Why did the wage share fall? Industry level evidence from Austria

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Abstract
There has been a significant decline in the share of wages in GDP in both developed and developing countries since the 1980s. This paper analyses the determinants of the wage share (labour compensation as a ratio to value added) using sectoral data for Austria, while also comparing our results with selected OECD countries.
We compile a comprehensive sector-level dataset of nine OECD countries (Austria, Denmark, France, Germany, Italy, Spain, Sweden, the UK, the US) for the period of 1970 to 2011, which allows us to trace the developments in the wage share across high and low skilled sectors and within manufacturing and service industries.
Our findings lend strong support to the political economy approach to functional income distribution. Technological change had an impact, especially in Austria, Italy, the US, but the effects are not robust with respect to the use of different specifications and the wage share in most countries in our sample appears to be driven by variables reflecting the bargaining power of labour such as union density, adjusted bargaining coverage and government spending. The relevance of these variables differs considerably across countries, lending support to our approach of country specific estimations.
We find that globalisation had a strong impact on the wage share in all countries. The effect of globalisation on the wage share was least strong in Denmark. In Austria, Germany, and to a lesser extent in the UK, the effect is due to outward FDI and intermediate import penetration which reflects the impact of international outsourcing practices. Intermediate imports penetrations had no significant impact in Spain while FDI played a smaller role in France and the US. Different institutional variables appear to be relevant for each country. Germany exhibits the most robust positive effect of union density on the wage share, while the decline in union density explains roughly 80 percent of the decline of the wage share in Austria. Conversely, collective bargaining coverage, together with social government spending, plays a more important role in France, the UK and the US. Financialisation had the most pronounced effect in Austria, the UK and the US, while it appears to be also relevant in Germany. We find mixed results for the effect of personal income inequality on the wage share. However, there is indicative confirmation for a negative effect in Austria, Germany, the UK and the US.

1. Introduction

There has been a significant decline in the share of wages in GDP in both developed and developing countries since the 1980s. This was accompanied by another trend towards greater inequality in personal income distribution, particularly by increases in income shares of the top 1% of the distribution (Atkinson, Piketty and Saez, 2011). These developments indicate a clear reversal of the trends towards relatively egalitarian income distribution during the post-war era. This paper analyses the determinants of the wage share (labour compensation as a ratio to value added) using sectoral data for Austria, while also comparing our results with selected OECD countries.

Previous research has highlighted processes such as technological change, financialisation, globalisation, changes in government policy, personal income inequality, and labour market institutions to explain the decline in the wage share. Since many of those factors are either determined on a sectoral level or have developed differently across sectors and countries, a sector-by-country analysis has several advantages over previous research that uses country-level data or pools countries with different institutional frameworks. Furthermore, while country-level analysis always faces the question whether the decline in the wage share captures changes in sectoral composition rather than a decline of the wage share within sectors, we are able to isolate the within sector development of the wage share, and are able to abstract from changes in the sectoral composition. In fact, we find little evidence to attribute the decline in the country-level wage share to a change in the sectoral composition of the economy, since the wage share decreased in most of the sectors simultaneously.

We compile a comprehensive sector-level dataset of nine OECD countries (Austria, Denmark, France, Germany, Italy, Spain, Sweden, the UK, the US) for the period of 1970 to 2011[1], which allows us to trace the developments in the wage share across high and low skilled sectors and within manufacturing and service industries. Our findings provide new insights with regard to the drivers of falling wage share. By conducting country specific estimations, we analyse how institutional differences in industrial relations, as well as social security and welfare regimes affect the wage share. While Austria is the focus of our analysis in this paper, we compare our results with estimations for Denmark, France, Germany, Italy, Spain, the UK, and the US.[2]

We confirm previous research based on the analysis of pooled aggregate county data attributing the decline in the wage share to financialisation, globalisation and a decline in bargaining power of labour; however, we find that these factors impact countries and skill groups within countries differently. Thereby we confirm the upmost relevance of country specific institutional setting in determining income distribution. In Austria, union density and household debt appear to be the strongest drivers of the decline in the wage share. Although we also find evidence for some negative impact of technological change, albeit not robust, our results indicate that the increase in income inequality is not inevitable but can be altered by political and institutional decisions.

The remainder of the paper is organised as follows. Section 2 provides a short review of the theoretical literature the determinants of functional income distribution from the perspective of different schools of thought as well as an overview of the empirical literature. Section 3 introduces our data and the stylised facts. Section 4 presents our estimation methodology and expected results based on the theoretical considerations introduced in section 2. Section 5 presents the estimation results and section 6 concludes.

2. Literature review

The issue of increasing personal income inequality, in particular earnings inequality, has attracted a significant amount of research. In contrast, changes in functional income distribution, i.e. the fall in the share of wages in GDP have only recently been the subject of research with an aim to pin down the effects of technology, globalisation, and changes in the bargaining power of labour. Different economic schools of thought developed distinct starting points for their analysis of functional income distribution.

The neoclassical approach, which also forms the basis for the New Keynesian analysis, starts with a production function with two factors: capital and labour. The relative income shares of labour and capital are determined by technology. If a firm produces in a fully competitive market with full-capacity utilisation and the production function is characterised by constant elasticities of substitution between capital and labour the relative income shares of the productive factors are determined by their marginal productivity which is technologically given by the employment elasticity of output. Hence, the focus on technological change which characterises many studies in the mainstream economic tradition derives directly from their theoretical approach. There are two critical assumptions in this framework: fully competitive markets and full-capacity utilisation. As soon as the assumption of perfect competition is dropped, i.e. if firms and workers act in oligopolistic markets as is mostly the case, relative bargaining power is influenced by the price setting power (mark-up power) of firms (Stockhammer, 2009). There is a substantial literature in the New Keynesian tradition that derives from this (EC, 2009). Empirically, this approach is most prominently represented by the International Monetary Fund (IMF, 2007), the European Commission (EC, 2007), Bassanini and Manfredi (2012), and Karabarbounis and Neiman (2012). Indeed their findings indicate that technological change is the primary determinant of falling wage shares followed by globalisation. However, Stockhammer (2015) argues that a close examination of the reported findings reveals serious robustness issues regarding the effects of technology. Indeed both the IMF (2007) and the EC (2007) report that the technology variables are not robust to the inclusion of time effects. However, they do not interpret the non-robust effects of technology with caution, but rather make a strong case that the fall in the wage share is an unavoidable outcome of technological progress.

Consistent with the nature of modern capitalist economies, the relaxation of the assumption of full-capacity utilisation gave birth to Keynesian macroeconomics which emphasise the role of effective demand in determining output, income and employment. Consequently, functional income distribution is governed by consumption of workers and capitalists and, more importantly, by the propensity to invest which is driven by aggregate demand and business expectations, i.e. the animal spirits of the private investors (Kaldor, 1955). Most heterodox authors accept this analysis but augment the emphasis on animal spirits by additional factors governing the balance of power between employers and employees as suggested by Marxist or Institutionalist economists. Technology might affect the contributions of the factors of production but technological change itself is an endogenous outcome of conflict in the labour process. Wages are negotiated between employers and employees and are therefore subject to social norms and relative bargaining power. Consequently scholars in this tradition have offered a more thorough analysis of the determinants of bargaining power. Marxist economists emphasise the sphere of production as the source of surplus and the core determinant of income distribution. Economists working

in a post-Keynesian or Kaleckian tradition start directly from the assumption of oligopolistic markets and focus on the sphere of circulation. They emphasise the degree of monopoly in a market, which is determined by the degree of competition between firms, union power and, in a more recent interpretation of the literature by the strength of the financial sector (Kalecki, 1954; Hein, 2015). In the following, we refer to the Marxist, Institutionalist and post-Keynesian/Kaleckian analysis as the Political Economy approach.

Although the New Keynesian and the Political Economy approach to income distribution start from different assumptions, both arrive at a bargaining framework to analyse distribution of income, at least in the more recent studies in the New Keynesian tradition. The difference is that the New Keynesian approach discusses the effects in a rather technical manner driven by a production function approach, while studies following the bargaining approach would always relate the developments to changes in bargaining power. For example, New Keynesian scholars discuss how globalisation changed the factor supplies or costs of intermediate products, and how this technically affects parameters in the equation for the wage share. In contrast, political economists rather look at how globalisation and financialisation increase the fall-back options of capital while decreasing the fall-back options of labour and thereby change the relative bargaining power between the two factors.

Both the mainstream studies and the research in the tradition of political economy find substantial negative effects of globalisation on the wage share. IMF (2007) and EC (2007) employ import and export prices, immigration, offshoring, and trade openness (measured as export plus imports as a ratio to value added) as measures of globalisation and find all of them to have the expected negative effect on the wage share. However, there is a difference in the interpretation of the results depending on the country group used.

