

MONETARY POLICY & THE ECONOMY

Quarterly Review of Economic Policy

Monetary Policy & the Economy provides analyses and studies on central banking and economic policy topics and is published at quarterly intervals.

Publisher and editor

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Oesterreichische Nationalbank, 1090 Vienna

DVR 0031577

ISSN 2309–1037 (print)
ISSN 2309–3323 (online)

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Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or of the Eurosystem.

Call for Applications: Visiting Research Program

The Oesterreichische Nationalbank (OeNB) invites applications from external researchers for participation in a Visiting Research Program established by the OeNB's Economic Analysis and Research Department. The purpose of this program is to enhance cooperation with members of academic and research institutions (preferably post-doc) who work in the fields of macroeconomics, international economics or financial economics and/or pursue a regional focus on Central, Eastern and Southeastern Europe.

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. Visiting researchers are expected to collaborate with the OeNB's research staff on a prespecified topic and to participate actively in the department's internal seminars and other research activities. They will be provided with accommodation on demand and will, as a rule, have access

to the department's computer resources. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. Research visits should ideally last between three and six months, but timing is flexible.

Applications (in English) should include

- a curriculum vitae,
- a research proposal that motivates and clearly describes the envisaged research project,
- an indication of the period envisaged for the research visit, and
- information on previous scientific work.

Applications for 2015 should be e-mailed to

eva.gehringer-wasserbauer@oenb.at
by May 1, 2015.

Applicants will be notified of the jury's decision by mid-June. The following round of applications will close on November 1, 2015.

Analyses

Austrian GDP Growth at 0.8% in 2014

Gerhard Fenz¹

Austria's Economic Output Went Up by Only 0.2% in the Second Quarter of 2014

According to the flash release of national accounts data, in the second quarter of 2014 the Austrian economy grew by only 0.2% against the previous quarter (in real terms, seasonally and working day-adjusted). As a result, Austrian GDP growth is currently lagging behind the expectations of the OeNB's Economic Indicator of July 2014 (+0.4%).

In the second quarter of 2014, mildly positive economic stimuli were generated by both private and government consumption (0.1% and 0.4%, respectively). Investment growth, by contrast, was unexpectedly sluggish. Companies curbed their investment activity by 0.3% in view of persistent uncertainty. Overall, domestic demand contributed 0.1 percentage points to GDP growth. Despite weak investment, net exports did not make any contribution to GDP growth (0.0 percentage points). Modest export growth

of 0.5% was offset by similarly high import growth.

GDP growth for 2013 was marginally revised downward by 0.1 percentage points to 0.3%. What is more significant for GDP growth in 2014, however, is the marked downward revision by 0.15 percentage points to just under 0.1% for the first quarter of 2014. Even if GDP growth is likely to be revised slightly upward owing to data gaps in the first quarter of 2014, its performance in the first six months of 2014 remains disappointing on the whole.

The OeNB's Economic Indicator Does Not Point to Economic Recovery in Austria in the Second Half of 2014 – GDP Growth at 0.8% in 2014

The external macroeconomic environment developed worse than anticipated in recent months. In addition to the sustained sluggishness of the euro area economy, the Austrian economy also had to struggle with the effects of geopolitical tensions. Goods exports on a

Table 1

National Accounts Data for Austria

	GDP	Private consumption	Government consumption	Gross fixed capital formation	Exports	Imports	Domestic demand (excluding inventories)	Net exports	Changes in Inventories	Statistical differences	
	Change on previous period in %						Contribution to GDP growth in percentage points				
Q1 13	+0.0	+0.0	+0.9	-0.3	+0.5	-0.1	+0.1	+0.3	-0.2	-0.2	
Q2 13	+0.0	+0.1	+0.7	+0.0	+0.6	+0.9	+0.2	-0.1	-0.1	+0.0	
Q3 13	+0.3	+0.1	+0.5	+0.0	+1.0	+1.1	+0.1	+0.0	+0.0	+0.1	
Q4 13	+0.4	+0.1	+0.4	-0.3	+0.9	+0.6	+0.1	+0.2	+0.0	+0.1	
Q1 14	+0.1	+0.1	+0.4	+0.6	+0.3	+0.6	+0.3	-0.1	-0.3	+0.2	
Q2 14	+0.2	+0.1	+0.4	-0.3	+0.5	+0.5	+0.1	+0.0	-0.1	+0.2	
2011	+2.9	+1.1	+0.5	+7.3	+6.8	+7.5	2.1	0.1	-0.4	1.1	
2012	+0.7	+0.4	+0.1	+1.9	+1.6	+0.0	+0.6	+1.0	-0.7	-0.2	
2013	+0.3	+0.1	+2.2	-0.8	+2.5	+0.9	+0.3	+1.0	-0.5	-0.3	

Source: Austrian Institute of Economic Research (WIFO), Eurostat.

¹ Oesterreichische Nationalbank, Economic Analysis Division, gerhard.fenz@oenb.at.

In collaboration with Friedrich Fritzer, Fabio Rumler and Martin Schneider. Parts of this paper were published in German in: OeNB: Konjunktur aktuell. Berichte und Analysen zur wirtschaftlichen Lage. August 2014.

Chart 1

OeNB Export Indicator: Truck Mileage and Goods Exports (seasonally and working day-adjusted)

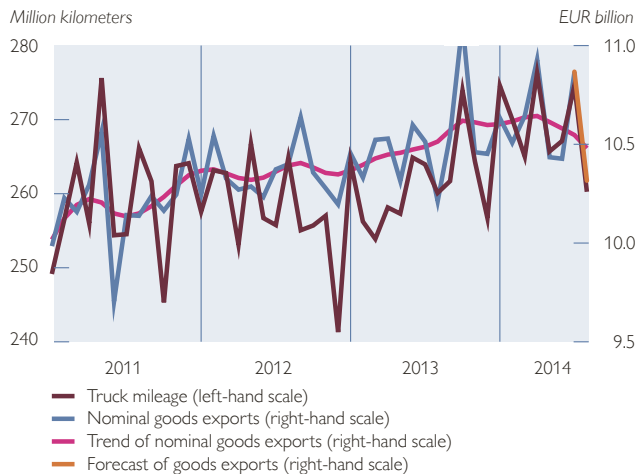
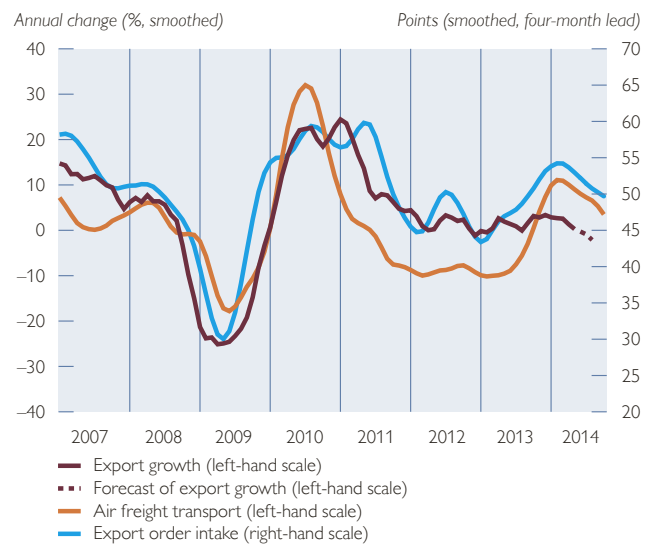


Chart 2

Leading Indicators for External Trade



cumulative basis rose by a mere 1.2% in the first six months of 2014. Goods exports to the euro area strengthened by 0.4%, with exports to Italy going down (-0.7%) while those to Germany went up (+0.9%). Austrian exports to Russia slumped owing to Russia's longer-standing economic fragility and its conflict with Ukraine. Goods exports to Russia contracted by 12% in the first six months of 2014, slumping by more than 20% in June alone. Accounting for a share of less than 3% of Austria's external trade, the Russian market is of relatively small importance, however. The OeNB Export Indicator, which is based on truck mileage data compiled by the Austrian highway authority ASFINAG, signals a slow start to the second half of 2014 for Austrian exports. In addition, other available leading indicators such as export orders and air freight volumes do not currently indicate a rebound in exports in the second half of 2014.

Given the high level of uncertainty, the in any event weak cyclical stimulus

from exports is currently not transmitted to the domestic economy. Moreover, various confidence indicators reflect the high uncertainty prevailing in the corporate sector. For instance, both the European Commission's Economic Sentiment Indicator (ESI) and the Bank Austria Purchasing Managers' Index (BA-CA PMI) deteriorated to their lowest levels in over one year. At 93 points in September 2014, the ESI is significantly below its long-term average of 100, while the PMI, at just 47.9 points, even signals a contraction in industry.

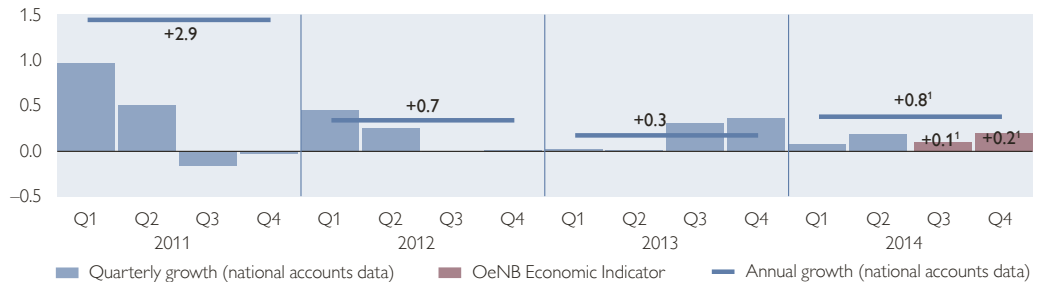
Thus, many companies are postponing their investment projects. Investment growth is being fueled only by housing investment, which is benefiting from rising property prices and an increased need for housing.

Easing inflation and a modest rise in real incomes will permit some scope for additional household spending in the coming months. Private consumption growth will, however, be only marginally stronger, at best, than in the

Outlook for Austria's Real GDP in the Third and Fourth Quarter of 2014

(seasonally and working day-adjusted)

Quarterly change in % (quarterly data)



Source: OeNB Economic Indicator of October 2014, Eurostat.

¹ As forecast.

first six months of 2014. Overall, GDP growth is not expected to accelerate in the second half of the 2014.

Against this backdrop, the OeNB had to significantly revise downward its growth expectations for 2014. The results of the OeNB's Economic Indicator of October 2014 suggest that Austrian GDP will grow by +0.1% on a quarterly basis in the third quarter of 2014. In the fourth quarter of 2014, quarter-on-quarter growth is expected to pick up slightly to +0.2%. This means that Austria's growth outlook for 2014 as a whole must be revised downward from 1.6% (OeNB June 2014 economic outlook) to no more than 0.8%. Via the carry-over effect, the changed growth profile for 2014 also has a detrimental impact on the growth expectations for 2015, which would be revised downward mechanically from 1.9% to around 1¼%.

Unemployment Rate Not Expected to Decline

Austria – latterly, in tandem with Germany – continues to post the lowest unemployment rate in the EU. Whereas the labor market situation has significantly improved in Germany in recent years owing to the country's relatively

healthy economy and labor market reforms, in Austria it has deteriorated. In Germany, the unemployment rate (Eurostat definition) fell from 7.5% in 2008 to 4.9% in July 2014. In Austria, by contrast, it climbed from 3.8% to 4.9%.

The rise in Austria's unemployment rate cannot be attributed to slow employment growth. The number of persons in employment is rising steadily despite weak economic momentum. For instance, payroll employment registered 22,000 more persons in August 2014 than in the previous month. At 3,564,000, payroll employment numbers reached a new record high for August.

The fact that the number of newly created jobs does not suffice to prevent unemployment from rising reflects strongly expanding labor supply. In this context, two factors are crucial: growing labor force participation rates among older employees and the influx of foreign labor from the new EU Member States.

The number of economically active persons aged 50 to 64 increased by slightly more than 46,000 in both 2012 and 2013. More than half of this rise is attributable to an accelerating labor

Table 2

Key Indicators for the Austrian Labor Market

	Payroll employment		Unemployed persons		Unemployment rate (%)	
	Thousands	Annual change in %	Thousands	Annual change in %	AMS definition (nonseasonally adjusted)	Eurostat definition (seasonally adjusted)
2011	3,422	+1.8	246.7	-1.6	6.7	4.2
2012	3,465	+1.3	260.6	+5.7	7.0	4.4
2013	3,483	+0.5	287.2	+10.2	7.6	4.9
Q3 13	3,553	+0.4	260.3	+13.2	6.8	5.0
Q4 13	3,474	+0.4	314.5	+11.9	8.3	5.0
Q1 14	3,448	+0.7	348.6	+9.5	9.2	5.0
Q2 14	3,505	+0.7	293.3	+14.7	7.7	5.0
Mar. 14	3,472	+0.7	319.2	+10.0	8.4	4.9
Apr. 14	3,476	+0.7	307.5	+12.6	8.1	4.9
May 14	3,499	+0.4	290.9	+15.5	7.7	5.0
June 14	3,540	+0.9	281.6	+16.2	7.4	5.0
July 14	3,595	+0.3	286.4	+11.6	7.4	4.9
Aug. 14	3,564	+0.6	292.3	+11.1	7.6	x

Source: Eurostat, Austrian Association of Social Insurance Providers, Austrian Public Employment Service (AMS).

force participation rate, which for this age cohort attained a new record high of 62% in 2013. Although the labor force participation rate of older employees is thus only slightly below the euro area average (65%), Austria's gap vis-à-vis its peer countries such as Germany (73.4%) and Sweden (81.3%) remains considerable. Excluding the increase in the labor force participation rate of persons aged 50 to 64, the number of Austria's total economically active population would have fallen by some 15,000 persons in 2013; in fact, however, it rose by 15,000 persons. In future, the labor force participation rate of older employees is anticipated to rise not least owing to pension reforms.

In addition, foreign labor has increased sharply since the Austrian labor market was opened to workers from the new EU Member States. Since then, labor supply from the EU-10 countries has been growing by an annual average of more than 30,000 persons. Since January 1, 2014, a stronger influx from Romania and Bulgaria has offset the

slowly decelerating inflow from the EU-8 countries.

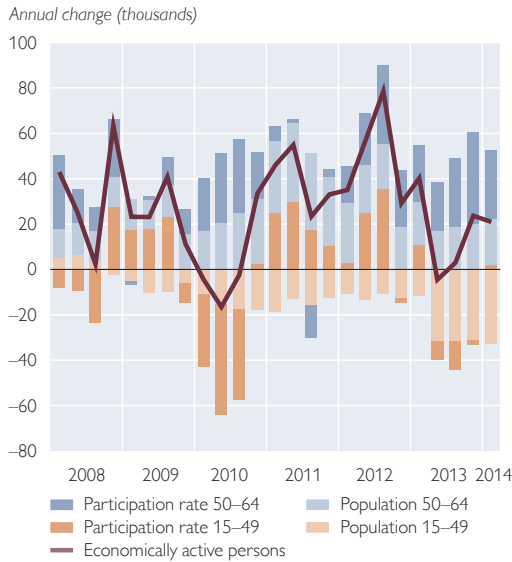
The trend of growing employment, expanding labor supply and stable or slightly rising unemployment is likely to continue in the coming months. The stabilizing number of vacancies and the increasing number of leased workers indicate sustained employment growth for the remainder of 2014. At the same time, the number of leased workers who are registered unemployed is going up. Nevertheless, it is gratifying to note that the number of intended dismissals under the AMS early warning system is trending downward.

All in all, however, it should not be expected, given the bleak economic environment, that employment growth will be sufficiently robust in the next few months to induce a fall in unemployment. Austria's unemployment rate (AMS definition), which rose by 0.7 percentage points to 8.5% on a seasonally-adjusted basis (nonseasonally adjusted: 7.6%) within a year, might therefore continue to inch up slightly in the com-

Chart 4

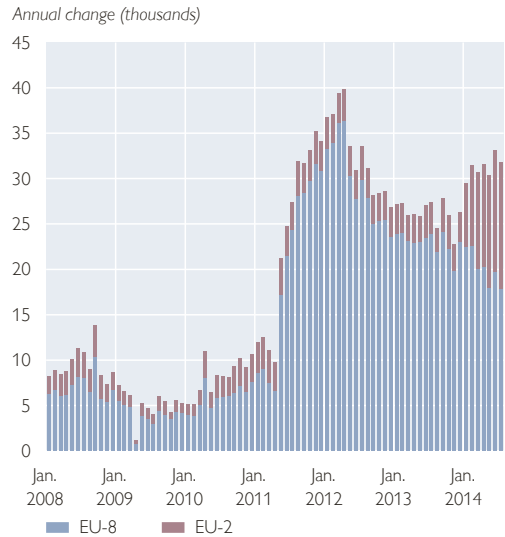
Determinants of Labor Supply Growth in Austria

Economically active persons aged 15–64



Source: Eurostat, Federal Ministry of Labour, Social Affairs and Consumer Protection (BMASK), AMS.

Economically Active Persons from the EU-10 Countries

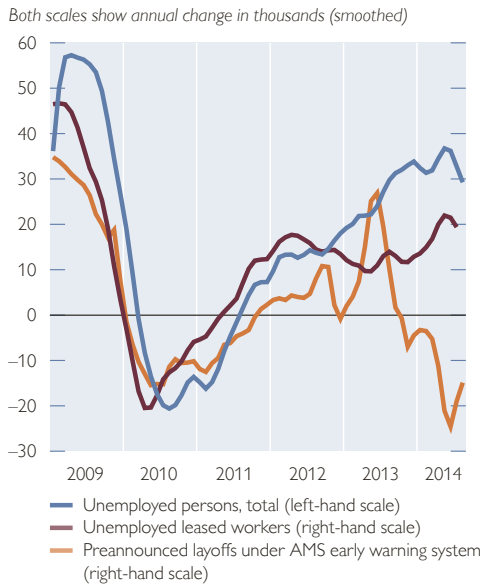


Note: EU-8: Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, Slovenia.
EU-2: Bulgaria, Romania.
EU-10=EU-8+EU-2.

Chart 5

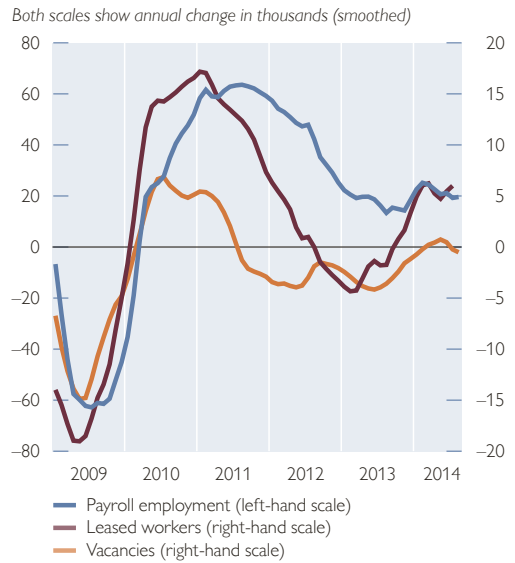
Leading Indicators for the Labor Market

Unemployment



Source: Statistics Austria, AMS.

Employment



ing months. By contrast, the unemployment rate (Eurostat definition) is likely to remain at just below 5% for the rest of 2014, as in the previous 12 months. The different development of these two unemployment rates is likely to be related to difficulties encountered in the coverage of foreign employees.

Inflation Rate in 2014 Barely Changed So Far

Austrian HICP inflation has remained nearly unchanged since early 2014. In August 2014, headline inflation stood at 1.5%, i.e. at the same level as in January 2014. In the interim, it had climbed to 1.7% in June and July 2014, which reflected above all the price developments in the services and processed foods sectors (including alcohol and tobacco).

In August 2014, the services sector alone, where annual inflation accelerated from 2.6% (in January) to 3.0% (in August), accounted for around 90% of headline inflation. Inflation in restaurant and hotel services remains above average, for which healthy growth in demand in the tourism sector is likely to be a key factor. In addition, annual rent inflation accelerated (to 4.2% in August 2014) owing to the previous months' adjustment of both rents in various categories and benchmark rent levels, as well as to the continued dynamic development of property prices. However, administered prices such as those for dental services also contributed to the uptick in services inflation.

Although nonenergy industrial goods inflation fluctuated for the most part just below 0.5% until July 2014, it fell sharply to -0.2% in the following month. This drop in inflation was attributable primarily to price declines in clothing and footwear (-1.5%) but also to those in many durables for rec-

reation and culture (e.g. recording media) and in nondurable household goods.

Although inflation in the food sector has on the whole eased since early 2014, it accelerated slightly in both July and August 2014. This development is primarily attributable to unprocessed food (e.g. fruit and vegetables) prices, the inflation rate of which went down from 1.8% in January 2014 to -0.3% in June. By August 2014, however, it had climbed again to 0.8%. Annual inflation in the energy sector has so far remained negative in 2014, standing most recently at -2.3% in August owing to still falling fuel prices.

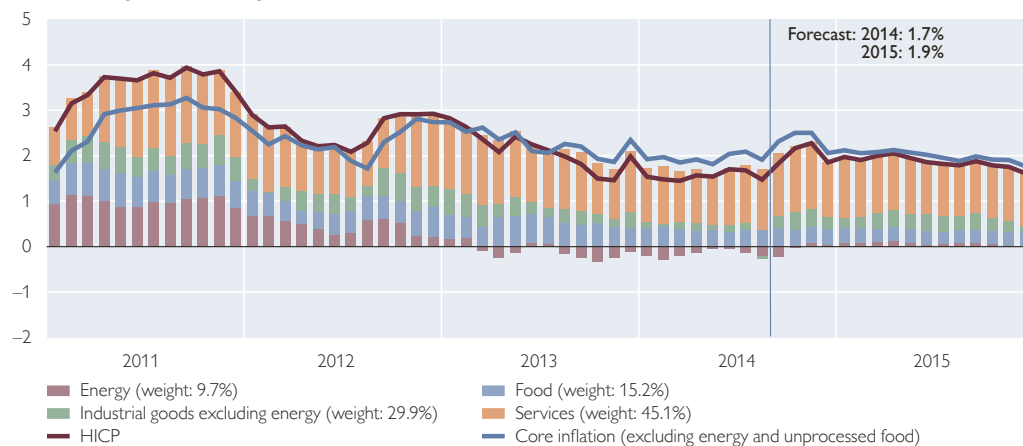
Inflation continues to be far higher in Austria than in other euro area countries. In August 2014, for instance, HICP inflation stood at 0.4% in the euro area and at 0.8% in Germany. Austria's inflation gap vis-à-vis Germany, its most important trading partner, was 0.7 percentage points in August 2014. This gap mirrors above all differing price developments in the services sector. In August 2014, services inflation was 3.0% (July: 2.8%) in Austria and 1.4% (same as in July) in Germany. Within the services sector, Austria's inflation gap vis-à-vis Germany is attributable to both wage-sensitive sectors (recently, especially restaurant and hotel services as well as financial services) and sectors where pricing is essentially determined by public sector entities (including cultural services and education). The higher rate of services inflation in Austria is therefore likely to be attributable to the public sector, to wage development and, not least, to the increase in rents.

In its inflation forecast of September 2014, the OeNB expects inflation in Austria to average 1.7% in 2014 and to rise modestly to 1.9% in 2015. Core inflation (excluding energy and unpro-

Austrian HICP Inflation and Contributions of Subcomponents

Annual change in % for HICP and core inflation;
contributions to growth in percentage points for subcomponents

Last observation: 1.5% (August 2014)



Source: OeNB, Statistics Austria.

cessed food) will be above headline inflation over the forecast horizon and is expected to average 2.1% per annum in 2014 and 2.0% in 2015.

In particular, the industrial goods sector (excluding energy) will fuel the modest uptrend in inflation from its current level of 1.5% (August 2014) to an annual average of 1.9% in 2015. Inflation in this sector should rise on the back of both import prices that are pointing to the upside and improved consumer demand, as well as owing to base effects in the forecast period. In the services sector, by contrast, HICP inflation will ease slightly by 2015. Falling crude oil prices, which have an inflation-dampening effect particularly on transportation services, will be a key contributory factor. In restaurant and hotel services, however, inflation is not expected to fall, as positive growth in demand in the tourism sector should further continue. Owing to falling producer prices for certain agricultural products, annual processed food inflation is forecast to be lower in 2015 than

in 2014. By contrast, unprocessed food inflation, which recently slumped sharply, should return to its medium-term level by 2015. The impact of the Russian import embargo for agricultural products on Austrian consumer prices cannot be estimated at this point in time. However, the direct impact is most likely to be minimal since Russia is a relatively unimportant market for the Austrian products affected by the embargo.

The public sector's contribution to inflation (in terms of administered prices and indirect taxes) will be 0.4 percentage points in both 2014 and 2015. The fiscal package (particularly, the hike in tobacco taxes, which are to be increased further in a second step in 2015), which came into force in March 2014, will lift inflation by 0.1 percentage points in both 2014 and 2015. The contribution made to inflation by administered prices (e.g. fees and charges) will amount to 0.3 percentage points in both 2014 and 2015.

Labor Productivity Developments in Austria in an International Perspective

Martin Schneider¹

After World War II, Austria, like other European countries, had for decades been improving its labor productivity, continuously catching up relative to the United States. Only when U.S. labor productivity grew at an accelerated pace from the mid-1990s to the mid-2000s on the back of new technologies implemented in distribution as well as finance and business services, did Austria – and in particular its service sector – fall behind. Unlike the U.S.A., Austria did not benefit from a technology-driven boom. By contrast, the productivity performance of Austrian manufacturing, without the production of information and communications technologies, is comparable to that in the U.S.A. and in Germany. Hence, to boost labor productivity in Austria, a high priority should be given to policies stimulating the diffusion of new technologies in the service sector.

JEL classification: O30, O47, O57

Keywords: Labor productivity, growth accounting, services, information and communications technologies

Productivity is key in determining the growth performance of a country. Since labor and capital cannot be expanded ad infinitum, long-run growth can only be based on a more efficient use of resources. After World War II, Austria – like European economies in general – had for decades been catching up toward the U.S. productivity level. However, since the mid-1990s, European countries have been falling behind the U.S.A. in terms of productivity growth. This phenomenon triggered a wave of empirical research, which showed that the accelerated productivity growth in the U.S.A. was broadly based and covered both manufacturing and market services. Within manufacturing, the production of information and communications technologies (ICTs) recorded the strongest productivity growth. Productivity growth in market services was mainly concentrated in sectors, such as retail trade or financial services, that had expansively integrated ICTs into their production process (Bosworth and Triplett, 2007). Uppenberg (2011) found that market services accounted for two-thirds of the U.S.-EU productivity growth gap in the 2000s,

and manufacturing for the remaining third.

Various studies (O'Mahony and van Ark, 2003; Denis et al., 2004; Gomez-Salvador et al., 2006; van Ark et al., 2008) tried to shed light on the question why European countries had not been able to keep up with the U.S.A. since the mid-1990s. The key finding of this literature is that the slower emergence of the knowledge economy in Europe is the main contributor. Within the EU, substantial differences across individual Member States and industries were observed. Most papers did not focus on Austria, it being only a small EU Member State. Kegels et al. (2008) analyzed productivity performance in Austria, Belgium and the Netherlands, using data until 2004. The authors attributed the lower productivity growth to the “disappearance of the catch up bonus diminishing the possibility to learn from the US.” Biatour and Kegels (2007) analyzed labor productivity growth in market services in Austria, Belgium and the Netherlands. They found that Austria and Belgium recorded a decrease in productivity growth between 1995 and 2004, while the Netherlands showed

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Refereed by:
Bas Bakker,
IMF

a pattern similar to the U.S.A. and posted an increase in its growth rate. Later, the financial and economic crisis was followed by a solid upswing in the U.S.A., whereas the recovery in Europe was much more muted, which left its mark on productivity.

