return to the important role of labor market developments in changes in market inequality in greater detail below. Capital income is generally not fully captured in household surveys and represents less than 10 percent of total household income in the data we used, so it is not too surprising that it would not be a major driver of measured market inequality. [5]

5. Redistribution is relatively high in European perspective and it has fallen below its post-reunification peak. Comparing the Gini coefficient of pre-government income with that of post-government income provides a measure of the extent of redistribution across households. Figure 2 shows that the inequality-reducing effect of redistribution grew strongly in the years following reunification, as large transfers were made to the eastern part of the country. A peak was reached in 2003, followed by a small decline over 2003–2009, and a stabilization afterwards.

Figure 2. Impact of Tax and Benefit System on Gini Index (Pre-government Gini minus post-government Gini, index points)



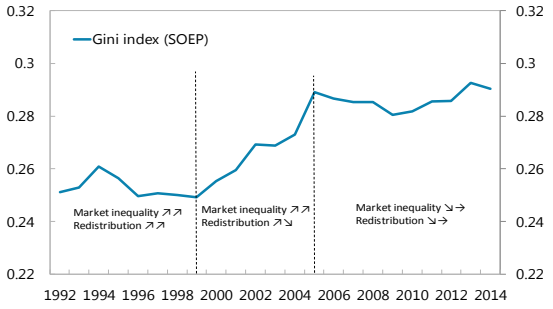
Sources: SOEP, and IMF staff calculations

The public pension system is the largest contributor to the German redistribution system, but its impact on the trend in the degree of redistribution appears to have been broadly neutral. Among the other main components of the tax benefit system, the inequality-reducing effect is largest for direct taxes and means-tested social spending, and is tiny for non-means-tested social spending and social security contributions. Overall, Germany is one of the European countries with the largest reduction in market inequality through redistribution (IMF, forthcoming).

[5] There are at least three reasons for this. First, the participation rate of the top 1 percent of income earners in surveys is low, and these households earn a larger share of their income from capital than the rest of the population. Second, corporate earnings that are retained by firms are not captured nor attributed to firms' shareholders. Third, capital earnings that are automatically reinvested through household savings vehicles such as life insurance products are not easily captured either. Thus, the capital share of income measured in household surveys is significantly below that in the national accounts.

6. Disposable income inequality has leveled off, after increasing strongly between 1999 and 2005. Figure 3 shows the evolution of the Gini coefficient of equivalized disposable income, i.e. income after government taxes and transfers. The increase in market income inequality in the 1990s was offset by a commensurate increase in redistribution, resulting a stable profile of disposable income inequality. By contrast, the continued increase in market income inequality in the first half of the 2000s was not matched by a further increase in redistribution, which pushed up the Gini by about 4 percentage points in only a few years. Since 2005, the Gini has been broadly stable, placing Germany just below the EU median according to Eurostat data. Changes in household structure (in particular, the trend towards smaller household sizes, and the rising share of single parent households) appears to have had an inequality-increasing effect, but a relatively small one (Peichl et al., 2010; Biewen and Juhasz, 2012).[6]

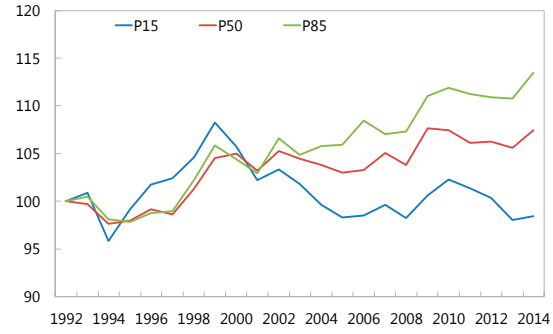
Figure 3. Gini Index of Equivalized Disposable Income, 1992–2014 (Index between 0 and 1)



Sources: SOEP, and IMF staff calculations

7. A more granular look at the full income distribution confirms the divergence in disposable income from 1999. Figure 4 shows the evolution of real (equivalized) disposable income for 3 percentiles of the distribution: the 15th percentile (P15), the median (P50), and the 85th percentile (P85). Income of the three groups move in parallel and upwards in the 1990s. However, after 1999, income of the high-income group (P85) kept increasing, while that of the median stagnated, and that of the low-income group (P15) declined, especially during 1999–2005. In recent years, the gap between P85 and P15 has increased further (see also Grabka and Goebel, 2017).

