The Role of Bargaining Power

How Unions Affect Income Distribution

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1 Introduction

For a long time, the share of income attributable to different factors of production has been assumed to be relatively stable. The question how income is divided between capital and labour has therefore attracted little interest among economists. The common perception was based on statistical observations by Nicolas Kaldor, who included the long-term constancy of factor shares of income in his stylized facts (Kaldor, 1957, p. 591). However, in the last decades the functional division of income in most countries was more volatile than conventional theory suggests and the share attributable to labour even seems to decline systematically.
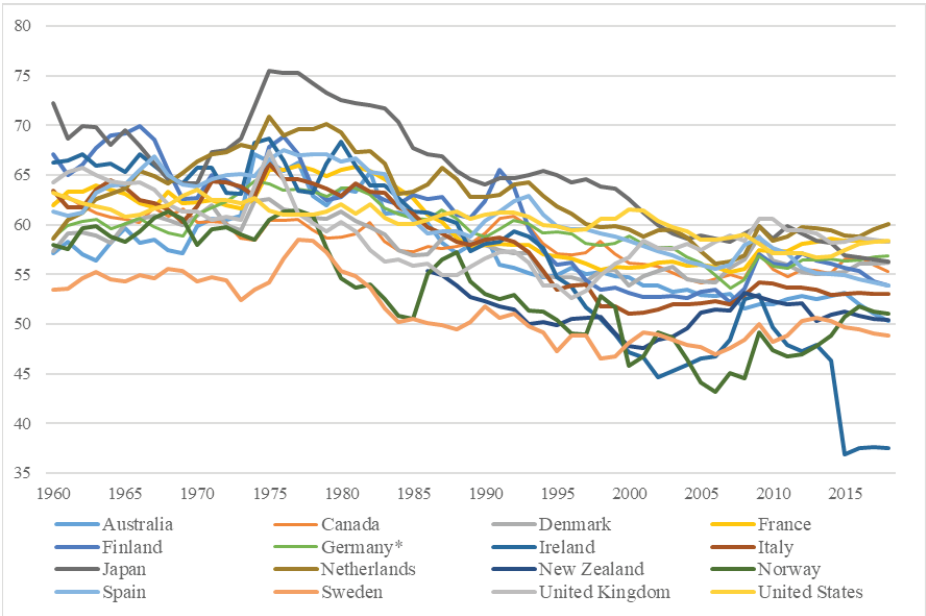
Figure 1:   *Wage share as percentage of GDP in selected OECD countries 1960 – 2016 (*until 1990 only West Germany). Source: Own representation based on European Commission (2017).*

These developments of the labour incomes have sparked renewed interest in the topic of factor shares as numerous studies show[1] but have also raised questions concerning the relevance of factor shares. Atkinson (2009) argues that there are several reasons for studying factor shares. The most important is that the understanding of factor shares connects income at the macroeconomic level to personal income at the micro level. Therefore, changes in factor shares may help explain inequality in the distribution of individual income which in turn is linked to the issue of fairness and social justice (Atkinson, 2009, p. 5).