The aim of this paper is to examine labor productivity developments in Austria in an international perspective. Therefore Austria is compared with the U.S.A. and Germany, with a special focus on sectoral productivity developments. The EU KLEMS database, which provides output, input and productivity measures at the industry level, allows for a comprehensive analysis of productivity developments.

The paper is organized as follows. Section 1 explains how labor productivity is measured. Section 2 discusses Austrian labor productivity developments in an international perspective and is followed by a decomposition of labor productivity growth in Austria, Germany and the U.S.A. Section 3 analyzes developments in different industries in more detail. Section 4 provides a breakdown of labor productivity growth within the classical growth accounting framework into contributions from labor composition, capital deepening and total factor productivity. Section 5 concludes.

1 Measuring Labor Productivity

The EU KLEMS database provides output, input and productivity measures at the industry level (O'Mahony and Timmer, 2009). The analysis presented here draws on data from the ISIC Rev. 4 industry classification, which are available for 12 countries (Austria, Belgium, Finland, France, Germany, Spain, Italy,

the Netherlands, Sweden, the United Kingdom, the U.S.A. and Japan) and 34 industries (see table A1 in annex 2). For most countries, the data series start in 1970 and extend to 2010. The data are organized according to the growth accounting methodology, which allows for assessing the relative importance of labor, capital and intermediate input for output growth. In addition, a measure for multifactor productivity growth can be derived. Labor input is divided into hours worked and a labor composition index, which takes the heterogeneity of the labor force into account. Labor input is cross-classified by education, gender and age, which produces 18 labor categories. Based on the assumption that marginal costs reflect marginal productivity, wage differentials result in different productivities per category. Capital is split into ICT capital and non-ICT capital (Timmer et al., 2007). The EU KLEMS database suffers from a considerable time lag. Therefore, to include also more recent years in the analysis, we use productivity data from the Conference Board Total Economy Database, which are available at the national level until 2013. We define labor productivity as real value added Y_t per hour worked H_t ,

$$LP_t \equiv \frac{Y_t}{H_t}.$$
²

Since the growth accounting methodology is based on a loglinearization of the production function, and to ensure consistency within the paper, we define labor productivity growth as the log-differences of value added minus the log-difference of hours worked

$$(\Delta \ln(LP_t) \equiv \Delta \ln(Y_t) - \Delta \ln(H_t)).$$

² This is not the only way to define labor productivity. Besides value added, gross output can be used as an output measure. Labor input can also be measured in heads instead of hours. The OECD (2001) gives an overview of different productivity measures.

2 International Labor Productivity over Time

In the post-World War II period, labor productivity in Europe was characterized by a fast catching-up process relative to the United States, with the first oil crisis in 1973 marking a break. From 1952 to 1973, labor productivity growth in Austria amounted to around 5% p.a., almost tripling from EUR 5.7 to EUR 16.1 per hour worked (at 2005 purchasing power parities).³ Relative to the U.S.A., productivity increased from 38% of the U.S. level to 68%. This fast catching-up was attributable to a well-educated labor force and institutional arrangements that basically ensured limited wage demands and enabled productivity-enhancing investment (van Ark et al., 2008). After the first oil crisis, however, productivity growth slowed down considerably in most world regions.

Despite this slowdown, European countries kept catching up relative to

the U.S.A. until the mid-1990s. In 1995, labor productivity in Austria reached 78% of the U.S. level, Germany attained 88%, and Belgium drew level with the U.S.A. After 1995, the pattern of productivity growth reversed. In the subsequent decade, labor productivity growth rates trended downward in Europe, whereas productivity growth in the United States doubled. Between 2005 and 2008, output and productivity in Europe grew somewhat more strongly than in the U.S.A. With the onset of the financial and economic crisis and the following recovery, the patterns reversed once again. While the United States has experienced a solid recovery, the European economies started to suffer from a variety of problems that have been exerting a drag on growth and productivity.

Chart 2 shows labor productivity growth for all 12 countries in the EU KLEMS database for four different time periods (1986–1995, 1996–2005,

Table 1

Average Growth of Output, Hours Worked and Labor Productivity 1952–2013¹

	1952–1973	1974–1985	1986–1995	1996–2004	2005–2008	2009–2013
<i>Average annual growth rate in %</i>						
Real value added						
Austria	5.2	2.3	2.7	2.4	2.9	0.4
Germany	5.6	1.9	2.5	1.4	2.3	0.6
U.S.A.	3.7	2.7	2.5	3.1	1.6	1.1
Hours worked						
Austria	-0.5	-0.9	0.2	0.8	0.7	-0.2
Germany	0.1	-0.9	0.1	-0.3	0.6	0.2
U.S.A.	1.2	1.6	1.4	0.8	0.8	-0.3
Labor productivity						
Austria	5.7	3.2	2.5	1.6	2.1	0.6
Germany	5.6	2.7	2.4	1.8	1.8	0.3
U.S.A.	2.5	1.1	1.1	2.3	0.8	1.4

Source: EU KLEMS database (1980–2010), the Conference Board Total Economy Database (1952–1969, 2011–2013), Eurostat.

¹ Values between 1980 and 2010 are taken from the EU KLEMS database. Values before 1970 and after 2010 have been chained with the growth rate (measured by the log-difference) of the respective variable from the Conference Board Total Economy Database. Real value added was chained with the growth rate of real GDP.

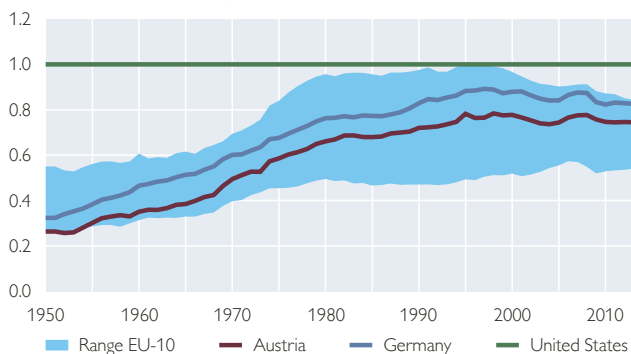
³ It is difficult to compare productivity levels between countries given the issues of currency conversion and purchasing power (van Ark and Timmer, 2001; Dey-Chowdhury, 2007). Absolute values at purchasing power parities consequently depend on the choice of the base year and are hence not unique.

Chart 1

Labor Productivity Developments of EU Member States Relative to the United States, 1950–2013

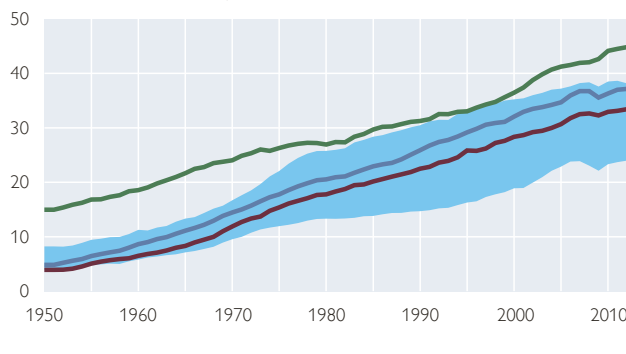
Relative Productivity (U.S.A.=1)

Gross real value added in EUR per hour worked at 2005 PPPs



Productivity Level

Gross real value added in EUR per hour worked at 2005 PPPs

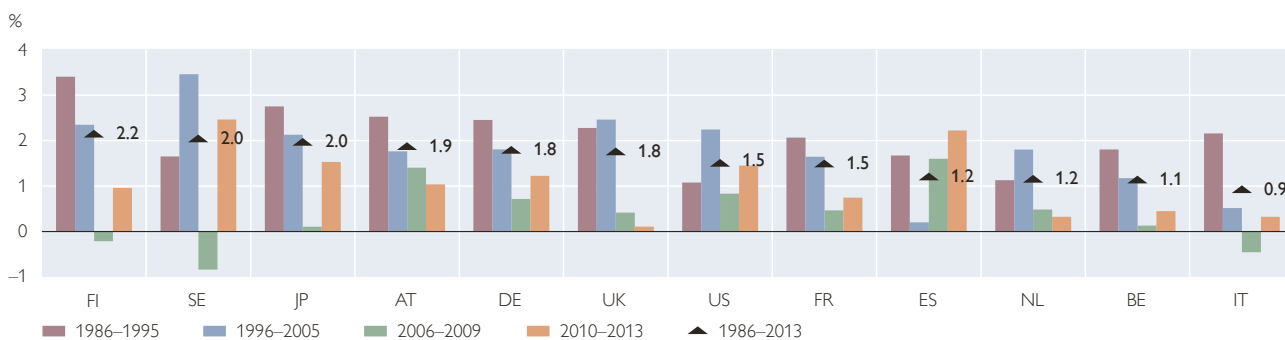


Source: New Cronos, EU KLEMS database (1970–2010), the Conference Board Total Economy Database (1950–1969, 2011–2013).

Note: The EU-10 consist of Belgium, Germany, Spain, France, Italy, the Netherlands, Austria, Finland, Sweden and the United Kingdom. Data before 1970 and after 2010 are chained by using data from the Conference Board Total Economy Database (growth rates of real GDP and hours worked, respectively).

Chart 2

Average Annual Labor Productivity Growth



Source: EU KLEMS database (1986–2010), the Conference Board Total Economy Database (2011–2013 and 1986–1995 for Sweden).

2006–2009 and 2010–2013). The countries are sorted in descending order according to labor productivity growth over the whole horizon (1986–2013). Austria ranks fourth after Finland, Sweden and Japan, outperforming most European countries. Italy shows the worst performance, which reflects the country’s failure to undertake structural change. The United Kingdom’s weak performance from 2006 onward is likewise noteworthy. Belgium’s modest labor productivity growth should not be a matter of concern; after all, Belgium exhibits the

highest level of labor productivity of the EU-10.

3 Productivity Developments by Industry

Analyzing labor productivity developments at the industry level provided us with many interesting insights. We calculated labor productivity in 2005 purchasing power parities (PPPs) to allow for a comparison between countries. Total labor productivity in Austria amounted to EUR 33 per hour worked in 2010 (see table 2 as well as table A2 in annex 2 for a detailed breakdown).

Table 2

Labor Productivity Levels in Austria, Germany and the United States by Industry

	Austria			Germany			U.S.A.		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
	<i>EUR per hour worked at 2005 PPPs</i>								
Total	22	28	33	26	32	36	31	36	44
Agriculture and mining (NACE A–B)	4	6	8	11	11	18	49	56	61
Manufacturing (NACE C)	22	33	41	25	35	44	20	31	54
Utilities (NACE D–E)	54	71	78	52	73	84	60	80	78
Construction (NACE F)	26	29	28	20	20	20	37	35	30
Distribution services (NACE G–I)	20	24	27	18	21	26	25	35	44
Finance and business services (NACE J–N)	44	47	56	52	60	58	44	46	60
Personal services (NACE O–U)	24	25	26	24	27	28	31	30	30

Source: EU KLEMS database, Eurostat, author's calculations.

Labor productivity levels differ markedly between industries. Agriculture and mining post the lowest level by far, reaching a mere 24% of total labor productivity. In manufacturing, labor productivity exceeds the country-wide productivity average by 24%. Utilities, in turn, stand out with a very high level of productivity (239% of the average). This industry consists mainly of sectors supplying natural resources like gas, water and electricity, which have low employment intensity. The service sector is very heterogeneous with high productivity differentials. Finance and business services exhibit a very high level of productivity, while distribution and personal services are clearly below average. In Germany, labor productivity is slightly higher (EUR 36 per hour worked), whereas it is considerably higher in the U.S.A. (EUR 44 per hour worked). The marked productivity dispersion also holds for Germany and the U.S.A. (with the exception of the relatively high level of labor productivity of agriculture and mining in the U.S.A.).

Chart 3 shows the contributions of seven industries to total trend labor productivity growth for Austria, Germany and the United States as from

1980. We calculated the industry contributions according to equation (1) as described in box 1 with EU KLEMS data running to 2010. For the period from 2011 to 2013, we took labor productivity growth from the Conference Board Total Economy Database, which includes more recent data than EU KLEMS, but does not provide an industry breakdown. Since the annual contributions are very volatile, we calculated trend labor productivity by using the HP filter to obtain a clearer picture.

Labor productivity in *Austria* – like in all European countries – is characterized by a downward trend, which started in the mid-1970s. Two episodes of increasing labor productivity interrupted this downward trend. In the mid-1990s, structural change and Austria's EU accession temporarily increased labor productivity growth, driven by a shrinking agricultural sector combined with the remaining sector's increasing productivity and a short-lived surge in service productivity. In the mid-2000s, agriculture and the manufacturing sector – having recovered from a dip in productivity growth after the 2001 recession – contributed to higher productivity growth. The financial and economic crisis then again exerted a

Decomposing Labor Productivity Growth by Industry

Labor productivity growth for the total economy can be the result of two phenomena. First, labor productivity can increase within an industry (“within-industry effect”) for numerous reasons (capital deepening, labor composition change, total factor productivity). Second, resources can be shifted from less productive industries to sectors with higher productivity and/or higher productivity growth (“reallocation effect”). The appropriate framework for disentangling these two effects is a shift-share analysis. In equation (1), growth of total labor productivity LP_t (measured as the log-difference of labor productivity) is decomposed into the sum of contributions of industries i

$$\Delta \log(LP_t) \approx \underbrace{\sum_{i=1}^I \bar{w}_{i,t}^V \Delta \log(LP_{i,t})}_{\text{within-industry effect}} + \underbrace{\sum_{i=1}^I (\bar{w}_{i,t}^V - \bar{w}_{i,t}^H) * (\ln(w_{i,t}^H) - \ln(w_{i,t-1}^H))}_{\text{reallocation effect}}, \quad (1)$$

where $\Delta \log(LP_{i,t})$ denotes labor productivity growth of industry i . Weights $w_{i,t}^H = H_{i,t} / H_t$ denote the share of industry i in total hours worked in year t .

$$\bar{w}_{i,t}^H = (w_{i,t-1}^H + w_{i,t}^H) / 2 \quad \text{and} \quad \bar{w}_{i,t}^V = (w_{i,t-1}^V + w_{i,t}^V) / 2$$

are defined as the average weights of the current and the previous year of hours worked and value added $V_{i,t}$ of industry i in total hours worked and value added, respectively.¹

Within-industry effects of industry i are calculated by multiplying its labor productivity growth rate $lp_{i,t}$ with its share in total hours worked ($w_{i,t}^V$). If there is no reallocation of labor input over time, the within-industry effects will add up to total labor productivity. Since there is continuous structural change in the economy, the reallocation effect has to be taken into account. An increase of labor input

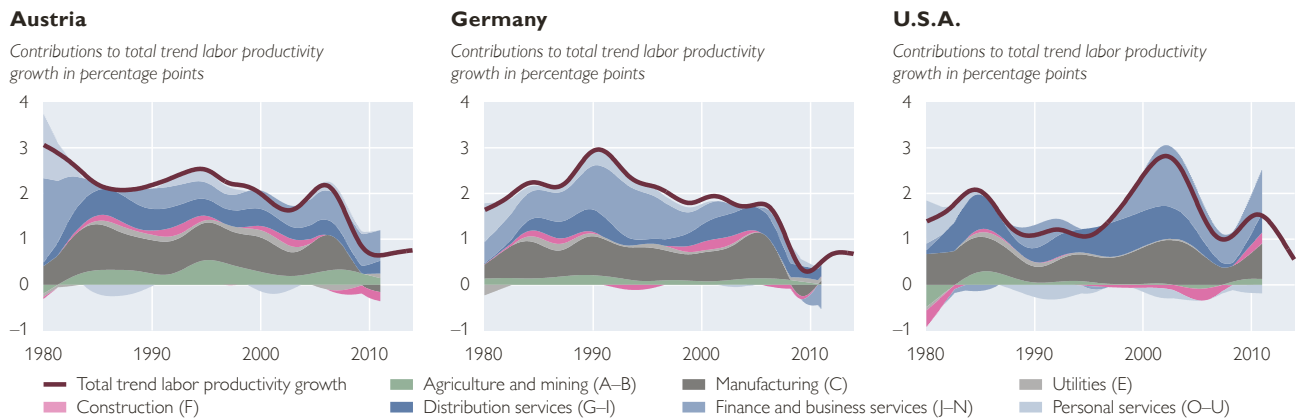
$$(\ln(w_{i,t}^H) - \ln(w_{i,t-1}^H)) > 0$$

into an industry with above-average productivity ($\bar{w}_{i,t}^V - \bar{w}_{i,t}^H > 0$) leads to an increase in overall labor productivity.

This equation can be used in two ways to analyze productivity developments. First, we may look at the contributions for industry i . Industry contributions approximately add up to labor productivity growth (measured as log-difference). Discrepancies between the sum of industries and total labor productivity growth mainly arise from the fact that real value added of industries does not add up to total value added because of the chainlinking and, to a lesser extent, because of the approximate character of the formula. Second, we may calculate aggregated within-industry and reallocation effects. In that way, we can disentangle “pure” labor productivity gains that occur within one sector from shifts in the industry composition of total output.

¹ See Reinsdorf and Yuskavage (2010) for a discussion of different formula to decompose labor productivity into industry contributions.

Contributions to Total Trend Labor Productivity Growth in Austria, Germany and the United States by Industry



Source: EU KLEMS database (1980–2010), the Conference Board Total Economy Database (2011–2013), author's calculations.

drag on productivity growth. As a case in point, manufacturing and the construction sector exhibited a decline in productivity, mainly driven by firms' labor hoarding and by government measures that helped mitigate the employment impact of the crisis (Hofer et al., 2014).⁴ The contributions of the Austrian service sector do not show strong time variation (with the exception of the sharp decrease in the first half of the 1980s, which is exaggerated by end-point problems of the HP filter).

The time profile of labor productivity growth in *Germany* differs from that in Austria mainly due to German reunification. While there is no comparable structural change in agriculture, the development of manufacturing is broadly similar to that in Austria (with the exception of the mid-2000s, when labor productivity growth was much stronger in Germany). The main difference to Austria arises from the service sector,

which contributed considerably to Germany's overall labor productivity growth in the early 1990s.

In the *United States*, labor productivity growth differed markedly from that in European countries. Prior to the first oil crisis, it was clearly below Austria (1952–1973: +5.2% p.a.; U.S.A.: +2.5% p.a.). From 1974 to 1995, it slowed down further to 1.1% p.a. (Austria: 2.5% p.a.). After 1995, the picture changed for one decade. While labor productivity further declined in Europe, it doubled in the U.S.A. (1995–2004: +2.3% p.a.). This development was to a large extent driven by the service sector. In addition, the computer industry also contributed heavily to this development.⁵ In the following subsections, we will dig more deeply into developments by industry to identify the main contributors to overall labor productivity growth in Austria.

⁴ The decline of employment in Austria during the crisis was small given the severity of the recession. Firms adapted mainly by reducing the number of hours worked (Stiglbauer, 2010).

⁵ The spike in the sum of the contributions for the U.S.A. is caused by end-point problems of the HP filter and should not be overinterpreted.

3.1 Agriculture and Mining: Decline of Agriculture Drives Economy-Wide Labor Productivity Growth

Developments in *agriculture and mining* have played an important role for overall labor productivity in Austria over the last decade. Besides productivity increases within the sector, *reallocation effects* (a shift of employment away from agriculture to other sectors) have proved to be significant. Chart 3 (left panel) shows that the contribution from agriculture and mining to economywide trend labor productivity growth is dominated by this reallocation effect. Between 1990 and 2010, the hours worked in agriculture and mining dropped by 43%. Since labor productivity in agriculture and mining is clearly below the economy-wide productivity level (see table 2 and table A2 in annex 2), this drop in hours resulted in an increase of overall productivity.

Productivity in *agriculture* has traditionally been low for numerous reasons, including the nature of Austria as an alpine country with often difficult con-

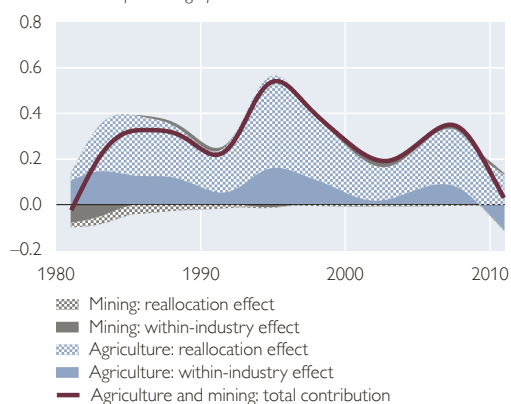
ditions, the small average farm size and the fact that many farms are operated on a part-time basis (see Schneider, 2003, for a more detailed discussion). Over the last decades, an immense structural change took place, driven by technological progress, EU accession, changes of the subsidies schemes and the emergence of organic farms. Between 1995 and 2010, the number of farms fell by 32%; employment decreased by 39%. In the same period, the average farm size increased by 24% according to Eurostat. The growth decomposition (right panel of chart 4⁶) shows that productivity developments within agriculture (i.e. without reallocation effects) are driven by large positive contributions of total factor productivity (TFP), whereas contributions from capital deepening are negative over the entire horizon. This implies that investment declined even more strongly than labor input. Developments in *mining* do not have any significant effect on overall developments.

Chart 4

Agriculture and Mining

Contributions of Agriculture and Mining to Total Trend Labor Productivity Growth

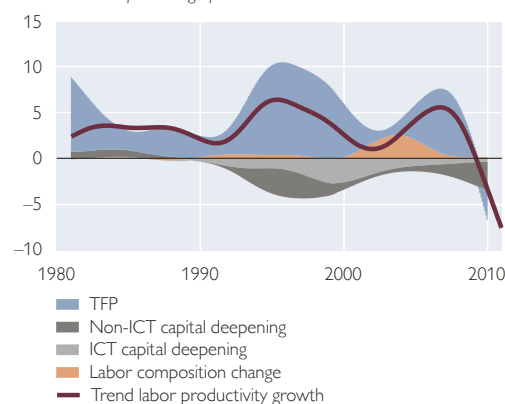
Contributions in percentage points



Source: EU KLEMS database (1980–2010), author's calculations.

Contributions to Trend Labor Productivity Growth in Agriculture

Contributions in percentage points



⁶ Note that while the left panel of chart 4 shows contributions to economy-wide trend labor productivity growth, the right panel of this chart presents a decomposition of trend labor productivity growth in agriculture.

3.2 Manufacturing: Productivity Growth in Austria Driven by Traditional Industries

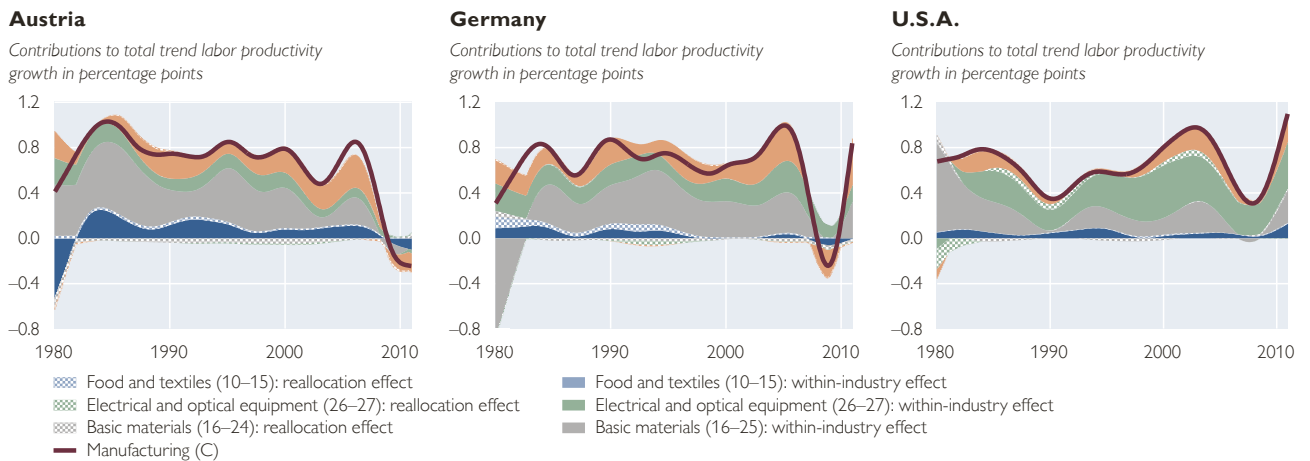
Labor productivity in Austrian manufacturing industries developed well during the last decades, being either above (1986–1995) or at (1996–2005) the EU-10 average. In a long-term perspective, the contributions of the manufacturing sector to overall labor productivity developed in a similar way in Austria and Germany.

The main drivers of manufacturing were traditional industries (*basic mate-*

rials, NACE 16–25). *Electrical and optical equipment* (NACE 26–27) did not play a significant role, especially in Austria. The 2001 recession caused labor productivity growth to decline. Reallocation effects were slightly negative for *basic materials* and *electrical and optical equipment* and positive for *food and textiles*. This finding implies a fall in the relative size of all three industries, since labor productivity of the former two industries is above, while labor productivity of the latter was below the economy-wide average.

Chart 5

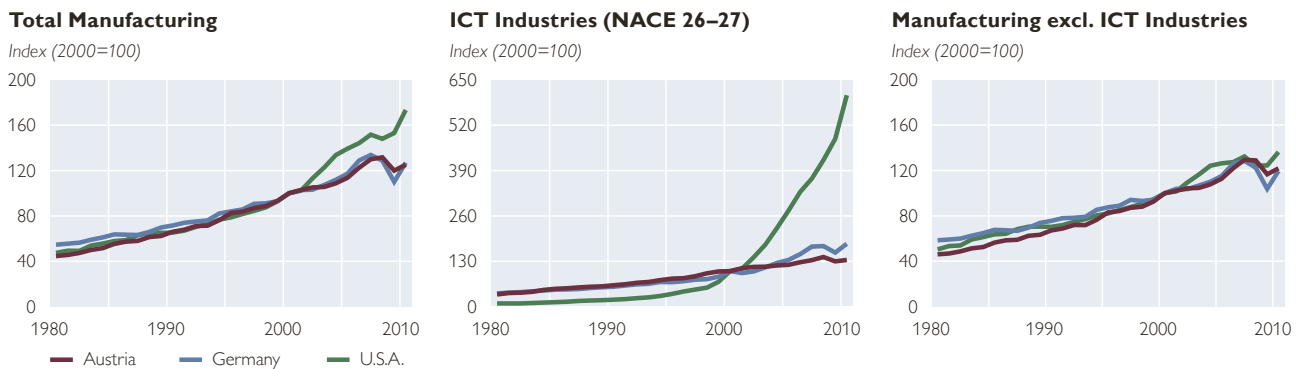
Contributions to Total Trend Labor Productivity Growth in Austria, Germany and the United States: Manufacturing



Source: EU KLEMS database (1980–2010), author's calculations.