Publications focusing on within sector wage shares find mixed results. Sector-level data allows to differentiate between the decline in the within-sector wage share and a change in the sectoral composition of the economy which is an advantage over country-level data.[3] Bassanini and Manfredi (2012) fail to find a robust effect of sector specific import prices on the wage in all but one specification and do not obtain a significant coefficient for import penetration at all. They argue that the negative effect confirmed by country level studies result from a process of reallocation of production towards sectors with lower wage share brought about by increasing competition from abroad and confirm their hypothesis by additional estimations on the sectoral composition in their sample. Thereby they refer to the ‘between component’ of the aggregate wage share. They do find, however, a negative impact of offshoring, especially in high wage share countries, while FDI appears to be insignificant in their analysis. The negative effect of offshoring is furthermore confirmed by Lin and Tomaskovic-Devey (2013) for the US.

Research in the tradition of political economy confirm these results, especially with respect to trade openness variables (Jayadev, 2007; Stockhammer, 2015), as well as intermediate import penetration and outward FDI for within sector wage shares in Austria (Onaran, 2011, 2012).

Regarding the effects of the changes in the bargaining power of labour, the IMF (2007) and the EC (2007) both use standard indices for labour market institutions such as union density, employment protection legislation, unemployment benefit generosity and the tax wedge designed to measure labour market rigidities rather than to measure the bargaining power of labour (Stockhammer, 2015). EC (2007) finds that while minimum wages have a positive effect, higher employment protection legislation

has negative effects on the wage share; their interpretation of the results is that tighter employment protection legislation leads to higher bargaining power of workers and an increase in wages, but it does not increase the wage share, since the labour demand is very elastic. IMF (2007) finds negative effects of unemployment benefits and the tax wedge. Numerous studies also include direct bargaining variables such as union density, strike activity and collective bargaining regimes into their empirical analysis. Strike activity has been found to have a positive impact on the wage share (Kristal, 2012; Argitis and Pitelis, 2001), while ILO (2011) argues that collective bargaining arrangements and minimum wages could have positive effects on the wage share. Union density is the most commonly used variable with the best data availability and the most robust effect. It has been found to increase the real wage (Choi, 2001) – especially in countries with a low level of bargaining coordination (Nunziata, 2005), reduce wage dispersion, and limit the size of top income shares. Additionally, stronger labour unions are likely to exercise political pressure in favour of redistribution policies, thereby decreasing *net* income inequality (after taxes and transfers) (Jaumotte and Buitron, 2015).[4] Nevertheless, it has been argued that the actual effect of unions may be underestimated in empirical studies since collective bargaining coverage greatly exceeds union membership in some countries. However, poor data availability limits the employability of this variable (OECD, 2006), at least for the sectoral level. Stockhammer (2015) fails to find any statistically significant effect of the labour market institution variables such as employment protection legislation, minimum wages, unemployment benefit replacement ratio, unemployment benefit duration, and the tax wedge.

The mainstream literature does not control for the effects of welfare state retrenchment or financialisation. In the political economy literature, welfare state retrenchment is found to be an important determinant of the fall in the wage share (e.g. Harrison, 2005; Jayadev, 2007; Onaran, 2009; Stockhammer 2015); however, the measure used is often only aggregate government spending as a ratio to GDP, and is too broad to reflect the details of the welfare reforms essential to the bargaining power of labour. Kristal (2012) uses government civilian spending, which nevertheless does not capture the details of spending that is particularly important for the social wage and bargaining power of labour such as public spending on social protection or health and education. There have been only few studies investigating the impact of financialisation on functional income distribution. The term is not unambiguously defined, but encompasses the 'increased role of financial activity and rising prominence of financial institutions' (Stockhammer, 2015). Financialisation gained momentum since the 1980s. Similar to globalisation, it has increased the 'exit options' for capital which can now be invested in real as well as financial assets (Jayadev, 2007). Furthermore, it has been argued that financialisation changed industrial relations and led to a 'shareholder value orientation' as a consequence of hostile takeovers of listed companies (Lazonick and O'Sullivan, 2000). Financialised firms adopt a 'downsize and distribute' strategy, which reduces prospects for labour to agree on a beneficial compromise. Similarly, the self-perception of workers changed due to financialisation, resulting in an emergence of 'investor identities' (Langley, 2007). The main indicators of financialisation applied are financial globalisation calculated as foreign assets plus liabilities (Stockhammer, 2009, 2015), current account openness (Jayadev, 2007), and dividend and interest payments and income (Hein and Schoder, 2011; Dünhaupt, 2013). Interestingly, all studies obtain a significant negative effect of at least one of those variables. Kohler, Guschanski and Stockhammer (2016) offer a systematic analysis of different channels through which financialisation affects the wage share

including all of these measure and augmenting them by variables measuring the competition on capital markets (stock market turnover ratio) and household debt. They find the latter variable to be most significant for the determination of the wage share among all financialisation variables as well as control variables. The only study on within sector wage shares including a measure of financialisation is Lin and Tomaskovic-Devey (2013) who account for the ratio of financial receipts of non-financial corporations (including interest, dividend and capital gains) to business receipts for the case of the US. The only paper, to the best of our knowledge, investigating the effect of financialisation on the wage share using firm level data is Alvarez (2015) who includes net financial income and interest payments as explanatory variables in his analysis of France.

Summing up, the research based on a political economy approach uses aggregate country level panel data, which does not differentiate the results across skill groups and industries. Within the mainstream literature, which argues the primacy of technological change, Bassanini and Manfredi (2012) and Karabarbounis and Neiman (2012) use sectoral as well as country panel data; however they do not explicitly control for variables which would reflect the bargaining power of labour and labour market institutions, welfare state retrenchment or financialisation. IMF (2007) attempts to distinguish the effects on the wage share of the workers in the skilled and unskilled industries; however the study claims that the income share of skilled workers rose by focusing on the share of wage bill in the industries using predominantly skilled labour as a ratio to the economy wide value added, rather than the share of wages in the skilled sectors as a ratio to the value added in those sectors, which is also mentioned in a figure in the paper. According to the latter indicator, which is reported but not discussed in the IMF study, the labour share of skilled workers is also falling in some major economies. Lin and Tomaskovic-Devey (2013) and Onaran (2011, 2012) are closest to our analysis, but while these studies focus on a single country, the US and Austria respectively, we perform our analysis for selected OECD countries and are therefore able to account for country specific differences in industrial relations. Furthermore, we incorporate a broader range of explanatory variables.

3. Data and stylised facts

3.1 Data

We have compiled a comprehensive database for nine OECD economies drawing on six publicly available international databases for sectoral data which we augmented by country level data.[5]

We measure the wage share as labour compensation as a ratio to value added with data obtained from the EU KLEMS database. Labour compensation includes the wage of self-employed workers, imputed based on the assumption that their wage is equal to the average hourly wage of the sector.[6] Since data from EU KLEMS is only available until 2009 we extrapolate through splicing. More specifically, we link the wage share from KLEMS with the growth rate of the wage share obtained from the OECD Structural Analysis database (OECD STAN).[7] Both series have a correlation of 0.91. We control for violent swings in the wage share by excluding years where the percentage change in the wage share exceeds 30% in absolute values, which mostly appear in Denmark, the UK and Sweden, but our results are robust to all these cleaning procedures.

In order to see how our results differ if we use the after-tax wage share as the dependent variable in our estimations we had to obtain measures for implicit tax rates

on labour income, indicating the share of taxes paid out of wage income. The series are not readily available for many countries and for long periods; therefore we reconstructed the series using the technique proposed by Carey and Tchilinguirian (2000) with data from several sources of the OECD database.

We obtain measures of capital stock from the EU KLEMS database. Unfortunately only aggregated capital stock data is available at the 2-digit level.[8] We extrapolate capital stock from KLEMS using the growth rate of the same measure from STAN. At the 1-digit level we are able to disaggregate ICT and non-ICT capital. ICT and non-ICT capital is reported as services (measured as an index) rather than stock in the newer versions of KLEMS.

Our globalisation variables are obtained from the OECD. Import data disaggregated for intermediate import and other imports is from OECD STAN Bilateral Trade Database by Industry and End-Use Category. We calculate the ratio of intermediate and other imports to domestic absorption, i.e. value added plus total exports minus total imports of the sector.[9]

FDI is taken from the OECD FDI statistics database and measures FDI positions (stocks) as assets minus liabilities of all parent companies to their affiliates (OECD, 2016).[10] We normalise the measure by the numbers of people engaged in the sector, which we consider to have advantage over other forms of normalization for two reasons: First, since we are interested in the effect of FDI on industrial relations, a normalisation by people engaged in the production process seems reasonable. Second, since FDI is measured as a stock it is preferable to normalise it by another stock variable and not a flow variable like value added or output.

Our measure of migration is the stock of foreign labour by nationality taken from the OECD and we splice it with the growth rate of foreign population for the years for which data is not available (in line with IMF, 2007).[11] We include it in our estimations as a ratio to total employment of the country.

Finally, for robustness tests we use an aggregate index of economic globalisation supplied by Dreher (2006) and updated in Dreher, et al. (2008), which combines *de facto* data from trade flows, FDI stocks, portfolio investment, income payments to foreign nationals with *de jure* measure of hidden import barriers, tariff rates, taxes on international trade and capital account restrictions.