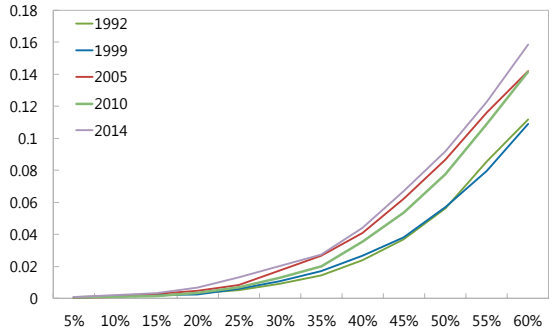
Figure 4. Equivalized Disposable Income (by percentile), 1992–2014 (2010 euros, 1992=100)



Sources: SOEP, and IMF staff calculations

8. The growing gap between the median and the bottom of the income distribution implies that relative poverty has increased since 1999. Relative poverty is typically measured as the share of people having a disposable income below 60 percent of that of the median. Figure 5 shows that this measure crept up over time, reaching 16 percent of the population in 2014.

Figure 5. Germany: At-Risk-of-Poverty Rate, Various Thresholds (Share of population with disposable income below a % of the median)



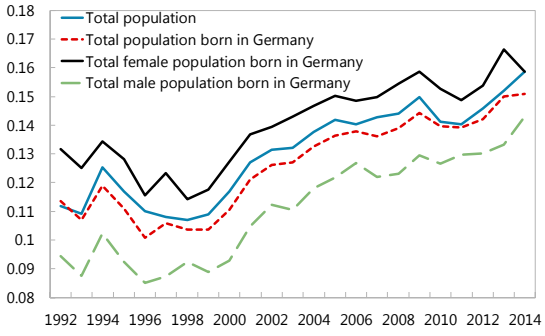
Source: SOEP, and IMF staff calculations

[6] Peichl et al. (2010) find that the effect appears to be stronger for income before taxes and transfers, implying the German tax benefit system helped offset the impact of changing household structure (at least until 2007).

Alternative measures of the relative poverty rate based on thresholds lower than 60 percent also show an upward trend.

9. This increase in poverty rate appears to have been relatively broad-based across various demographic groups. The upward trend in the relative poverty rate between 1999 and 2014 has been relatively more pronounced for children and young adults, those with a low education level, and single-parent households. Immigration has had a negligible effect on the trend so far: while the immigrant population has a higher poverty rate than the population born in Germany, composition effects from a rising share of immigrants in the population have not played a role (Figure 6).[7] BMAS (2017) describes policy measures taken during the current legislative term that may have had a poverty-reducing effect which is not yet captured by the data (see Appendix for a summary).

Figure 6. Germany: At-Risk-of-Poverty Rate
(Share of demographic group with disposable income below 60 percent of median)