Chart 6

Labor Productivity in Manufacturing in Austria, Germany and the United States



Source: EU KLEMS database.

Between 1980 and 2000, developments of labor productivity in manufacturing were very similar in all three countries (chart 6). Beginning in 2002, labor productivity in U.S. manufacturing outpaced developments in Austria and Germany, accounting for one-third of U.S. productivity growth. This growth was solely driven by the ICT industry (*electrical and optical equipment*), where labor productivity exploded. However, productivity growth in the U.S. ICT industry might be overestimated due to flawed input price measurement (see box 2). Between 2000 and 2008, the manufacturing sectors – without ICT industries – of the three countries under review showed a relatively similar development, with increases of 20% (Austria), 22% (Germany) and 24% (United States). The financial and economic crisis exerted a stronger drag on labor productivity in manufacturing in Austria and Germany compared with the U.S.A.

3.3 Services: U.S.A. Has Been Outperforming Austria and Germany since the End-1990s

The service sector, which is by far the largest sector in industrialized economies, accounts for the lion's share of value added and employment. Its share in total value added in Austria increased from 64% in 1990 to 70% in 2010. In the United States, the share is even higher (80% in 2010). Although the share of services in total exports amounts to less than 30% in Austria, their role is greater for overall productivity and competitiveness, since many services are important inputs into the production of goods. Woerz (2008) finds that labor productivity is one of the key determinants of export competitiveness of the Austrian service sector.

The structure of the service sector differs markedly between the three

countries reviewed here (table 3). In Austria, *distribution services* play a much greater role than in Germany and the U.S.A., while the importance of *finance and business services* is much lower. The relative size of *personal services* is similar across the three countries.

Productivity developments in services explain a large part of the difference in labor productivity growth of Austria vis-à-vis Germany and the U.S.A. In the periods from 1986 to 1995 and from 2006 to 2009, services in Austria contributed 1 percentage point to overall annual labor productivity growth. Between 1996 and 2005, the contribution slowed down to 0.6 percentage points. Chart 7 shows a decomposition of the contribution of the service sector into the within-industry and the reallocation effect for the three service categories distribution services, finance and business services and personal services.

The contribution of *distribution services* in Austria slowed down from 0.5 percentage points between 1986 and 1995 to 0.3 percentage points between 1996 and 2005. In Germany, the contribution remained more or less constant (1986–1995: 0.3 percentage points; 1996–2005: 0.4 percentage points). The U.S. distribution sector experienced a boost of labor productivity growth between the mid-1990s and the mid-2000s (1986–1995: 0.4 percentage points; 1996–2005: 0.7 percentage points). This boost was attributable primarily to productivity gains in the U.S. retail sector based on various factors. The implementation of information and communications technologies like barcode scanners, communication equipment and inventory tracking devices as well as transaction processing software proved to be one important source of productivity growth (van Ark et al., 2008). These technologies enabled process innovations

Box 2

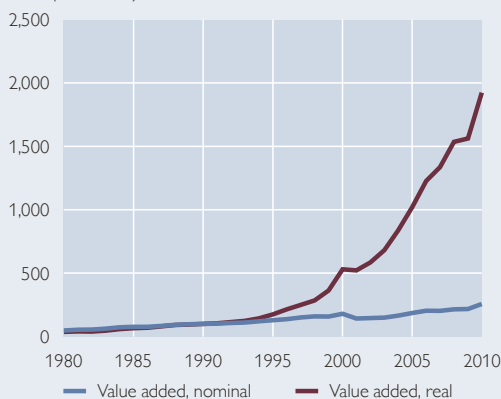
To Which Extent Is Labor Productivity Growth in U.S. Manufacturing Overestimated by Flawed Input Price Measurement?

There is an ongoing debate about whether and to which extent real growth in U.S. manufacturing is overestimated by an “input price bias.” Value added of an industry is defined as gross output minus inputs used in the production process. Real value added is thus influenced by nominal values as well as by the prices of gross output and inputs. The hypothesis is that the value added deflator exhibits a downward bias – and hence real value added an upward bias – for two reasons. The first is a change in the statistical methodology to construct price indices. In 1997, the output price index in U.S. manufacturing was changed to a hedonic-based index. Quality improvements – which are especially large for the computer industry – subsequently lead to lower output prices and higher real gross output. However, no corresponding shift was made for the measurement of input prices. As a consequence, input prices exhibit an upward and real inputs a downward bias. (Baily and Bosworth, 2014).

Value Added in the U.S. Electrical and Optical Equipment Industry

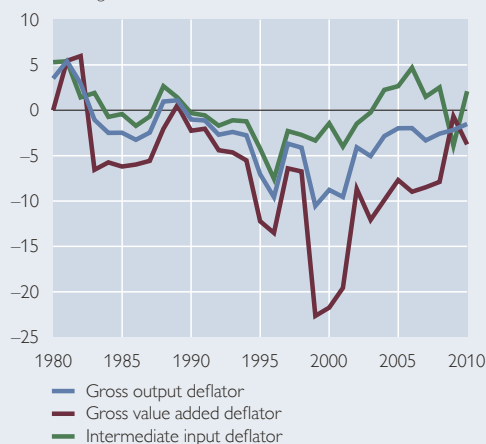
Value Added

Index (1990=100)



Deflators

Annual change in %



Source: EU KLEMS database.

The second argument is that offshoring activities cause an upward bias of input prices. Since the mid-1990s, massive outsourcing has taken place in the U.S. manufacturing industries. The import share of material inputs by U.S. manufacturers increased from 17% to 25% between 1997 and 2007. Houseman et al. (2011) argue that the price declines associated with the shift to low-cost foreign suppliers (i.e. offshoring) are not captured in existing price indices. They estimated that real value added growth in manufacturing, which amounted to 3.0% p.a. between 1997 and 2007, was overstated by 0.2 to 0.5 percentage points (i.e. by about 7% to 18% of growth).

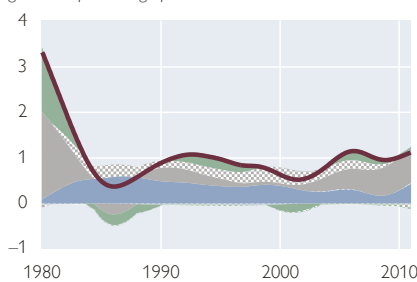
in the areas of store and supply chain management and allowed for optimized marketing campaigns. In addition, large-scale retail formats (as exemplified by Walmart) were an important driver of U.S. productivity growth (McKinsey

Global Institute, 2002). Austria and Germany are clearly lagging behind the U.S.A. in the implementation of such productivity-enhancing innovations. In transport and storage activities (NACE 49–52), labor productivity in Austria

Contributions to Total Trend Labor Productivity Growth in Austria, Germany and the United States: Services

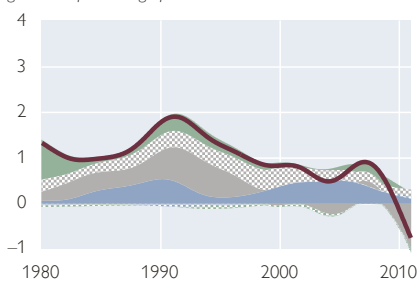
Austria

Contributions to total trend labor productivity growth in percentage points



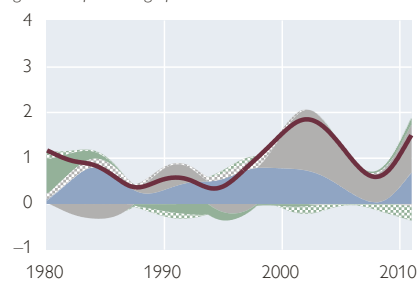
Germany

Contributions to total trend labor productivity growth in percentage points



U.S.A.

Contributions to total trend labor productivity growth in percentage points



■ Personal services: reallocation effect
 ■ Distribution services: within-industry effect
 ■ Finance and business services: reallocation effect
▨ Personal services: within-industry effect
 ▨ Distribution services: reallocation effect
 ▨ Finance and business services: within-industry effect
— Services total

Source: EU KLEMS database (1980–2010), author's calculations.

Table 3

Composition of the Service Sector in Austria, Germany and the United States in 2010

	Austria	Germany	U.S.A.
	Share of value added in %		
Service sector (G–U)	100.0	100.0	100.0
Distribution services (G–I)	32.9	22.8	21.5
Trade (G)	19.3	14.6	14.5
Transportation and storage (H)	6.7	5.6	3.5
Accommodation and food services (I)	7.0	2.6	3.6
Finance and business services (J–N)	37.8	44.5	46.3
Information and communication (J)	4.4	5.8	7.0
Financial and insurance activities (K)	7.0	6.5	10.7
Real estate activities (L)	13.5	16.9	15.2
Business services (M–N)	12.8	15.2	13.4
Personal services (O–U)	29.3	32.7	32.2
Share of service sector in total value added	70.3	69.5	79.9

Source: EU KLEMS database, author's calculations.

declined slightly between 1996 and 2005, while Germany and the United States saw strong productivity increases. Similar to the retail sector, new technologies, such as network optimization and dispatching, barcode scanning, data exchange with customers, intelligent vehicle systems, positioning and remote tracking, might explain the differences in productivity performance. By contrast, labor productivity growth in

postal and courier activities (NACE 53) in Austria outpaced that in Germany and the United States, reflecting the massive structural changes in the wake of liberalization during this period (see table A3 in annex 2).

An important source of labor productivity growth in all three economies, *finance and business services* account for most of the difference between Austria, Germany and the United States. Two results are noteworthy. First, reallocation effects resulting from the growing role of these services played an important role in Austria and Germany. For the U.S.A., reallocation effects are almost negligible. Second, U.S. finance and business services experienced a boost in labor productivity (within-industry effect) from the mid-1990s onward, which is well documented in the literature (see e.g. Bosworth and Triplett, 2007). This boost was ascribable to ICT capital deepening and an acceleration of TFP growth on the back of stepped-up use of ICTs. However, precrisis growth patterns were distorted by the existence of financial bubbles and debt-fueled demand growth (Uppenberg, 2011).

Since 2006, labor productivity growth of finance and business services in Austria has been accelerating, while it turned negative in Germany. The U.S.A. shows strong cyclical behavior, with a deceleration during the crisis and a strong acceleration afterward.

3.4 Structural Change Contributes Positively to Labor Productivity Growth in Austria

This subsection provides a summary of our findings on the impact structural change had on labor productivity growth in Austria. As mentioned earlier, structural change – i.e. the shift of resources between industries – contributed positively to labor productivity growth in Austria and Germany, whereas its effect was negative in the United States.

In Austria, this is mainly attributable to the declining share of agriculture and the increasing share of finance and business services. This effect was especially strong between 1986 and 1995, accounting for 11% of labor productivity growth. Over the entire horizon, the effect amounted to 0.2 percentage points or 9% of labor productivity growth. In Germany, the effect was even stronger (0.3 percentage points

or 15% of labor productivity growth), driven by a declining share of food and textiles and the growth of finance and business services. The U.S.A. recorded a negative reallocation effect of –0.1 percentage points or –7% of labor productivity growth, which stems primarily from the deindustrialization that took place during the last decades.

4 Contribution of Production Factors to Trend Labor Productivity Growth

The EU KLEMS database enables us to calculate the contributions made by production factors to labor productivity growth at both the national and industry level. We decompose labor productivity growth into its contributions from labor composition, ICT capital deepening⁷, non-ICT capital deepening and total factor productivity. In annex 1 we explain how we calculated these contributions based on the production factor framework.

Chart 9 shows the results of this decomposition for Austria, Germany and the United States. Since annual labor productivity and its contributions are very volatile, we calculated trend labor productivity by using the HP

Chart 8

The Role of Structural Change for Total Labor Productivity Growth



Source: EU KLEMS database, author's calculations.

⁷ Capital deepening is defined as capital services per hour worked.

filter⁸. Overall trend labor productivity growth in Austria and Germany are of a similar magnitude, but they are driven by different factors. In Austria, the most important contribution came from TFP. By contrast, non-ICT capital deepening played the dominant role in Germany. For the U.S.A., capital deepening explains the bulk of labor productivity growth.⁹

Turning to the time profile of labor productivity growth in *Austria*, we see that the slowdown during the late 1980s was to a large extent driven by a slowdown in non-ICT capital deepening. The Austrian economy experienced a boom phase between 1988 and 1992 resulting in strong growth of employment and hours worked. The acceleration in labor productivity during the first half of the 1990s coincided with Austria's EU accession in 1995 and was mainly driven by falling labor input. The productivity surge in the mid-

2000s and the drop during the financial and economic crisis cannot be explained by inputs into the production process and are thus attributed to TFP. Investment was especially weak in this period. Labor composition change also made positive contributions, which were on average higher than in Germany and the United States.

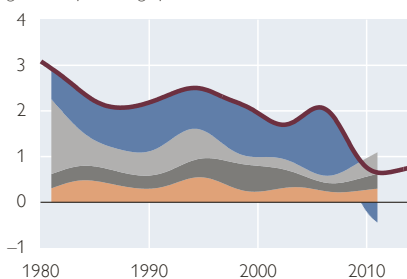
Having peaked in the early 1990s, labor productivity growth in *Germany* decelerated considerably to levels observed in the 1980s, mainly driven by weaker contributions from TFP. According to Eicher and Roehn (2007), this TFP decline was attributable to productivity decreases in non-ICT industries, whereas ICT-producing ones recorded a surge in productivity. However, this surge was not strong enough to offset the decline in non-ICT industries. The financial and economic crisis was the main reason for the slowdown observed in Germany in the late 2000s.

Chart 9

Contributions of Production Factors to Trend Labor Productivity Growth in Austria, Germany and the United States

Austria

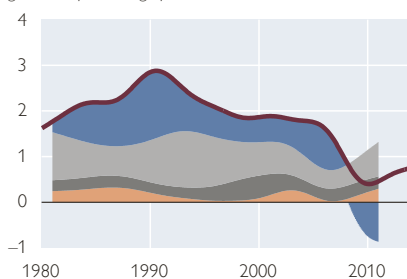
Contributions to trend labor productivity growth in percentage points



■ TFP
 ■ Non-ICT capital deepening
 ■ ICT capital deepening
 ■ Labor composition change
 ■ Growth of trend labor productivity

Germany

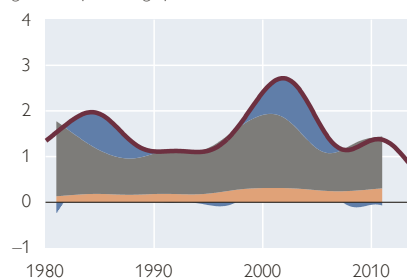
Contributions to trend labor productivity growth in percentage points



■ TFP
 ■ Non-ICT capital deepening
 ■ ICT capital deepening
 ■ Labor composition change
 ■ Growth of trend labor productivity

United States

Contributions to trend labor productivity growth in percentage points



■ TFP
 ■ Capital deepening
 ■ Labor composition change
 ■ Growth of trend labor productivity

Source: EU-KLEMS database (1985-2010), Conference Board Total Economy Database (2011-2013), author's calculations.

⁸ Since the HP filter suffers from end-point problems, developments at the beginning and end of the sample should not be overinterpreted.

⁹ For the U.S.A., data are available for overall capital contributions only. No breakdown into ICT and non-ICT capital is available.

The surge in labor productivity growth in the *United States* in the 2000s is attributable both to capital deepening (mainly ICTs, although the EU KLEMS database provides no breakdown for the United States) and to stronger TFP growth.

4.1 Manufacturing

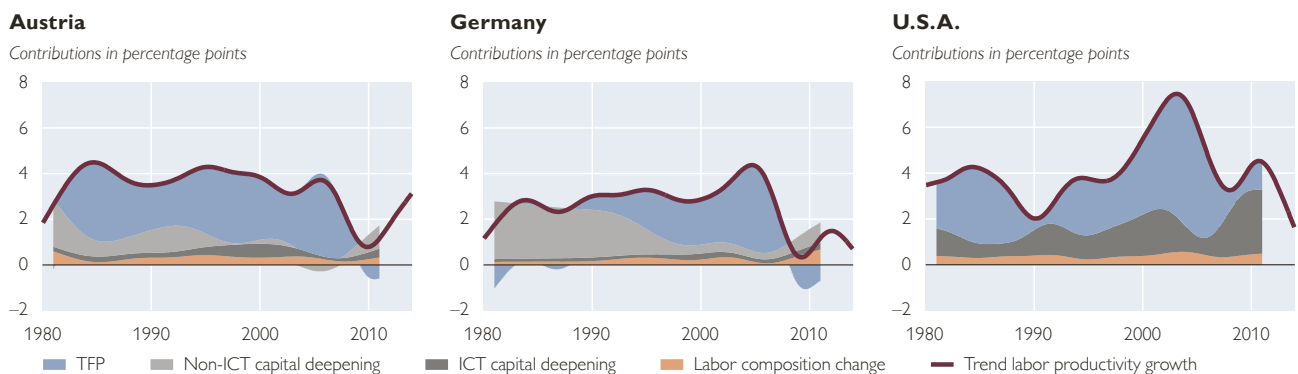
In the *United States*, periods with high contributions from capital deepening (1980s, 2000s) were closely followed by periods with strong TFP growth, which indicates massive spillovers from investment (especially in ICTs). The importance of ICT investment for TFP growth is well documented in the literature (Fukao and Miyagawa, 2007; Jorgenson et al., 2008; Biagi, 2013). Investment in ICTs fosters productivity enhancements, but for such technologies to be used efficiently, the workforce must be sufficiently capable and proper organizational structures must be in place as well. According to the above literature, the U.S. economy fared best in creating an environment promoting the adaptation of new technologies. Most European countries, including Austria and Germany, failed to achieve that. The dominant role ICT

investment plays in explaining the different productivity developments in the United States and in Europe is well established in the empirical literature. Biagi (2013) finds this difference to be traceable to the smaller size of the ICT-producing industry in Europe, lower investment in ICT capital and a lower TFP in the ICT-using industries, especially in wholesale trade and financial services. This implies that EU firms in these industries lack in capability to integrate new technologies and to use them in an efficient way. This may be due to market segmentation and the smaller firm size in Europe, which makes it more difficult for firms to cope with the high costs of implementing ICTs. Differences in access to funding might be another explanation.

Chart 10 shows the contributions of production factors to trend labor productivity growth in manufacturing. It shows similarities as well as striking differences between the three countries. The common factor is that labor productivity growth in manufacturing is to a large extent driven by TFP, i.e. it cannot be explained by capital deepening and labor composition change. This can be seen as evidence for the various *new*

Chart 10

Contributions of Production Factors to Trend Labor Productivity Growth in Manufacturing (NACE C) in Austria, Germany and the United States



Source: EU KLEMS database (1980–2010), Eurostat, U.S. Bureau of Labor Statistics (2011–2013), author's calculations.

technologies that have already impacted on productivity in manufacturing over the last years and will have an increasing impact over the next years. Some examples are given below. Industrial robots and automation are no new phenomena, but the rapidly falling prices and increasing abilities of industrial robots create numerous new areas of application. Technologies such as 3D printing (“additive manufacturing”) are still only at an early stage, but create an enormous potential for the future. Progress in computing allows for building digital prototypes when developing new products, thus enabling cost savings and reduced time to market (advanced design). The use of low-cost sensors leads to an “Internet of Things,” which refers to the direct interconnectedness of machines over the Internet and brings about improved monitoring of the production process. While these new technologies play an important role for the acceleration of TFP growth in the United States (Baily and Bosworth, 2014), the slowdown of TFP growth in Austria and Germany points to an enormous untapped potential in both countries. Capital deepening has played a subordinate role in Austria –

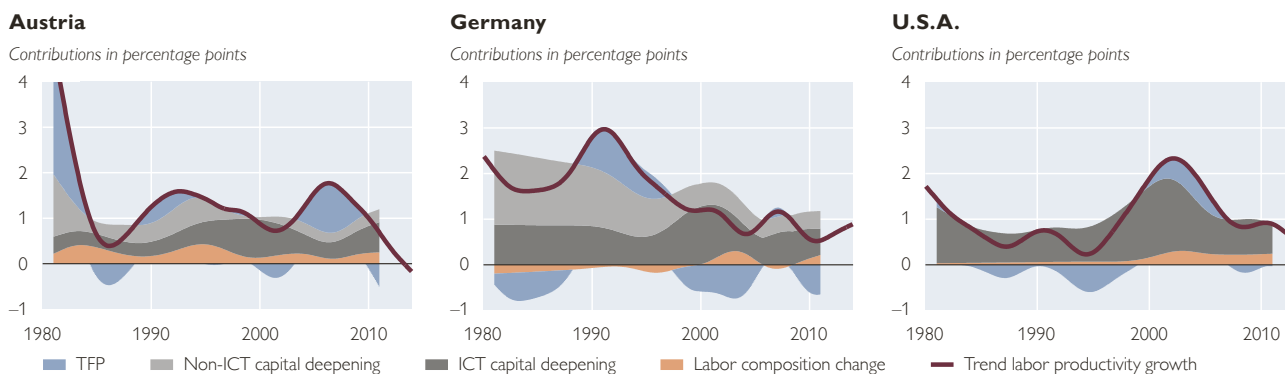
especially during the last decade, which ties in with the weak investment development.

4.2 Services

The decomposition of trend labor productivity growth in the service sector (chart 11) attests to a striking difference regarding manufacturing. While total factor productivity plays a significant role in manufacturing in all three countries, capital deepening is the main driver of labor productivity in services, with the contribution of TFP being only of minor importance. The relative size of the contributions is similar in all three countries. Measuring the output and productivity of service industries is a challenging task. This holds especially for non-market services and the real estate industry. In addition, the high heterogeneity of the service sector (see the results of Bosworth and Triplett, 2007, for the United States) poses severe aggregation problems. Hence, the aggregated small role of TFP for the service sector masks different developments at the industry level. One additional caveat has to be considered. TFP measures the efficiency with which input factors are used in the production

Chart 11

Contributions of Production Factors to Trend Labor Productivity Growth in Services (NACE G–U) in Austria, Germany and the United States



Source: EU KLEMS database (1980–2010), Eurostat (2011–2013, for Austria and Germany), U.S. Bureau of Economic Analysis (2011–2012, for the U.S.A.), author's calculations.

process. As a residual measure, it also includes measurement errors.

A summary of the main drivers of labor productivity growth – TFP and capital deepening – and their respective significance is presented in table 4. For economy-wide labor productivity growth, the role of production factors varies from country to country and over time. The most obvious result for Austria and Germany is the declining role of capital deepening over time. For the United States, in contrast, the contribution of capital deepening remained stable over time. At the sectoral level, the picture becomes clearer. In manufacturing, TFP dominated labor productivity growth in all three countries. Exceptions are Germany during the 1980s and the United States at the end of the 2000s. During these episodes, capital deepening was the main driver. In the service sector, the reverse held true, with labor productivity growth almost solely driven by capital deepening.

5 Summary and Discussion of the Results

This paper sheds light on the question “How did labor productivity develop in Austria relative to Germany and the U.S.A.?”, drawing on data from the EU KLEMS database. Labor productivity growth in Austria and Germany had outpaced U.S. growth for decades after World War II, which implied a narrowing of the productivity gap. From the mid-1990s to the mid-2000s, accelerated U.S. labor productivity growth reversed this picture, however. The U.S. boom was to a large extent driven by the development and application of information and communications technologies. Austria and Germany did not experience such a boom, given the negligible size of ICT-producing industries and deficits in implementing such new technologies.

Table 4

Main Drivers of Labor Productivity Growth in Austria, Germany and the United States

	Austria	Germany	U.S.A.
Total economy	TFP Capital deepening (steady decline)	Capital deepening TFP (after the reunification)	Capital deepening TFP (in the 2000s)
Manufacturing	TFP	TFP	TFP (especially in the 2000s)
Services	Capital deepening	Capital deepening	Capital deepening

Source: Author's compilation.

A look at the industry level reveals that structural change (especially the shrinking size of the agricultural sector and growth of finance and business services) has supported overall labor productivity growth in Austria. Labor productivity growth in manufacturing in Austria has been keeping up with that in Germany. Relative to the U.S.A., Austrian manufacturing industries have posted higher productivity growth, except in the early 2000s and ever since the financial and economic crisis. However, U.S. productivity growth might be overstated due to measurement issues. Labor productivity growth of the Austrian service sector fell behind the U.S.A. particularly markedly, as new technologies in distribution services as well as finance and business services were not adopted as rapidly and sweepingly in Austria as in the U.S.A. Since the onset of the crisis, the Austrian service sector has developed more favorably vis-à-vis Germany thanks to the solid productivity performance of finance and business services, which contrasts with a productivity drop in Germany.

Which policy conclusions can be drawn from these findings? Although the decompositions based on the growth accounting framework are much too simplistic to provide a definitive answer, they can give guidance on how to deal

with future challenges. Austria's falling behind the United States from the mid-1990s onward was clearly driven by Austria's lack in producing and implementing new technologies. By contrast, the Austrian growth model in manufacturing, which promotes the exploitation of niches in traditional industries, has proven successful. Building up significant ICT-producing industries in Austria seems to be unrealistic, but the adoption of ICTs should be fostered, especially in the service sector. Hence, a high priority should be given to policies stimulating innovation and the diffusion of information and communications technologies. Also, the approach should be broadly based, since the empirical literature suggests that fostering innovation requires more than just putting one or two key elements into place.

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Annex 1: Calculating Contributions to Labor Productivity Growth

To calculate labor productivity growth, we use the Cobb-Douglas production function (1) with constant returns to scale.

$$Y_t = A_t K_{ICT,t}^\alpha K_{Non-ICT,t}^\beta (H_t L_t)^\gamma \quad (1)$$

In formula (1) A represents total factor productivity. Capital services are separated into ICT capital (K_{ICT}) and non-ICT capital ($K_{NON-ICT}$). H represents the labor input in total hours worked and L is a composite index of labor composition including gender, age and educational levels (see O'Mahony and Timmer, 2009). α , β and γ represent the share of ICT capital, non-ICT capital and labor compensation in total income ($\alpha + \beta + \gamma = 1$). By taking logarithms and differentiating (1), we derive equation (2), which gives us a decomposition of output growth into its contributions.

$$\begin{aligned} \Delta \ln(Y_t) = & \Delta \ln(A_t) + \alpha \Delta \ln(K_{ICT,t}) + \\ & + \beta \Delta \ln(K_{Non-ICT,t}) + \gamma \Delta \ln(H_t L_t) \end{aligned} \quad (2)$$

We define labor productivity as output by hours worked. Subtracting $\Delta \ln(H_t)$ from both sides of the log-linear version (2) gives us a decomposition of labor productivity growth (3).

$$\begin{aligned} \Delta \ln(Y_t) - \Delta \ln(H_t) = & \Delta \ln(A_t) + \\ & + \alpha (\Delta \ln(K_{ICT,t}) - \Delta \ln(H_t)) + \\ & + \beta (\Delta \ln(K_{Non-ICT,t}) - \\ & - \Delta \ln(H_t)) + \gamma \Delta \ln(L_t) \end{aligned} \quad (3)$$

Labor productivity growth ($\Delta \ln(Y_t) - \Delta \ln(H_t)$) is decomposed into a contribution from total factor productivity ($\Delta \ln(A_t)$), from ICT capital deepening ($\alpha (\Delta \ln(K_{ICT,t}) - \Delta \ln(H_t))$), from non-ICT capital deepening ($\alpha (\Delta \ln(K_{Non-ICT,t}) - \Delta \ln(H_t))$) and from labor composition change ($\gamma \Delta \ln(L_t)$).