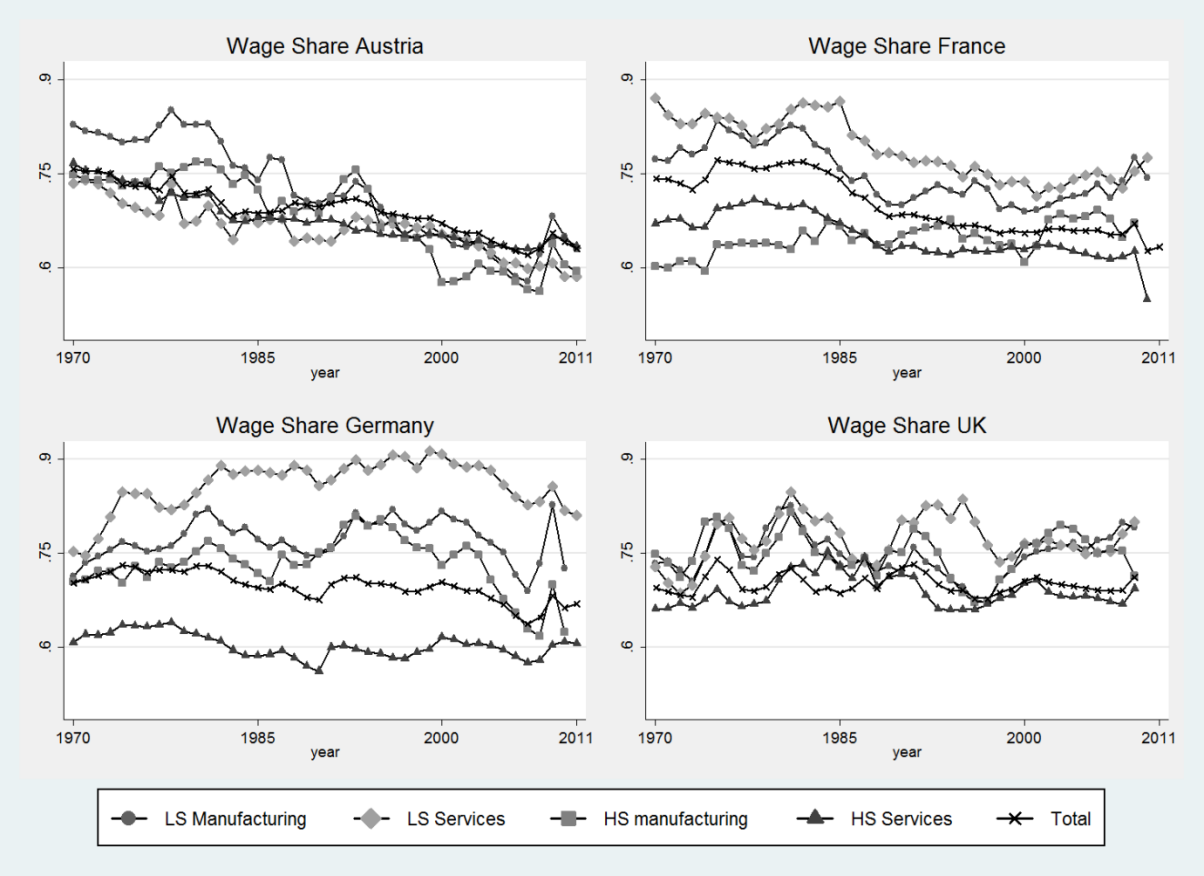
Our only measures for labour market institutions available at the sectoral level is union density supplied by Ebbinghaus and Visser (2000) and Visser (2015). Data is only available on an aggregated level of sectoral classification and not available for each year. Therefore, we interpolate the series between available years and extrapolate data for service sectors using the growth rate of country-level union density. Similarly, we extrapolate manufacturing sectors using the growth rate of the total manufacturing union density or country-level union density when the latter series was not available. Due to the large amount of data created by extra- or interpolation we have reasons to doubt the reliability of this variable, although this is more relevant for earlier years before 1995 which are included only in a limited number of our estimations. However, it is important to note that such interpolation smoothens the data and thereby diminishes its ability to capture short-time adjustment in bargaining variables in reaction to certain political or economic events. Nevertheless, we think the results are indicative and important as this paper is the first attempt to analyse the impact of union density on sectoral wage share for several countries. We also check for robustness by using the country level aggregate union density variable supplied by the OECD. Our second measure of bargaining power is adjusted bargaining coverage[12] measuring the number of employees covered by collective (wage) bargaining agreements as a

proportion of all wage and salary earners in employment with the right to bargaining (Visser, 2015). This variable is only available at the country level.
Furthermore, we account for social government spending defined as social transfers in kind from government to households measuring expenditure by government on market goods and services provided to households such as health care, housing, recreational and cultural services, education and social protection. This measure excludes social transfers in cash (reflecting welfare benefits), which we add to the previous measure for robustness tests. The variable is measured as percentage of GDP and obtained from the OECD National Accounts at a Glance database.
Furthermore we include the Gini-coefficient obtained from the “Standardized World Income Inequality Database” (Solt, 2014), and top 1 percent income shares from the “World Wealth and Income Database” (Alvaredo et al., 2015).
Our country-level financialisation variables include interest and dividend payments and income of nonfinancial corporations as a ratio to total resources of nonfinancial corporations obtained from the OECD Non-financial Accounts by Sectors Database which is part of the Annual Accounts statistics. Furthermore, we augment our analysis by a variable measuring household debt as percentage of GDP from the Bank of International Settlements Total Credit Statistics.

3.2 Stylised Facts

While the decline in the aggregate country-level labour share is a well-documented fact, there is only limited analysis of dynamics in functional income distribution at the sectoral level. We find that the trend observed in the aggregate country level wage share is mirrored at the sectoral level, albeit with important differences between manufacturing and services sectors as well as high (HS) and low skilled (LS) sector groups and across countries as can be seen in Figure 1 below for selected countries.

Figure 1: wage share in Austria, France, Germany and the UK



Source: Own calculations; see Section 3.1 for detailed sources. Data excludes the "Agriculture, Hunting, Forestry and Fishing" sector.

In Austria we observe one of the steepest declines in the wage share in comparison to other European countries. The wage share in value added of the sector is generally higher in the manufacturing industries than in services until the late 1990s, after which the wage share in manufacturing falls below the wage share in the service sectors. This pattern is unique to Austria – most other countries exhibit a higher wage share in low skilled service industries than in manufacturing as can be seen in France, Germany and the UK – and can well be related to imputed wages of owner entrepreneurs.

Within manufacturing sectors in Austria low skilled sectors maintained the highest share of wages in value added in the economy until the mid-1980s, but also exhibit the sharpest decline amongst all sector groups by 27 percentage-points from 85 percent to 58 percent between 1978 and 2007. Interestingly, this trend is mirrored by the other sectors so that low skill manufacturing never falls below high skilled manufacturing which experienced a reduction of the wage share by 21 percent between 1980 and 2008, a period which was marked by high scale privatisation practises. The wage share in high skilled service sectors declined relatively less in comparison to the rest of the economy, but with a decrease by 14 percentage-points between 1970 and 2007 the reduction in the share of wages in these sectors is still substantial.

During the same time employment composition between sectors (measured as people engaged to include self-employed) changed drastically. The general trend is a

decrease in the employment of low skilled sectors while employment in the high skilled sectors increased. In order to isolate the effect of a change in employment on the wage share, we further calculated labour shares for a constant level of employment between its peak and bottom point in Austria.[13] While the change in people engaged accounted for 89% of the decline in the wage share for low skilled manufacturing sectors in Austria, a significant part of the decline remains unexplained. This figure is even more dramatic for the other sectors: change in employment explains only 30% of the decrease in the wage share of low skilled service sectors, while employment in high skilled manufacturing and services increased and even more than doubled for high skill service sectors.

The dynamics of the other countries in our sample are very diverse.[14] The wage share in France exhibits the strongest skill bias amongst the four countries. However, the only sector group characterised by a slightly increasing wage share is high skilled manufacturing, while other sectors have lost out in comparison to their own position in the 1980s. In Germany the wage share appears to be quite stable until the early 2000s, which marks the implementation of the Hartz reforms – one of the most drastic labour market policy packages to be implemented in Germany. Thereafter all sector groups besides high skilled services exhibit a strong decline in the wage share. In the UK low skilled services experienced a steady reduction in the wage share since the mid-1990s, while low skilled manufacturing sectors have increased their wage share in the same period, although they still lost out in relation to their position in the early 1980s. Turning to high skilled sectors, services show the most steady wage share, which experienced a sharp decline by 9 percentage-points between 1984 and 1994 and afterwards stabilised at a lower level.

Looking at the crisis year shows some interesting dynamics. Unfortunately, our data quality is worse for those years given that we are employing an unbalanced panel and thereby face the risk of sectors dropping out of our sample at the beginning and end of the time period. Nevertheless, we can observe some interesting dynamics. Historically, the wage share tends to rise during recessions as companies hold on to workers and productivity falls more than real wages, then the wage share falls back in a recovery. But during the 2008 recession the labour share did the opposite in some countries: it fell soon after the initial year of the recession, and when the recovery began the aggregate wage share kept falling in most countries. This trend can clearly be observed in in the US, Austria, France and Germany. Unfortunately, our sectoral data for the UK is limited and ends in 2009, but nevertheless we can observe a decline for manufacturing sectors in the last years of the sample while service sectors exhibit an increase between 2008 and 2009; also the data for the aggregate economy which is available until 2015 confirms these trends.