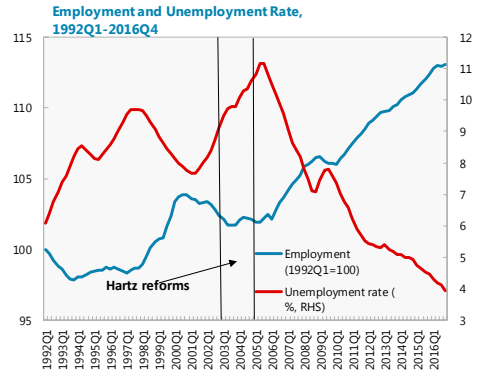


Sources: SOEP, and IMF staff calculations

C. Labor Market Developments During 1992–2016

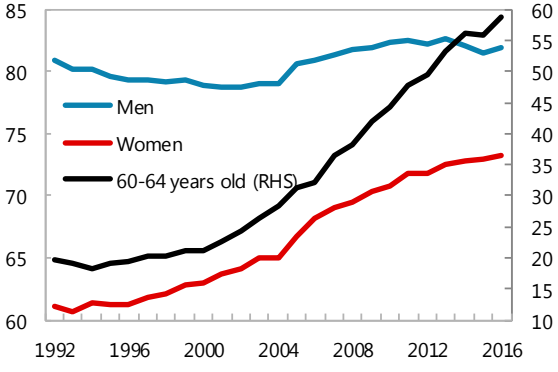
10. The German labor market performance has turned around since 2005. The unemployment rate (as measured in the national accounts), which had risen from 6 percent at the time of reunification to 11 percent in 2005, plunged spectacularly thereafter and is today below 4 percent. In parallel, employment growth, which had been tepid until the mid-2000s, started rising at a sustained pace (Figure 7), as participation rates of women and older workers started rising at a faster rate and the participation rate of men reversed its declining trend (Figure 8).

Figure 7. Employment and Unemployment Rate, 1992:Q1–2016:Q4



Sources: Haver and IMF staff calculations.

Figure 8. Labor Force Participation Rate
(Percent)

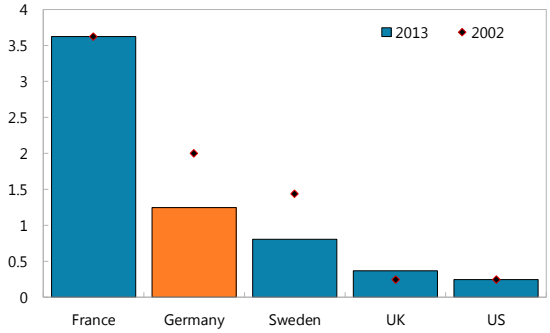


Sources: Eurostat, and IMF staff calculations.
Note: methodological change in the survey in 2005

[7] Using a different data source (the German Microcensus), Seils and Hoehne (2017) find that the increase in the child poverty rate since 2009 is due to immigration only.

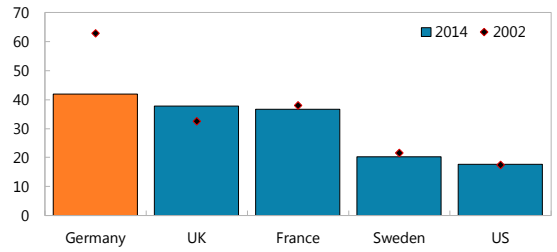
11. This turnaround coincided with the implementation of a comprehensive set of labor market reforms during 2003–2005 which increased labor market flexibility (see Weber, 2015; Scheffel and Krebs, 2017 and references therein). The reforms increased the effectiveness of labor market support services, including through a reorganization of the Federal Labor Agency and a redesign of active labor market policies. They also sought to stimulate labor demand by a liberalizing temporary agency work and short-term contracts (Figure 9), and to boost labor supply and induce more intense search efforts by cutting unemployment benefits for the long-term unemployed (Figure 10; Krebs and Scheffel, 2013) and reforming social assistance. As a result of the reforms, matching efficiency in the labor market improved, and the Beveridge curve shifted to the left (Figure 11; Jung and Kuhn, 2014).

