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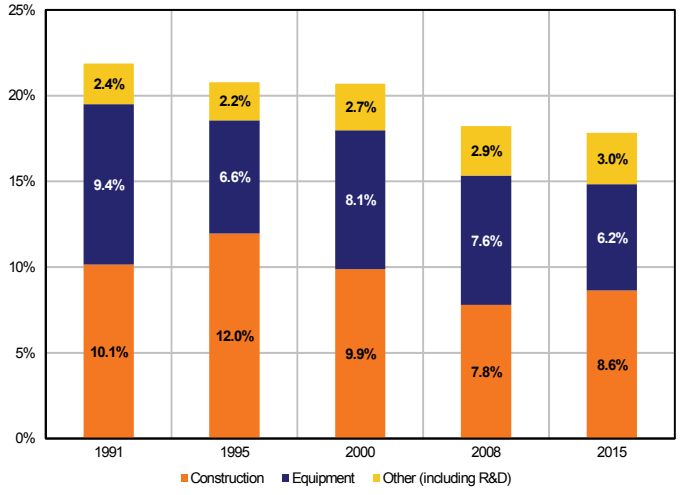
Is there too little private investment in Germany?

- Private investment as a share of the German economy has fallen since the mid-1990s. It stood at 21% of GDP at the time, and has stagnated below 18% of GDP since the 2008 crisis. After the post-reunification boom, construction slowed in the 2000s, and the investment downturn then spread to the rest of the economy.
- Since the crisis, German private investment has shifted away from equipment and towards construction. Equipment investment has proved more sluggish than expected when gauged against its usual determinants, for economic activity has been relatively strong, financial conditions favourable, and capacity utilisation high. Firms seem particularly sensitive to the high level of uncertainty, which could influence their investment behaviour.
- Business investment decisions may also be impeded by several specific features of the German economy:
  - Ageing of the owners of *Mittelstand* companies [1], who tend to invest less as they grow older. Half are over 50 years old, and the situation is compounded by the lack of prospects for selling or handing over their firms as they approach retirement.
  - Internationalisation of German firms. In seeking to optimise global value chains, German firms may have improved their export competitiveness, while balancing domestic investment against outward foreign direct investment (FDI).
  - Hiring difficulties. For many years, companies have reported problems in filling skilled positions, particularly for manual occupations. This may have become a major obstacle to investment.
- Low equipment investment reduces capital accumulation, which could restrict medium-term economic growth, all the more as population prospects could lead companies to continue the downward adjustment in their capital stock. These negative prospects could be offset in part by investment quality, particularly the rise in research and development (R&D) investment. R&D investment has registered over 20 years of virtually uninterrupted growth, and could boost Germany's potential growth by raising total factor productivity.

Share of private investment by type of asset (as % of GDP)



Source: Destatis.

(1) The term *Mittelstand* designates SMEs with annual revenues below €50 million and up to 499 employees.

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1. The share of private investment in Germany has fallen since the mid-1990s

The share of private investment in the German economy began to fall in the second half of the 1990s and the trend intensified in the 2000s. The decline is observed with respect to both GDP (18% in 2015 versus an average 21% in the 1990s) and value added of nonfinancial corporations (NFCs, 20% in 2015 versus an average 23% in the 1990s). While the profile of private investment in the 1990s and 2000s may be tied to post-reunification economic policies, its persistently weaker level since the crisis raises questions, notably in light of the strength of Germany's economy.

1.1 The trend began in construction

The construction sector was the main contributor to the decline in German private investment before the crisis. Reunification fuelled strong growth in construction in the 1990s. The decline observed in the 2000s can be explained by several factors.