Considering individual income, profound changes could be observed in the last decades. Most notably, the research of Atkinson et al. (2011) and Piketty (2014) revealed an relative increase in top incomes, especially in Anglo-Saxon countries. Although the development differs across countries, the share of top
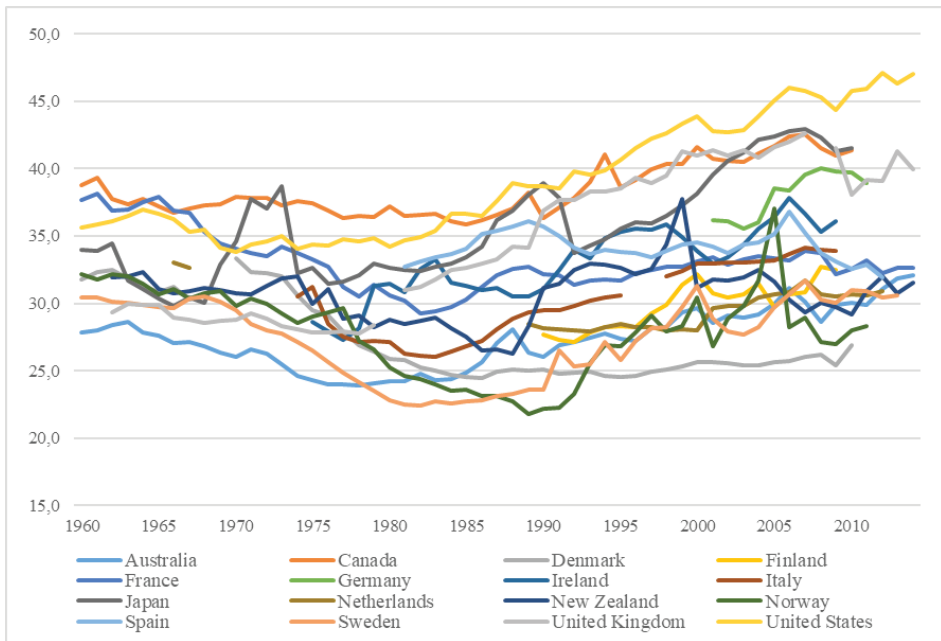
Figure 2:   Income share of the top 10 percent in selected OECD countries 1960 –
            2014 (Share of pre-tax national income attributable to the top 10 percent
            of income recipients). Source: Own representation based on Alvaredo et al.
            (2017).

[1]   See for example IMF (2007) and ILO and OECD (2015).

incomes has been rising in most OECD member states since the 1980s. In the United States for example, the income share attributable to the top 10 percent rose from 34 percent in 1980 to 46 percent in 2010. The trend is less pronounced in most European countries, with a range from Germany where the share of the top 10 percent rose from 32 percent in 1980 to 40 percent in 2010, to Denmark where the share moved only slightly from 26 to 27 percent over the same period.

The recent contributions to the literature are not exclusively of a descriptive nature. Various studies offer potential explanations for the observed changes in income distribution in developed countries. While the explanations for changes in individual income are manifold,[2] changes in the division of income between capital and labour is mostly attributed to technological progress that affects the relative productivity of input factors. Specifically, technological change since the 1980s is considered to be capital-biased, leading to a reduction in the labour share of income (Acemoglu, 2002, 2003). High wage growth in the 1960s and 70s that motivated companies to develop technologies which avoid additional labour costs is considered to be the principal reason for the occurrence of capital-biased technological change (Blanchard, 1997). Empirical evidence supporting this thesis is for example provided by IMF (2007) and Bentolila and Saint-Paul (2003). Although it relaxes the assumptions of the Cobb-Douglas production function to some degree, this line of argument is largely consistent with neoclassical theory.

In contrast, this paper explores a possibility which contradicts neoclassical labour theory. The main thesis is that the decline of the wage share and the share of income attributable to recipients of middle and low incomes is a result of a decline of collective bargaining power. This thesis is consequently based on the argument that wages are not primarily determined by the individual marginal productivity but by the distribution of power between the groups involved.

Although bargaining power has historically been a main subject of economic study (Marx, 1867; Galbraith, 1952; Ashenfelter & Johnson, 1969), the literature that analyses the effect of collective bargaining in recent times is still in its infancy. Nevertheless, there are a few recent empirical studies that investigate

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[2] Explanatory approaches include for example the dynamics of economic growth and the return to capital (Piketty, 2014), growing demand for high skills and education (Autor, 2014), trade and offshoring (Ebenstein et al., 2015), and policies that have changed the institutional framework, such as financial deregulation (Philippon & Reshef, 2012; Tanndal & Waldenström, 2017).

the effect of collective bargaining power on labour shares. Fichtenbaum (2009), Kristal (2010), and Bengtsson (2014), for example, use union density as proxy for collective bargaining power. The results of these studies suggest a positive effect of collective bargaining power on the labour share of income. Regarding unions' effect on individual income, the literature focuses on redistribution rather than on the direct influence through wages (e.g. Pontusson, 2013).[3] This paper aims at extending the empirical research and embedding the observed effects in a theoretical framework.