Figure 9. Strictness of Employment Protection—Temporary Contracts (Index)



Sources: OECD

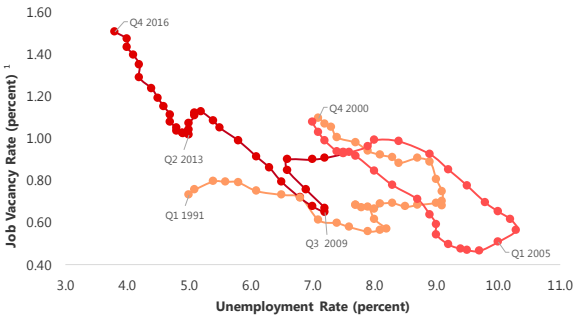
Figure 10. Net Replacement Rate for Long-Term Unemployed (percent)



Sources: OECD

Note: the net replacement rate indicates the proportion of net income that is maintained after job loss for a given family type. The numbers shown in the figure are the average for 6 family types across 2 earnings levels (67 percent and 100 percent of Average Worker earnings), assuming these families do not qualify for cash housing assistance or social assistance top ups, as computed by the OECD.

Figure 11. Germany: Beveridge Curve, 1991:Q1–2016:Q4

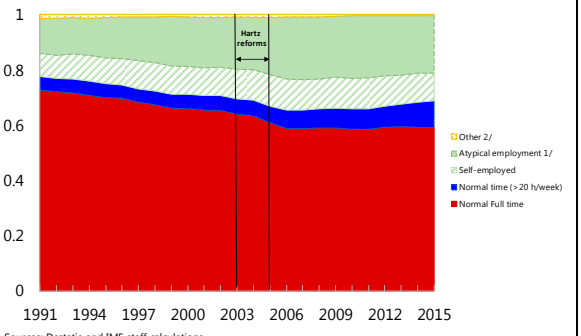


Source: Haver Analytics, Destatis, OECD and IMF Staff calculations

1 Number of registered unsubsidized vacancies in relation to the labor force

12. The share of atypical forms of employment stopped increasing soon after the reforms. Regular full-time and part-time jobs, while remaining the norm, declined as a share of total employment during the 1990s and early 2000s. At the same time, so-called marginal employment, temporary employment, and part-time jobs with low weekly hours grew in importance (Figure 12). These trends continued during the period of implementation of the reforms and shortly afterwards. However, beginning in 2006, the respective shares of these broad categories of employment stabilized, and a small trend reversal has been observed in recent years, when regular forms of employment accounted for most of employment growth across most economic sectors, and atypical employment

Figure 12. Composition of Employment, 1991–2015 (employed persons aged 15-64, share of total)



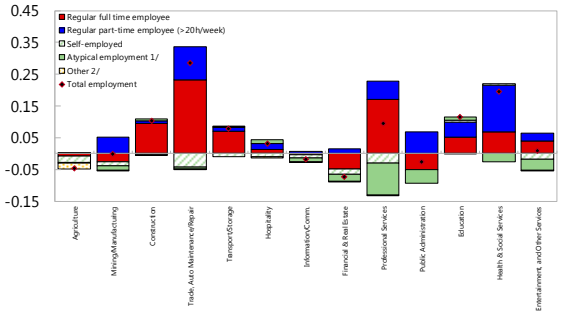
Sources: Destatis and IMF staff calculations

1/ Temporarily employed, part-time employed (<20 h/week), marginally employed, employed in *Kurzarbeit*, employed living in collective households

2/ Assisting family members

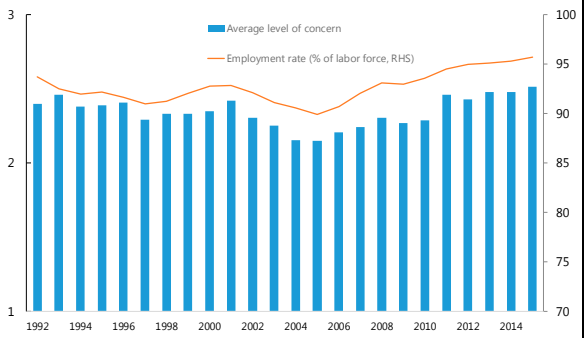
receded somewhat (Figure 13). With historically low unemployment rate and improved overall job quality, concerns about job security are at a historic low (Figure 14).