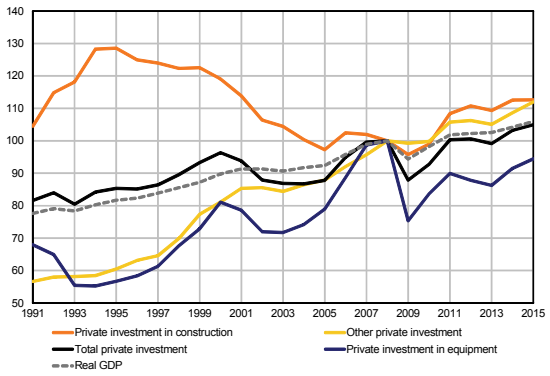
(i) **Reversal after a period of overinvestment.** To support reunification in the early 1990s, the German authorities opted for a "high-tech, high-wage" strategy of major infrastructure expenditures and capital subsidies in the new Länder. This support for investment helped to lower the cost of capital, which had been driven up by the Bundesbank's restrictive monetary policy at the time[1]. The investment subsidies of the early 1990s mainly stimulated construction investment, which rose by nearly 18% between 1991 and 1995 (at an annual rate of 4%), driven by residential construction (up 28%, or a 6.4% annual rate). This period of high growth may have reduced the need for subsequent investment.

(ii) **The impact of demographic decline.** Germany's total population peaked at 82.5 million in 2003 then fell each year through the end of the 2000s[2], limiting demand for residential construction.

(iii) **The impact of wage moderation in the 2000s.** Reunification had led to major wage increases in the early 1990s, particularly in the East, in order to harmonise pay with the West and curb emigration from Eastern to Western Germany. While these objectives were achieved to some extent, Germany's cost competitiveness slipped and unemployment rose. The social partners then opted for wage moderation, which gained momentum in the early 2000s with the enactment of the Hartz reforms[3]. Household disposable income stagnated as a result, slowing household investment in residential property.

In 1995, at the height of the construction investment boom, the sector accounted for nearly 58% of Germany's private investment and 12% of GDP, compared with an average of about 48% of investment and 8% of GDP in the 2000s. The construction sector has, however, picked up since 2010, leading to an increase in total investment (see Chart 1).

Chart 1: Change in German GDP and private investment, by type (2008=100; in real terms)



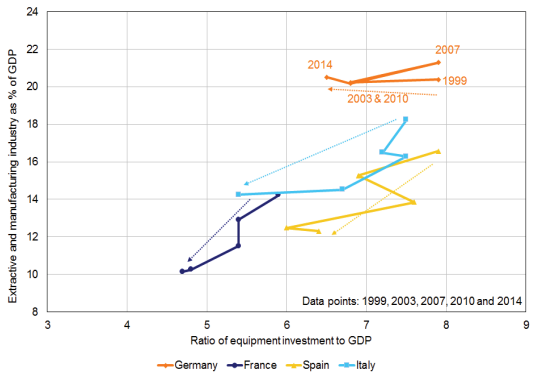
Source: Eurostat.

1.2 Concerns now focus on equipment investment

The sluggish pace of investment since the crisis is attributable to the "equipment" component, which was lower in 2015 than in 2008 (see Chart 1). Equipment investment started falling in the early 2000s, but less sharply than construction investment, and is the only form of investment that has failed to revert to its pre-crisis level. The ratio of equipment investment to GDP fell from 8.1% in 2000 to 7.6% in 2008 and 6.2% in 2015. It nevertheless remains higher than the euro area average of 5.8% considering that industry accounts for a larger share of the economy in Germany (20.5% of nominal GDP in 2014) than in the other European countries (14.2% in Italy, 12.3% in Spain and 10.1% in France). But unlike those other countries, the relative size of German industry was almost unchanged between 1999 and 2014, while the ratio of equipment investment to GDP fell more than in France and almost as much as in Italy. This has revealed a new German paradox (see Chart 2).

(1) See Bénassy-Quéré, A. and Villa, P. (1994), *La réunification allemande du point de vue de la politique économique* (in French), CEPII.
(2) See Baquero, L. (2015), "Will demography disrupt the German economic model?", *Trésor-Economics*, no. 149.
(3) The Hartz reforms were launched in 2003. They aimed to make the labour market more dynamic and flexible through training for the unemployed, job creation (including low-wage jobs) and cuts in unemployment benefits.