Summing up, despite the diversity of wage share dynamics across countries and sector groups, there are no sectors which seem to be exempt from the rise in inequality in functional income distribution across countries, an observation which cast doubt on two most commonly used explanations to account for the decrease in the country-level wage share in the mainstream analysis. On the one hand, there is reason to question the argument of skill-biased technological change as the main driver of functional income inequality, since it predicts an increase in the wage share of skilled workers while the wage share of unskilled workers declines. If our sectoral skill disaggregation roughly reflects the share of skilled and unskilled workers we can decisively conclude that this trend is not apparent the OECD countries. In Austria labour in all sectors of the economy has lost compared to capital. On the other hand, several economists have attributed the decline of the country-level wage share to a change in the sectoral

composition of the economy, maintaining that the observed decline is mainly the result of traditionally capital intensive sectors with a low wage share producing an increasing share of overall value added (EC, 2009). Although our observation of an overall decline in the wage share across skill groups does not invalidate this explanation, it nevertheless provides evidence that changing industrial composition cannot on its own explain the decline in the aggregate wage share. This confirms previous findings by Karabarbounis and Neiman (2012, 2014) and Rodriguez and Jayadev (2010). Therefore, the analysis of the causes of the decline in the wage share remains an important question which cannot be merely attributed to technology driven changes in the sectoral composition of the economy.

Regarding the remaining variables in our sample, our measures of globalisation show a similar pattern across all countries. Intermediate import penetration increased in all countries in both high and low skilled manufacturing sectors.[15] The highest total growth rates were achieved in the 1990s in Sweden and Germany, driven by high skilled manufacturing sectors which in general have a higher level of intermediate imports than low skilled manufacturing sectors. A similar pattern can be observed for outward foreign direct investment (FDI). Here we can see a strong skill bias in the sense that outward FDI per employee increased more for high skilled manufacturing and service sectors than for their low skilled counterparts in Austria, France, Germany and the US while the other countries experienced a rather balanced increase in outward FDI across sectors. The exceptions are always low-skilled service sectors which experience the least amount of outward FDI. The share of migrant workers in the total labour force has been increasing in most countries with the noticeable exceptions of Sweden, where it has stagnated, and France where it declined. Nevertheless, the share of migrants is very small in all countries, exceeding ten percent only for Austria where it reaches 12 and the US where data is not comparable because it is measured as foreign-born rather than foreign labour force.

The share of ICT capital in value added is usually applied as a measure of technological change in the literature. We observe a steady increase in the share of ICT capital measures across all sectors and countries. There is a slight bias in favour of high skilled sectors in Austria, the UK and the US, but the general positive and sometimes even exponential trend is common to all countries.

We observe a strong decline in union density for all sector groups in Austria, France, Germany, the UK and the US, while the decline is more moderate, albeit still visible, in Italy, Denmark and Sweden. Union density stagnated or even increased in Spain between 1980 and 2010, however not exceeding the comparatively low level of 20 percent.[16] In most countries union density began to decrease in the 1980s, with the exception of Austria, France and the US where it has been declining since the 1970s. Union density is highest in manufacturing sectors and lowest in low skilled service sectors. However, the latter group is also characterised by the smallest reduction in union density. Comparing countries amongst each other union density measured at the country level declined most strongly in Austria where we observe a reduction by 35 percentage-points between 1970 and 2011, followed by the UK and Germany where the reduction constitutes 24 and 18 percentage-points respectively.

Adjusted collective bargaining coverage also falls in most countries. The most drastic reductions in bargaining coverage can be observed in the UK, Germany and the US where it declined by 48, 27 and 18 percentage-points between the 1970 and the 2010s.

We observe an increase in social government spending in our sample period in most countries with the exception of Sweden and Denmark where the measure stayed

roughly constant. Interestingly, while social government spending increased or stagnated, it's financing is more relying on workers' income as can be observed by the increasing implicit tax rates for labour and consumption for all our sample (Onaran and Bösch, 2014).
Personal inequality measured by the Gini coefficient increased in most countries with regard to its level in the 1980s, with France as the only outstanding exception. A similar pattern can be observed for the income share of the top 1 percent, this time Denmark being the exception from the rule of increasing top income shares.

4. Estimation Methodology

Our basic specification of the within sector wage share has the following form:

$$WS_{i,t} = \alpha_i + \alpha_g GROWTH_{i,t} + \alpha_k KnonICT_{i,t} + \alpha_{kict} KICT_{i,t} + \alpha_{barg} BARGAINING_{i,t} + \alpha_{glob} GLOBAL_{i,t} + \alpha_{welfare} WELFARE_t + \alpha_{financial} FINANCIALISATION_t + \alpha_{ineq} INEQAULITY_t + \varepsilon_{i,t} \quad (3)$$

where i is the sector index, t is the time index, and *WS* is the wage share in sector i. *GROWTH* is the first difference of value added of the sector in order to control for the counter-cyclical dynamics of the wage share. *KICT* and *KnonICT* are ICT (information and communication technology) and non-ICT capital services as a ratio to value added in sector i; these capture the effects of technological change. α_i is a sector specific coefficient. We do not include period effects in our baseline estimation since several of our bargaining variables are only available on the country level and are thereby statistically similar to year dummies while carrying more meaningful information.
GLOBAL is a set of variables which capture the effects of globalisation, such as intermediate import penetration and inward and outward FDI intensity. Intermediate import penetration is clearly linked to the wage share insofar as intermediate imports are related to the process of outsourcing to foreign companies. However, our data for intermediate imports is based on the conversion of commodity indices to sector indices and thereby doesn't allow us to calculate how much of the imported product is actually used by each sector, which would constitute a more precise outsourcing measure and requires the use of Input-Output tables. However, assuming that the use of imported goods stays relatively constant across sectors intermediate import penetration is a relevant measure for the reallocation of production abroad. We expect a negative effect on the wage share for low skilled sectors in capital abundant countries (as high-income OECD countries are usually assumed to be), brought about either by downward pressure on wages to maintain competitiveness, through trade-induced labour-saving technological change, or a reallocation of employment abroad or towards more capital-intensive sectors in the economy (Onaran, 2011). The expected effect for high skilled sectors is more ambiguous, given that imports can also increase output if they are complementary to domestic production or reduce costs. The effect is theoretically even more ambiguous if one considers imports of final goods that are not produced domestically (Grossman and Rossi-Hansberg, 2006; Onaran, 2011). Depending on which factor is the most dominant, effects are likely to differ across countries.
We focus on outward FDI since it is clearly linked to developments in the wage share while the effect of inward FDI is more ambiguous, and less relevant for developed economies. Furthermore, estimations with inward FDI didn't change our results for outward FDI and the coefficient was not robust. We generally expect the effect of

outward FDI to vary across manufacturing and services and potentially across skill groups. FDI is generally classified into two categories: vertical or cost-seeking FDI leads to substitution of domestic, usually low skilled workers by foreign labour, thereby creating negative employment effects in the home country while also increasing intermediate imports. However, there might be a positive scale effect related to vertical FDI if it increases exports through cost advantages or for production purposes in foreign affiliates. Additionally, cost-seeking FDI might have an impact on the factor composition since the type of jobs created abroad are potentially of a low skilled nature, thereby lowering the wage share of low skilled domestic workers and increasing it for high skilled workers. Furthermore, vertical FDI potentially induce downward pressure on wages as foreign workers can be argued to increase labour demand at lower wage rates. This channel is most likely to impact both skilled and unskilled workers alike. Horizontal, or market-seeking FDI can also have a negative effect to the extent that it replaces exports. More likely though it will have a positive effect for high skilled workers because of an increase in employment at headquarters situated in the home country (Onaran, 2012). Generally, we expect these effects to be less pronounced in services because of their non-tradable character.

Furthermore we test the robustness of our results with regard to globalisation with country-level variables like the KOF globalisation index supplied by Dreher (2006) and Dreher, et al. (2008). These controls, which are important because the variable constitutes an exogenous measure of globalisation, strongly confirm our results with sector level variables.[17]

Our final variable accounting for trends in globalisation is the share of migrant workers in total employment. Previous findings suggest the effect of migration on the wage share to be negligible (IMF, 2007). Theoretically, it can be either positive or negative depending on whether foreign workers complement domestic workers and thereby increase productivity or replace domestic workers while receiving a lower wage (or lower social security contributions).

$BARGAINING$ is a set of variables related to the industrial relations and labour market institutions including union density (alternately at the country and sector level) and adjusted collective bargaining coverage at the country level. While union density measures 'potential union bargaining pressure', 'the effectiveness of unions in providing and defending minimum standards of income and employment' is argued to be better captured by bargaining coverage defined as employees covered by collective (wage) bargaining agreements as a proportion of all wage and salary earners in employment with the right to bargaining (Visser, 2006: 39). Furthermore we experimented with a measure of minimum wages as a ratio to the sectoral average wage as well as the growth rate of real minimum wages. Theoretically, an increase in any of those measures is expected to increase the real wage which will lead to an increase in the wage share if the elasticity of substitution between capital and labour is less than unity.