The starting point of the theoretical analysis is the neoclassical or standard model of labour economics. Chapter 2 explains shortcomings of the model and why it fails to depict reality sufficiently. Chapter 3 develops a theoretical argument how bargaining power determines the division of income between capital and labour. Subsequently, sources of bargaining power – for both labour and capital – are analysed. The main emphasis however is laid on the *collective bargaining power* of workers which can be attained by organisation in unions. Chapter 4 analyses the sources of workers' bargaining power with regard to their ability to explain the shifts in income distribution observed over the last decades. Following this line of argument, collective bargaining power is a main determinant of the labour share of income and the income share of recipients of middle and low incomes. Chapter 5 provides empirical evidence for the arguments that have been derived theoretically before. A panel data analysis of 18 OECD countries is applied to investigate the effect of collective bargaining power on two measures of income distribution, the national wage share and the share of national income that accrues to the bottom 90 percent. The empirical analysis builds on the work of Kristal (2010) and Bengtsson (2014) but extends the existing literature in two ways. First, it expands the investigated period and second, it broadens the perspective by not only examining labour income but also individual income shares. Chapter 6 provides a brief conclusion along with possible policy implications and an outlook on future research.

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[3]   An exception is the work of Jaumotte and Osorio Buitron (2015) who investigate the effects of measures of collective bargaining power on the Gini coefficient and top income shares.

2 The Theory of Wage Determination

The starting point for the theoretical analysis of the observed trends in income distribution is the labour market. The primary role of the labour market is the allocation of labour resources which makes it crucial for the production process. For the majority of people however, labour income is the primary – if not the only – source of income. The labour market is therefore also the most important entity for the division of income. It determines not only the functional, but also – to a large extent – the individual income distribution due to the importance of wages to most people.

Chapter 2.1 introduces the analysis with a discussion of the neoclassical standard model of labour economics which is the most common model used to describe labour markets. After a description of the basic functionality of the model has been given, its assumptions are critically reviewed with special emphasis on its ability to explain the observed trends in income distribution.

2.1 The Neoclassical Model of Labour Economics

Neoclassical theory states that wages are determined by the marginal product of labour. The basic idea behind this concept is the assumption that a profit maximising employer only hires an employee if the marginal revenue of the additional employee is higher than his costs. The employee, on the other hand, chooses between paid work and leisure time. If the compensation is worth more to him than the leisure time he gives up, he will decide to work. The theory assumes that the workers' willingness to "sell their time" usually increases with rising wages. An employee who is paid less than the value of his marginal product will always find a different employer, who is willing to pay him more. That means that the lower limit of wages is determined by the competition between

companies. At the same time, an employee cannot demand a wage that is higher than the value of his marginal product because the employer will always find another individual willing to accept the offered wage. Therefore, the upper limit is determined by the competition between workers. As a result, the labour market in the neoclassical standard model will reach an equilibrium in the long run in which supply equals demand and wages are equal to the value of the marginal product of labour.[4]

To reach this conclusion, a variety of assumptions are made. First of all, workers have to be free to choose between work and leisure time. Second, there must be perfect competition in the labour market – it is imperative for the model that no single employer has influence on wages, and costs can only be adjusted by determining the quantity of labour. The third assumption concerns information. To determine the optimal quantity of labour, the employer must know – or at least must be able to approximately calculate – the individual marginal productivity of employed and potential workers. Although there are other assumptions that are necessary, these three are the most relevant assumptions for the analysis presented. The next section will proceed with a closer analysis of these assumptions, their ability to depict reality, and their relevance for the determination of wages.