Chart 2: Change in equipment investment rate and share of industry (as % of GDP)



Source: Eurostat.

Interpretation: In Italy, the ratio of private equipment investment to GDP fell from 7.5% in 1999 to 5.4% in 2014, while industry as a percentage of GDP fell from 18.2% to 14.2%.

The trend does not seem due to changes in the structure of German industry. Germany's nominal industrial value added rose at a average annual rate of 2.2% between 2000 and 2013. With very few exceptions (leather and textiles, wood and paper, and coke and refining), all industrial sectors contributed to the trend; there were no radical changes in the distribution of value added across sectors. At the same time, investment ratios stagnated or fell in all sectors. The trend started in the early 2000s and has intensified since the crisis. Sectors with rising investment ratios prior to 2008 experienced a reversal; in sectors with a declining trend before the crisis, the downward trend intensified. This is particularly the case for transport vehicles, where the investment ratio fell from 13.6% in 2000 to 11.4% in 2013[4], despite being the sector that had invested most intensively since the start of the 2000s (with a nominal average annual increase of 3.1%). The increase, however, was far smaller than the 4.5% average annual growth in the sector's value added, which confirmed the role of vehicle manufacturing as the leading contributor to Germany's industrial value added.

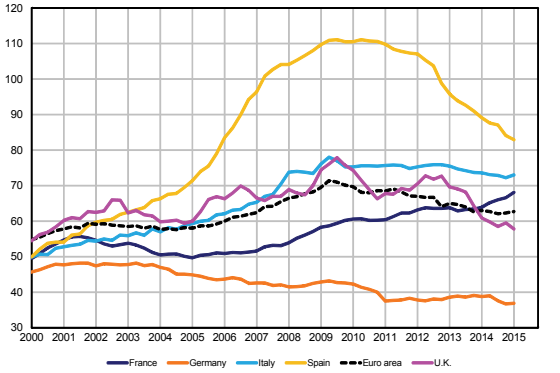
2. German equipment investment has been surprisingly sluggish, in light of the usual determinants, unless uncertainty has played a greater role than in the past

2.1 Decorrelation from German economic fundamentals

Equipment investment is not only weak, but also appears to have been decorrelated from its usual determinants ever since the crisis (see Box 1). The relative weakness of equipment investment in recent years does not seem justified by the situation of the German economy; nor is it consistent with the standard determinants, whether in the financial sphere or in the real economy.

Germany's capacity utilisation rate now exceeds its long-term average, and has been running above those of the other large European economies since the crisis ended, indicating stronger economic activity that could create the need for investment. Moreover, German firms are not experiencing problems in financing their projects, given favourable lending conditions with historically low interest rates and their resources for self financing. Their financial soundness is often seen as linked to their profit margins, which rose strongly through the late 2000s before falling back, largely owing to the end of wage moderation. After paying their charges in full and financing their investments, Germany's NFCs still have substantial financial resources. Their debt is significantly lower than that of companies in the other euro area countries, and it has decreased since the early 2000s (see Chart 3).

Chart 3: Debt-to-GDP ratio of non-financial corporations (in %)



Source: Banque de France.

(4) Percentage of manufacturing value added.

Box 1: **Modeling equipment investment in Germany**

Investment models generally capture the adjustment of productive capacity to firms' demand expectations. This paper presents a simple investment model in the form of an error-correction equation used in a macroeconomic model that depends only on demand factors.