Annex 2: Tables

Table A1

Industry Structure of Austria, Germany and the United States

	Austria			Germany			U.S.A.		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
	%								
TOTAL ECONOMY	100	100	100	100	100	100	100	100	100
Agriculture and mining (A–B)	4.2	2.3	1.9	2.1	1.4	1.0	3.1	2.1	2.7
Agriculture, forestry and fishing (A)	3.6	1.9	1.5	1.3	1.1	0.8	1.6	1.0	1.1
Mining and quarrying (B)	0.6	0.4	0.5	0.8	0.3	0.2	1.5	1.1	1.6
Total manufacturing (C)	21.5	20.1	17.5	27.1	22.3	21.5	15.7	14.2	11.7
Food and textiles (10–15)	4.1	3.0	2.2	3.5	2.5	2.0	2.6	2.2	1.6
Food products, beverages and tobacco (10–12)	2.6	2.1	1.8	2.4	2.0	1.7	1.8	1.7	1.4
Textiles, wearing apparel, leather and related products (13–15)	1.5	0.8	0.4	1.0	0.5	0.3	0.8	0.5	0.2
Basic materials (16–25)	10.1	9.7	8.3	10.7	9.0	8.3	6.9	6.0	5.3
Wood and paper products; printing and reproduction of recorded media (16–18)	2.7	2.6	1.9	1.8	1.6	1.1	1.5	1.3	0.8
Coke and refined petroleum products (19)	0.3	0.6	0.1	0.2	0.3	0.2	0.7	0.4	1.2
Chemicals and chemical products (20–21)	1.4	1.3	1.5	2.7	2.2	2.5	1.7	1.5	1.6
Rubber and plastics products, and other non-metallic mineral products (22–23)	2.3	2.1	1.5	2.3	2.0	1.7	1.0	1.1	0.7
Basic metals and fabricated metal products, except machinery and equipment (24–25)	3.5	3.1	3.3	3.7	3.0	2.8	1.9	1.7	1.1
Electrical and optical equipment (26–27)	2.5	2.5	2.1	4.0	3.2	2.8	2.0	2.2	2.1
Manufacturing, transport equipment and other manufacturing (28–33)	4.8	5.0	5.0	8.9	7.5	8.4	4.2	3.9	2.6
Machinery and equipment n.e.c. (28)	2.2	2.0	2.1	3.9	3.2	3.3	1.4	1.1	1.0
Transport equipment (29–30)	1.0	1.4	1.4	3.3	2.9	3.6	1.9	1.8	0.9
Other manufacturing; repair and installation of machinery and equipment (31–33)	1.7	1.6	1.5	1.7	1.4	1.5	0.9	0.9	0.8
Utilities (Electricity, gas and water supply) (D–E)	3.6	3.3	3.4	3.0	2.7	3.5	2.5	2.0	2.1
Construction (F)	7.2	7.7	6.8	6.2	5.3	4.5	4.3	4.7	3.5
Services (G–U)	63.5	66.7	70.3	61.7	68.4	69.5	74.4	77.0	79.9
Distribution services (G–I)	23.6	22.9	23.2	15.8	16.1	15.9	18.8	19.0	17.2
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	14.3	13.2	13.6	9.6	10.2	10.1	13.3	13.1	11.6
Wholesale and retail trade and repair of motor vehicles and motorcycles (45)	2.0	1.7	1.5	1.4	1.5	1.4	x	x	x
Wholesale trade, except of motor vehicles and motorcycles (46)	7.0	6.7	7.3	4.2	4.2	5.0	x	6.2	5.5
Retail trade, except of motor vehicles and motorcycles (47)	5.4	4.8	4.8	4.1	4.6	3.7	x	6.9	6.1
Transportation and storage (H)	5.5	5.6	4.7	4.8	4.2	3.9	2.9	3.0	2.8
Transport and storage (49–52)	4.9	4.8	4.2	3.9	3.5	3.5	2.9	3.0	2.8
Postal and courier activities (53)	0.6	0.7	0.5	0.9	0.7	0.4	x	x	x
Accommodation and food service activities (I)	3.8	4.1	4.9	1.4	1.7	1.8	2.7	2.8	2.9
Finance and business services (J–N)	20.4	24.0	26.5	25.7	30.4	30.9	31.1	35.2	37.0
Information and communication (J)	3.1	3.3	3.1	3.5	4.2	4.0	4.7	5.3	5.6
Publishing, audiovisual and broadcasting activities (58–60)	0.6	0.8	0.7	1.1	1.3	1.3	1.3	1.4	1.4
Telecommunications (61)	1.9	1.3	1.1	1.6	1.5	1.1	2.6	2.6	2.4
IT and other information services (62–63)	0.5	1.2	1.4	0.9	1.3	1.6	0.8	1.4	1.8
Financial and insurance activities (K)	5.9	5.6	4.9	4.7	4.4	4.5	5.7	7.7	8.5
Real estate activities (L)	6.8	8.3	9.5	9.1	10.9	11.8	12.1	12.4	12.2
Professional, scientific, technical, administrative and support service activities (M–N)	4.7	6.8	9.0	8.3	10.9	10.6	8.5	9.8	10.7
Community, social and personal services (O–U)	19.4	19.8	20.6	20.2	21.9	22.7	24.5	22.8	25.7
Public administration and defence; compulsory social security (O)	6.1	6.2	5.9	6.8	6.5	6.3	14.4	12.2	13.6
Education (P)	5.6	5.4	5.6	4.2	4.5	4.5	0.8	0.9	1.1
Health and social work (Q)	5.2	5.4	6.3	5.0	6.4	7.3	5.9	6.0	7.6
Arts, entertainment, recreation and other service activities (R–S)	2.5	2.7	2.8	4.0	4.1	4.2	3.4	3.8	3.4
Arts, entertainment and recreation (R)	0.9	1.1	1.2	1.2	1.4	1.4	0.7	1.0	1.0
Other service activities (S)	1.6	1.6	1.6	2.7	2.7	2.8	2.7	2.8	2.5
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T)	0.1	0.0	0.0	0.3	0.3	0.3	x	x	x
Activities of extraterritorial organizations and bodies (U)	x	x	x	x	x	x	x	x	x

Source: EU KLEMS database (ISIC Rev. 4).

Labor Productivity Levels in Austria, Germany and the United States

	Austria			Germany			U.S.A.		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
<i>EUR per hour worked at 2005 PPPs</i>									
TOTAL ECONOMY	22	28	33	26	32	36	31	36	44
Agriculture and mining (A–B)	4	6	8	11	11	18	49	56	61
Agriculture, forestry and fishing (A)	3	5	6	8	9	16	16	24	36
Mining and quarrying (B)	49	54	98	23	28	34	113	133	105
Total manufacturing (C)	22	33	41	25	35	44	20	31	54
Food and textiles (10–15)	18	25	30	23	28	26	32	41	56
Food products, beverages and tobacco (10–12)	20	27	31	30	30	26	44	49	57
Textiles, wearing apparel, leather and related products (13–15)	14	22	28	14	21	29	17	24	56
Basic materials (16–25)	28	41	43	24	36	46	31	39	54
Wood and paper products; printing and reproduction of recorded media (16–18)	25	33	41	20	28	38	30	29	38
Coke and refined petroleum products (19)	157	503	167	86	149	145	48	130	267
Chemicals and chemical products (20–21)	26	48	71	25	47	78	36	47	61
Rubber and plastics products, and other non-metallic mineral products (22–23)	26	36	33	22	31	39	25	34	40
Basic metals and fabricated metal products, except machinery and equipment (24–25)	27	38	41	24	34	36	28	35	38
Electrical and optical equipment (26–27)	21	36	47	19	34	61	2	13	82
Manufacturing, transport equipment and other manufacturing (28–33)	21	29	38	31	37	44	24	28	40
Machinery and equipment n.e.c. (28)	24	32	38	33	43	41	28	29	47
Transport equipment (29–30)	28	37	55	34	36	54	22	27	31
Other manufacturing; repair and installation of machinery and equipment (31–33)	16	22	29	22	29	34	22	29	50
Utilities (Electricity, gas and water supply) (D–E)	54	71	78	52	73	84	60	80	78
Construction (F)	26	29	28	20	20	20	37	35	30
Services (G–U)	26	30	34	28	33	36	34	37	43
Distribution services (G–I)	20	24	27	18	21	26	25	35	44
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	20	25	29	17	21	28	24	36	46
Wholesale and retail trade and repair of motor vehicles and motorcycles (45)	30	25	22	21	23	30	x	x	x
Wholesale trade, except of motor vehicles and motorcycles (46)	24	36	45	19	26	47	x	36	47
Retail trade, except of motor vehicles and motorcycles (47)	15	18	21	16	17	18	x	36	46
Transportation and storage (H)	20	25	27	19	25	31	23	30	38
Transport and storage (49–52)	23	27	26	19	27	35	23	30	38
Postal and courier activities (53)	8	16	30	17	20	16	x	x	x
Accommodation and food service activities (I)	19	20	22	17	15	15	34	37	40
Finance and business services (J–N)	44	47	56	52	60	58	44	46	60
Information and communication (J)	31	34	44	26	43	57	28	29	57
Publishing, audiovisual and broadcasting activities (58–60)	30	36	37	31	41	47	32	29	54
Telecommunications (61)	39	45	93	24	73	153	35	44	104
IT and other information services (62–63)	23	27	31	27	30	40	17	18	36
Financial and insurance activities (K)	32	49	76	51	59	59	27	36	50
Real estate activities (L)	210	216	222	347	354	428	249	291	346
Professional, scientific, technical, administrative and support service activities (M–N)	22	25	29	36	37	30	31	28	33
Community, social and personal services (O–U)	24	25	26	24	27	28	31	30	30
Public administration and defence; compulsory social security (O)	24	27	29	23	28	33	30	29	30
Education (P)	29	32	32	29	31	28	31	30	26
Health and social work (Q)	22	22	23	20	24	26	32	28	30
Arts, entertainment, recreation and other service activities (R–S)	20	20	22	29	29	29	32	34	31
Arts, entertainment and recreation (R)	27	26	28	31	36	30	28	32	35
Other service activities (S)	17	17	18	28	26	28	34	35	30
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T)	14	7	7	12	12	13	x	x	x
Activities of extraterritorial organizations and bodies (U)	x	x	x	x	x	x	x	x	x

Source: EU KLEMS database (ISIC Rev. 4), Eurostat, author's calculations.

Table A3

Labor Productivity Growth in Austria, Germany and the United States

	Austria			Germany			U.S.A.		
	86-95	96-05	06-10	86-95	96-05	06-10	86-95	96-05	06-10
	<i>Annual change (log-difference*100)</i>								
TOTAL ECONOMY	2.5	1.7	1.3	2.4	1.7	0.6	1.1	2.2	0.8
Agriculture and mining (A-B)	2.5	3.3	3.8	1.6	3.0	9.3	3.2	-0.7	4.3
Agriculture, forestry and fishing (A)	4.1	2.7	2.8	0.9	6.3	10.0	0.4	6.7	3.2
Mining and quarrying (B)	-0.9	6.7	4.2	3.8	-2.8	8.5	6.1	-4.2	3.3
Total manufacturing (C)	4.0	3.2	1.0	2.7	3.2	-1.6	3.1	5.7	2.4
Food and textiles (10-15)	3.8	2.1	1.0	2.2	0.7	-2.5	2.9	2.0	1.1
Food products, beverages and tobacco (10-12)	3.9	1.5	0.7	0.1	-0.4	-3.0	2.0	-0.2	0.2
Textiles, wearing apparel, leather and related products (13-15)	2.5	3.0	1.0	4.4	3.5	-0.0	3.8	5.1	2.3
Basic materials (16-25)	3.9	1.8	-0.1	2.5	3.4	-0.3	1.7	3.8	0.6
Wood and paper products; printing and reproduction of recorded media (16-18)	4.1	1.8	1.7	2.1	3.1	3.0	-0.5	2.0	3.0
Coke and refined petroleum products (19)	8.8	-2.4	-12.9	-3.4	0.9	0.9	-0.4	13.0	-5.5
Chemicals and chemical products (20-21)	6.5	6.5	1.9	4.9	5.6	1.0	3.1	3.2	2.5
Rubber and plastics products, and other non-metallic mineral products (22-23)	2.3	2.1	-1.7	3.6	2.8	-0.5	3.1	3.0	-1.0
Basic metals and fabricated metal products, except machinery and equipment (24-25)	3.4	1.6	-0.8	3.1	2.5	-3.2	2.7	1.7	-1.2
Electrical and optical equipment (26-27)	4.7	4.1	2.0	3.8	6.6	3.7	11.5	20.8	14.1
Manufacturing, transport equipment and other manufacturing (28-33)	3.7	4.1	0.1	1.8	2.5	-4.6	1.3	3.7	-1.7
Machinery and equipment n.e.c. (28)	4.5	3.1	0.2	1.9	2.1	-6.3	1.7	2.9	0.7
Transport equipment (29-30)	1.5	3.6	1.1	1.7	1.8	-3.9	1.0	4.1	-6.9
Other manufacturing; repair and installation of machinery and equipment (31-33)	4.3	4.1	0.5	1.8	4.3	-2.1	1.5	4.1	3.0
Utilities (Electricity, gas and water supply) (D-E)	2.0	4.5	-2.5	2.7	3.3	1.9	3.9	1.8	-2.0
Construction (F)	1.5	1.0	-2.0	0.2	0.5	-2.5	-0.2	-1.6	-1.8
Services (G-U)	1.5	0.9	1.5	2.3	1.0	1.4	0.4	1.8	0.6
Distribution services (G-I)	2.4	1.3	0.8	2.3	2.3	2.1	1.9	3.7	-0.2
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	3.0	1.9	0.4	2.5	2.8	2.6	2.2	4.3	0.2
Wholesale and retail trade and repair of motor vehicles and motorcycles (45)	-1.4	-0.6	-2.3	4.7	3.5	0.5	x	x	x
Wholesale trade, except of motor vehicles and motorcycles (46)	5.0	2.8	1.7	2.1	5.6	4.8	x	x	-0.6
Retail trade, except of motor vehicles and motorcycles (47)	1.9	1.8	0.2	2.4	-0.1	1.0	x	x	0.8
Transportation and storage (H)	2.4	0.8	1.8	3.2	2.6	1.2	2.5	3.0	0.4
Transport and storage (49-52)	1.7	-0.2	1.3	3.4	3.0	1.7	2.5	3.0	0.4
Postal and courier activities (53)	7.3	7.5	5.0	2.0	0.0	-1.7	x	x	x
Accommodation and food service activities (I)	1.0	0.1	0.7	-0.5	-1.0	1.7	-0.0	1.7	-2.0
Finance and business services (J-N)	1.1	0.4	2.5	2.3	-0.1	0.7	0.4	2.1	1.6
Information and communication (J)	3.8	1.4	1.3	3.6	2.4	7.3	2.4	4.4	2.8
Publishing, audiovisual and broadcasting activities (58-60)	2.2	2.5	0.1	2.7	0.3	6.1	0.9	4.3	0.6
Telecommunications (61)	6.5	3.7	5.5	6.6	7.7	11.8	3.1	6.0	6.4
IT and other information services (62-63)	1.1	2.2	0.1	1.1	1.6	7.1	3.8	4.3	2.6
Financial and insurance activities (K)	1.5	5.6	7.0	2.6	-1.6	5.0	1.7	3.9	1.3
Real estate activities (L)	0.4	-0.2	2.2	-0.0	1.6	1.3	1.1	0.8	4.1
Professional, scientific, technical, administrative and support service activities (M-N)	2.5	0.1	1.9	2.3	-1.0	-3.2	-0.4	1.4	0.1
Community, social and personal services (O-U)	0.5	-0.2	0.8	1.3	0.4	1.1	-0.6	-0.1	0.2
Public administration and defence; compulsory social security (O)	1.3	0.2	1.4	2.7	1.0	2.2	-0.0	0.2	0.3
Education (P)	1.6	-0.7	0.2	1.0	-0.5	-0.8	-0.4	-1.0	-0.9
Health and social work (Q)	-0.8	-0.2	1.1	0.4	1.1	1.8	-1.9	-0.3	0.7
Arts, entertainment, recreation and other service activities (R-S)	0.2	-0.0	-0.0	0.8	-0.5	0.8	-0.2	-0.3	-1.0
Arts, entertainment and recreation (R)	2.2	-1.0	1.0	2.2	-1.1	-1.8	0.1	0.7	1.3
Other service activities (S)	-0.8	0.3	-0.7	0.3	-0.3	2.0	-0.4	-0.6	-1.8
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T)	-4.4	-2.6	3.3	-0.1	0.3	0.5	x	x	x
Activities of extraterritorial organizations and bodies (U)	x	x	x	x	x	x	x	x	x

Source: EU KLEMS database (ISIC Rev. 4), author's calculations.

How Gender-Specific Are Payments? A Study Based on Austrian Survey Data from 1996 to 2011

Klaus Forstner,
Karin Wagner¹

Based on payments surveys commissioned by the OeNB in 1996, 2000, 2005 and 2011, this study highlights patterns in consumer payment behavior in Austria with a view to establishing gender-specific patterns and changes thereof.

While cash continues to dominate, we find that its use contracted to a share of roughly two-thirds in value terms in the review period. This decline was almost twice as large for women as for men (–24 percentage points versus –12 percentage points), thus more than offsetting the significantly higher cash payment volume of women observed in 1996 (90% versus 81%). By 2011, women were heavier users of debit cards than men, in terms of transactions as well as in terms of value.

The higher tendency of women to use cashless payment systems evidently reflects safety concerns with cash. Women are also more risk averse than men in the sense that they are more likely to plan their monthly expenses and more likely to acknowledge the relevance of keeping an eye on what they spend.

JEL classification: E58, E41, D12, J16

Keywords: use of payment methods, payment behavior, gender, survey data

As in other countries, payment habits have been subject to considerable change in Austria: in the place of cash, the use of payment cards has become more widespread; consumers have adopted innovative forms of payment, such as mobile and online payments; there has been a substantial increase in point-of-sale terminals. The take-up of different payment methods varies, among other things, with different shopping amounts, which are in turn aligned with consumers' income levels and shopping purposes – and with gender. For instance, as is evident from the OeNB Payments Survey 2011, more women than men do the daily shopping for their families (see table 1). And the gender income gap continues to persist; in 2012, it was still significant at 81.7% for full-time employees.²

At the same time, fundamental social changes (such as a larger share of women earning their own money, decreasing birth rates, an increasing share of single or divorced women, and higher education for women) have had strong effects on the way of women in household finances – as a result of which the payment habits of women are likely to have changed as well.

How much women know about their partners' expenses and finances, and what role they play with regard to their household's finances (such as whether they have access to a joint account) is also fundamentally influenced by cultural habits. Being a migrant/having different cultural habits plays an important role (see also Björnberg and Kollind, 2005). For instance, according to the OeNB Payments

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² According to Statistics Austria, the average statistical income was EUR 32,540 for fully employed women but EUR 39,848 for fully employed men in 2012.

Refereed by:
Tobias Schmidt,
Deutsche Bundesbank

Table 1

Who Takes Care of What in Your Household?

		Respon- dent	Respon- dent's partner	Both	No answer
		<i>out of 100</i>			
Keeping track of household finances	All	34	13	53	0
	Male respondents	23	18	58	1
	Female respondents	43	8	48	0
	Migrant female respondents	33	23	44	0
Paying the bills	All	35	19	46	0
	Male respondents	37	15	48	1
	Female respondents	34	22	44	0
	Migrant female respondents	30	40	30	0
Doing the daily shopping	All	41	22	37	0
	Male respondents	12	43	45	1
	Female respondents	66	4	30	0
	Migrant female respondents	65	7	28	0
Making saving and investment decisions	All	19	14	64	3
	Male respondents	23	10	65	3
	Female respondents	16	17	69	3
	Migrant female respondents	9	28	58	5
Deciding about costly purchases	All	9	6	84	0
	Male respondents	9	6	83	1
	Female respondents	9	7	84	0
	Migrant female respondents	2	9	88	0

Source: OeNB Payments Survey 2011.

Note: Figures in rows may not add up to 100 due to rounding.

Survey 2011, the share of women who do not have a good idea of their partners' expenses is twice as high for migrant women as for women in general (see table 7).

These patterns and changes raise a number of fundamental questions. How have women reacted to the greater variety of payment options? How have these options affected their use of cash? Are there differences compared with men? The data of the 2011 OeNB Payments Survey permit detailed insights into the payment habits of women, and the comparison of the 2011 data with three earlier surveys allows us to establish what changes occurred from 1996 to 2011. Such an analysis is important input for assessing future trends – a key issue from a central banking perspec-

tive as regards the design and effectiveness of monetary policy.

First, this study aims to highlight shifting payment preferences among men and women in Austria (section 1). To put these figures in perspective, we test underlying social factors which correlate with the use of different payment methods and discuss possible reasons for gender-related differences (section 2). To round off the picture, we establish the pattern of intra-household control of finances and discuss how much women know about their partners' finances and which factors boost their decision-making power with regard to household finances (section 3). The final section summarizes and concludes.

1 Gender-Related Findings of OeNB Payments Surveys Conducted between 1996 and 2011

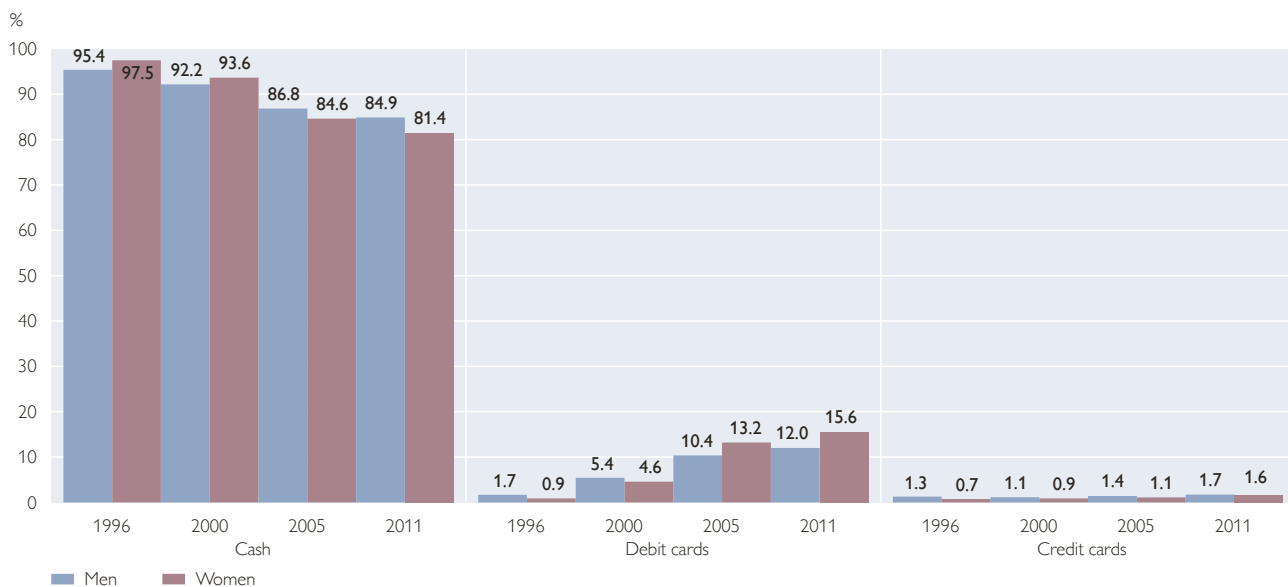
In the context of a 2011 OeNB survey on the payment habits of households in Austria³ (see Mooslechner et al., 2012, and the statistical background information at the end of this paper), survey respondents were asked to record all transactions – other than recurrent payments (e.g. rent, operating costs, insurance, phone bills, loan payments) – made for themselves, for other household members and for their household as a whole over a period of seven successive days. Of the 2,271 respondents surveyed, 1,165 actually kept a payment diary. Comparable surveys conducted earlier in 1996, 2000 and 2005 allow us to analyze how the payment behavior of women changed during this period.

1.1 Cash still Dominates but Debit Cards Have Become More Popular Especially among Women

According to the 2011 survey, cash remains the payment method of choice for shoppers in Austria, but its share has declined gradually (see chart 1), from over 95% of all payment transactions in 1996 to 85% for men, and from over 97% to over 81% for women. At the same time, the share of debit cards increased from 1.7% to 12% of transactions for men, and from 0.9% to 15.6% of transactions for women. In other words, cash use went down more among women than among men. Since the cash changeover to euro, women have been using debit cards more often than men in the place of cash. By 2011, women were using debit cards to pay roughly one-sixth of their transactions, compared with roughly one-eighth for

Chart 1

Share of Cash and Debit/Credit Cards in Payment Transactions by Gender



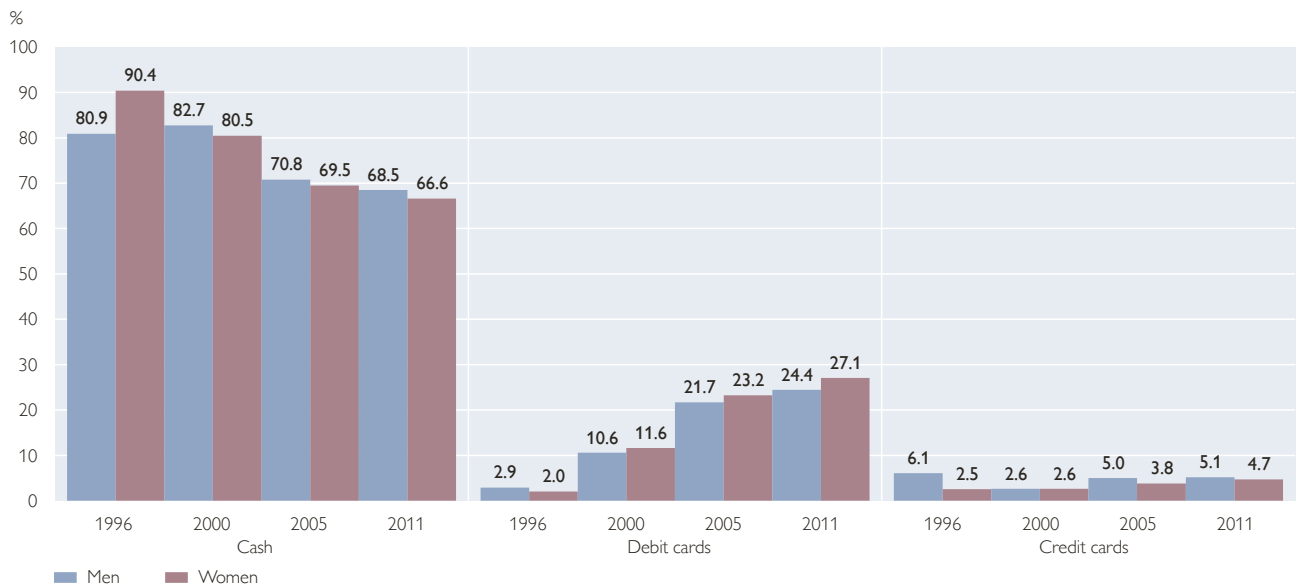
Source: OeNB Payments Survey 2011.