FINANCIALISATION includes interest and dividend payments and income as a ratio to total resources of nonfinancial corporations, as well as household debt as a share of GDP at the country level. There are different channels through which financialisation is said to impact the wage share. Post-Keynesian literature emphasises the effect of financial payments of non-financial corporations and relate it to an increase in the mark-up of employers if the latter is cost-sensitive with respect to financial payments (Hein, 2015). Alternatively one could argue that dividend payments are an indication of increasing 'shareholder value' orientation, inducing a 'downsize and distribute' strategy that will supress wages and employment (Lazonick and O'Sullivan, 2000;

Stockhammer, 2004; Dallery, 2009). Household debt has been found to reduce wage share arguably through increasing financial vulnerability that has an adverse effect on workers' willingness to engage in collective action (Anderloni, Bacchiocchi and Vadone, 2012; Barba and Pivetti, 2009; Kohler, Guschanski and Stockhammer, 2016).
WELFARE is social government spending at the individual level as explained in the previous section. This variable is measured at the country level and is the same for all sectors.
INEQUALITY is country level inequality measured as the Gini coefficient or the income share of the top one percentile, again the same for all sectors.
We apply two main estimation techniques. Our baseline estimation is performed using the within estimator (also referred to as Fixed Effects Estimator), while we estimate the variance-covariance-matrix of the remainder error term using the approach developed by Driscoll and Kraay (1998). Therefore, standard errors are fully robust with respect to serial correlation within countries, cross-sectional correlation across sectors as well as general heteroscedasticity. Our main robustness controls are conducted with a first difference estimator. This has the additional advantage that potential non-stationarity concerns are taken care of given that all our variables are unambiguously stationary in first differences.[18]
Since there is reason for concerns regarding the endogeneity and specifically reverse causality for our measures of technological change and globalisation, and because the effect of other variables will most likely be manifested with a time lag, all explanatory variables enter the equation with a lag. It would be preferable to employ a General Method of Moments estimator to tackle the issue of endogeneity as well as the dynamic nature of the wage share. However, due to the limited number of cross sections in our single country estimations this estimation method is not appropriate. With regards to endogeneity concerns we employ the second best approach by using lagged values of the explanatory variables (Wooldridge, 2002). In addition to the pool of all sectors, separate regression analysis will be performed for sector groups disaggregated as high skilled and low skilled sectors in manufacturing and services separately.
In separate regressions we employ four alternative measures of the wage share for robustness check: i) the after tax wage share calculated as explained in the previous section; ii) compensation of employees as a ratio to value added, i.e. the wage share without the adjustment for self-employed workers; iii) wages and salaries as a ratio to value added – this is a measure of primary market distribution since it excludes all redistribution measures including social security contributions; iv) a sample without the outliers in which we drop all observations where the wage share exceed 1. If not otherwise mentioned in the text our baseline results are confirmed by these robustness tests.
We aim at using our variables at the most disaggregated level for which data are available. While our dependent variable is available at the two digit level of ISIC 4 (International Standard Industrial Classification of All Economic Activities), most of our explanatory variables are available at the 1-digit level with the exception of total capital stock and intermediate import penetration which are available at a 2-digit level. For this reason we switch between the two and one digit level according to the specification as explained in the next section.
Estimation period differs due to data availability depending on the variables used in each specification and country. While data for the wage share at sectoral level is available for 1970-2011, the data for the FDI starts only in 1985 and detailed data on imports disaggregated as intermediate and final imports starts in 1995. The estimation

period for Austria and most other countries is 1996-2010 for specifications including intermediate imports and 1986-2010 for specifications including FDI, with the exception of Denmark where our sample finishes in 2011. Furthermore, data for our measures of financialisation starts in 1995 for Austria and most other countries with the exception of France where data is available from 1970. It is mostly data on the capital stock that constrains the last year of our sample period, although for same countries, like the US, data for the sector-level wage share also ends in 2010.
We exclude the Agriculture, Hunting, Forestry and Fishing, and Mining and Quarrying sectors as well as mostly publicly owned sectors (Public Administration and Defence, Compulsory Social Security, Education, Human Health and Social Work Activities) from the reported estimations, as these sectors' wage setting behaviour may constitute an outlier and may not be determined by the same forces as in other sectors, but results are robust to the inclusion of these sectors.

5. Estimation Results

Table 1 shows estimation results for Austria for the total sector pool, while the reader is referred to Guschanski and Onaran (2016a) for estimation differentiated by skill group and manufacturing and service sectors.

Table 1: Estimation Results for Austria, all sectors, 1986-2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
growth	-0.065	-0.069	-0.048	-0.212***	-0.211***	-0.210***	-0.134**	-0.128**
	(0.240)	(0.205)	(0.313)	(0.001)	(0.001)	(0.001)	(0.048)	(0.048)
capital stock_t-1	0.013	0.005	-0.060					
	(0.813)	(0.930)	(0.134)					
int. imports_t-1	-0.399***	-0.369***	-0.112					
	(0.003)	(0.001)	(0.398)					
other imports_t-1	0.043	0.038	0.073**					
	(0.127)	(0.191)	(0.013)					
social government_t-1		-0.040			-0.004		0.006	0.003
		(0.258)			(0.649)		(0.674)	(0.840)
tot. union density_t-1			0.009***			-0.001		
			(0.001)			(0.736)		
ICT capital_t-1				-0.027***	-0.025***	-0.032**	-0.009	-0.020
				(0.000)	(0.000)	(0.024)	(0.723)	(0.467)
non-ICT capital_t-1				0.045**	0.044**	0.051**	0.016	0.029
				(0.029)	(0.032)	(0.011)	(0.777)	(0.607)
outward FDI_t-1				-0.016**	-0.016**	-0.016**	-0.011	-0.010
				(0.026)	(0.028)	(0.036)	(0.107)	(0.106)
hh debt_t-1							-0.403	-0.415
							(0.185)	(0.164)
fin. income_t-1							-0.043	-0.034
							(0.221)	(0.329)
fin. payments_t-1							-0.034	-0.069*
							(0.215)	(0.087)
migration_t-1							3.904**	4.927**
							(0.047)	(0.022)
gini_t-1								-0.011
								(0.146)
constant	0.689***	1.162**	0.334**	0.675***	0.724***	0.705***	1.635	1.919**
	(0.000)	(0.011)	(0.015)	(0.000)	(0.000)	(0.000)	(0.100)	(0.047)
withR2	0.084	0.102	0.200	0.347	0.347	0.348	0.245	0.251
F-test	3.355	6.118	14.180	27.750	24.949	28.417	99.925	246.535
Period	1996-2010	1996-2010	1996-2010	1986-2010	1986-2010	1986-2010	1996-2010	1996-2010
Observations	256	256	256	386	386	386	249	249
Number of sectors	19	19	19	20	20	20	20	20

Notes: The dependent variable is the within sector wage share. All estimations exclude Agriculture, Hunting, Forestry and Fishing; and Mining and Quarrying sectors as well as public sectors (Public Administration and Defence; Compulsory Social Security; Education; Human Health and Social Work Activities). Estimations performed using the within estimator with autocorrelation, cross-sectional correlation and heteroscedasticity robust standard errors. P-values below the estimation coefficients in parenthesis. *, **, *** denote statistical significant at the 1%, 5% and 10% level, respectively. The estimation period for specifications 1-3 is 1996-2010 due to data availability.

We estimate specifications (1) to (3) at the 2-digit level while specifications (4) to (8) is estimated at the 1-digit level. We separately estimate the effect of increasing import penetration and outward FDI on the wage share, while controlling for union density and individual government spending at the country level in specifications (1) to (6). To avoid multicollinearity we estimate specifications with union density and government spending separately and exclude union density from specifications (7) and (8) since it's strongly correlated with other country-level variables (negative correlation below -0.9 for Austria).

We find robust significantly negative effects of globalisation, measured by intermediate import penetration and outward FDI on the wage share in specifications (1) to (6), while the effect of the variables accounting for technological change is not robust and does not always have the expected sign: total capital stock as a ratio to value added is insignificant in all specifications while when capital is disaggregated as ICT and non-ICT capital, ICT capital services as a ratio to value added has a negative effect and

non-ICT capital services as a ratio to value added has a positive effect. With regard to the control variables at the country level, we find a positive but not robust effect of union density, while social government spending turns out to be insignificant for the determination of the wage share in Austria. We furthermore include two specifications augmented by additional variables measuring migration, financialisation and person income inequality.[19] Among our financialisation variables, household debt and financial income and payments are significantly negative and robust to changes in the sample when the first difference estimator is applied. Furthermore, we find positive effects of the share of migrant workers in total labour force and negative effects of the Gini coefficient although the statistical significance of these two variables varies.
Besides robustness tests using different estimation techniques and different measures of the wage share as described in section 3, we estimated our specifications for different sub-pools, i.e. only manufacturing or only service sectors, as well as for high- and low skilled sectors within manufacturing and services separately. This not only allows us to test the robustness of our results, but at the same time provides insights with regards to the variables that have potentially contrasting effects for manufacturing and services or across skill groups. However, since our cross sections are limited to 20 sectors for the 1-digit level estimations the estimations across skill groups can only provide indicative evidence.