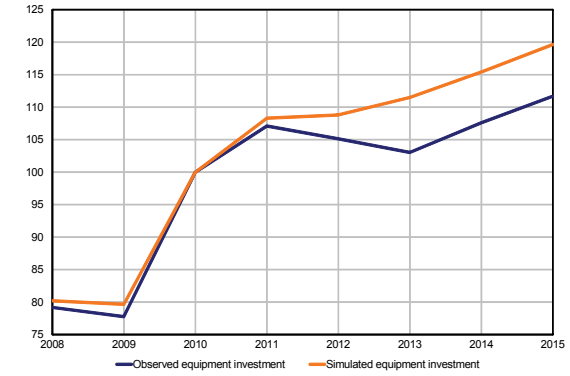
The equation assumes that equipment investment depends in the long run on final demand for firms' output. In the short term, equipment investment is broken down into its domestic component and its external component, which allows identification of different sensitivities of investment to domestic demand (elasticity: 0.52) and exports (elasticity: 0.18).

Our equation shows that, since the crisis, investment has been consistently lower than the level suggested by such a model: the unexplained difference has been negative since 2008, and the gap has widened since 2012 (see Chart 4).

$$\ln(GFCF\text{–}eq_t) = \underset{(-2.4)}{-0.17}[\ln(GFCF - eq_{t-1}) - \underset{(66.74)}{0.58}\Delta\ln(FD_{t-1})] + \underset{(9.5)}{0.52}\Delta\ln(DD_t) + \underset{(10.8)}{0.18}\Delta\ln(EXPORT_t) - \underset{(-3.2)}{0.01}Ind - 09_{Q1} + C$$

In this equation, equipment investment (*GFCF–eq*) is estimated by ordinary least squares for the period 1993Q1–2012Q4, *FD* denotes final demand, *DD* denotes domestic demand, *EXPORT* denotes German exports, and *IND_09Q1* is a dummy variable indicating the sharp contraction that occurred during the crisis. Student's t values are in brackets, DW is1.89 and R^2_{adj} is 80.3%.

Chart 4: Observed and simulated values for equipment investment (2010=100)



Source: Destatis, DG Trésor.

2.2 Uncertainty may also have been a factor, even if it fails to explain the full extent of the slowdown

Decorrelation from the usual determinants has been recognised in papers published by Goldman Sachs[5] and the IMF[6]. Both begin by testing the explanatory power of the standard determinants of equipment investment (such as GDP growth, corporate profits and cost of debt), and conclude that they do not suffice to explain the trend.

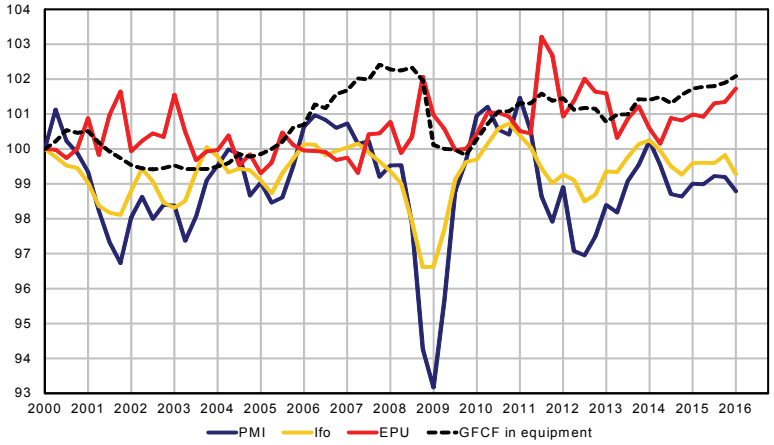
The degree of optimism of economic players should also be taken into account, given the correlation between (1) uncertainty indicators regarding economic policy (EPU index) and confidence among businesses (Ifo business climate index) and purchasing managers (PMI), and (2) **changes in equipment investment** (see Chart 5).

Uncertainty can be either policy-related or economic. It leads to fear of the unknown by economic players, causing them to defer investment projects until they can gather further information. Such behaviour can affect economic growth via business investment, and can be considered rational in that it is often costly to reverse an investment decision.