Note: The chart reflects the share of cash and cards as payment methods in a week's transactions as recorded by survey respondents. To ensure the comparability of data, bank transfers are excluded from this analysis.

³ The survey was open to all households resident in Austria, i.e. not limited to Austrian citizens.

Chart 2

Share of Cash and Debit/Cards in Payment Value by Gender



Source: OeNB Payments Survey 2011.

Note: The chart reflects the share of cash and cards as payment methods in a week's transactions as recorded by survey respondents. To ensure the comparability of data, bank transfers are excluded from this analysis.

men. In contrast, the share of credit card payments remains small, and women continue to pay fewer purchases with credit cards than men.

In terms of payment value, women used to make a significantly higher amount of payments in cash than men in 1996 (90% versus 81%; see chart 2). By 2000, however, such gender differences had ceased to be of real significance. Cash use by women has, in fact, contracted more than cash use by men over the 15-year horizon of the paper (–24 percentage points versus –12 percentage points). By 2011, women were using debit cards to settle 27% of all purchases in terms of value, compared with 24% for men. The higher preference of women for cards is evidently related to women's spending patterns, i.e. to the fact that more women than men do the daily shopping for their families.

Interestingly, cash use varies significantly with age (see chart 3). When

looking at payment value, we see that women started with a higher share of cash payments than men in all birth cohorts but the youngest age group, i.e. those who were born between 1972 and 1981. This age group also recorded the sharpest decline in cash use: While the youngest men and women used cash to settle more than 95% and 85% of their payments in 1996, their cash use was down to about 60% by 2011. At the same time, the oldest age group birth cohort (60 years or older in 1996) is an outlier: in this age group, growing older led to a renewed preference for cash, and in this age group women recorded a larger share of cash payments than men in all four surveys, whereas in general cash use went down more among women than among men. Moreover, the period from 1996 and 2011 saw a number of supply-side changes, for instance an increase in the number of point-of-sale terminals (which furthered evolving trends in payments, but

Chart 3

Share of Cash in Payment Value by Birth Cohorts



is unlikely to have been the only driver of these trends; see table A1) or, in the case of big retailers, the adoption of near-field communication (NFC) technology (a technology available since 2013 which allows customers to pay simply by swiping their smartphones at store checkouts).

Payment preferences also vary with payment amounts and are gender-specific also from this perspective (see table 2). This breakdown of the survey data for 2011 confirms that, for purchases of up to EUR 100, women use cash less often than men whereas they use debit cards more often than men. In

Table 2

Share of Payment Method for Different Transaction Values

	Up to EUR 10	EUR 10 to 20	EUR 20 to 50	EUR 50 to 100	EUR 100 or more
Men					
	%				
Cash	96.9	87.0	74.5	59.1	48.9
Debit	2.3	10.5	20.0	29.3	36.1
Credit	0.2	0.9	1.9	6.2	6.1
Other	0.6	1.6	3.6	5.3	8.9
Women					
	%				
Cash	94.7	86.5	68.7	53.4	48.9
Debit	3.7	11.6	27.1	35.9	31.9
Credit	0.3	0.5	1.9	6.5	9.6
Other	1.2	1.4	2.3	4.2	9.6

Source: OeNB Payments Survey 2011.

Table 3

Card Payments by Gender

	1996			2000		
	All	Women	Men	All	Women	Men
Transactions						
Total number of recorded transactions	14,255	8,502	5,753	14,973	10,017	4,956
Average number of weekly transactions per person	12.8	12.7	12.8	12.5	12.4	12.7
Average number of daily transactions per person	1.8	1.8	1.8	1.8	1.8	1.8
Median number of weekly transactions per person	12.0	12.0	12.0	12.0	12.0	12.0
Median number of daily transactions per person	1.7	1.7	1.7	1.7	1.7	1.7
Value (EUR)						
Total value of recorded transactions	503,251.6	279,889.3	223,362.3	425,675.4	226,668.2	199,007.2
Mean value of transactions per person	451.3	419.6	498.6	354.7	279.5	511.6
Median value of weekly transactions per person	268.2	271.4	262.3	279.0	277.7	286.2
Median value of daily transactions per person	38.3	38.8	37.5	39.9	39.7	40.9
2005						
			2011			
	All	Women	Men	All	Women	Men
Transactions						
Total number of recorded transactions	14,075	8,123	5,952	12,811	7,721	5,090
Average number of weekly transactions per person	12	12	12	11.1	10.9	11.4
Average number of daily transactions per person	2	2	2	1.6	1.6	1.6
Median number of weekly transactions per person	11	11	11	10.0	10.0	10.0
Median number of daily transactions per person	2	2	2	1.4	1.4	1.4
Value (EUR)						
Total value of recorded transactions	408,041.6	206,734.1	201,307.6	355,905.3	186,915.2	168,990.0
Mean value of transactions per person	339.8	293.7	405.0	307.6	263.3	378.1
Median value of weekly transactions per person	255.6	251.6	262.4	214.0	209.2	217.1
Median value of daily transactions per person	36.5	35.9	37.5	30.6	29.9	31.0

Source: OeNB Payments Survey 2011.

Note: Payments recorded in 1996, 2000 and 2005 were inflated with the CPI to the value of September 2011. The sample was weighted by age, gender and federal province to be representative of the target population.

addition, women use credit cards more often than men for very small amounts and for purchases worth EUR 50 or more.

When comparing figures on card transactions in greater detail, we see a gender difference: women make more card transactions than men in general, and they record a higher total value of card transactions. This can be explained by the fact that women are more likely to do the daily shopping for their families (see table 1). At the same time, men record a higher mean value

of transactions, i.e. they spend more on average when shopping (see table 3⁴).

Based on the 2011 survey data, the probability of owning a debit card increases with the level of education and with income while it decreases with age (see chart 4). Moreover, women with higher education and women in higher income quartiles outnumber male debit cardholders. Finally, debit card ownership is more widespread among the younger age cohorts, whereas the gender difference is higher in the older age cohorts.

⁴ The decline in the total value of recorded transactions cannot be explained (maybe major distortions remained in the sample although a weighting procedure was applied ex ante to achieve a representative sample).

Table 4

Number of Transactions by Product Group and Gender

	Men	Women
	%	
Food	35.0	40.0
Clothing, shoes	8.9	9.8
Drugstores, leisure activities	6.8	9.1
Tobacconists/news	10.0	6.6
Restaurants/hotels	20.4	13.4
Gas stations	7.3	5.1
Away-from-home services (hair care, repairs etc.)	0.7	0.6
In-home services	2.4	2.0
Other	8.7	13.3

Source: OeNB Payments Survey 2011.

An analysis broken down by product group reveals that shopping for food, clothing and shoes is more often done by women than by men. This goes hand in hand with the fact that more women than men do the daily shopping for their families. In contrast, men will visit tobacconists and gas stations more often than women. No significant gender differences can be observed

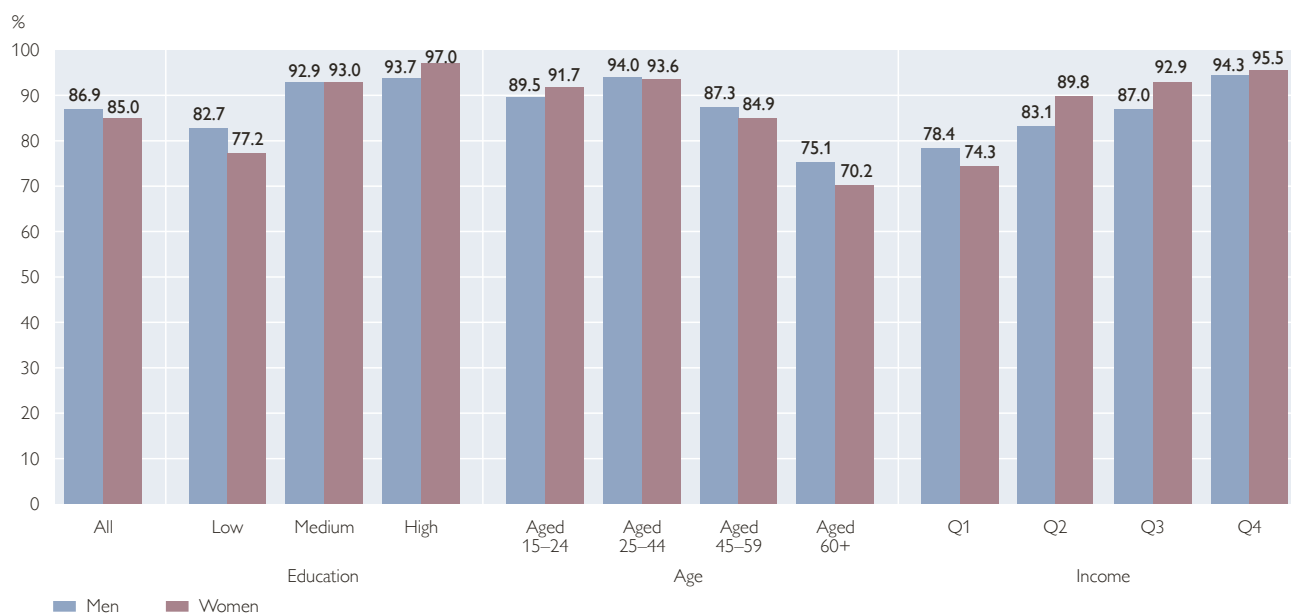
when it comes to shopping for services (see table 4).

There is even a gender difference with regard to average payment values on working days and weekend days (see chart 5). Whereas men spend roughly the same amount on average irrespective of the day of the week, women spend more on average than men on working days (EUR 46 versus EUR 43), evidently because they are more likely to do the daily shopping for their families (see table 1). On Saturdays and Sundays, though, men spend more than women on average. This translates into higher median amounts spent by men on weekends as well as on average.

Finally, 57% of the women versus 43% of the men surveyed in 2011 acknowledge planning their monthly expenses in advance. Women also consider it more important to keep track of their monthly expenses than men: 94% of the female respondents rate advance planning as (very) important compared

Chart 4

Debit Card Ownership by Gender



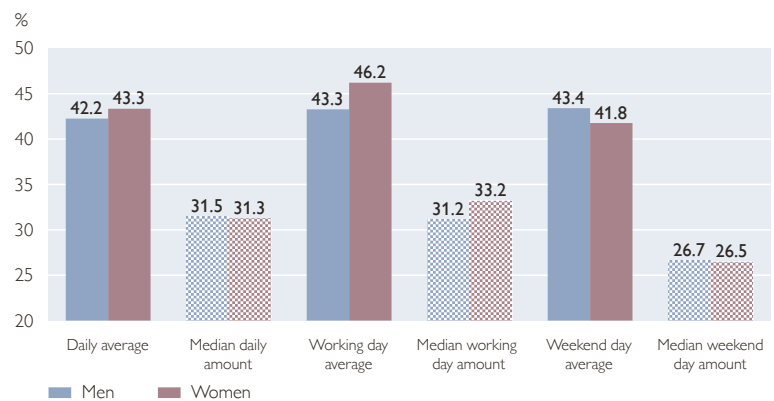
Source: OeNB Payments Survey 2011.

with 87% of the male respondents. Among those who do not plan their expenses in advance, 34% of the women versus 32% of the men at any rate target monthly spending limits that they do not want to exceed. Among those overdrawing their accounts, men slightly outnumber women (but the numbers are nearly equal between women and men). Women are more keen than men to avoid overdrafts (87% versus 82%), and more women than men consider themselves to be careful with their finances (90% versus 86%).

1.2 Women Carry Less Cash Around than Men for Safety Reasons

Many studies find women to be more risk averse with money than men (Bajtelsmit and VanDerhei, 1997; Jianakoplos and Bernasek, 1998; Hinz et al., 1997). Again, the gender income gap may be at play here, as the readiness to assume a risk grows with higher in-

Chart 5
Working Day and Weekend Day Purchases by Gender



Source: OeNB Payments Survey 2011.

come. Other reasons for the lower risk tolerance are less exposure to financial information and less confidence in economic affairs (Barber and Odean, 2001).

Concerning personal security, the OeNB Payments Survey 2011 found women to feel ill at ease when carrying

Table 5

Cash in Pockets by Gender

	Average cash in pocket		Amount of cash that starts making respondents ill at ease		Cash in pocket at the start of the payment diary	
	Women	Men	Women	Men	Women	Men
<i>Average amount (EUR)</i>						
All	61.0	84.3	462.8	614.0	63.9	68.1
Single	43.8	70.5	361.7	678.6	62.2	63.5
Married	68.2	90.0	505.7	645.0	68.7	71.9
Divorced/separated	62.6	87.8	481.7	380.7	56.9	60.0
Widowed	61.6	93.9	443.4	285.7	58.3	82.1
Aged 15–24	36.6	46.9	364.2	990.1	32.4	62.3
Aged 25–44	59.4	84.7	437.7	684.0	62.1	57.0
Aged 45–59	64.7	81.7	408.1	535.7	72.1	64.9
Aged 60 or above	70.6	101.5	611.1	459.1	71.8	90.4
Low education	60.3	82.4	384.5	573.9	66.5	73.7
Medium education	65.4	93.2	734.1	763.9	56.0	63.7
High education	59.4	85.1	451.1	646.0	63.4	58.0
1 st household income quartile	52.9	57.3	524.3	475.1	57.7	54.0
2 nd household income quartile	58.3	75.1	462.3	502.5	81.8	68.2
3 rd household income quartile	69.0	91.1	509.4	795.4	72.3	73.3
4 th household income quartile	71.4	101.3	480.3	796.3	83.8	81.4

Source: OeNB Payments Survey 2011.

amounts of EUR 463 or more on average with them, while men acknowledged feeling safe up to an amount of EUR 614. Around one-third (34%) of women feel safe even if they have a lot of money with them. Besides gender, net income, age and marital status have an effect on the amount of money respondents typically carry with them. Single persons carry less money around than divorcees or widows/widowers. Married persons carry more money with them than all other groups. The amount of cash in pockets increases with household income and with age, as does the amount respondents had with them when starting to record their payments. The pocket cash value from which respondents feel ill at ease also goes up with age in the case of women, but not in the case of men (table 5).

These findings match the results with regard to the average amounts respondents indicated that they tend to carry around: EUR 61 in the case of women versus EUR 84 in the case of men. This difference was not fully aligned with the actual amounts respondents had in their wallets when they started their payment diary: here the average results were EUR 64 for women and EUR 68 for men.

Section 2 below will take a closer look at the gender-specific differences in the payment behavior outlined so far by analyzing the role of underlying factors. Thereafter, section 3 discusses household patterns (i.e., who is responsible for what?) and the degree of access to household finances as reasons that may explain the more intensive usage of particular payment instruments.

2 Factors Driving the Use of Cash Vary with Family Status

In the following, we cross-check gender-specific differences in the adoption of payment methods with statistical methods. As we have seen, cash is still widely used in Austria and women are more risk averse than men. In the OeNB Payments Survey 2011, 81% of the respondents indicated a preference for cash, as it allows them to keep track of how much they spend and how much money they have left, simply by checking their wallets. Von Kalckreuth et al. (2011) used German survey data to analyze whether paying cash indeed enables persons to monitor their liquidity. They defined persons who use cash to keep track of what they spend and to plan further expenses/investment as “pocket watchers.” In other words, being a pocket watcher denotes a certain attitude toward cash. We chose to incorporate such an approach to establish whether women tend to qualify as pocket watchers significantly more often than men.⁵

The dependent variable POCKET-WATCHER takes the value 1 if respondents acknowledged the relevance of keeping track of their monthly expenses and indicated that cash allowed them to monitor their payments and was indispensable for controlling expenditure.

Besides respondents’ sociodemographic characteristics, we include the variable INTERVIEW_LENGTH as an indicator of the costs of processing information during the face-to-face interviews.⁶ This variable captures the number of seconds the interview took, the

⁵ Von Kalckreuth et al. (2011) primarily analyzed the link between information costs, need to monitor and pocket watcher.

⁶ The survey was based on computer-assisted personal interviewing (CAPI).

underlying rationale being that persons who are quick at answering are presumed to be very good at mastering complex information. Furthermore, we use the variable MONITORING to capture the personal importance of

financial control (to single out those who have an idea of how much they can spend on daily purchases, leisure time activities, clothes and so on). The underlying rationale is to identify those respondents for whom planning and

Table 6

Pocket Watchers

Marginal effects

	[1]	[2]	[3]
	PROBIT	PROBIT	PROBIT
Sample:	All	Married couples	Singles
	POCKETWATCHER	POCKETWATCHER	POCKETWATCHER
MALE	-0.0756** (-2.69)	-0.0916* (-2.08)	0.00231 (0.05)
MARRIED	-0.00855 (-0.31)		
AGE	-0.00164 (-0.40)	-0.00250 (-0.33)	-0.00612 (-0.67)
AGE_2	0.0000537 (1.24)	0.0000773 (1.02)	0.000130 (1.17)
EDU_MEDIUM	-0.0147 (-0.39)	-0.0213 (-0.41)	-0.0216 (-0.26)
EDU_HIGH	-0.0612 (-1.83)	-0.000831 (-0.02)	-0.121* (-2.24)
EDU_UNI	-0.0757 (-1.32)	-0.136 (-1.60)	-0.126 (-1.54)
EMPLOYED	0.0341 (0.96)	0.0688 (1.24)	0.0545 (0.88)
PERSONAL_INCOME	-0.0126 (-0.89)	-0.00613 (-0.32)	-0.0332 (-1.26)
INTERVIEW_LENGTH	-0.00731** (-3.09)	-0.00610 (-1.62)	-0.00927* (-2.29)
MONITORING	0.185*** (7.45)	0.169*** (4.62)	0.152** (3.28)
MALE_MIGR	-0.199*** (-4.15)	-0.311*** (-5.51)	-0.162* (-2.25)
START_AMOUNT	0.000407*** (3.50)	0.000300 (1.80)	0.000362* (2.07)
UNCERTAINTY_AMOUNT	-0.00000594 (-1.11)	-0.00000594 (-1.10)	0.0000152 (0.79)
CHILDREN	-0.0209 (-0.60)	0.0113 (0.24)	-0.0892 (-1.28)
N	1,649	771	486
Pseudo R ²	0.0774434	0.08012149	0.0802454
Wald chi ² (15)	162.89	76.09	51.81
Prob > chi ²	0.0000	0.0000	0.0000
Log likelihood	-1,041.76	-486.20	-297.86

t statistics in parentheses, * p < 0.05, ** p < 0.01, *** p < 0.001

Source: OeNB (authors' calculations).

budgeting mistakes generate monetary or psychological costs (see von Kalckreuth et al., 2011). We incorporate two variables to capture risk awareness: `START_AMOUNT`, reflecting respondents' cash in pocket when they started to record their payments, and `UNCERTAINTY_AMOUNT`, indicating the amount of cash at which they begin to feel ill at ease. To incorporate shopping habits, we create a variable `SHOPPING_HABITS` for respondents who answered that they did the daily shopping. Furthermore we include a variable `CHILDREN` to indicate whether respondents had children or not. Finally, to reflect intercultural differences, we include `MIGR` as an indicator of persons whose mothers or fathers were not born in Austria.

We run the regression three times with varying sample sizes – the whole sample, married couples and singles – with a view to establishing whether single women behave differently than married ones.

The results (first data column) confirm the existence of a gender effect: women have a higher propensity to be pocket watchers than men. This underlines the descriptive findings that women are more conservative about payments and more risk averse, i.e. that they care more about their finances than men. The variable `MONITORING` shows a highly significant influence on the propensity to be a pocket watcher, as does the variable `INTERVIEW_LENGTH`, yet with a negative sign: the better respondents are able to take in complex information, the lower the need to carefully monitor expenses. And the initial amount of cash in pocket matters, too: the higher this amount is, the more likely someone is to be a pocket watcher.

Turning to the sample split into married (second data column) and sin-

gle persons (third data column), we find a negative gender effect and a negative migration influence for married persons, i.e. married and married migrant women have a lower propensity to be pocket watchers than single women. Moreover, the influence of monitoring one's finances is again highly significant and positive: married respondents who monitor their finances have a high propensity to be pocket watchers. Because of the questionnaire design, we were unable to control for shopping habits (the questionnaire did not generate enough information; we tried taking the variable "doing the daily shopping," but this variable is highly correlated with the gender variable, which would have led to multicollinearity). For singles, gender does not have a significant influence on the propensity to use cash to control liquidity. After all, persons living alone need to take all decisions on their own: how much to spend, where to invest, how to control their finances. Within this column, all significant variables indicated above therefore remain the same, with higher education showing a negative influence; in other words, the higher educated a person, the lower his or her propensity to be a pocket watcher is.

What we see after running these three regressions is, first, that women have a higher propensity to acknowledge the benefits of cash for monitoring liquidity. This pattern underlines the persistence of women's traditional role as the household member responsible for doing the daily shopping for their families. To accomplish these duties, they have a certain amount of money (cash and other) with which they must do. In this context, paying cash is simply the easiest way to control day-to-day spending. Men seem to see less of a need to control their finances, or they

do not really care whether they use cash or other payment instruments to do so. Second, the regressions show that the payment habits of women are closely aligned with their family status: the gender effect observed with married women does not exist for single women. The gender effect established here is not totally clear, however, as we were unable to capture all effects (when we tried to include shopping habits, the gender variable turned insignificant but nevertheless remained nearly significant – with a p-value of 0.066)

3 Women Know More about Their Partners' Finances If They Are the Earner with the Higher Income

The intensity of women's involvement in their household's financial decisions and the degree of insight into their partners' finances may be further factors when explaining the gender difference in payment. What does the literature say on this issue, and what do the results of the Payments Survey 2011 say?

In recent decades, family patterns have undergone important structural changes in European countries. As women started to participate more strongly in the labor market, they also gained financial decision-making influence within the household. The variables accounting for the wife's influence within the household has been analyzed widely (Davis, 1970; Munsiger et al., 1975; Spiro, 1983; Lee and Beatty, 2002). The classic resource theory of power by Blood and Wolfe (1960) links household power to income and prestige derived from accomplishment of paid work. At the same time, a number of papers show that women with a higher income and socio-professional status than that of their partners do not automatically have

a greater say in financial decision-making (Hochschild and Machung, 1989; Brines, 1994; Tichenor, 1999).

To gain more control over their household's finances, women first need to know how much their partners earn and where the household stands financially. How much women know about their partners' expenses and finances and what role they play within the household – for instance whether they have access to a joint account – is also dependent on cultural habits. According to the OeNB Payments Survey 2011 (see table 7), the share of women who do not have a good idea of their partners' expenses is twice as high for migrant women as for women in general. Female respondents less frequently reported a joint account and joint decision-making on expenses. Moreover, as shown by Dema-Moreno (2009), many decisions related to household finances result from daily practice or social reform rather than from prior negotia-

Table 7

What Do You Know about Your Partner's Finances?

	Men	Women	Migrant women
%			
I have a good idea of my partner's expenses	60.0	61.8	39.5
I have a good idea of my partner's major expenses	30.4	27.7	39.5
I do not have a good idea of my partner's expenses	8.3	9.2	18.6
No answer	1.4	1.3	2.3

Do You Make Your Payments Out of a Joint Account?

	Men	Women	Migrant women
%			
We make all our payments out of a joint account	42.1	39.8	37.2
We make all our payments out of a joint account but have separate accounts as well	37.9	39.6	39.5
We have separate accounts	18.5	20.1	20.9
No answer	1.5	0.5	2.3

Source: OeNB Payments Survey 2011.

Table 8

Financial Decision-Making Power of Women

Marginal effects

	PROBIT
	FEMALE_DECISION_POWER
AGE	-0.001 (-0.41)
AGE_2	0.000 (0.68)
EDU_MEDIUM	0.053 (1.77)
EDU_HIGH	-0.012 (-0.72)
EMPLOYED	0.007 (0.45)
PERSONAL_INCOME	-0.0270556*** (-4.44)
INSIGHT_PARTNER_INCOME	0.0330162*** (3.28)
HH_SIZE	0.033 (0.143)
HH_SIZE_2	-0.003 (-1.09)
EDU_PARTNER	-0.0359599*** (-3.71)
EDU_WIFE_HIGHER	0.021 (0.99)
INCOME_WIFE_HIGHER	0.0654125* (-2.34)
MIGR	0.013 (0.54)
N	760
Pseudo R ²	0.226
Wald chi ² (13)	86.540
Prob > chi ²	0.000
Log likelihood	-150.765

t statistics in parentheses, * p < 0.05, ** p < 0.01, *** p < 0.001

Source: OeNB (authors' calculations).

tions. In other words, this is another area where intercultural differences come into play. In Spain, Dema-Moreno (2009) found both partners to view the money earned by the household as joint funds and no evidence for negotiations allocating a certain amount to either of

the partners. In other countries in contrast, e.g. in Sweden, keeping part of the money for oneself is common practice (Nyman, 1999; Björnberg and Kollind, 2005). To sum it up, migration and culture matter more than gender because, as table 7 shows, the gender-related differences are minor.

As we saw in the regression on pocket watchers, the attitude of women on the relevance of keeping track of monthly expenses and on the relevance of cash for monitoring expenses tends to differ depending on whether they are in a partnership or not. Therefore, it would appear insightful to test intra-household decisions in the same way. The characteristics that women would need to exhibit with a view to achieving the role of head of household have been assessed by Bertocchi et al. (2012). The data generated with the OeNB Payments Survey do not allow us to replicate their approach, though.⁷ Instead, we try to quantify the financial decision-making power of women based on the self-assessment data of the survey. Although self-assessment data can lead to a bias, they do highlight some trends. At the same time, social interactions are, to a large extent, hard or impossible to capture with an econometric model. So what follows is a rather vague attempt to establish which sociodemographic factors boost the financial decision-making power of women.

We incorporate sociodemographic factors (age, education, employment status and personal income, migration status), showing the number of household members. Additionally we include the educational level of the partner (EDU_PARTNER) and two series that

⁷ Most prominently because the concept of household head is old-fashioned and has therefore tended to disappear from surveys over time.

Table 9

Intra-Household Correlation of Education, Employment and Income

Education		Education of men		
		Low	Medium	High
		%		
Education of women	Low	90.3	3.9	5.8
	Medium	47.1	41.3	11.6
	High	23.2	10.1	66.7

Employment status		Employment status of men		
		Employed	Not employed	Retired
		%		
Employment status of women	Employed	87.6	5.7	6.7
	Not employed	32.2	29.9	37.9
	Retired	16.7	0.0	83.3

Personal income		Income of men			
		1 st quartile	2 nd quartile	3 rd quartile	4 th quartile
		%			
Income of women	1 st quartile	9.4	25.6	34.5	30.5
	2 nd quartile	10.5	32.9	28.9	27.6
	3 rd quartile	3.8	17.0	45.3	34.0
	4 th quartile	12.8	10.3	15.4	61.5

Source: OeNB Payments Survey 2011.

cross-check women's income and education attributes with those of their partners (INCOME_WIFE_HIGHER, EDU_WIFE_HIGHER). The variable INSIGHT_PARTNER_INCOME takes the value 1 for women who indicated to have a good idea of their partners' finances. Taking a sample of married households, we constructed a variable FEMALE_DECISION_POWER as a proxy for a high financial decision-making power of women. This variable takes the value 1 for women who have a good idea of their partners' finances and of the household's finances and who are the bill-payers (see table 8).