Figure 13. Contributions to Annual Growth of Total Employment (2011–2015 average, percentage points)



Sources: Destatis and IMF staff calculations
1/ Temporary employed, part-time employed (<20 h/week), marginally employed, employed in short-term work, employed living in collective households
2/ Assisting family members

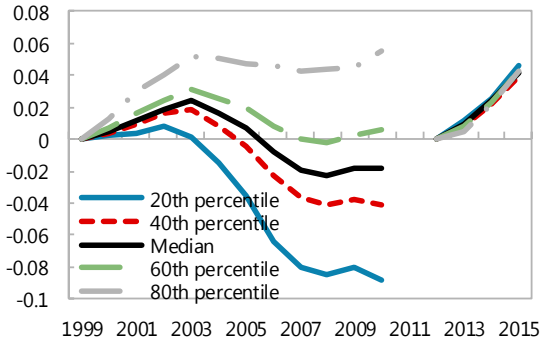
Figure 14. Concerns with Job Security, 1992–2015 (inverted scale: 1=very concerned; 2=somewhat concerned; 3=not concerned at all)



Sources: SOEP, and IMF Staff calculations

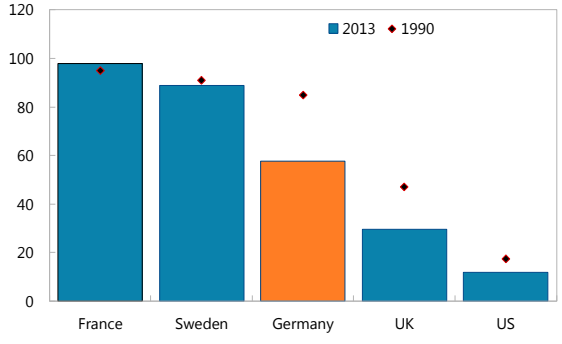
13. Wage inequality gradually rose from the 1990s, but this trend has stopped over the past few years. The wage distributions for full-time and part-time employees widened from the mid-1990s (Figure 15). Technological change, greater trade openness and offshoring opportunities, as well as diminished coverage by collective bargaining agreements likely played a role, as in other advanced countries (Figure 16; Dustmann et al., 2014; Felbermayr and Baumgarten, 2015). Following the Hartz labor market reforms, the surge in labor supply triggered by the reforms initially reinforced pre-existing downward pressures on low wages (Burda and Seele 2016), but did not result in an increase in labor income inequality because of its powerful positive effect on employment (Figure 17).

Figure 15. Cumulative Changes in Real Wage, 1999–2010 and 2012–2015* (2010 euros, full time employees)



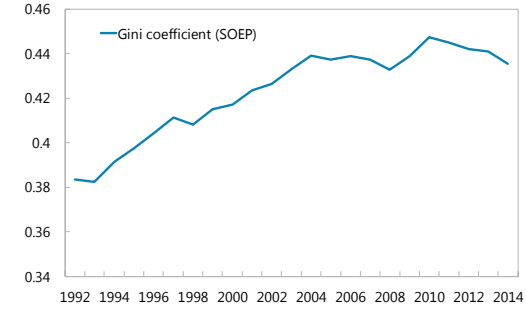
Source: Federal Employment Agency.
*new survey procedure starts in 2011

Figure 16. Collective Bargaining Coverage, 1990 and 2013 (Percent of employees)



Sources: Visser (2016)

Figure 17. Germany: Gini Coefficient of Individual Income from Dependent Employment (Index between 0 and 1)