These conclusions are shared by the Goldman Sachs and IMF analysts, who incorporate the uncertainty factor in their equation for equipment investment. In both studies, this improves understanding of German equipment investment behaviour since the crisis. In the IMF paper, inclusion of the uncertainty factor reduces the unexplained difference in German investment by approximately one-third.

(5) See Goldman Sachs, *European Economies daily: Uncertainty weighing on investment in Germany*, 2012.
(6) See IMF, *Investment in the Euro Area: Why Has It Been Weak?*, 2015.

Chart 5: Uncertainty and confidence in the future economic situation, and change in GFCF in equipment in Germany (2000Q1=100; reduced centred survey index values)[7]



Source: Economic Policy Uncertainty, Ifo, Markit, Destatis DG Trésor.

However, neither the Goldman Sachs nor the IMF analysts find these results entirely satisfactory. The Goldman Sachs paper argues that the uncertainty factor is not sufficiently robust econometrically[8], and that the lack of information on its future path precludes its use in forecasting models. For the IMF, incorporation of uncertainty represents an improvement, but its explanatory power remains lower than in the other major European countries studied.

3. German investment behaviour is also related to specific features of the economy

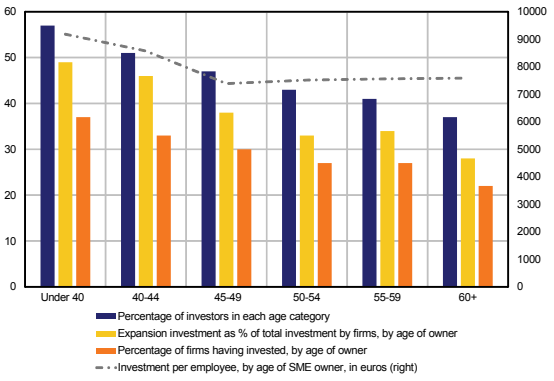
3.1 SME owners are found to invest less as they grow older

The *Mittelstand* is a vital part of the German economy, given its share in the country's jobs, value added, exports and investment, contributing 41% of total investment in 2013[9].

German investors may become ever more cautious with the ageing of SME owners. A KfW study[10] finds that the older SME owners are, the more negative their expectations; over half are now 50+, compared with 25% in 2002.

The KfW report also identifies a negative relationship between SME owners' age and their propensity to invest. Only 37% of SME owners aged 60 and over exhibit a propensity to invest, compared with 57% for owners under 40; the average for all ages is 46%. Age is also found to affect the types of investment undertaken by owners, as rising age is negatively related to expansion investment, which accounts for 28% of total net investment in firms with owners aged 60+, compared with 49% for companies managed by owners under 40. Lastly, with rising age, SME owners reduce their annual investment volume per full-time equivalent employee, which comes to approximately €7,500 after 45, compared with over €9,000 for owners under 40. "Projects that are fraught with risk or tie up capital–such as expanding foreign activities or acquiring a further production line–are deferred" (see Chart 6).

Chart 6: Investment behaviour of SME owners, by age



Source: KfW, Demografie im Mittelstand, 2015.

The prospect of the owner's retirement, and with it the sale or handover of the firm, weighs on investment, especially for companies with no succession plans in place. This is the case for nearly half of the 580,000 owners expected to retire by 2017, who together account for 16% of SME owners and employ an estimated 4 million people[11].

(7) The ZEW survey measures the confidence of financial analysts, the Ifo Business Climate Survey measures the confidence of entrepreneurs, and the PMI measures the confidence of purchasing managers (here, in the manufacturing sector).

(8) The uncertainty variable is not significant, owing to the Student's t value associated with it.

(9) Destatis (see "Shares of small and medium-sized enterprises in selected variables") puts the share at 41.4%, but KfW estimates it at 53%.