2.2 Critique of the Neoclassical Model

It is imperative to notice that the three mentioned assumptions are interconnected. It is therefore difficult to analyse them independently. The first assumption – the freedom to choose between work and leisure time – ignores two important factors. First of all, working hours are usually more or less fixed. Employees can choose between different companies, activities, and locations but are usually not able to set working hours freely. This is not only due to cultural circumstances and legal provisions but also an inevitable consequence of the complementarity of different activities and the division of labour. Although there are exceptions, complex production requires input factors to be present simultaneously. Therefore, in many fields of production and service different individuals have to work

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[4]   See for example Mankiw and Taylor (2011, pp. 382–394).

at the same time, which limits the freedom to choose working hours. The second factor is even more severe. Contrary to the neoclassical notion, employees are not free in their decision to work, in that sense that not working at all would be a plausible alternative. Without alternative sources of income, labour earnings are not only the origin of amenities – comparable to leisure time – but also an existential requirement for survival. If labour is the only source of income, "not to work" is simply not an option. Even though the existence of a welfare state softens the consequences of a person's employment decision, unemployment is not desirable due to socioeconomic reasons.[5] Moreover, unemployment benefits do not allow for voluntary unemployment since recipients are often legally obligated to accept job offers.[6] Voluntary unemployment – in the proper meaning of the word – is a marginal phenomenon that is mostly limited to individuals who have access to other sources of income such as the income of a spouse or an inheritance.

The necessary consequence of the rejection of this assumption is that perfect competition – the second assumption mentioned in the previous chapter – is not possible. If the employees are not free in their decision to work, employers have significant power over wages.

Although the third assumption mentioned in the previous chapter seems trivial at first glance, it is equally – if not even more – problematic than the first two assumptions. Prima facie, it seems obvious that managing a corporation inevitably requires that the employer, entrepreneur, or capital owner can calculate the effect of certain input factors on the company's output, otherwise efficient planning would be impossible. However, that might not necessarily be the case.

Economic textbooks usually exploit rather simple examples to describe the basic functionality of labour markets. Mankiw and Taylor (2011) for example describe the case of an apple farmer who hires workers to pick apples. In such a case – which is labelled "a typical firm" – it is relatively easy to determine the marginal productivity of labour. The farmer only has to calculate the number of apples which can be harvested by an additional worker. From there, the additional revenue can be derived and therefore the maximum amount a profit-maxi-

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[5]   Reasons include but are not limited to the social stigmatisation of unemployed individuals.
[6]   For an assessment of the legal requirements for unemployment benefits in various countries see for example Lødemel and Trickey (2001).

mising employer should be willing to pay. The problem with such examples is that apple farming which involves a lot of simple manual labour is not a typical business but rather the exception. Modern, capitalist economies are characterised by complex production relationships where different tasks are performed by individuals with different qualifications in combination with different types of capital. Hence, companies are not just upscaled versions of apple farms.

The importance of this consideration for the distribution of income can be shown by using a simple example. Suppose a logistics company is engaged to transport a certain amount of goods. The entrepreneur will hire a trucker and will provide a truck that he owns. As long as the costs for both factors do not exceed the revenue, the entrepreneur has an incentive to take the order. But how will the revenue be distributed between the entrepreneur and his employee? Conventional theory suggests that the trucker will be payed the value of his marginal product and the entrepreneur receives the value of the marginal product of the truck. However, in this situation the marginal product is not easily determined because labour and capital are complements. An additional trucker may increase the revenue but only if another truck is provided. At the same time, another truck is only useful if an additional driver is hired. In this case, it is possible to calculate the effect of a *combination* of certain inputs on the company's output, but not the exact marginal productivity of a unit of a *single* input. This applies even more for activities which are only indirectly involved in a production process or the provision of a service – such as administrative, managerial, or research activities. Nevertheless, it can hardly be negated that these kinds of activities are necessary for most kinds of business operations.

In this way, it can also be argued that the determination of the marginal productivity of combined inputs is also sufficient for efficient management. In the hypothetical case the employer has no influence over wages whatsoever, maximisation of profits only requires the predetermined costs of the combined inputs to be lower than the additional revenue generated by the combination of inputs. If this is the case, the employer will carry out the business operation, otherwise not. If the employer cannot influence prices of input factors, the division of income is fixed irrespective of how this division is accomplished. If on the other hand the employer has considerable influence over wages, maximisation of profits requires that he first calculates the additional revenue of the combined

input factors. Subsequently, it must be determined if it is possible to set wages so that costs are lower than the additional revenue. Only if the employer is not able to assert costs below the upper limit of additional revenue will operations cease. In this case the division of income between input factors is determined by the bargaining power of employers and employees. In both cases information regarding the marginal productivity of single units of a specific input factor is not necessary for efficient management.