Globalisation
Among our globalisation variables intermediate import penetration appears to have a negative impact on the wage share across all skill groups within the manufacturing sectors given that it is negative and significant for high and low skilled sectors alike. In the services sectors our data for intermediate import penetration is limited to one sector (recycling), but our results for the total economy are robust to the exclusion of this sector. This finding is also robust when different estimation methodologies are used. Intermediate import penetration is significant in specifications (1) to (3) when estimated in first differences. The fact that intermediate import penetration has a robust negative effect across all skill groups suggests that outsourcing of intermediate production may have harmed blue and white collar workers alike in Austria.
Outward FDI, equally negative and robust in our estimation for the total sample as intermediate import penetration, appears to have different effects across industry types. It has a negative and statistically significant effect in manufacturing as a whole as well as in low skilled manufacturing sectors, but the effect turns positive in high skilled manufacturing when the financialisation variables are included. For total service sectors its overall effect is positive for all specifications and statistically significant for specification (4). Although this effect appears to be driven mainly by high skilled services sectors, outward FDI is not robust to the inclusion of financialisation variables and switches its sign. Our measure of FDI is the variable for which we are most concerned about non-stationarity as our unit root test indicate that it is likely to be integrated of order one. Therefore, we prefer to rely on the estimations in first differences for the analysis of outward FDI. In these specifications, FDI has the same negative effect for total manufacturing sectors while it is positive but statistically insignificant for total services. While the effect of FDI in manufacturing is driven by high and low skilled sectors alike when measured in first differences, the positive sign in services is not present for any of the sub-samples of high or low skilled service sectors. Generally, it is plausible that there is a skill bias creating a higher demand for high skilled labour through outward FDI if it is of a vertical (cost-seeking) nature. It is also plausible that this effect is less strong in non-tradable service sectors with a more

horizontal market seeking nature. Other mechanisms like the threat effects associated with a change in the fall back options for capital and labour are also expected to be less important for high skill labour and services than low-skill labour and manufacturing (Onaran 2012). Our results confirm the different effects for services and manufacturing, although the fact that we fail to find a positive effect for high skilled manufacturing or a robust positive effect for high skilled services suggest that the potential beneficial effects are outweighed by the threat effects or substitution effects even for high skilled workers.

The share of migrant workers in total labour force has a robust and positive effect on the wage share for the manufacturing sectors and the total pool as is robust to different estimation methods. For service sectors the coefficient is insignificant with the exception of high skilled services where migration becomes significant. The positive sign suggests that migrant workers are on average complementary to domestic workers in Austria, thereby increasing the productivity and the wage share.

To sum up there is strong evidence of a negative effect of globalisation on the wage share in Austria. This effect is realised via an increase in intermediate imports and outward FDI and affects all sectors and skill groups with the potential exception of service sectors in the case of FDI. The negative effect of globalisation does not result from the increase of the migrant share of the labour force – on the contrary migration has a positive effect in Austria which points to the fact that migrant workers are complementary to domestic workers.

Technology

Our technology variables aim to capture the effect of skill-biased technological change on the wage share. We fail to find evidence for the mainstream hypothesis that technological change will decrease the wage share of low skilled workers and increase it for high skilled workers (EC, 2009; Bassanini and Manfredi, 2012). Indeed for Austria technological change embodied in the accumulation of ICT capital exercises a negative effect on workers in both the skilled and unskilled industries, although the effect is not robust in all samples. This finding is in line with the development of the wage share in Austria which shows a negative trend for all skill groups for manufacturing and service sectors alike, while the share of ICT capital also increased across all sectors. Curiously, the share of non-ICT capital has a positive effect on the wage share in most specifications, highlighting its labour augmenting nature, while it becomes insignificant in some other specifications. Again, no structural difference can be seen for the effect on high or low skilled industries.

A further interesting highlight of our findings indicate that ICT and non-ICT capital services become insignificant when included in an estimation with country-level financialisation variables, while some of our financialisation variables are significant for manufacturing industries applying the within estimator. The results also hold for estimations in first differences especially with respect to ICT capital, the main measure for skill-biased technological change.[20] This result appears to be similar to EC (2007) who report that variables for technological change are not robust to the inclusion of time effects. Our country-level variables are similar to period fixed effects given that they are the same across sectors and differ by year, but they carry much more specific information than a general time effect. Stockhammer (2015) also find that financial globalisation is the main driver of the wage share based on panel data estimations using country level (not sectoral) data. However, these results can only be seen as indicative and require further analysis, preferably with measures of financialisation at the level of disaggregation of the dependent variable, which can be done only using

firm level data as in Guschanski and Onaran (forthcoming). Interestingly, we obtain the same effect when we use wages and salaries as a ratio to value added as a dependent variable. This alternative dependent variable, which is equal to our wage share excluding social security contribution paid by employers to employees, is a better measure of primary market distribution since it excludes secondary distribution.

Country–level variables

With regard to the control variables, union density has a positive effect on the wage share in specification (3) – indeed it is highly significant and renders the effect of intermediate import penetration insignificant. The effect of union density is however not robust at the 1-digit level in specification (6).[21] The result is confirmed for sub-pools of manufacturing industries. However, given that the variable is measured at the country level, the reliability of the estimation results by sub-pools is questionable. In order to obtain at least indicative results with union density measured at the sectoral level we performed robustness tests with union density measured at the sector level regardless of our concerns about its reliability as mentioned in section 3. In general results for sectoral union density confirm the results for country-level union density. The positive but not robust impact of union density is generally driven by all sector and skill groups. Furthermore, we experimented with adjusted bargaining as an alternative measure for workers bargaining power. However, given that bargaining coverage stayed at a constant level since the 1970s in Austria the variable created multicollinearity with our fixed effects and we had to drop it.

Social government spending turns out to be insignificant or positive for almost all specifications with the exception of estimations for the high skilled manufacturing sectors only where we find an unexpected negative sign for specifications (7) and (8). Nevertheless, like union density, social government spending becomes insignificant for most estimations in first differences, while it is positive for service sectors.

Since there are no measures of financialisation at the sectoral level we can only use country-level variables among which household debt and financial payments appear to have a robust negative effect, albeit mostly for estimations in first differences. This finding is robust to the application of different samples, although the highest statistical significance is achieved for the high-skilled manufacturing sector. Similarly we find a negative effect of household debt for the manufacturing sector for the estimations in levels, in both low and high skilled manufacturing sectors alike. Given that lower income workers might be credit constrained and that the recent surge in household debt was mainly driven by the upper-middle class this result seems plausible. It is not entirely clear, however, why workers in the high-skilled manufacturing sector should be stronger affected by household debt than workers in the high skilled service sector.

Our specification (8) reflects the argument that personal income inequality is an indicator of the command over resources and power relations, hence we include the Gini coefficient in our set of explanatory variables. We find no statistically significant effect, however, we consider the income share of the top 1% to be a better measure for personal income distribution than the Gini coefficient, because it captures the tail of the distribution where most of the increase in income inequality happened, while the Gini coefficient is rather in-sensitive to changes in the tails. Furthermore, we have less concern in the case of the income share of the top 1% with regard to endogeneity that naturally arises between a measure of functional and personal income distribution that captures the whole population like the Gini coefficient. Unfortunately there is no data on the income share of the top 1% for Austria in The World Wealth and Income

Database which is why we revert to using the Gini for Austria, while we experiment with top income shares for the remaining countries in our sample.

After tax wage share

Our estimation result for the after tax wage share as the dependent variable strongly confirm our initial results for our main variables, although the statistical significance of household debt is increased.[22] Intermediate imports, outward FDI and union density have the same effect across different samples. This implies that the effect of intermediate imports, outward FDI and union density is similarly relevant for after tax wage share as for the before tax wage share.

Economic effects

Finally, we report the economic significance of our variables for a specification including intermediate import penetration and union density (specification (3)) as well as a specification including all other variables (specification (8)) in Table 2. More precisely, we calculate the predicted change in the dependent variable based on individual covariates by multiplying the estimation coefficient of the respective explanatory variable with the cross-sectional average change of that variable over the sample period and dividing by the change in the wage share.[23,24]

Table 2: Economic significance of coefficients for selected specifications for Austria

Method	Δexplanatory var*coeff	Δexplanatory var*coeff
Specification	Based on Table 1, Specification (3)	Based on Table 1, Specification (8)
growth	-0.002	-0.005
capital stock	0.017	
int. imports	-0.008	
other imports	0.006	
social government		0.001
total union density	-0.093	
ICT capital		-0.023
non-ICT capital		-0.009
outward FDI		-0.0003
household debt		-0.102
fin. Income		-0.017
fin. payments		-0.009
migration		0.122
gini		0.001
Period	1996-2007	1996-2007
ΔWage Share	-0.106	-0.068

Notes: Columns 2 and 4 report coefficients for our sample based on estimates from specification (3) and (8) in Table 1 respectively multiplied by the change in the variable. Columns 3 and 5 report the predicted change in the wage share for the change in our explanatory variables over our sample period based on estimates from specification (3) and (8) in Table 1 respectively. A negative (positive) sign in columns 3 and 5 indicates that the variable had a negative (positive) impact on the wage share. The last two rows reports the change in percentage points for the estimations indicated in the top row.