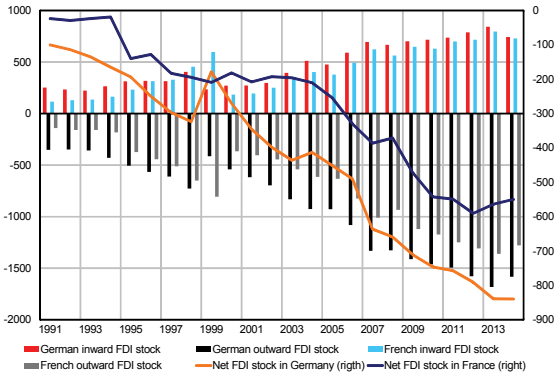
(10) KfW (2015), "Ageing of German SME owners is putting a dampener on investment", *Focus on Economics*, no. 85, 23 March.

(11) KfW (2015), "Succession planning in SME sector in full swing: Half a million hand-overs by 2017", *Focus on Economics*, no. 91, 23 April.

3.2 Is the German market becoming less attractive?

Germany's outward investment far exceeds inward foreign direct investment (FDI) from the rest of the world. This long-standing trend continues to intensify. By way of comparison, German firms and French firms now have roughly the same stock of outward FDI, but France has more inward FDI than Germany. As a result, Germany's net FDI stock was a negative $840 billion in 2014, compared with a negative $550 billion for France (see Chart 7).

Chart 7: FDI stock, France and Germany ($bn)



Source: UNCTAD.

German firms have widely turned to an internationalisation strategy, largely through foreign direct investment (FDI)[12], strengthening positions first in North America in the 1990s, then in Europe and Asia in the 2000s. European Union countries account for over half the stock of Germany's outward FDI, so the EU continues to be the leading destination, followed by North America, which accounts for almost one-fourth, and Asia, which accounts for barely one-tenth[13].

More specifically, the EU's ability to attract German outward FDI has grown since the early 2000s on the strength of the surge in FDI to Western European countries (up an average 10.7% a year between 2001 and 2011)[14], driven by investment in the U.K., the Netherlands and Belgium. The 13 countries of Western Europe as a whole received 44% of German outward FDI in 2011, up from 39% in 2001. Over the same period, growth of FDI to Germany's Hinterland[15] slowed to an average 14% per year, after a huge leap in the 1990s. These countries accounted for 7% of Germany's outward FDI in 2011 compared with 4% in 2001. Also during the period, Asia's share doubled from 4% to 8%, with an average annual growth rate close to 17%, making Asia the highest growth area, driven by FDI in China (up 23% per year on average). The increased investment in Eastern Europe, Asia and Western Europe occurs at the expense of North America, where the share of German FDI was nearly halved during the period, from 42% in 2001 to 23% in 2011.

There are two distinct reasons for these trends. Outward FDI into Western Europe and North America aims to establish proximity with consumers, whereas outward FDI into Central and Eastern Europe was driven by the fragmentation of the production process (see Box 2).

Germany's integration into global value chains lends credence to the notion that FDI may have crowded out domestic investment. While there are many signs, the phenomenon remains hard to identify, and the debate regarding complementarity and substitutability of domestic investment and FDI persists in the economic literature.

Lastly, the tax reforms in 2001 and 2008 may have stimulated business internationalisation by increasing the relative attractiveness of foreign investment[16]. The stimulus began in the early 2000s; the previous corporate income tax distinction between retained earnings (taxed at 40%) and distributed earnings (taxed at 30%)–for foreign or domestic income–was abolished in 2001 to establish a single rate of 25%, further reduced to 15% in 2008. Several years after the reforms took effect, they appear to have impacted German corporate investment strategies regarding both the funding and the location of investments. The European Commission has developed an indicator of the marginal cost of investment adjusted to account for relevant tax provisions in order to assess the tax-adjusted cost of an outbound investment compared with a domestic investment for various financing modes[17]. The analysis indicates that, since 2001, the after-tax cost of a new domestic investment has exceeded the cost of investing in a facility abroad–if the latter is a new facility–irrespective of the mode of financing (from retained earnings, debt, or fresh capital).