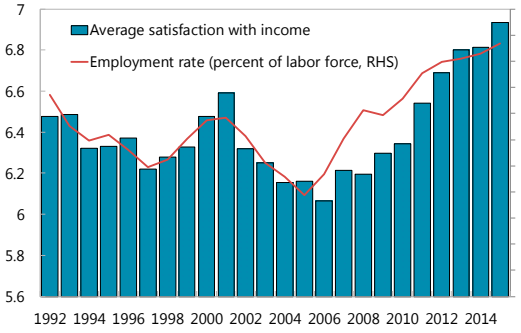


Sources: SOEP, and IMF staff calculations

Since 2010, both wage and labor earnings inequality have been broadly stable. The reasons behind the stabilization (or even slight reversal) of wage inequality as still unclear. The further strengthening of the labor market may have played a role, as well as a pause in the skill-bias of technological change in Germany (Hutter and Weber, 2017). The new statutory minimum wage (announced in late 2013, and introduced in January 2015) also provided a higher floor to hourly wages from 2015, and perhaps from 2014 as anticipatory effects may have played a role.

14. Satisfaction with household income is at a post reunification high. Overall, in the context of a continuously improving labor market and real wage increases across the board over the past few years, satisfaction with household income has been rebounding strongly from its trough in 2006 (just after the unemployment rate reached its peak), and reached a historical high in 2015 (Figure 18). Even for the low paid (individuals below the second decile of the income distribution), the satisfaction measure is at or near its historical high too despite the stagnation of real disposable incomes at the bottom of the distribution, suggesting that labor market outcomes play a role beyond the mere level of income. Unsurprisingly, satisfaction improved the least since 2005 for those not in the labor force and the unemployed.

Figure 18. Satisfaction with Household Income, 2015
(Rating between 0 and 10, population aged 18–65)



Sources: SOEP, and IMF staff calculations

D. Conclusion

15. Inequality of disposable income has been broadly flat over the past ten years, but relative poverty risk has crept up. Against the background of stable market income inequality and a well-developed redistributive tax and transfer system, the Gini index of disposable income has barely moved in recent years. However, weak disposable income growth in the left tail of the income distribution has resulted in a slow but sustained rise in the share of individuals at risk of poverty. Looking forward, successfully integrating refugees in the labor market will be an important component of anti-poverty efforts. Policies to increase equality of opportunities and social mobility would also help address poverty concerns over the longer term (GCEE, 2016, Grevenbrock, forthcoming).

16. The impressive performance of the German labor market over the past two decades helps qualify the Krugman (1994) hypothesis that there is a trade-off between inequality and labor market flexibility in advanced countries. Following ambitious reforms that increased labor market flexibility in the mid-2000s, the German hourly wage distribution widened significantly. However, it did not widen the distribution of labor income from dependent employment, because the strong positive employment response offset the negative effect of additional labor supply on hourly wages. Furthermore, the wage distribution has stopped widening since the beginning of the decade, even before the introduction of the statutory minimum wage in 2015.

Annex I. Selected Social Cohesion Measures Taken During the Current Legislative Term

This annex provides a list of selected measures taken in several policy areas during the current legislative term to strengthen social cohesion. It is based on the summary of the Fifth Poverty and Wealth Report (BMAS, 2017), which contains a more comprehensive set of measures and programs as well as more details on the measures listed here.

Labor Market Regulation

1. The legislature reformed the legal framework for the labor market with the aim of ensuring fair conditions for workers regarding wages and other quality-related aspects of work. Key measures are the introduction of a statutory minimum wage to improve pay in the lower wage bracket, law on greater pay transparency to tackle the gender pay gap, law on temporary agency work to prevent abusive labor contracts and gear the supply of temporary workers towards its core function.

Adult Education

2. The legislature further promoted continuing vocational education and training (CVET). A new law improves access to CVET for low-skilled long-term unemployed persons and for older workers, and the budget support for CVET (including through Federal Employment Agency programs) was increased.

Unemployment

3. Several measures were taken to develop employability, enhance participation, and fight hardship during long-term unemployment. In particular, a new federal program aimed at long-term unemployed persons at the far margins of the labor market who either require special support due to health impairments, or who are living with children in one joint household, was introduced.