It is imperative to note that when planning is oriented towards the combination of input factors – which seems necessary if individual marginal productivity cannot be determined – the division of income between input factors is of secondary importance for the overall profitability of the company. It is however of vital importance for the employer if he is at the same time the owner of the capital.[7] From the perspective of a profit maximising capital owner who has influence over wages there is no reason to stop applying downward pressure on wages beyond the profitability limit since any further decrease of wages would, ceteris paribus, increase capital income. Assuming that employers can exercise influence over wages – which is most likely the case in the absence of perfect competition – bargaining power is one of the most important factors at the cost side of business operations.

It is often argued that the absence of perfect competition in reality does not mean that the neoclassical standard model can easily be dismissed (e.g. Friedmann, 1953). The model should rather serve as reference point for the efficient allocation of resources.[8] However, the rejection of the third assumption – due to efficiency not being linked to the individual marginal productivity of specific input factors – even raises the question whether the model can serve as *any* kind of reference point.

Irrespective of whether it may serve as a valid benchmark, the neoclassical standard model does not depict labour markets in the form they exist in today's capitalist democracies. In order to explain the developments in industrialised countries in recent times, it may instead be useful to analyse the distribution of power between capital and labour.

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[7]   Or associated with the capital side, for example if the compensation of the management depends on capital income.

[8]   In this case, the policy implication would be to create a market environment as close to perfect competition as possible.

Although it does not fit especially well into the overall framework of neoclassical theory, the question of bargaining power is not absent from economic textbooks. For example, Blanchard (2003) describes bargaining power as one of the most important determinants of wages. However, the focus is only laid on differences between wages for different jobs and not on the division of income between capital and labour. Mankiw and Taylor (2011) mention bargaining power in the context of unions which may be able to assert wages above the equilibrium wage.[9] This interpretation however assumes that there is an equilibrium wage which itself is not influenced by bargaining power.

Despite the fact that individual bargaining power may play an important role in explaining differences between compensations for different jobs, this paper argues that bargaining power determines the division of total income between profits and wages which is an entirely different issue. Furthermore, the rejection of the assumption of perfect competition in the labour market also means that there is no such thing as an equilibrium wage. Although market forces and legal constraints limit the range in which wages can be set, considerable influence of bargaining power contradicts the notion of a general equilibrium which is independent from the distribution of power. Therefore, the argument that bargaining power allows for wages that exceed the equilibrium provides no meaningful insight.

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[9]   In this context, equilibrium wage refers to the equilibrium of the neoclassical model, i.e. a wage that equals the marginal productivity of labour (Mankiw & Taylor, 2011, pp. 409–410).

3 The Division of Power between Capital and Labour

As demonstrated in the last chapter, it seems plausible that bargaining power determines wages in relation to profits. In order to investigate if changes in income distribution are connected to workers' ability to influence wages, it is essential to not only note that wages are set through bargaining power but also to investigate the determinants of bargaining power. Once the sources of workers' bargaining power are identified, it is possible to analyse whether its decline contributed to the shifts in income distribution.

The first section of this chapter analyses the bargaining power of employers or capital owners. In this context, both terms are used synonymously because the employer either *is* the capital owner or acts as an agent of capital owners.[10] Although the dominant position of employers in the labour market is common sense and could therefore be seen as trivial, it still is imperative to investigate the sources and extent of employers' power in order to understand the way in which they influence the division of income. Workers' bargaining power can only be understood if the reasons why the distribution of power is generally skewed towards capital is analysed first.

Subsequently, two sources of workers' bargaining power are considered. Chapter 3.2 deals with individual bargaining power with a special emphasis on the demand for certain professions which is linked to individual qualification. The second source of workers' bargaining power, which is considered in chapter 3.3, is collective action of workers who organise themselves to negotiate wage agreements.