(12) The internationalisation of production may also involve outsourcing and portfolio investment, but data are more scarce and the negative correlations are less robust because less well documented; the correlations are fragile even for FDI.

(13) CNUCED data for 2011. Because the data available for 2012 are incomplete and exhibit inconsistencies, they are not discussed here.

(14) Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Portugal, Sweden and the U.K. accounted for 44.5% of total German outward FDI in 2011, versus 38.6% in 2001.

(15) The term "Germany's Hinterland" refers to a group of Central and Eastern European countries (Czech Republic, Poland, Hungary, Slovakia and Slovenia) that enjoy the threefold advantage of geographical proximity to Germany, European Union membership, and lower labour costs than in Germany and the other major countries in Western Europe. German firms improved their competitiveness in the 1990s and 2000s by offshoring low-value-added tasks for low-cost production in these countries, before importing into Germany for subsequent stages in the production and sales process.

(16) See German Council of Economic Experts, annual report, 2014-2015.

(17) See Commission Staff Working Document, Country Report Germany, 2015.

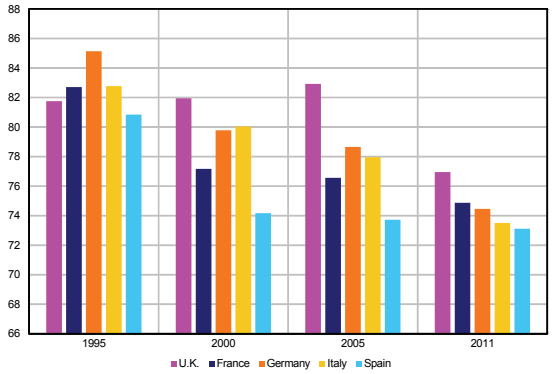
Box 2: **Definition of global value chains and Germany's position in the process**

The term "value chain" refers to the full range of activities performed by firms in various locations to produce a good or service, from the design stage up to distribution to the final consumer. This fragmentation of production and sales consists in optimising production by exploiting the comparative advantages of each production site. Global value chains (GVCs) have developed as globalisation has intensified following the liberalisation of trade and communications.

Germany's integration into global value chains has increased significantly. Between 1995 and 2011–the period used by the OECD to estimate the growth of GVCs–the domestic value added embodied in Germany's exports fell from 85% to 74.5%, placing Germany in the lead among the largest European countries, overtaken only by the U.K. since 2000, and by France in 2011 (see Chart 8). Nearly all sectors have contributed to the intensification of Germany's integration into GVCs, but the movement has been strongest in chemicals, the metalworking industry and transport equipment.

As a consequence, the import content of German exports has increased, illustrating Germany's high and growing integration into GVCs.

Chart 8: Domestic value added embodied in exports, by country



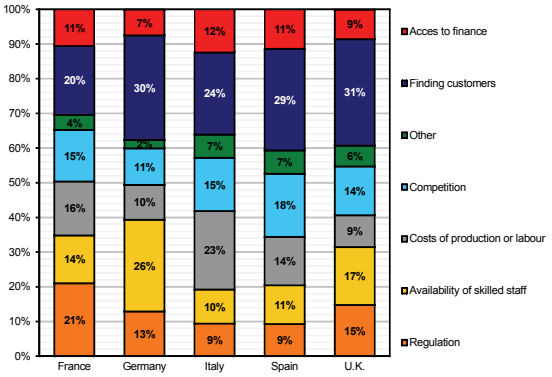
Source: OECD, TiVA database.

Note: 2011 is the most recent year available in the TiVA database.