The probit regression shows personal income to be of high significance.

At the same time, high income and higher education as such do not automatically give women a larger say in household finances – what matters is how a woman's education and income level correlates with that of her partner (see table 9). Highly educated partners will have a highly significant negative effect on a woman's propensity to have a lot of decision-making power. A woman's financial decision-making power within the household will increase only if she is also the earner with the higher income. A woman is also likely to have a greater say in the household's financial decisions when she has a better idea of her partner's finances.⁸

⁸ The assumption that women pay smaller amounts and that this may be one of the reasons for explaining the lesser financial decision-making power of women is refuted by the results displayed in chart 5.

4 Conclusions and Summary

Social changes over time, as a result of which women have become better educated and more independent, more likely to be single or divorced than married, etc., have had strong effects on women's lives and on their spending behavior and payment habits. We used OeNB Payments Survey data spanning 15 years to empirically analyze how gender-specific payments are in Austria. During this period, cashless payment options developed rapidly and payment cards became more widespread. Our aim was to check whether these trends were transmitted to men and to women alike or not.

We find the decline in cash use from 1996 to 2011 to have been more pronounced among women than among men (–24 percentage points versus –12 percentage points in value terms). Nonetheless, cash continues to dominate. Benefits include the fact that cash does not come with extra costs (such as account fees), and that cash is handy for monitoring expenses. While more women than men acknowledged these benefits in the 2011 Payments Survey (92% versus 88%, and 85% versus 79%, respectively), women at the same time also more readily acknowledged debit card payments to be fast (83% versus 80%). Against this backdrop, and considering the fact that debit cards are found to be more useful than credit cards for avoiding account overdrafts, women in Austria have become heavier debit card users than men – both in terms of payment transactions and in terms of payment value.

The fact that women seem to be quite open to cashless payment systems may be related to safety concerns, i.e. to the fact that women are more risk averse than men and start to feel ill at ease carrying around large amounts at lower levels than men. Women start to

worry with amounts higher than EUR 463, while men continue to feel safe with another EUR 150 in their pockets. The finding that women are open for new products, while attaching great importance to safety and convenient features for monitoring expenses – as more women than men tend to plan their monthly expenses and consider it important to keep an eye on what they spend – will be important for the take-up of new payment methods, such as solutions based on near-field communication technology or other forms of contactless payment. These results may be of interest for commercial banks' information and advertisement policies.

Statistical regressions showed men less to be likely than women to acknowledge the benefits of cash as a tool to monitor payments. This underlined the descriptive findings that women are more conservative about payments and more risk averse, i.e. they care more about their finances than men. Additionally, the regressions showed that women's spending behavior also depends on whether they are in a partnership or not – the other effects remaining the same, in the case of singles, gender has no significant influence on the relevance of cash for monitoring liquidity.

Insights into the determinants of bargaining power help to understand how economic and portfolio decisions come about and how gender-based policies should be designed. Keeping this in mind, we analyzed the factors behind the financial decision-making process on the basis of a variable measuring the financial decision-making power of women and regressing it on various sociodemographic factors. According to these results, being well educated or having a high income does not matter as such. Only women earning more than

their partners significantly gain in intra-household bargaining power.

Gender-specific differences in payments affect many more aspects not touched upon in this paper for space constraints. At the same time, the paper does show that social trends seem to have strong effects other than purely economic ones. They affect payment patterns and habits as well as the portfolio decision-making of households.

Further research will be required to establish in greater detail whether the gender-specific differences observed in payments indeed reflect purely gender-related differences, or much rather the impact of gender differences relating to people's jobs (resulting in different levels of income, different numbers of hours worked, etc.) and consumer behavior (including such details as to whether they drive a car or not).

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Statistical Background Information

Survey institute:

Institut für empirische Sozialforschung GmbH (IFES, Institute for Empirical Social Research).

Survey period:

September 2011 to January 2012, with 91.4% of the payment diaries maintained between September and November.

Survey population:

Persons aged 15+ who reside in Austria and speak German.

Survey sample:

3,992 (less neutral nonresponses⁹: adjusted sample of 3,802) persons.

Interviews held with:

2,271 persons (1,293 women, 978 men).

Response rate (based on the adjusted sample): 59.7%.

Number of completed payment diaries returned:

1,165 (713 women, 452 men).

Sample design:

Stratified multistage clustered random sampling. Stratification is by federal province, political district and size (category) of municipality.

Weighting:

By age, gender and federal province.

Survey method:

Computer-assisted personal interviewing (CAPI). Following the interview, respondents who had not indicated a prior unwillingness to record payments were given a payment diary together with a reply envelope (handed out to some 75% of respondents).

Data Annex

Table A1

Number of POS Terminals in Austria

1996	5,095
1997	13,331
1998	19,240
1999	28,763
2000	40,170
2001	58,073
2002	68,939
2003	73,333
2004	86,690
2005	89,271
2006	99,106
2007	104,400
2008	106,807
2009	123,704
2010	107,629
2011	107,397
2012	112,614
2013	118,752

Source: ECB.

⁹ False addresses, clearly unoccupied flats/houses and people who do not speak German or who are mentally unable to answer are designed as neutral nonresponses.

Austria Holds Intra-EU Export Market Shares almost Constant despite Difficult Economic Environment

Klaus Vondra¹

Before the global recession, export growth outperformed economic growth across the EU. The economic crisis hit almost all EU countries through a steep fall in exports, especially exports of goods. Yet, as shown in this article, almost all countries in Europe were hit by the slump in exports simultaneously; hence, intra-EU export market shares were left broadly unchanged by the crisis. This article presents a market share analysis for both goods and services and explores some underlying factors for these developments. From a regional perspective, Central, Eastern and Southeastern European (CESEE) countries gained market shares in the period 2004 to 2012 at the expense of major pre-2004 EU countries (the U.K., France and Italy). From a product perspective, service market shares developed broadly in line with goods market shares. At the same time, service-oriented countries were able to compensate losses in goods market shares by expanding service market shares. Austria managed to keep its market share position almost constant, benefiting most from trade links with Germany. At the product level, Austria strengthened its exports of high-technology good products.

JEL classification: F14, F15, F40

Keywords: financial and economic crisis, export market shares, goods, services

In the decade to 2014, the EU countries experienced a pronounced economic cycle: Following suppressed output growth after the bursting of the dot-com bubble in 2000, GDP growth reaccelerated in most European economies from 2004 until 2008, when the boom was brought to a sudden stop by the global financial and economic crisis of 2008/2009. In many European economies, the ensuing bust period dragged on until recently under the impact of the European sovereign debt crisis.

In the boom period 2004 to 2008, GDP growth was clearly fostered by strongly growing exports in some EU countries, whereas other EU countries built up unsustainable imbalances through negative net exports reflecting catching-up processes² (CESEE countries) or a lack of competitiveness (Southern European countries). 2009

saw a sharp decline in export growth, especially in goods, in almost all EU countries, followed by a fast rebound in many economies in 2010. Since then, export growth has developed heterogeneously across the EU, increasing sharply, for instance, in Estonia, Lithuania and Slovakia, broadly stagnating in Cyprus and Finland, and declining further in Greece. In the light of the European debt crisis, the heterogeneous development of exports, and hence of current account surpluses and deficits particularly within the euro area has been discussed intensely by academia (e.g. Danninger and Joutz, 2007; Young and Semmler; 2011, Cardoso et al., 2012) and within economic policy circles (e.g. European Commission, 2013). The paper will shed light on the intra-European development of export shares.³

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² "Catching up" in this connection is defined as both strengthening domestic demand based on the possibility of higher consumption as well as the increase in the need for new infrastructure. At the same time, this catching-up process was triggered by large capital inflows that filled the gap between the need for investments and low saving rates.

³ The narrow focus on only intra-EU market shares is data-driven; but as section 1 shows, it is empirically justified.

Refereed by:
Konstantins Benkovskis,
Bank of Latvia

The empirical literature on changes in exports, market shares and competitiveness has mainly concentrated on goods exports, given their predominance over service exports in most European countries and the existence of comprehensive databases for goods trade (e.g. UN ComTrade, ComExt, OECD). By contrast, the article at hand explores goods *and* service exports, starting with an analysis of changes in market shares that is meant to highlight how the patterns of the boom phase 2004 to 2008 differed from the patterns observed during the crisis period 2008 to 2012. Based on this analysis, the paper looks into the factors underlying market share developments, decomposing the associated effects into a “demand-driven” structural effect and a “residual” competition effect. The idea is to establish whether market shares and the factors driving associated changes developed independently of the underlying export growth boom/bust cycle or whether the crisis led to a structural break. With a particular focus on Austria, the paper examines the regional and product-specific breakdown of exports made by domestic exporters. This analysis could also deliver some insights on why Austria has lagged behind developments in Germany since 2010.

The paper is structured as follows: First, the paper discusses stylized facts of EU-wide export growth (section 1) and explains the methodology (section 2) as well as the data used (section 3). Second, the paper provides a detailed analysis and evaluation of export market share developments for all EU countries (section 4) and at a higher level of disaggregation for Austria (section 5). The paper concludes with a summary (section 6).

1 Stylized Facts on Export Growth across the EU

Focusing on the time period 2004 to 2012 in line with data availability,⁴ this paper provides contrasting analyses for the boom phase 2004 to 2008 and the crisis phase 2008 to 2012. The results are visualized with a corresponding set of charts that highlight the patterns described above and provide a starting point for the analysis (see charts 1 to 3).

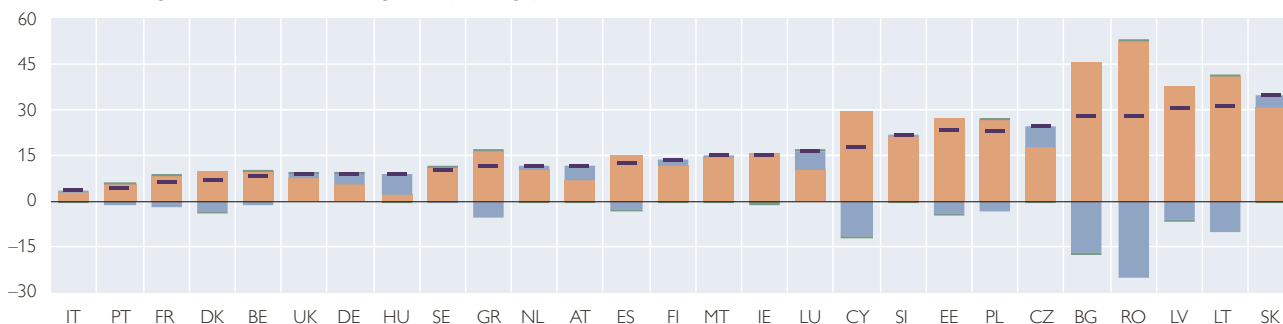
Contrasting the growth performance of EU countries in the boom phase 2004 to 2008 with the patterns observed in the bust phase 2008 to 2012, the paper finds the contribution of net exports to GDP growth to provide several insights: First, in the boom phase, most CESEE EU countries (all but the Czech Republic, Hungary and Slovakia) faced negative growth contributions from net exports, which can be explained by their catching-up process, i.e. by strong domestic demand inducing strong import growth. In this period, all CESEE EU countries but Hungary outperformed all other EU countries in terms of output growth. Second, despite the strong international environment, the contribution of net exports to growth was negative also in Belgium, Denmark, France, Greece, Ireland, Portugal, Spain and France. Their weaker performance can essentially be attributed to higher wage and price increases than in other old EU countries, coupled with the inability of the euro area members to resort to a devaluation of the national currency to regain price competitiveness. This combination led to an appreciation of the respective real exchange rates and fostered the loss of international competitiveness as reflected by clearly increasing current account deficits in Portugal, Greece and Spain.

⁴ Disaggregated service exports are only available since 2004 and currently up to 2012.

Cumulated Real GDP Growth and Contributions of Domestic Demand and Net Exports to Growth

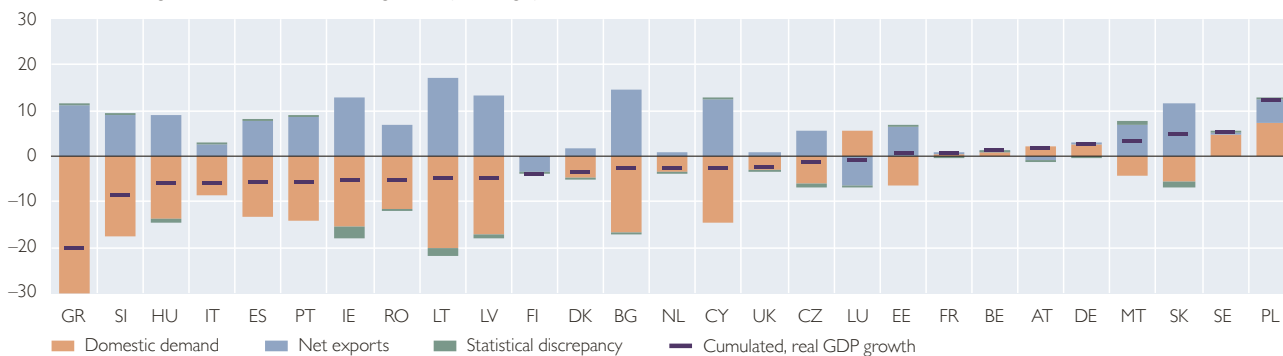
2004–2008

Cumulated, real change of GDP in %; contributions to growth in percentage points



2008–2012

Cumulated, real change of GDP in %; contributions to growth in percentage points



Source: Eurostat.

Note: BE (Belgium), BG (Bulgaria), CZ (Czech Republic), DK (Denmark), DE (Germany), EE (Estonia), IE (Ireland), GR (Greece), ES (Spain), FR (France), IT (Italy), CY (Cyprus), LV (Latvia), LU (Luxembourg), HU (Hungary), MT (Malta), NL (Netherlands), AT (Austria), PL (Poland), PT (Portugal), RO (Romania), SI (Slovenia), SK (Slovakia), FI (Finland), SE (Sweden), UK (United Kingdom).

From 2008/2009 onward, Europe suffered from the economic crisis and in particular from the sovereign debt crisis: At the end of 2012, 18 countries had yet to regain the real GDP levels measured in 2008. While the contribution of net exports to GDP growth was positive in all of these 18 countries with the exception of Finland and Luxembourg (as well as in another six countries) during the crisis period, this positive contribution was mainly based on negative import growth.⁵ The latter reflected a sharp drop of investment

growth that was due to confidence effects and difficult refinancing conditions, and a deterioration of consumption growth, based on deleveraging effects of the private and the public sector. At the same time, this turnaround corrected the current account imbalances described above: In 2013, Portugal, Greece and Spain recorded small current account surpluses as a percentage of GDP.

Summing up, the EU countries experienced strong GDP growth until 2008, followed by a sharp setback and

⁵ In 15 of these 18 countries (except the Czech Republic, Lithuania and the Netherlands), real imports decreased from 2008 to 2012. Table A1 in the annex shows the cumulative growth of GDP, exports and imports in the periods 2004 to 2008 and 2008 to 2012. Clearly, the positive contribution of net exports in the second period in many countries (e.g. Greece, Cyprus or Portugal) was driven by a slump in import growth.

diverse recovery patterns. Yet this overall trend masked quite heterogeneous developments across countries. As shown in chart 2, export growth was one main driver of this diverse development in many countries. The remainder of this article will attempt to establish whether the country-specific export growth patterns had implications for market share developments and hence for the underlying structure of the economies.

The data explored for the purpose of this study support the following stylized facts, as evidenced by charts 2 and 3:

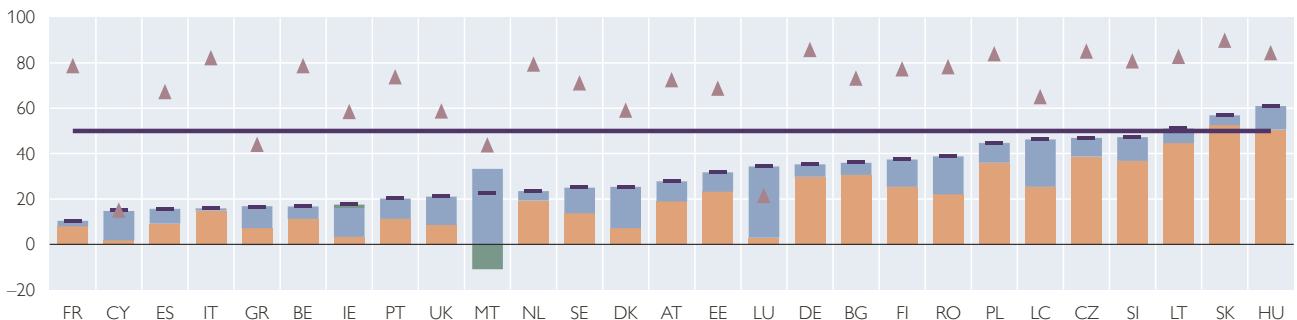
- *Service exports need to be included in the analysis of export issues.* The share of goods exports in total exports is greater than 50% in all EU countries except Cyprus, Greece, Luxembourg and Malta. But the strong role of service exports becomes obvious if the growth contribution of services to export growth is used as an indicator. As plotted in chart 2, the growth contribution of service exports to export growth exceeds the growth contribution of goods exports in seven countries in both time periods.⁶

Chart 2

Cumulated Real Export Growth and Contributions from Goods and Services to Export Growth

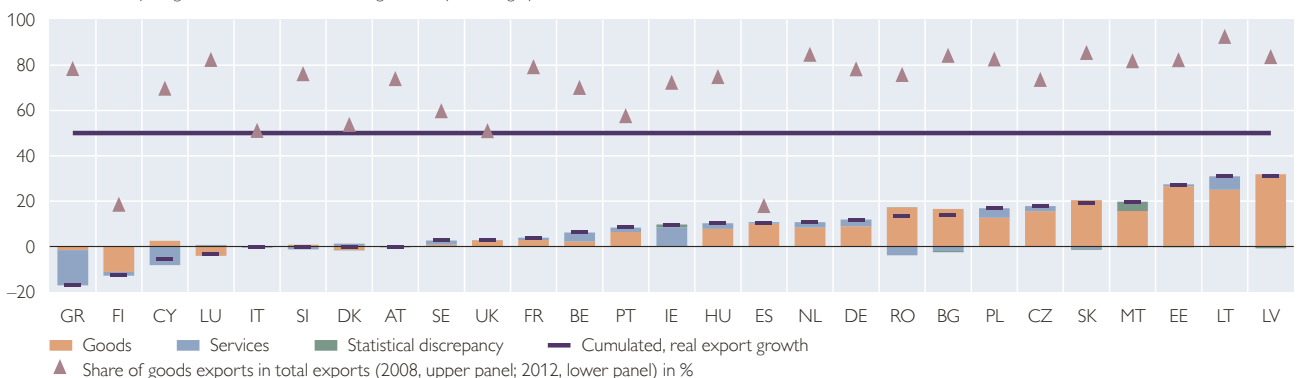
2004–2008

Cumulated, real export growth in %; contributions to growth in percentage points



2008–2012

Cumulated, real export growth in %; contributions to growth in percentage points



Source: Eurostat.

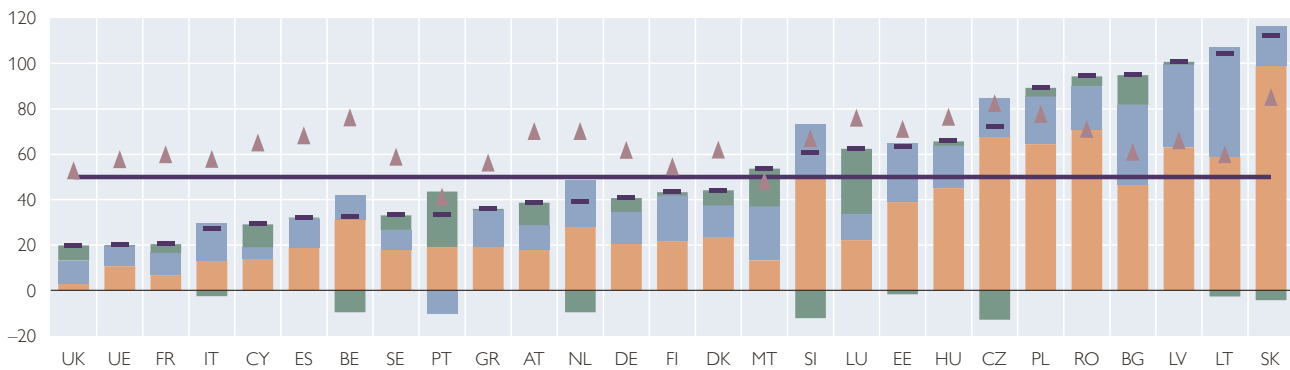
Note: BE (Belgium), BG (Bulgaria), CZ (Czech Republic), DK (Denmark), DE (Germany), EE (Estonia), IE (Ireland), GR (Greece), ES (Spain), FR (France), IT (Italy), CY (Cyprus), LV (Latvia), LU (Luxembourg), HU (Hungary), MT (Malta), NL (Netherlands), AT (Austria), PL (Poland), PT (Portugal), RO (Romania), SI (Slovenia), SK (Slovakia), FI (Finland), SE (Sweden), UK (United Kingdom).

⁶ Moreover, the relative growth contribution of services to goods exceeds the absolute service share (based on 2008 data) in 21 EU countries between 2004 and 2008 and in 13 EU countries between 2008 and 2012.

Cumulated Nominal Export Growth and Contributions from Intra- and Extra-EU Exports to Export Growth

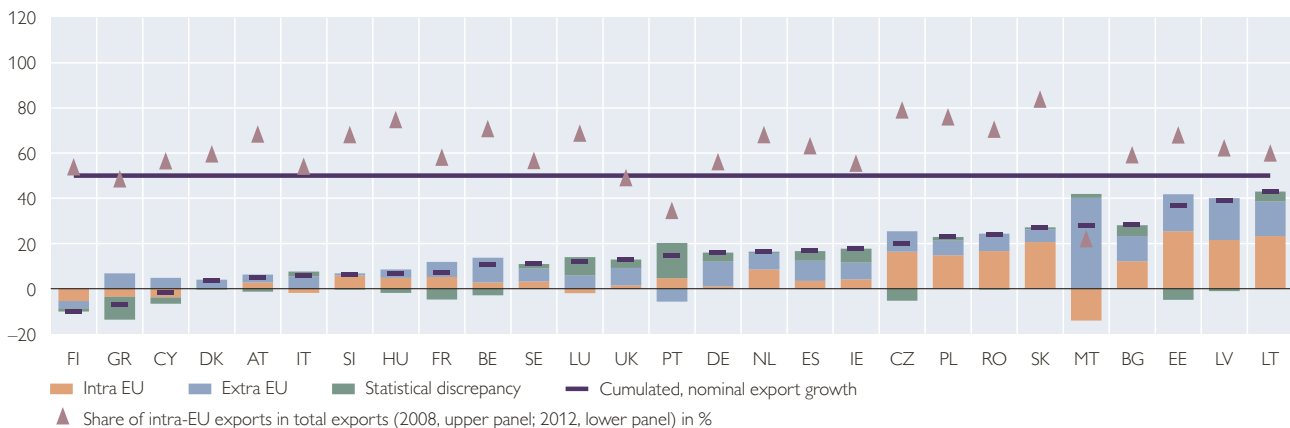
2004–2008

Cumulated, real export growth in %; contributions to growth in percentage points



2008–2012

Cumulated, real export growth in %; contributions to growth in percentage points



Source: Eurostat.

Note: BE (Belgium), BG (Bulgaria), CZ (Czech Republic), DK (Denmark), DE (Germany), EE (Estonia), IE (Ireland), GR (Greece), ES (Spain), FR (France), IT (Italy), CY (Cyprus), LV (Latvia), LU (Luxembourg), HU (Hungary), MT (Malta), NL (Netherlands), AT (Austria), PL (Poland), PT (Portugal), RO (Romania), SI (Slovenia), SK (Slovakia), FI (Finland), SE (Sweden), UK (United Kingdom).

- *Trade within EU countries (intra-EU trade) outpaces trade with the rest of the world (extra-EU trade).* Chart 3 shows the contribution of intra-EU trade to export growth and the share of intra-EU exports in total exports (2008). Apart from Portugal and Malta, all EU countries exported more goods and services to EU countries than to countries outside the EU in 2008. In terms of growth contributions (to total export growth), intra-EU trade outpaced extra-EU trade in 19 countries before and in 15 countries during the crisis. Hence, intra-EU trade dominates in absolute levels, but is less significant in growth terms.
- *Export price developments differ across EU countries.* The figures in charts 1 and 2 on GDP and export growth are based on real growth, which lags behind nominal export growth, especially in the CESEE countries. Put differently, these countries have high export deflators, which need to be considered in the analysis of export performance. However, no deflators

are available for the disaggregated export data used in sections 4 and 5. To see the impact of the export deflators, compare the difference between real (chart 2) and nominal (chart 3) export growth.

2 Methodology

This paper uses the method of constant market share analysis (CMSA) to generate ex post information on the factors underlying national export performance. Changes in market shares are decomposed into a structural and a competition effect. The structural effect can be decomposed further into the growth of export markets and product varieties, while the competition effect covers changes in price and non-price competitiveness.

The analysis of constant market shares goes back to the pioneering work of Tyszynski (1951) and was developed further by Richardson (1971a, 1971b) and Milana (1988). Skriner (2009) provided a comprehensive discussion of the theoretical aspects of CMSA, while Widodo (2010) highlighted the differences between the various approaches and contributed an in-depth analysis of the competition effect. CMSA is now a standard tool for explaining developments in international competitiveness. Examples of recent applications are Ragacs et al. (2011) for Austria, Amador and Cabral (2008) for Portugal, and Deutsche Bundesbank (2006) for Germany.

This paper provides a CMSA of intra-EU trade for goods and services. To enhance understanding, the following equations – while calculated for all countries – are written only from the perspective of Austria (AT). In line with Deutsche Bundesbank (2006), the total change in the share of Austrian exports to EU countries is proxied by the difference between the growth of Austrian exports to EU countries and the total sum of EU countries' imports from EU countries.⁷

$$\begin{aligned} \frac{d\left(X^{AT} / M^{EU}\right)}{X^{AT} / M^{EU}} &= \frac{dX^{AT}}{X^{AT}} - \frac{dM^{EU}}{M^{EU}} = \\ &= \sum_i \sum_j \frac{X_{ij}^{AT}}{X^{AT}} \frac{dX_{ij}^{AT}}{X_{ij}^{AT}} - \sum_i \sum_j \frac{M_{ij}^{EU}}{M^{EU}} \frac{dM_{ij}^{EU}}{M_{ij}^{EU}} \end{aligned} \quad (1)$$

where X_{ij}^{AT} are Austrian exports of product j to EU country i ; M_{ij}^{EU} are imports of product j from EU country i ; X^{AT} are the sum of Austrian exports to EU countries and M^{EU} the sum of EU imports from EU countries (excluding Austria). The percentage change in Austria's market shares within the EU thus corresponds to the difference between the growth rates of Austrian exports and intra-EU imports. By expanding (1)⁸ and rewriting the whole equation, the terms can be rearranged in the following way:

⁷ CMSA analyses usually consider the total sum of exports. In order to capture the true trade inflows into the countries, the paper instead uses import data. Ignoring the statistical discrepancy, total exports should be equivalent to total imports. However, there is a tendency to report a higher amount of exports, and therefore imports are chosen.