Family and Children Benefits

4. New legislation sought to improve the career/family care balance with the introduction of the care support allowance and the legal entitlement to family care leave. The parental allowance was reformed to offer more targeted support to parents seeking a partnership-based family/career balance.

5. Child benefits were increased in recent years. The standard child benefit was raised each year during 2015–2017 and is to be raised in 2018. The supplementary child allowance—a benefit paid to families who are particularly at risk of poverty—was increased in 2016 and 2017.

6. Benefits for single parents were increased. The so-called maintenance advance was raised in 2015, 2016 and 2017, and it is expected to be guaranteed in principle up to a child's eighteenth birthday from July 2017. In 2015, the tax relief for single parents with one child was increased by almost 50 percent, and a new system of graded payments from the second child onwards was introduced.

7. The ongoing expansion of child daycare and the legal entitlement, introduced in 2013, to a daycare place for children from their first birthday has led to a further improvement in children's opportunities for social integration and in the career/family care balance. In recent years, the Federal Government has offered large support to local authorities in expanding child daycare services and has made investments to improve quality.

Youth Education

8. Since 2014, individual mentoring has been offered to over 100,000 poorer-performing young persons, to help them achieve school-leaving qualifications and go into training. A new instrument was introduced in 2015 to help more disadvantaged youngsters successfully complete a course of initial training within the dual system.

Social Assistance

9. The value of cash assets exempt from income testing for social assistance purposes was increased substantially for every adult person who is eligible for benefits.

Housing

10. As part of the reform of housing benefit in 2016, housing benefit was adjusted in line with the trend in rent and incomes, the first such adjustment since the 2009 housing benefit reform. Furthermore, the substantial increase in the compensation received by the Länder for the discontinuation of past federal financial assistance for the promotion of housing improved the framework conditions for the construction of affordable housing.

Retirement and Pensions

11. In July 2016, the largest nominal pension increase in 23 years was implemented: 4.25 percent (western Germany) and 5.95 percent (eastern Germany). Furthermore, pensions in the East and West of the country are to be harmonized by 2025.

12. A new law, which will come into force in July 2017, will help simplify the legislation governing partial pensions and additional earnings. It will be more attractive to work in addition to receiving an old-age pension or after reaching the standard retirement age.

13. Measures were taken to boost reduced earning capacity pensions. Further improvements are being prepared, as the group of people with reduced earning capacity is particularly affected by poverty.

Disability

14. The rights of persons with disabilities have been enhanced with the Federal Participation Act. Furthermore, recipients of integration assistance will be able to retain far more of their income and save up to 50,000 euros in assets in the future. Support services will also be provided for continuing vocational training at school or university.

Health and Long-Term Care

15. In recent years, several measures were taken that led to a significant reduction in the number of persons without health insurance coverage. Several laws were passed to strengthen long-term care provision. Specific incentives to boost medical services, especially in structurally weak, rural areas, were introduced.

Asylum-Seekers and Refugees

16. Persons seeking protection have the opportunity of having their professional skills ascertained if formal proof of such skills cannot be provided. The "Integration through Qualification" funding program was expanded in 2015.

17. The waiting time during which persons whose deportation has been suspended and asylum seekers are not permitted to work was reduced to three months. Since August 2016, most employment agencies have been dispensing with the employment priority review—i.e. the review which checks whether employees with priority status are available for a given job. The Federal Government is funding subsidized jobs for asylum-seekers and young adult refugees who are able to work and are eligible for social assistance. For the latter group, associated measures, such as instruction, support, counselling, and mentoring are provided.

18. Integration course capacity has been expanded significantly and courses have been opened to both asylum seekers with good prospects of remaining in Germany and persons whose deportation was suspended for humanitarian reasons. Until end-2018, asylum seekers who have good prospects of remaining in Germany and have already been in the country for at least three months will have easier access to specific instruments of employment promotion.