The decline in the wage share, taken as an average over the two specifications, is 8.7 percentage points, similar to the decline in the country level wage share which constituted 6.6 percentage points. Based on the estimation with union density (specification (3)) we find that union density had the strongest impact in Austria, explaining 85.1 percent of the average decline of the wage share. Increasing imports of capital and consumption goods and the increase in capital intensity have had a sizeable positive effects. Capital intensity had the second highest positive impact, predicting 16.5 of the change in the wage share. Based on specification (8) we find a sizeable negative effect of household debt and, albeit much smaller in size, of ICT capital intensity. Results indicate that migration had a strong positive effect on the wage share.

Comparison with results for selected OECD countries

We obtain considerable differences when comparing the results for Austria with estimation results for the other countries in our sample.[25] We find that globalisation had a strong impact on the wage share in all countries. The effect of globalisation on the wage share was least strong in Denmark. In Austria, Germany and, less robust, in the UK, the effect is due to outward FDI as well as intermediate import penetration which reflects the impact of international outsourcing practices. Intermediate imports

penetration had no significant impact in Spain while FDI played a smaller role in France and the US.
Different institutional variables appear to be relevant for each country. Germany exhibits the most robust positive effect of union density on the wage share, and there is also some positive effect of union density in Austria, while collective bargaining coverage plays a more important role in France and the UK together with social government spending.
Financialisation, as captured by household debt, had the most pronounced effect in Austria, the UK and the US, while financial income appears to be relevant in Germany. Estimations for other countries are inconclusive and require analysis using data on a more disaggregated level.
We find mixed results for the effect of personal income inequality on the wage share. However, there is indicative confirmation for a negative effect in Austria, Germany and the UK.
While variables capturing technological change are significant in selected specifications for Austria, Italy and the US, they do not appear to be very robust to the application of different estimation techniques or the split of the sample in services and manufacturing sectors. Furthermore, we do not find strong evidence of skill-bias in terms the effect of technological change, which constitutes the core of the mainstream explanation for increasing inequality. For some specifications we observe that these variables are especially sensitive to the inclusion of country-level measures of financialisation or bargaining power. However, these results are not robust to the application of different estimation methodologies. This suggests that while technological change surely has increased value added, the negative impact on the wage share is more likely to be an effect of reduced bargaining power of workers, brought about by globalisation and a deterioration of bargaining conditions.

6. Conclusion

Our findings lend strong support to the political economy approach to functional income distribution. Technological change had an impact, especially in Austria, Italy, the US, but the effects are not robust with respect to the use of different specifications and the wage share in most countries in our sample appears to be driven by different variables reflecting the bargaining power of labour such as union density, adjusted bargaining coverage and government spending. Furthermore, we don't find strong support for the skill-biased technological change hypothesis which implies an adverse effect for low skilled workers and a beneficial effect for high-skilled workers. Indeed, the high significance of institutional variables suggests that the negative effect of technological change on income distribution stems from the fact that workers weren't able to capture the gains of increased productivity due to a weak bargaining position.
In terms of economic significance, the decline in the wage share in Austria is most strongly driven by a deterioration of bargaining power as captured by union density and different measures of financialisation. However, the most relevant institutional variables differ considerably across countries, lending support to our approach of country specific estimations.
Our findings have important policy implications. Rising inequality is not an inevitable outcome of technological change. Tackling income inequality requires a restructuring of the institutional framework in which bargaining takes place and a levelled play-ground where the bargaining power of labour is more in balance with that of capital.

The impact of globalisation is likely to be significantly moderated or offset by stronger bargaining power of labour via an improvement in union legislation, increasing the coverage of collective bargaining, increasing the social wage via public goods and social security and international labour standards embedded in a broader strategy of global cooperation for high road labour market policies and macroeconomic policy coordination. Each country would have to address specific issues supporting the strongest positive drivers of the wage share while mitigating factors that reduce workers' bargaining power. Furthermore, our results suggest that a simple attempt to reduce income inequality through skill-upgrading will not work as skill-biased technological change does not seem to be the most relevant factor determining the distribution between labour and capital.

References

Alvaredo, F.; Atkinson, A.B.; Piketty, T.; Saez, E.; Zucman, G., The World Wealth and Income Database (2015), online: http://www.wid.world.
Alvarez, I., Financialization, non-financial corporations and income inequality: the case of France, in: Socio-Economic Review 13 (2015) 449-475.
Anderloni, L.; Bacchiocchi, E.; Vadone, D., Household financial vulnerability: an empirical assessment, in: Research in Economics 66 (2012) 284-296.
Argitis, G.; Pitelis, C., Monetary Policy and the Distribution of Income: Evidence for the United States and the United Kingdom, in: Journal of Post Keynesian Economics 23 (2001) 617-638.
Atkinson, A.; Piketty, T.; Saez, E.; Top incomes in the long run of history, in: Journal of Economic Literature, 49/1 (2011) 3-71.
Barba, A.; Pivetti, M.; Rising household debt: Its causes and macroeconomic implications – a long-period analysis, in: Cambridge Journal of Economics, 33 (2009) 113-137.
Bassanini, A.; Manfredi, T., Capital's Grabbing Hand? A Cross-country/Cross-industry Analysis of the Decline of the Labour Share, in: OECD Social, Employment and Migration Working Papers 133 (2012).
Carey, D.; Tchilinguirian, H., Average Effective Tax Rates on Capital, Labour and Consumtion, in: OECD Economics Department Working Paper 258 (2000).
Choi, M., Threat Effect of Foreign Direct Investment on Labour Union Wage Premium, in: PERI Working Paper Series 27 (2001).
Dallery, T., Post-Keynesian theories of the firm under financialization, in: Review of Radical Political Economics 41 (2009) 492-515.
Dreher, A., Does Globalization Affect Growth? Empirical Evidence from a new Index, in: Applied Economics 38/10 (2006) 1091-1110.
Dreher, A.; Gaston, N.; Martens, P., Measuring Globalization - Gauging its Consequence (New York 2008).
Driscoll, J.; Kraay, A., Consistent covariance matrix estimation with spatially dependent data, in: The Review of Economics and Statistics 80/4 (1998) 549-560.
Dünhaupt, P., The effect of financialization on labor's share of income, in: Berlin School of Economics and Law Working Paper Series (2013).
Ebbinghaus, B.; Visser, J., The Societies of Europe - Trade Unions in Western Europe since 1945 (London 2000).
European Commission, The labour income share in the European Union, in: European Commission, Employment in Europe (Brussels 2007) 237–272.

EU KLEMS, EU KLEMS Methodology (2007), online: http://www.euklems.net/data/EUKLEMS_Growth_and_Productivity_Accounts_Part_I_Methodology.pdf
European Commission, Understanding Labour Income Share Dynamics in Europe, in: Economic Papers 379 (2009).
Grossman, G. M.; Rossi-Hansberg, E., Trading tasks: a simple theory of offshoring, in: NBER Working Paper (2006).
Guschanski, A.; Onaran, Ö., The Political Economy of Income Distribution: Industry Level Evidence from Austria (2016a), online: https://emedien.arbeiterkammer.at/viewer/image/AC13337879/1/LOG_0003/
Guschanski, A.; Onaran, Ö., Determinants of the wage share: a cross-country comparison using sectoral data, in: Greenwich Papers in Political Economy, Working Paper GPERC41 (2016b), online: http://gala.gre.ac.uk/15847/
Harrison, A.E., Has Globalisation Eroded Labour's Share? Some Cross-Country Evidence, in: MPRA Papers, Working Paper 39649 (2005).
Hein, E., Finance-dominated capitalism and re-distribution of income: a Kaleckian perspective, in: Cambridge Journal of Economics (2015).
Hein, E.; Schoder, C., Interest rates, distribution and capital accumulation – A post-Kaleckian perspective on the US and Germany, in: International Review of Applied Economics 25 (2011) 693-723.
Internatioal Labour Office, Chapter 3: The labour share of income: determinants and potential contribution to exiting the financial crisis, in: ILO World of Work Report: Making Markets Work for Jobs (Geneva 2011).
International Monetery Fund, Chapter 5: The globalization of labor, in: IMF World Economics Outlook (Washington April 2007).
Jaumotte, F.; Buitron, C.O., Inequality and Labor Market Institutions, in: IMF Staff Discussion Note, Working Paper (2015).
Jayadev, A., Capital account openness and the labour share of inomce, in: Cambridge Journal of Economics (2007).
Kaldor, N., Alternative Theories of Distribution, in: The Review of Economic Studies 23/2 (1955) 83-100.
Kalecki, M., Theory of Economic Dynamics (New York 1954).
Karabarbounis, L.; Neiman, B., Declining Labor Shares and the Global Rise of Corporate Savings, in: NBER Working Paper No. 18154 (2012).
Karabarbounis, L.; Neiman, B., The Global Decline in the Labor Share, in: The Quarterly Journal of Economics (2014) 61-103.
Kohler, K.; Guschanski, A; Stockhammer, E., How does financialization affect functional income distribution? A theoretical clarification and empirical assessment, in: Socio-Economic Review (2016).
Kristal, T., Good Times, Bad Times: Postwar Labor's Share of National Income in Capitalist Democracies, in: American Sociological Review, 75/5 (2012) 729–763.
Langley, P., Uncertain Subjects of Anglo-American Financialization, in: Cultural Critique 65 (2007) 67-91.
Lazonick, W.; O'Sullivan, M., Maximizing shareholder value: a new ideology for corporate governance, in: Economy and Society 29 (2000) 13-35.
Lin, K.-H.; Tomaskovic-Devey, D., Financialization and U.S. Income Inequality, 1970–2008, in: American Journal of Sociology 118/5 (2013) 1284-1329.
Nunziata, L., Institutions and Wage Determination: A Multi-Country Approach, in: Oxford Bulletin of Economics and Statistics 67/4 (2005) 435-466.
Organization for Economic Cooperation and Development, Reassesing the Role of Policies and Institutions for Labour Market Performance: A Quantitative Analysis, in:

OECD Employment Outlook 2006: Boosting Jobs and Incomes, (OECD 2006) 207-231.
Organization for Economic Cooperation and Development, Foreign Direct Investment (FDI) Statistics - OECD Data, Analysis and Forecasts (2016), online: https://www.oecd.org/daf/inv/FDI-statistics-explanatory-notes.pdf.
Onaran, Ö., Wage share, globalization, and crisis: The case of manufacturing industry in Korea, Mexico, and Turkey, in: International Review of Applied Economics 23/2 (2009) 113-134.
Onaran, Ö., The Effect of Import Penetration on Labor Market Outcomes in Austrian Manufacturing Industry, in: The International Trade Journal 25/2 (2011) 163-204.
Onaran, Ö., The Effect of Foreign Affiliate Employment on Wages, Employment, and the Wage Share in Austria, in: Review of Political Economy 24/2 (2012) 251-271.
Onaran, Ö.; Bösch, V., The effect of globalization on the distribution of taxes and social expenditures in Europe: Do welfare state regimes matter?, in: Environment and Planning 46 (2014) 373–397.
Rodrigueq, F.; Jayadev, A., The declining labor share of income, in: UNDP Human Development Paper 36 (2010).
Solt, F., The Standardized World Income Inequality Database, in: Working paper SWIID Version 5.0, (October 2014).
Stockhammer, E., Financialization and the slowdown of accumulation, in: Cambridge Journal of Economics 28 (2004) 719-741.
Stockhammer, E., Determinants of Functional Income Distribution in OECD Countries, in: Macroeconomic Policy Institute Studies (2009).
Stockhammer, E., Determinants of the wage share: a panel analysis of advanced and developing economies, in: British Journal Of Industrial Relations (2015).
Visser, J., Union membership statistics in 24 countries, in: Monthly Labor Review (2006) 38-49.
Visser, J., ICTWSS: Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts in 34 Countries between 1960 and 2007 (2015), online: http://www.uva-aias.net/208.
Wooldridge, J. M., Econometric Analysis of Cross Section and Panel Data. (Cambridge 2002).

[1] The time period is determined by data availability at a detailed sectoral level.
[2] More detailed results and discussion on countries other than Austria can be found in Guschanski and Onaran (2016a).
[3] Country-level analysis always faces the question as to whether the decline in the wage share captures changes in sectoral composition rather than a simultaneous decline of the wage share in all sectors; therefore, in order to abstract from mere reallocation effect and focus on a distributional analysis it is crucial to isolate the within sector development of the wage share. This can be illustrated simply by writing the aggregate wage share as a function of weighted sectoral wage shares (EC, 2009):

$$WS_t^C = \frac{LC_t^C}{VA_t^C} = \sum_{i=1}^{n} \frac{VA_{i,t}}{VA_t^C} * \frac{LC_{i,t}}{VA_{i,t}} \quad (1)$$

where i stands for the sector and t for the year. WS_t^C stands for the aggregate wage share of country C, which is defined by labour compensation LC_t^C as a ratio to total domestic value added (VA_t^C) and can be expressed as the sum of within sector wage shares $\frac{LC_{i,t}}{VA_{i,t}}$ weighted by the sectors' contribution to total value added $\frac{VA_{i,t}}{VA_t^C}$. Consequently a change in the aggregate wage share can results from changes in the sectoral composition, referred to as the between component, or changes in the sectoral wage shares, referred to as the within component as distinguished by the first and second product in equation (2):

$$\Delta WS_t^C = \sum_{i=1}^{n} \Delta\left(\frac{VA_{i,t}}{VA_t^C}\right) * \frac{LC_{i,t}}{VA_{i,t}} + \Delta\left(\frac{LC_{i,t}}{VA_{i,t}}\right) * \frac{VA_{i,t}}{VA_t^C} \quad (2)$$

[4] Although some economists argued that stronger unions can lead to higher unemployment there is very little econometric evidence for this hypothesis (OECD, 2006; Jaumotte and Buitron, 2015) .
[5] The use of an international database is instructional for making the variables and estimations comparable between countries. See Guschanski and Onaran (2016a, 2016b) for further information on sector definitions and the skill taxonomy.
[6] It would be preferable to use value added at factor cost for the calculation of the wage share. Unfortunately, there are no long series on taxes minus subsidies on production in EU KLEMS.
[7] Since self-employed are not included in the measure of labour compensation in OECD STAN we impute their wages by applying the same technique as in EU KLEMS. We exclude observations where the number of self-employed suddenly falls to zero, assuming that it must be related to a measurement error.
[8] We refer to our data as 'at the 2-digit level' if we use manufacturing sectors at 2-digits. Most service sectors are always used at the 1-digit level.
[9] Unfortunately, data for most countries includes re-export and re-imports as most countries do not report these series separately.
[10] Given the asset/liability principle of the measure negative FDI positions can result 'when the loans from the affiliate to its parent exceed the loans and equity capital given by the parent to the affiliate' (OECD, 2016).
[11] Since data for foreign labour and population by nationality is not available for the US we use foreign labour and population differentiated by country of birth for the US only.
[12] The variable is adjusted for the possibility that some sectors or occupations are excluded from the right to bargain (removing such groups from the employment count before dividing the number of covered employees by the total number of dependent workers in employment).
[13] This is not a true isolation of the employment effect since the level of employment has an impact on the bargaining power of worker and is itself a function of economic activity measure by value added. However, this calculation allows us to see how much of the decline in the wage share is a mere effect of a change in the number of people employed and how much of it is due to changes in bargaining power between employers and workers, which is, among other factors, determined by the level of (un)employment.
[14] See Guschanski and Onaran (2016b) for a more detailed discussion.
[15] We focus on the analysis of manufacturing sectors for intermediate imports because the only service sector for which we have data is Recycling.
[16] Since this can be attributed to a period of recovery after oppressed labour unions after Franco, we regard it as a special case.
[17] Results available upon request.
[18] FDI is the only variable for which we found ambiguous results with regard to its stationarity in levels. Furthermore, we conducted robustness tests where we include a constant for the first difference estimations, which is equivalent to including a trend in our level estimations. Our results are robust to the inclusion of a constant and the constant appears to be insignificant in most specifications.
[19] We do not report a version of specifications (7) and (8) including intermediate imports, given that it would limit our sample size from 20 to 11 cross sections and effectively eliminate all service sectors. However, our results are largely robust to the inclusion of import penetration in specifications (7) and (8).
[20] See Guschanski and Onaran (2016a) for more detailed results.
[21] We experimented with specifications (7) and (8) including union density, which mostly rendered an insignificant or negative coefficient. However, the result was very sensitive to robustness checks so that we concluded that the insignificant or negative sign was mainly driven by multicollinearity between our explanatory variables. For this reason we exclude union density from specifications (7) and (8).
[22] The estimation results are available upon request.
[23] We limit the analysis to the pool including manufacturing and service sectors (Table 1), but calculations for sub-pools are available upon request. Furthermore, we exclude the crisis years from the calculations by using the absolute change and standard deviation of our variables from the beginning of the sample (1996) until 2007. The reason for this adjustment is the atypical behaviour of most of our variable during the Great Recession which strongly alter their pre-crisis trend. However, the relative size of the economic significance is not altered if we use the full sample.

[24] We also apply an alternative method to calculate economic significance by standardising the estimation coefficients, which is equivalent to performing estimations with variables transformed to a mean of zero and a standard deviation of one. While the previous method is intuitively straight forward, it can be misleading if variables do not exhibit a trend (e.g. growth). In this case calculating standardised coefficients is more reliable. The results confirm our findings for the first method.
[25] See Guschanski and Onaran (2016b) for detailed results on a selected group of OECD countries.