⁸ with $+\sum_i \sum_j \frac{X_{ij}^{AT}}{X^{AT}} \frac{dM_{ij}^{EU}}{M_{ij}^{EU}} - \sum_i \sum_j \frac{X_{ij}^{AT}}{X^{AT}} \frac{dM_{ij}^{EU}}{M_{ij}^{EU}}$

$$\begin{aligned}
 & \frac{d(X^{AT} / M^{EU})}{X^{AT} / M^{EU}} = \\
 & = \underbrace{\sum_i \sum_j \left(\frac{X_{ij}^{AT}}{X^{AT}} - \frac{M_{ij}^{EU}}{M^{EU}} \right) \frac{dM_{ij}^{EU}}{M_{ij}^{EU}}}_{\text{Structural Effect}} + \\
 & + \underbrace{\sum_i \sum_j \left(\frac{dX_{ij}^{AT}}{X_{ij}^{AT}} - \frac{dM_{ij}^{EU}}{M_{ij}^{EU}} \right) \frac{M_{ij}^{EU}}{M^{EU}}}_{\text{Competition Effect}} \quad (2)
 \end{aligned}$$

The structural effect quantifies changes in the EU market shares based on product and regional specialization in combination with shifts in the region's market structure. In contrast, the competition effect covers developments that are independent of "market" and "product" growth; hence, this effect can be interpreted as a competition effect that includes both price and non-price competitiveness. Nonetheless, this effect is very often interpreted as a residual effect. By further rewriting (2), the structural effect can be decomposed into

- a market effect,

$$\sum_i \left(\frac{X_i^{AT}}{X^{AT}} - \frac{X_i^{EU}}{X^{EU}} \right) \frac{dX_i^{EU}}{X_i^{EU}}$$

- a product effect,

$$\sum_j \left(\frac{X_j^{AT}}{X^{AT}} - \frac{M_j^{EU}}{M^{EU}} \right) \frac{dM_j^{EU}}{M_j^{EU}}$$

- a mixed effect (structural effect minus market and product effects).

The market effect denotes the regional distribution of exports while the product effect captures the influence of product varieties. The mixed effect represents differences between individual industries regarding the geographical focus

of exports and can be considered a residual.

3 Data

The paper uses two kinds of data sources: First, data on goods exports from the European Commission's ComExt database and second, service data derived from balance of payments statistics hosted by Eurostat.

Bilateral *data on goods exports and imports* include all EU countries except Croatia. Data are available from 1999 to 2012 and are assigned to ten different product categories (in line with SITC Rev. 4)⁹ as well as, in a more detailed analysis for Austria, to 59 product categories (also SITC Rev. 4).

Data quality differs across countries, product categories and time: The data set is complete with respect to both the considered time period and the bilateral export sums. However, the product-specific bilateral data come with two problems: First, in many countries the bilateral sums of the ten product categories do not sum up with the reported sum of exports/imports. To reflect the difference, this paper introduces an eleventh product category called "Rest." Second, product-specific bilateral trade figures exhibit missing data, either as a result of data holes in the statistics, because a given product is not traded between the considered country pair or for reasons of confidentiality.¹⁰ In case exports in a specific production sector are conducted only by one company or a small group of companies, the publication of these data is forbidden to prevent conclusions on firm-specific data. These aspects need to be considered

⁹ These data provide a total of 4,536 (1,008 for services) possible data points for each country.

¹⁰ For Germany, Spain, France, Italy, the Netherlands and the U.K., fewer than ten data points are missing; for Cyprus, Latvia, Luxembourg, Malta and Slovenia, more than 11% (up to 24%) of the observations are missing. This missing data points are replaced by a small positive zero, e.g. 0.00001. In some cases it is necessary to substitute missing observations by an interpolated value.

when interpreting the country-specific results. For the purpose of this paper, the routines were run with several different settings – regarding the missing aggregation issue and data holes – in order to test the consistency of the presented results.

Data on service exports contain information on all EU-28 countries from 2004 to 2012, separated into three categories: travel, transport and other services. These three categories sum up to total exports and imports, but suffer from many data holes in bilateral cate-

gory-specific data¹¹ despite the low level of disaggregation.

4 Changes in Export Market Shares across the EU

Constant market shares analysis of intra-EU trade in goods and services in 2004 to 2008 as well as 2008 to 2012 yields the following main results (table 1):

- Across the EU, changes in goods export market shares fall in three categories. First, the CESEE EU countries clearly increased their market shares in both time periods, independently from the

Table 1

Export Market Shares

	Share of goods in total exports (2008)	Goods		Services					
		2004–2008	2008–2012	2004–2008	2008–2012				
	in %	Average yearly % changes in time horizon							
Latvia	71.1	↑	5.2	↑	9.3	↑	16.3	→	0.3
Lithuania	85.7	↑	4.9	↑	8.7	↑	10.9	→	1.9
Romania	81.9	↑	3.0	↑	5.6	↑	33.7	↓	-3.4
Slovakia	91.9	↑	6.8	↑	5.0	↑	14.9	↓	-1.3
Malta	48.1	↓	-3.0	↑	5.9	↑	15.6	↑	2.5
Poland	86.0	↑	4.5	↑	3.0	↑	15.6	→	1.1
Bulgaria	78.5	↑	4.2	↑	6.2	↑	5.1	↓	-2.5
Estonia	72.1	→	1.7	↑	8.0	↑	5.8	→	-0.2
Czech Republic	86.5	↑	3.6	↑	2.8	↑	13.3	→	-0.8
Slovenia	81.6	↑	3.7	→	1.1	↑	6.0	↓	-1.2
Luxembourg	23.1	→	-0.1	↓	-5.9	↑	6.7	→	0.5
Hungary	84.5	→	1.9	→	0.5	↑	6.5	→	-0.1
Netherlands	80.8	→	1.4	→	1.9	→	-0.6	→	0.7
Sweden	72.0	→	-0.1	→	0.3	→	1.4	↑	2.7
Portugal	75.3	→	-0.5	→	1.0	↑	2.3	↓	-2.6
Germany	86.1	→	0.0	→	-0.2	→	2.0	→	0.1
Ireland	56.9	↓	-2.5	↓	-2.0	↑	4.0	→	1.0
Belgium	80.0	→	-0.2	↓	-1.1	→	0.7	↑	2.3
Denmark	61.9	→	-0.5	↓	-2.3	↑	6.0	↓	-3.1
Austria	73.7	→	-0.5	→	-0.5	→	0.9	↓	-1.1
Spain	69.0	→	-1.0	→	0.3	→	0.0	↓	-1.8
France	79.8	↓	-1.8	↓	-1.2	↓	-3.2	↑	7.6
Finland	77.5	→	-0.3	↓	-3.6	↑	3.6	→	-0.5
United Kingdom	58.2	↓	-2.3	→	0.3	↓	-2.0	↓	-1.2
Greece	46.8	↑	2.4	↓	-2.0	→	-0.7	↓	-5.6
Italy	83.3	→	-0.8	↓	-1.5	↓	-4.5	↓	-3.7
Cyprus	16.2	→	-0.9	→	0.0	→	1.9	↓	-7.3

Source: Eurostat, own calculations.

Note: Sequence of countries is based on overall market share development. The green, gray and red arrows indicate whether the change was clearly positive (>2%), relatively stable or clearly negative (<-1%).

¹¹ In Bulgaria, the Czech Republic, Denmark, Italy, Lithuania, Luxembourg, Austria, Slovenia and the U.K., fewer than 10 observations are missing, whereas in Germany, Ireland, Greece, Spain, Latvia, Malta, Portugal, Romania and Finland, more than 10% (up to 43%) of the observations are missing.

underlying export growth pattern – a result one would expect given their catching-up status. A second group of countries (the Netherlands, Sweden, Portugal, Germany, Austria and Spain) kept their goods market shares almost unchanged, while a third group (Luxembourg, Ireland, Belgium, Denmark, France, Finland, the U.K. and Italy) lost market shares and did so at an accelerated pace in five of those eight countries in the crisis period.

- *From 2004 to 2008, the market shares of services developed broadly in line with the market shares of goods.* In other words, the CESEE countries raised their service shares, and the countries in the second group kept their service shares constant. In the third group, the service shares of Ireland, Belgium, Denmark and Finland developed better than the goods shares.
- *From 2008 to 2012, service market shares developed out of sync with goods market shares.* Decomposing the processes within the crisis period is less straightforward, as the country-specific developments appear to be masked by clear gains of France (+7.6%), which are based on strong increases of service exports other than travel or transport to Belgium, Germany and the U.K. In 2012, total service exports to these three countries accounted for more than 50% of all French service exports to EU countries. Nonetheless, the results are almost unchanged even if France is excluded from the analysis. Overall, service export market shares changed only little during the crisis. Only France, Sweden, Malta and Belgium were clearly able to gain market shares (an average annual gain of more than 2%). Conversely, Cyprus, Greece, Italy, Romania and Denmark clearly lost market shares during the crisis

(average annual loss of more than 3%).

Table 1 presents an overview of changes in market shares of goods and service exports for the two time periods. To better visualize the results, the average yearly percentage changes for each country in each time period are classified as a clear increase if they exceed 2% (marked with an upward-pointing green arrow) or as a clear decrease if they are below –1% (marked with a downward pointing red arrow). Changes between 2% and –1% are classified as a relative stable development (marked with a gray horizontal arrow).

In a next step, the changes in *goods and service market shares* thus established are *linked to the relative importance of these shares in total exports*. The share of goods exports in total exports (in 2008) lay above 70% in the CESEE and the old Western European EU Member States. In the latter group, market shares of goods and services changed broadly in sync (except for services in the crisis period). In a third group of countries (Denmark, Ireland, Greece, Luxembourg, Malta, Cyprus and the U.K.), service exports accounted for 40% or more of total exports (2008). This country group has a rather weak goods exports performance. However, most of these countries compensate this weakness with steadily rising market shares in service exports. Traditional analysis limited to goods exports would miss this finding.

Table 2 presents *a more detailed breakdown* of the changes in market shares shown in table 1, as explained by a product and a market effect which sum up to the “structural effect” (neglecting the mixed effect). The remaining change of the market share can be interpreted as a competitiveness effect. To visualize the results, table 2 again uses three types of arrows: upward-

pointing (green), horizontal (gray), and downward-pointing (red) to reflect three categories of changes (above 2%; between 2% and –1%; below –1%). The arrows are displayed only if the structural or competition effect for the specific country and time period is in the same category as the change in the market share.¹²

In splitting up the market share the key question whether market share de-

velopments depend more on the structural (demand driven) or the competition effect. In a first step, this question is answered by a simple inspection of table 2: Comparing both effects, clearly the competition effect is more closely aligned with the overall market share changes.¹³ This first result is broadly confirmed in the detailed country graphs in the annex (charts A1, A2 and A3): While the variation of the

Table 2

Details to the Development of Market Shares

	Goods				Services			
	Structural effect		Competition effect		Structural effect		Competition effect	
	2004–2008	2008–2012	2004–2008	2008–2012	2004–2008	2008–2012	2004–2008	2008–2012
	Average yearly % changes in time horizon							
Latvia	↑ 3.1	↑ 3.1	↑ 6.4	↑ 5.6	↑ 2.1	→ 0.6	↑ 13.3	→ -0.5
Lithuania	↑ 5.6	↑ 3.3	↑ 3.2	↑ 4.9	↑ 3.9	→ -0.6	↑ 6.1	↑ 2.7
Romania	-0.4	-0.2	↑ 6.4	↑ 5.7	-0.0	↑ 1.0	↑ 33.1	↓ -4.4
Slovakia	↑ 2.1	0.1	↑ 10.5	↑ 4.8	↑ 2.2	→ -0.1	↑ 11.6	→ -0.8
Malta	↓ -2.3	1.7	↓ -4.1	↑ 3.7	-1.3	0.0	↑ 17.8	↑ 2.4
Poland	1.1	0.3	↑ 7.6	↑ 2.6	-0.1	→ -0.1	↑ 15.7	→ 1.2
Bulgaria	0.5	-0.3	↑ 7.7	↑ 6.6	1.3	↓ -2.1	↑ 3.6	-0.6
Estonia	2.6	↑ 2.4	→ 0.7	↑ 5.3	↑ 3.7	→ 0.9	1.9	-1.1
Czech Republic	1.5	0.4	↑ 5.2	↑ 2.3	0.9	→ -0.5	↑ 12.0	→ -0.4
Slovenia	-0.1	→ 0.2	↑ 7.6	→ 0.8	-1.2	→ -0.8	↑ 7.6	→ -0.4
Luxembourg	→ -0.8	-0.6	→ 0.5	↓ -5.6	-0.2	2.5	↑ 7.1	-2.1
Hungary	2.3	→ 0.4	→ 1.2	→ 0.0	1.9	→ -0.2	↑ 4.4	→ 0.1
Netherlands	→ 1.1	3.1	→ 1.4	-1.2	→ 0.3	→ 0.7	→ -0.9	→ -0.1
Sweden	→ 1.7	→ 0.9	→ -1.9	→ -0.7	→ 1.6	1.7	→ -0.2	0.9
Portugal	→ -0.1	→ -0.5	-1.1	→ 1.5	-0.9	-0.8	↑ 3.3	↓ -1.8
Germany	→ 1.1	→ 0.3	-1.2	→ -0.6	→ -0.0	→ 0.7	2.0	→ -0.6
Ireland	-0.9	→ 1.1	↓ -4.4	-2.7	-0.0	→ 1.7	↑ 4.0	→ -0.8
Belgium	→ 0.3	→ 1.0	→ -0.9	-2.1	→ -0.9	1.3	→ 1.3	0.8
Denmark	3.6	3.2	-4.2	↓ -5.1	0.9	0.0	↑ 4.9	↓ -3.1
Austria	2.0	→ 1.2	-2.8	-1.7	→ -0.3	→ -0.7	→ 1.2	→ -0.4
Spain	→ -0.8	→ -0.5	-1.2	→ 0.7	-1.8	→ -0.7	→ 2.0	↓ -1.1
France	→ -0.8	→ 0.2	-3.0	↓ -1.5	-1.1	0.3	↓ -2.2	↑ 7.3
Finland	2.5	2.7	-3.0	↓ -5.9	1.3	→ 1.3	↑ 3.0	-1.7
United Kingdom	0.2	→ 1.1	↓ -4.9	→ -0.8	→ 0.2	→ 1.0	-2.1	-2.2
Greece	↑ 2.3	1.7	↑ 2.1	↓ -3.6	-1.7	-1.6	→ 1.2	↓ -4.4
Italy	→ 0.1	→ -0.2	→ -1.8	↓ -1.4	-0.6	0.5	↓ -3.9	↓ -4.2
Cyprus	→ -0.9	-3.2	-1.1	3.1	→ -1.0	-1.8	3.1	↓ -6.0

Source: Eurostat, own calculations.

¹² For example, Lithuania has an average yearly export market share growth of 4.9% between 2004 and 2008; hence, the change is highlighted with a green arrow. Again for Lithuania between 2004 and 2008, the structural effect shows a change of 5.6% (again: 5.6% > 2%). Therefore, a green arrow is displayed. In contrast, Romania (also goods, 2004 to 2008) recorded market share gains above 2%; however, the structural effect is negative, and therefore no arrow is attached.

¹³ Clearly, for more countries (in both time periods) the competition effect has the same sign and a similar size as the market share change – as indicated by the colored arrows.

structural effect is only small, the competition effect develops very closely in line with the overall market share effect. This important result can be interpreted in two ways: An optimistic interpretation would assert that market share changes are for the most part explained by price and non-price competitiveness, whereas the demand effect (structural effect) has less influence on the overall changes. However, a less optimistic interpretation would assert that market share changes cannot be explained by the structural effect, and that the true drivers of market shares are not fully determined, as the “competition effect” is some kind of residual effect.

There are two possible extensions to the present analysis to further explain the competition effect: First, a combination of this calculated effect with standard price competitiveness indicators like unit labor costs or real effective exchange rates to separate price competitiveness effects from the overall effect, thus filtering out price competitiveness, and second, a different breakdown of market shares to further break down the competition effect, allowing for a better understanding of the driving forces of the competition effect (see e.g. Benkovskis and Wörz, 2013).

Besides showing the structural and the competition effect on market shares, table 2 offers further insights into the development of market shares in Europe:

- *The changing pattern of service market share developments can be traced to the competition effect.* For goods, the changes in market shares observed in the period 2004 to 2008 were broadly in line with the pattern observed for 2008 to 2012 for both

the structural and the competition effect. The same holds true for the structural effect of service exports.¹⁴ By contrast, there is a clear structural break in the competition effect of service exports. Before the crisis, 22 countries exhibited a positive average yearly percentage change, whereas this change was negative for 20 countries during the crisis. Within the latter group, the competition effect was clearly negative in the crisis year 2009 for 18 countries, but moved back to positive territory for 10 countries in 2010 and for 17 countries in 2011. Despite this quick rebound, the slump in 2009 was severe enough to yield an overall negative effect for the crisis period in 20 countries; hence, it was clearly a persistent shock. As already stated above, however, the data do not reveal whether those countries really lost competitiveness or whether the results were driven by another factor.

- *A positive structural effect drives market share growth more strongly for goods exports than for service exports.* This finding holds in both periods. A positive structural effect raised market shares of goods exports between 2004 and 2008 in 18 (2008 to 2012: 20) countries. However, only 12 countries (2004 to 2008) and 15 countries (2008 to 2012) experienced a positive structural effect on service exports. Interestingly, more countries were able to benefit from stronger market demand (i.e., a positive structural effect) for both goods and services in the crisis years 2008 to 2012. This increasing number of countries implies less centralization of exports with respect to origin, hence a greater geographical diversification of exports.

¹⁴ The mean effect over all countries changes by less than half a percentage point, confirming the fact that the size (and in most cases the sign) does not clearly change between the two periods.

- *Only a small number of countries were able to benefit from both product and market effects.*¹⁵ The demand-driven structural effect for goods can be split into a market and the product effect (neglecting the mixed effect), as shown in section 2. Heterogeneity is very high: Seven countries in the boom phase (2004 to 2008) and nine countries in the crisis period (2008 to 2012) recorded both positive market and product effects, but only the Northern European countries Denmark, Sweden, Finland, Latvia and Lithuania did so over the full time horizon. Thus, these countries have a comparative advantage over all other EU countries due to their export market structure and their product specialization. At the other end of the spectrum, France, Italy, Portugal and Spain face a negative product and market effect throughout the full time horizon, i.e. a comparative disadvantage vis-à-vis other EU countries, based on their particular export market and product specification patterns.

5 Details on Austrian Export Market Shares

This section discusses detailed results of the structural effect for Austria. In broad terms, Austrian exporters benefited from two key events: First, export firms derived long-term advantages from the productivity boost required as a result of and triggered by Austria's EU accession in 1995. Second, building on the historically strong ties to Central, Eastern and Southeastern European countries, Austrian firms were among the first to enter these markets after the fall of the Iron

Curtain. In 2004, these countries became members of the EU and the single market (Bulgaria and Romania in 2007). At that time, robust export ties had already been established; thus, the Austrian export industry participated strongly in the catching-up process of these economies, as evidenced by chart 4. However, this effect is masked by the importance and development of Austrian export ties to Germany. At least 30% of Austrian goods exports and almost 40% of service exports go to Germany, meaning that Germany is still the single most important export partner of the Austrian economy and as such more important than the whole CESEE region.¹⁶

In the boom period 2004 to 2008, Austrian export firms (both for goods and services) benefited most from trade links to Germany but also from links to CESEE. The market effect vis-à-vis the old EU countries Belgium, Spain, France, the Netherlands and the U.K. was in fact negative. Thus the results clearly reveal the changing geographical focus of Austrian firms from Western Europe to Eastern Europe. The countries grouped in the right panel of chart 4 contributed only very little to the overall effect. Interestingly, Italy, Austria's second-largest trading partner, is in this group. The results also imply that Austrian exporters might regain market shares once Eastern Europe (the Czech Republic, Hungary, Romania, Slovenia and Slovakia) regains its precrisis growth momentum. Once again, the surprisingly small changes of the market effect show that during the 2008/09 crisis, almost all European countries were simultaneously hit by a common supply

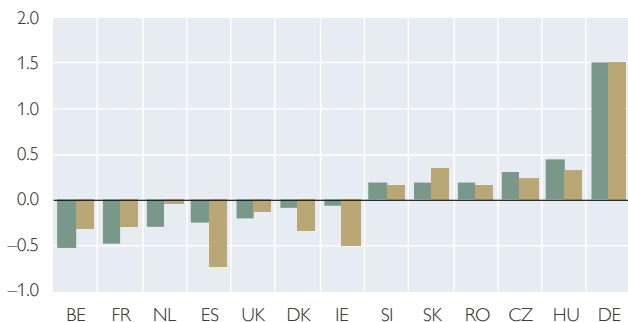
¹⁵ The results for the market and the product effect in the decomposition of goods exports are reported in table A2.

¹⁶ Indirect effects are not captured by this analysis. Thus, combining this data analysis with a world input/output table (Timmer, 2012) or a database on global value chains (Backer and Miroudot, 2013) would be a potential extension of the present study.

Breakdown of the Market Effect

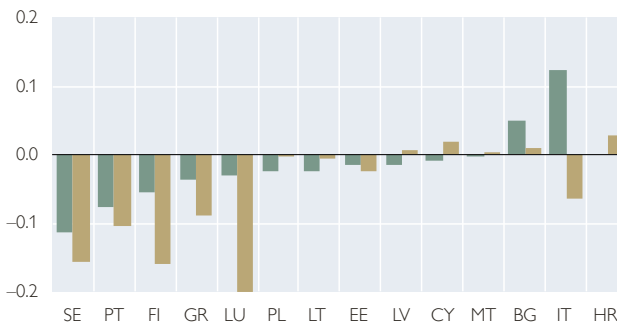
Pronounced changes 2004–2008

Average yearly contributions to the market effect in percentage points



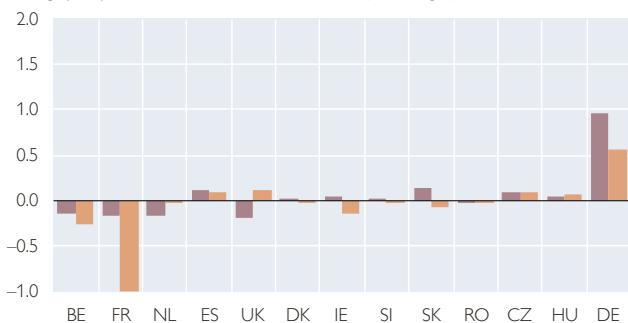
Few changes 2004–2008

Average yearly contributions to the market effect in percentage points



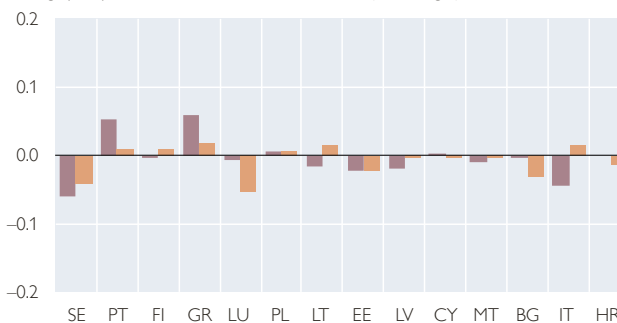
Pronounced changes 2009–2012

Average yearly contributions to the market effect in percentage points



Few changes 2009–2012

Average yearly contributions to the market effect in percentage points



Legend: Goods: 2009–2012 (dark purple), Services: 2009–2012 (orange), Goods: 2004–2008 (dark green), Services: 2004–2008 (gold)

Source: Eurostat, own calculations.

Note: BE (Belgium), BG (Bulgaria), CZ (Czech Republic), DK (Denmark), DE (Germany), EE (Estonia), IE (Ireland), GR (Greece), ES (Spain), FR (France), IT (Italy), CY (Cyprus), LV (Latvia), LU (Luxembourg), HU (Hungary), MT (Malta), NL (Netherlands), AT (Austria), PL (Poland), PT (Portugal), RO (Romania), SI (Slovenia), SK (Slovakia), FI (Finland), SE (Sweden), UK (United Kingdom).

shock, implying an almost unchanged structural development overall.

At the product level, Austrian exporters are heavily concentrated on three industries: metal production, manufacturing system engineering and the car component industry – all product classes that were hit especially hard by the crisis in 2009. Unlike in the case of Austria's geographical advantage, it is less clear whether this specific product specialization is an advantage or disadvantage for Austrian export developments.

Chart 5 presents the product-specific results derived for 59 product

categories. While the individual product categories are rather small at this very detailed level of classification, condensing them into technology classes¹⁷ yields clearer results:

- *Looking at goods exports*, the Austrian export industry benefited most from producing low-tech goods before and during the boom. By contrast, the production of medium-tech and high-tech products was too small to win market shares. However, the array of products changed over time, and during the crisis Austria was able to gain market shares in high-tech goods exports. The analysis at hand is

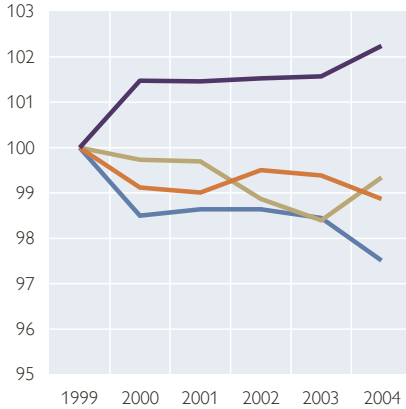
¹⁷ The paper uses the same product classification as Jiménez and Martin (2010).

Chart 5

Breakdown of the Product Effect

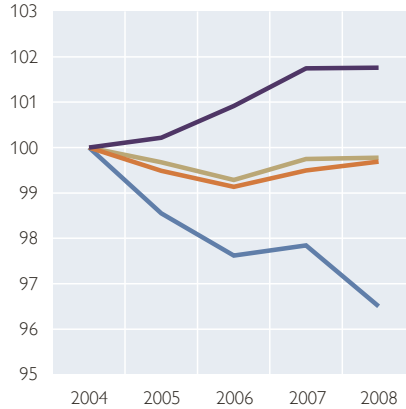
Goods before the boom

Index: 1999 = 100



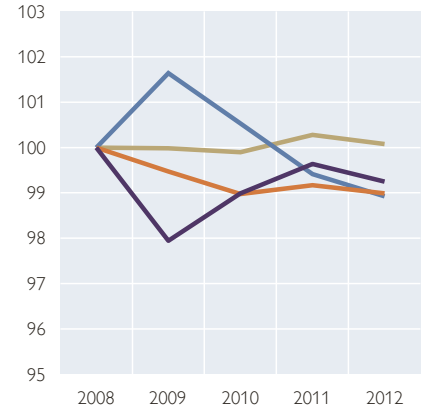
Goods during the boom

Index: 2004 = 100



Goods during the crisis

Index: 2008 = 100



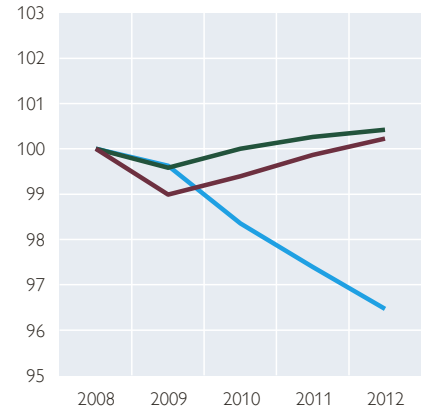
Services during the boom

Index: 2004 = 100



Services during the crisis

Index: 2008 = 100



■ Low-tech products ■ Medium-tech products ■ High-tech products ■ Excluded products
■ Travel ■ Transport services ■ Other services

Source: Eurostat, own calculations.

supported by Bank Austria (2013). The finding there is that between 2007 and mid-2013, Austria expanded production in the high-tech segment most strongly, followed by the medium-high and the medium-low-tech segment. The data basis in that study captures production for foreign and domestic demand, while this analysis focuses solely on exports.