19. The Integration Act created greater legal certainty for foreign nationals who are in principle required to leave the country and for companies providing vocational education and training qualifications. It also opened various benefits and services that promote training to specific groups of refugees.

References

Biewen, Martin, and Andos Juhasz (2012), "Understanding Rising Income Inequality in Germany 1999/2000–2005/2006", *Review of Income and Wealth*, 58(4): 622–647.

BMAS (Federal Ministry for Labor and Social Affairs of Germany) (2017), "Der Fünfte Armuts- und Reichtumsbericht der Bundesregierung"

BMWi (Federal Ministry for Economic Affairs and Energy of Germany) (2017), "2017 Annual Economic Report For inclusive growth in Germany and Europe"

Burda, Michael, and Stefanie Seele (2016), "No Role for the Hartz Reforms? Demand and Supply Factors in the German Labor Market, 1993–2014", Humboldt-Universität zu Berlin SFB 649 Discussion Paper 2016–010.

Dustmann, Christina, Bernd Fitzenberger, Uta Schonberg, and Alexandra Spitz-Oener (2014), "From Sick Man of Europe to Economic Superstar: Germany's Resurgent Economy", *Journal of Economic Perspectives*, 28(1): 167–88.

Felbermayr, Gabriel, and Daniel Baumgarten (2015), "Increasing Wage Inequality in Germany", Bertelsmann Foundation Report.

G20 (2016), G20 Leaders' Communiqué, Hangzhou Summit, 4–5 September 2016

GCEE (German Council of Economic Experts) (2016), "High Redistribution, Low Mobility", 2016 Annual Report, Chapter 10.

Grabka, Markus, and Jan Goebel (2017), "Real Income Rose Significantly Between 1991 and 2014 on Average—First Indication of a Return to Increased Income Inequality", DIW Economic Bulletin 2017/5

Grevenbrock, Nils (forthcoming), "'Old Age Poverty: Demographic Transition and Intra-Cohort Inequality'", mimeo.

Hutter, Christian and Enzo Weber (2017), "Labour Market Effects of Wage Inequality and Skill Biased Technical change in Germany", IAB Discussion Paper 5/2017

International Monetary Fund (forthcoming), "Inequality and Poverty across Generations in Europe", Staff Discussion Note.

Jung, Philip and Moritz Kuhn. (2014), "Labour Market Institutions and Worker Flows: Comparing Germany and the US", *The Economic Journal*, Volume 124, Issue 581: 1317–1342.

Krebs, Tom, and Martin Scheffel (2013), "Macroeconomic evaluation of labour market reform in Germany", *IMF Economic Review* 61.4: 664–701.

Krugman, Paul. (1994). "Past and Prospective Causes of High Unemployment." *Economic Review*, Issue Q IV, No v.79 (4): 23–43

Loungani, Prakash (2017), "Inclusive Growth and the IMF", IMFBlog, https://blogs.imf.org/2017/01/24/inclusive-growth-and-the-imf/

Peichl, Andreas, Nico Pestel and Hilmar Schneider (2012), Does Size matter? The Impact of Changes in Household Structure on Income Distribution in Germany, *Review of Income and Wealth* 58(1), 118–141.

Seils, Eric, and Jutta Hoehne (2017), "WSI-Kinderarmutsbericht: Kinderarmut & Fluechtlingskrise", WSI Verteilungsmonitor, Special Feature, April.

Scheffel, Martin, and Tom Krebs (2017), "Labor Market Institutions and the Cost of Recessions", IMF Working Paper No 17/87.

United Nations (2011), "Canberra Group Handbook on Household Income Statistics".

Visser, Jelle (2016), ICTWSS Data base. version 5.1. Amsterdam: Amsterdam Institute for Advanced Labour Studies (AIAS), University of Amsterdam. September 2016.

Weber, Enzo (2015), "The Labour Market in Germany: Reforms, Recession and Robustness", *De Economist*, 163:461–472.