3.3 The problems reported by firms mainly concern the supply of skilled labour

For several years, a major difference between German firms and their European counterparts has been the availability of skilled labour. This is the main problem for over a fourth of German companies, just after the problem of finding customers, and is far more prevalent than the problem of access to finance, or the costs of production or labour (see Chart 9). The proportion of tertiary-educated workers in Germany is lower than the OECD average (28% and 33%, respectively, in 2012)[18]. The situation is only gradually improving, as the percentage of tertiary-educated workers is just slightly higher among the 25-34s than among the 55-64s, at 29% and 26%, respectively. The trend towards tertiary education, however, appears to come at the expense of vocational education for skilled manual trades: vocational programs struggle to attract students, and companies report greater problems in filling the corresponding positions-to such an extent that this has become a major obstacle to investment[19]. Lastly, bearing in mind that Germany's workforce is expected to shrink, the problems in this area reported by German firms are not expected to ease in coming years, unless appropriate training is provided for unskilled individuals and for refugees.

Chart 9: Responses to the question: "How important have the following problems been for your enterprise in the past six months?"



Source: ECB, 2015 Survey on the Access to Finance of Enterprises (SAFE).

4. In the medium term, German growth could be slowed by weak equipment investment, but boosted by R&D investment

Weak equipment investment leads to lower capital accumulation, which could restrict medium-term economic growth and could be taken over by population decline in the long terme. The contribution of capital to Germany's potential growth has fallen steadily in the past thirty years. The trend is expected to continue, according to projections by the government and the European Commission, which both identify an underlying downtrend in Germany's potential growth[20] (see Table 1). Moreover, this is occurring amid a demographic decline that, in a long-term growth model[21], could lead to a downward adjustment in the stock of capital and therefore investment. In light of the pessimistic demographic projections, the growth in equipment investment is set to continue at the same modest pace as today.

These negative prospects for equipment investment could nonetheless be partly offset by investment quality, with rising investment in research and development (R&D). In 1995, R&D

(18) See OECD (2014), "Country Note: Education at a Glance, Germany".
(19) See Commerzbank (2016), "Germany: How to overcome shortage of skilled workers, Economic insight".
(20) While the underlying downtrend persists, the Commission recently revised Germany's potential growth for 2016 and 2017 upwards to take account of the impact on the labour factor of the massive immigration in recent years.
(21) Long-term growth models generally find a constant ratio between capital and labour.

investment by German firms[22] came to 1.4% of GDP, far ahead of Spain (0.4%), Italy (0.5%), and the U.K. (1.2%), and slightly ahead of France (1.4%).

Since then, Germany's private R&D investment has grown almost uninterruptedly, reaching 1.9% of GDP in 2014. R&D investment can support potential growth by raising total factor productivity (TFP)-notwithstanding the downtrend in TFP identified by both the European Commission and the German government (see Tabl 1).

Table 1: Change in potential growth and its components, according to the European Commission and the German government

	Potential growth (annua lchange, %)		Contribution					
			Labour		Capital		Total factor productivity	
	Commission	German Government	Commission	German Government	Commission	German Government	Commission	German Government
1981-1990	2.3	2.3	0.0	0.0	0.6	0.9	1.6	1.4
1991-2000	2.0	2.0	−0.2	−0.2	0.8	0.9	1.4	1.3
2001-2010	1.2	1.2	0.0	0.0	0.4	0.5	0.9	0.7
2011-2018	1.4	1.3	0.3	0.4	0.4	0,.4	0.7	0.6

Source: European Commission, Macroeconomic Imbalances Germany 2014; Gesamtwirtschafliches Produktionspotenzial und Konjoncturkomponenten, BMWi 2015.

Laure BAQUERO

(22) R&D investment is recorded in the national accounts under "other investment" along with software and databases; entertainment, literary and artistic originals; and cultivated biological resources. R&D accounts for a far higher proportion of "other investment" in Germany than in the other major European countries (54% in Germany versus 29% in the U.K. and France, 27% in Italy and 21% in Spain).

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Direction Générale du Trésor
139, rue de Bercy
75575 Paris CEDEX 12

Publication manager:
Michel Houdebine

Editor in chief:
Jean-Philippe Vincent
+33 (0)1 44 87 18 51
tresor-eco@dgtresor.gouv.fr

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