- The disaggregation of *service exports* cannot be as detailed as that of good exports for the following reasons: First, travel can be separated only

into holiday and business travel; holiday travel is the larger aggregate and is more important for Austria. While possible, separating transport (into air, ground, water) would provide only little additional information. The most important and dynamic, albeit highly volatile category is “other services”; again, decomposition does not provide meaningful information, because other services comprises many small, disparate subcategories. Second, data availability is limited already at the level of disaggregation

considered; hence, a further disaggregation of the other services would result in many data holes.

- The breakdown shows that Austria benefited from tourism during the boom but faced problems during the crisis. Transport developed quite constantly over the whole time period.
- “Other services” (all services other than travel or transport) were one of the driving forces of service exports before and during the crisis. Their development cushioned the overall setback in exports in 2009. Nevertheless, the results presented here indicate that the share of other services in Austria is still below the share of other services in the EU (based on the predominance of tourism in Austria) and is shrinking.

6 Summary

The article presents a standard constant market share analysis (CMSA) for goods and services for intra-EU countries' exports. The main findings are as follows:

First, the pattern of goods market shares is surprisingly constant over time and is almost independent of boom/bust cycles. This fact holds especially for the crisis years 2008/09 and shows that almost all countries were simultaneously hit by a common supply shock. Within the EU, the Central and Eastern European countries gained market

shares; some Western European countries (including Germany, the Netherlands and Austria) managed to keep their shares almost constant while others (including France, Italy and the U.K.) lost shares. Market share developments for services mirror the respective development of goods for most countries, except for those specialized in the service trade (like Belgium, Luxembourg and Ireland), which lost goods market shares but gained service market shares.

Second, the changes in market shares were driven by the competition effect. At the same time, putting a country's potential to improve its overall competitiveness down to competition only is not uncontested. Quite often, the competition effect is just interpreted as a residual effect that covers all unexplained factors other than demand-driven aspects. Regarding the demand-driven structural effect, the data do not support a clear predominance of either market or product effects for the EU countries.

The more detailed analysis of the Austrian export market shares shows (1) Germany as the most important partner country for Austrian exports and market shares, (2) the growing importance of high-tech products for goods exports, and (3) further growth potential of other services in a European comparison.

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Annex

Table A1

Cumulative GDP, Export and Import Growth for Chosen Time Periods

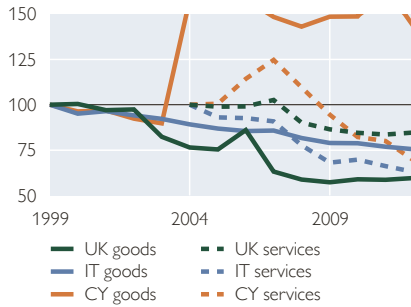
	GDP		Exports		Imports	
	2004–2008	2008–2012	2004–2008	2008–2012	2004–2008	2008–2012
<i>Cumulative growth in percentage points</i>						
Austria	11.7	1.5	27.7	-0.4	19.9	1.1
Belgium	8.5	1.1	16.7	6.1	19.5	6.1
Bulgaria	28.1	-2.8	35.9	13.9	55.9	-9.0
Cyprus	17.7	-2.5	14.7	-5.6	36.3	-19.4
Czech Republic	24.5	-1.4	46.9	17.7	35.8	11.0
Germany	9.0	2.7	35.2	11.7	29.4	13.0
Denmark	6.8	-3.7	24.9	0.1	35.6	-3.0
Estonia	23.5	0.3	31.7	27.0	34.0	16.7
Greece	11.5	-20.4	16.4	-16.4	26.5	-40.2
Spain	12.6	-5.6	15.6	10.5	21.6	-14.7
Finland	13.5	-3.8	37.4	-12.9	38.2	-6.8
France	6.6	0.5	10.4	3.8	18.1	2.4
Hungary	9.1	-5.9	61.0	10.2	46.4	0.5
Ireland	14.9	-5.2	17.5	9.5	21.3	-6.8
Italy	3.7	-5.7	15.8	-0.3	14.0	-8.6
Lithuania	31.3	-4.9	51.0	30.8	62.0	2.3
Luxembourg	16.9	-0.9	34.3	-3.4	36.3	0.2
Latvia	30.7	-10.0	46.1	20.1	43.1	-2.4
Malta	14.9	3.6	22.3	19.3	21.5	11.8
Netherlands	11.6	-2.5	23.4	10.6	24.0	10.3
Poland	23.6	12.5	44.6	16.9	50.9	4.5
Portugal	4.6	-5.4	20.2	8.3	18.4	-14.0
Romania	28.2	-5.0	38.7	16.4	95.5	-2.7
Sweden	10.5	5.1	25.0	2.5	31.5	2.3
Slovenia	21.7	-8.5	47.2	-0.5	44.7	-12.6
Slovakia	35.0	4.1	56.8	19.7	49.0	5.6
United Kingdom	8.9	-2.2	20.9	3.5	13.8	-0.2

Source: Eurostat.

Market Shares: Goods and Services

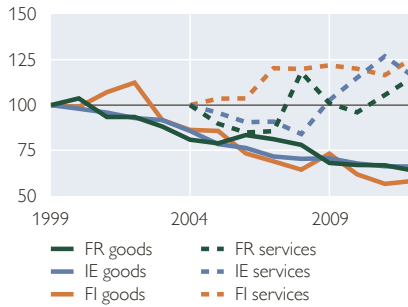
UK, IT, CY

Index 1999 = 100 (goods); Index 2004 = 100 (services)



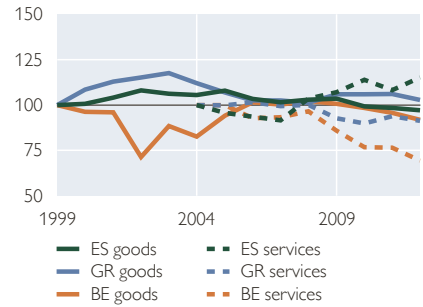
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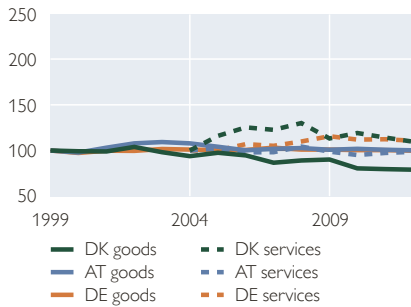
ES, GR, BE

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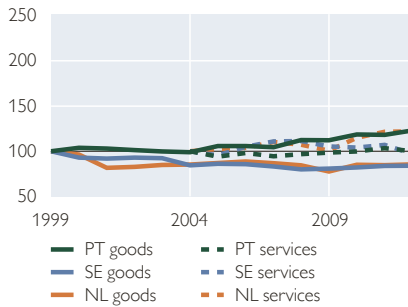
DK, AT, DE

Index 1999 = 100 (goods); Index 2004 = 100 (services)



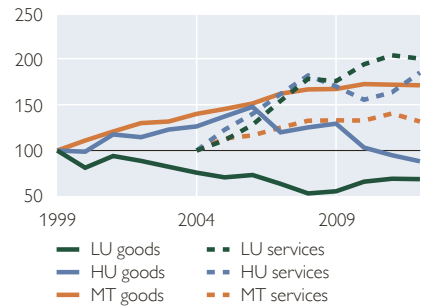
PT, SE, NL

Index 1999 = 100 (goods); Index 2004 = 100 (services)



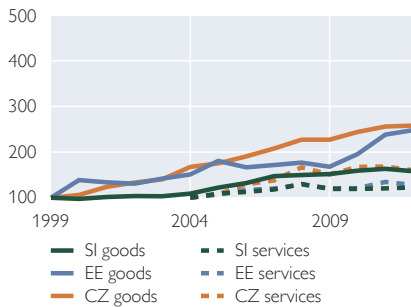
LU, HU, MT

Index 1999 = 100 (goods); Index 2004 = 100 (services)



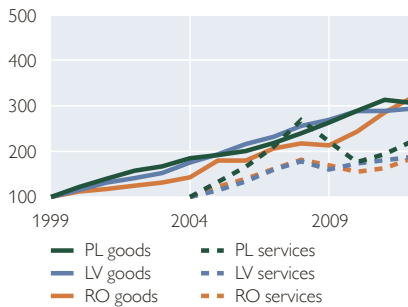
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Index 1999 = 100 (goods); Index 2004 = 100 (services)



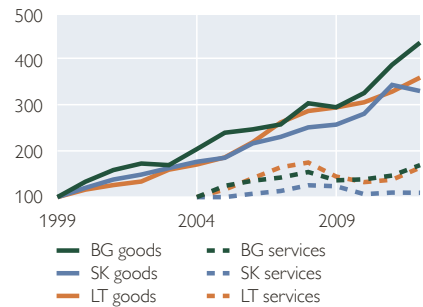
PL, LV, RO

Index 1999 = 100 (goods); Index 2004 = 100 (services)



BG, SK, LT

Index 1999 = 100 (goods); Index 2004 = 100 (services)



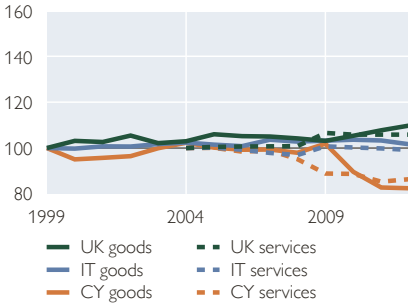
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Structural Effect: Goods and Services

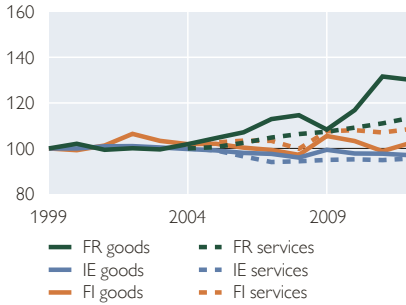
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FR, IE, FI

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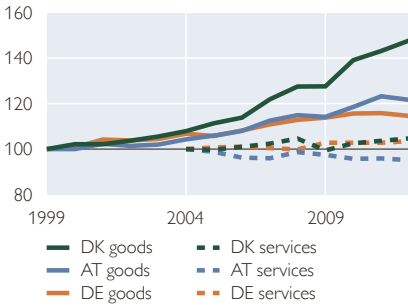
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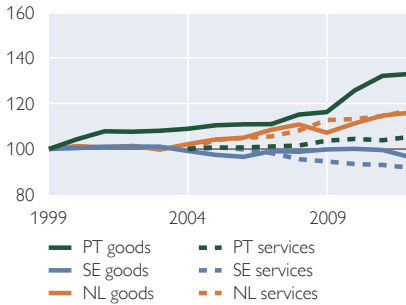
DK, AT, DE

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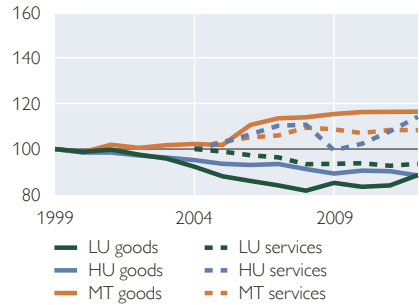
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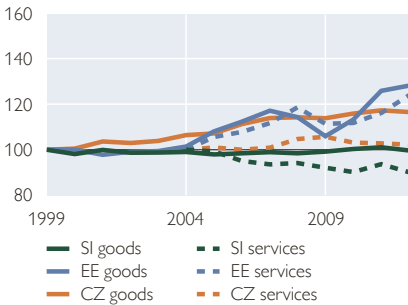
LU, HU, MT

Index 1999 = 100 (goods); Index 2004 = 100 (services)



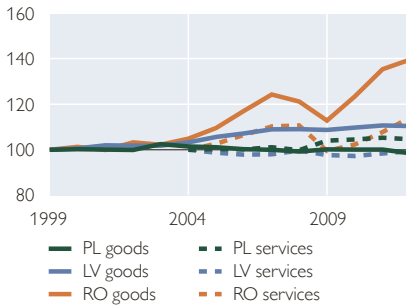
SI, EE, CZ

Index 1999 = 100 (goods); Index 2004 = 100 (services)



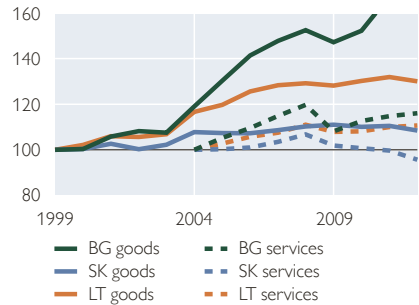
PL, LV, RO

Index 1999 = 100 (goods); Index 2004 = 100 (services)



BG, SK, LT

Index 1999 = 100 (goods); Index 2004 = 100 (services)



Source: ComExt, Eurostat.

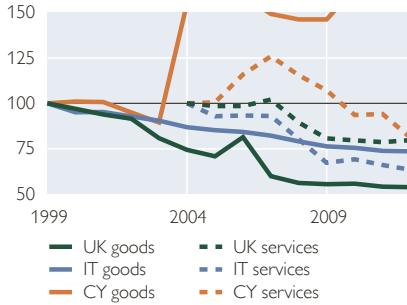
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Chart A3

Competition Effect: Goods and Services

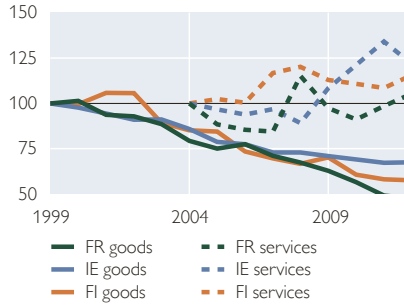
UK, IT, CY

Index 1999 = 100 (goods); Index 2004 = 100 (services)



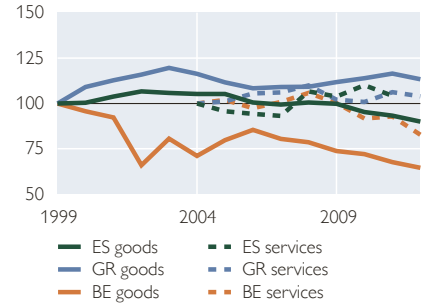
FR, IE, FI

Index 1999 = 100 (goods); Index 2004 = 100 (services)



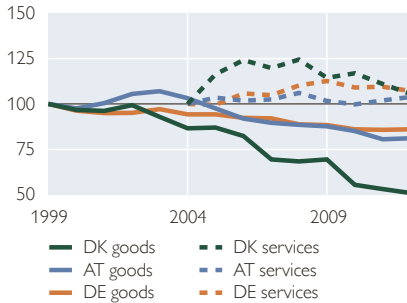
ES, GR, BE

Index 1999 = 100 (goods); Index 2004 = 100 (services)



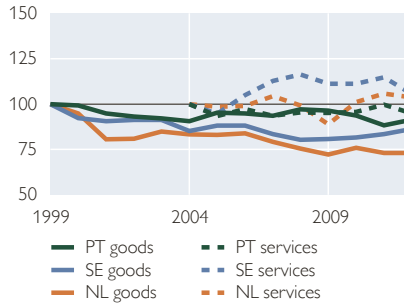
DK, AT, DE

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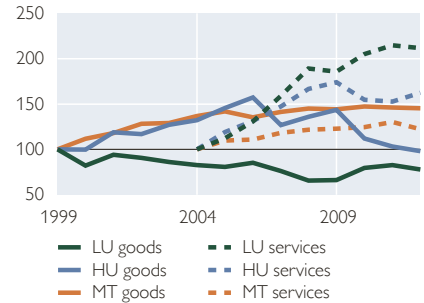
PT, SE, NL

Index 1999 = 100 (goods); Index 2004 = 100 (services)



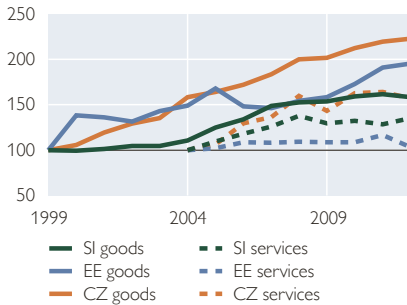
LU, HU, MT

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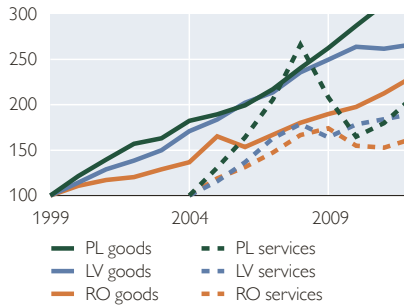
SI, EE, CZ

Index 1999 = 100 (goods); Index 2004 = 100 (services)



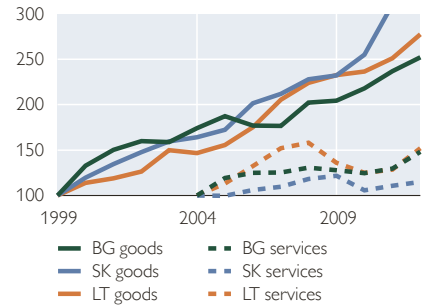
PL, LV, RO

Index 1999 = 100 (goods); Index 2004 = 100 (services)



BG, SK, LT

Index 1999 = 100 (goods); Index 2004 = 100 (services)



Source: ComExt, Eurostat.

Note: BE (Belgium), BG (Bulgaria), CZ (Czech Republic), DK (Denmark), DE (Germany), EE (Estonia), IE (Ireland), GR (Greece), ES (Spain), FR (France), IT (Italy), CY (Cyprus), LV (Latvia), LU (Luxembourg), HU (Hungary), MT (Malta), NL (Netherlands), AT (Austria), PL (Poland), PT (Portugal), RO (Romania), SI (Slovenia), SK (Slovakia), FI (Finland), SE (Sweden), UK (United Kingdom).

Table A2

Country-Specific Product and Market Effect for Goods Exports

	Product effect		Market effect	
	2004–2008	2008–2012	2004–2008	2008–2012
Latvia	4,8	2,8	12,5	12,2
Lithuania	9,9	10,1	14,2	8,6
Romania	-2,2	-3,5	0,1	-0,2
Slovakia	-0,0	-3,0	7,5	2,9
Malta	-5,8	3,1	-5,1	-2,4
Poland	-0,0	-2,5	5,1	3,7
Bulgaria	-0,8	-0,4	1,7	-6,5
Estonia	-0,2	1,8	12,4	5,6
Czech Republic	-3,0	-3,8	7,8	4,7
Slovenia	-2,6	-3,5	2,1	2,0
Luxembourg	-2,4	-5,2	-2,5	1,5
Hungary	-4,1	-3,6	6,6	3,3
Netherlands	2,7	5,4	-1,3	1,9
Sweden	3,8	0,1	0,9	0,4
Portugal	-0,7	-1,5	-5,2	-6,3
Germany	-1,2	-2,1	0,5	1,2
Ireland	-2,6	3,6	-6,3	0,9
Belgium	3,1	3,2	-1,7	1,9
Denmark	6,5	4,7	0,9	2,7
Austria	2,6	-2,0	3,3	2,9
Spain	-1,8	-1,6	-2,9	-3,5
France	-0,8	-0,9	-3,3	-1,4
Finland	6,5	0,7	3,5	3,9
United Kingdom	3,7	4,3	-2,3	-5,5
Greece	2,7	4,9	7,5	-3,2
Italy	-1,4	-2,3	-0,7	-1,7
Cyprus	-2,2	0,7	-4,3	-18,9

Source: Eurostat, own calculations.

Notes

List of Studies

Published in Monetary Policy & the Economy

For further details on the following publications, see www.oenb.at.

Issue Q3/13

Austrian Economy to Grow by 0.5% in 2013

Gerhard Fenz

The Distribution of Inflation among Austrian Households

Pirmin Fessler, Friedrich Fritzer

Internet Payment Behavior in Austria

Katharina Wolner-Rößlhuber, Christiane Burger, Johannes Gussenbauer

Issue Q4/13

Austrian Economy Recovers from Two-Year Weak Patch

The OeNB's Economic Outlook for Austria from 2013 to 2015 (December 2013)

Gerhard Fenz, Martin Schneider

Are Recent Increases of Residential Property Prices in Vienna and Austria Justified by Fundamentals?

Martin Schneider

The Austrian System of Individual Pension Accounts – An Unfinished Symphony

Markus Knell

Issue Q1/14

Austria: Economic Activity Picks Up at the Turn of the Year

Christian Ragacs

Reformed Economic Governance Structure in the European Union and the Way Forward

Christiane Kment, Isabella Lindner

Issue Q2/14

Moderate Upswing amid High Uncertainty. Economic Outlook for Austria from 2014 to 2016 (June 2014)

Christian Ragacs, Klaus Vondra

Fiscal Projections by the Oesterreichische Nationalbank: Methods and Motives

Doris Prammer, Lukas Reiss

Intergenerational Transmission: How Strong Is the Effect of Parental Home Ownership?

Karin Wagner

Toward a European Banking Union: Taking Stock – Summary of the 42nd OeNB Economics Conference in Vienna on May 12 and 13, 2014

Helmut Elsinger, Walter Waschiczek

Periodical Publications

See www.oenb.at for further details.

Geschäftsbericht (Nachhaltigkeitsbericht) Annual Report (Sustainability Report)

German | annually
English | annually

This report informs readers about the Eurosystem's monetary policy and underlying economic conditions as well as about the OeNB's role in maintaining price stability and financial stability. It also provides a brief account of the key activities of the OeNB's core business areas. The OeNB's financial statements are an integral part of the report.

www.oenb.at/Publikationen/Oesterreichische-Nationalbank/Geschaeftsbericht.html

www.oenb.at/en/Publications/Oesterreichische-Nationalbank/Annual-Report.html

Konjunktur aktuell

German | seven times a year

This online publication provides a concise assessment of current cyclical and financial developments in the global economy, the euro area, Central, Eastern and Southeastern European countries, and in Austria. The quarterly releases (March, June, September and December) also include short analyses of economic and monetary policy issues.

www.oenb.at/Publikationen/Volkswirtschaft/Konjunktur-aktuell.html

Monetary Policy & the Economy

English | quarterly

This publication assesses cyclical developments in Austria and presents the OeNB's regular macroeconomic forecasts for the Austrian economy. It contains economic analyses and studies with a particular relevance for central banking and summarizes findings from macroeconomic workshops and conferences organized by the OeNB.

www.oenb.at/en/Publications/Economics/Monetary-Policy-and-the-Economy.html

Fakten zu Österreich und seinen Banken Facts on Austria and Its Banks

German | twice a year
English | twice a year

This online publication provides a snapshot of the Austrian economy based on a range of structural data and indicators for the real economy and the banking sector. Comparative international measures enable readers to put the information into perspective.

www.oenb.at/Publikationen/Finanzmarkt/Fakten-zu-Oesterreich-und-seinen-Banken.html

www.oenb.at/en/Publications/Financial-Market/Facts-on-Austria-and-Its-Banks.html

Financial Stability Report

English | twice a year

The Reports section of this publication analyzes and assesses the stability of the Austrian financial system as well as developments that are relevant for financial stability in Austria and at the international level. The Special Topics section provides analyses and studies on specific financial stability-related issues.

www.oenb.at/en/Publications/Financial-Market/Financial-Stability-Report.html

Focus on European Economic Integration

English | quarterly

This publication presents economic analyses and outlooks as well as analytical studies on macroeconomic and macrofinancial issues with a regional focus on Central, Eastern and Southeastern Europe.

www.oenb.at/en/Publications/Economics/Focus-on-European-Economic-Integration.html

Statistiken – Daten & Analysen

German | quarterly

This publication contains analyses of the balance sheets of Austrian financial institutions, flow-of-funds statistics as well as external statistics (English summaries are provided). A set of 14 tables (also available on the OeNB's website) provides information about key financial and macroeconomic indicators.

www.oenb.at/Publikationen/Statistik/Statistiken---Daten-und-Analysen.html

Statistiken – Daten & Analysen: Sonderhefte Statistiken – Daten & Analysen: Special Issues

German | irregularly
English | irregularly

In addition to the regular issues of the quarterly statistical series “Statistiken – Daten & Analysen” the OeNB publishes a number of special issues on selected statistics topics (e.g. sector accounts, foreign direct investment and trade in services).

www.oenb.at/Publikationen/Statistik/Statistiken-Sonderhefte.html

Research Update

English | quarterly

This online newsletter informs international readers about selected research findings and activities of the OeNB’s Economic and Analysis and Research Department. It offers information about current publications, research priorities, events, conferences, lectures and workshops. Subscribe to the newsletter at:

www.oenb.at/en/Publications/Economics/Research-Update.html

CESEE Research Update

English | quarterly

This online newsletter informs readers about research priorities, publications as well as past and upcoming events with a regional focus on Central, Eastern and Southeastern Europe. Subscribe to the newsletter at:

www.oenb.at/en/Publications/Economics/CESEE-Research-Update.html

OeNB Workshop Proceedings

German, English | irregularly

This series, launched in 2004, documents contributions to OeNB workshops with Austrian and international experts (policymakers, industry experts, academics and media representatives) on monetary and economic policymaking-related topics.

www.oenb.at/en/Publications/Economics/Proceedings-of-OeNB-Workshops.html

Working Papers

English | irregularly

This online series provides a platform for discussing and disseminating economic papers and research findings. All contributions are subject to international peer review.

www.oenb.at/en/Publications/Economics/Working-Papers.html

Proceedings of the Economics Conference

English | annually

The OeNB’s annual Economics Conference provides an international platform where central bankers, economic policymakers, financial market agents as well as scholars and academics exchange views and information on monetary, economic and financial policy issues. The proceedings serve to document the conference contributions.

www.oenb.at/en/Publications/Economics/Economics-Conference.html

Proceedings of the Conference on European Economic Integration

English | annually

The OeNB’s annual Conference on European Economic Integration (CEEI) deals with current issues with a particular relevance for central banking in the context of convergence in Central, Eastern and Southeastern Europe as well as the EU enlargement and integration process.

www.oenb.at/en/Publications/Economics/Conference-on-European-Economic-Integration-CEEI.html

The proceedings have been published with Edward Elgar Publishers, Cheltenham/UK, Northampton/MA, since the 2001 conference.

www.e-elgar.com

Publications on Banking Supervisory Issues

German, English | irregularly

Current publications are available for download; paper copies may be ordered free of charge.

www.oenb.at/en/Publications/Financial-Market/Publications-of-Banking-Supervision.html

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