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[10] It is easy to imagine examples where employers (management) and capital owners (shareholders) are not identical and have differing interests. In the context of negotiation of workers' wages however, it seems most likely that their interests are aligned.

3.1 Bargaining Power of Capital Owners

Prima facie, it seems obvious that the distribution of power is biased towards capital owners, an assessment that can be traced back as far as Adam Smith who comments on the division of bargaining power as follows:

"It is not, however, difficult to foresee which of the two parties must, upon all ordinary occasions, have the advantage in the dispute, and force the other into a compliance with their terms. […] In all such disputes the masters can hold out much longer. A landlord, a farmer, a master manufacturer, a merchant, though they did not employ a single workman, could generally live a year or two upon the stocks which they have already acquired. Many workmen could not subsist a week […] without employment. In the long run the workman may be as necessary to his master as his master is to him; but the necessity is not so immediate." (Smith, 2007 [1776], pp. 56–57)

There is no reason to believe that this assessment is no longer valid. Although the situation of workers has improved remarkably since the times of Adam Smith – primarily through the creation of the welfare state – the basic pattern remains unchanged. For the employer it may be rational not to hire an employee at the demanded wage in order to avoid additional payments in the future. Such a decision usually does not mean that a company is forced to discontinue its operations. It rather means to accept a temporary decrease of profits in order to keep future profits on a high level. Capital owners may choose to accept this loss of profit because they may have already accumulated enough wealth, so they can afford this type of "investment" in future profits. Furthermore, capital owners may be less dependent on the income from this specific investment due to additional sources of income such as labour income, but also capital income from other investments. Regardless of whether owners of family businesses are considered or shareholders of multi-national corporations, the basic principle remains the same. On the other hand, workers usually depend exclusively on labour income from one particular job and thus severely restricting their scope of action. As a result, the pressure to accept a job offer at a given wage rate is far more urgent than the pressure to hire someone at the demanded wage rate.

However, this imbalance of power would be of little relevance if the demand for all types of labour would generally exceed supply. Only when there is at least

a small surplus of individuals willing to work can an employer hope to "wait out" unwelcomed wage demands. The fact that unemployment is a realistic and imminent possibility creates competition between potential employees so that employers can always rely on applicants who are willing to work for the offered wage rate. If supply exceeds demand, workers compete more keenly among themselves than companies compete for them. The very existence of unemployment therefore secures that bargaining power is shifted towards capital.

Another factor that gives capital owners an advantage in negotiating wages is the access to information. A typical argument presented by employers in wage negotiations is the claim that it is impossible for the company to pay the demanded wage and still remain profitable. It is of course possible that such a statement is accurate, but it is usually difficult to verify for employees. While the employer has first-hand information regarding the company's financial scope, it is nearly impossible for a single individual to evaluate the means and resources of the company. Instead, applicants have to rely on rough estimations and third-hand information from employees in similar positions. In combination with the pressure from competition, the employee usually has no other choice than to believe the statement and accept the offer. Considered in isolation, the informational advantages of capital owners may not be of great significance, but it magnifies the bias that is created by the other factors.

The aspects identified in this chapter show in which way the division of power is skewed towards capital owners. As a result, it seems only natural that capital owners can acquire an ever-greater proportion of overall income. The distribution of income between capital and labour therefore depends to a large extent on the ability of workers to find mechanisms which balance the bargaining positions in the labour market.

3.2 Qualification and Individual Bargaining Power

As elaborated in the previous section, supply and demand are of particular importance for wage negotiations. A surplus of people willing to work creates competition that weakens the bargaining position of labour. Accordingly, full employment would largely cancel out the power of capital. Full employment

– meaning that the only form of unemployment that exists is frictional – is however extremely rare. The connection between unemployment and competition within the working class nevertheless suggests that an increase in demand for labour, ceteris paribus, strengthens workers' bargaining power.

So far, demand for labour has only been addressed at an aggregate level. However, the notion that additional demand increases bargaining power is also relevant for specific jobs. The harder it is for employers to replace an employee, the better is his position for negotiating wages. As a result, the *individual* bargaining power of an employee is largely determined by the ratio of supply and demand for his skills. An obvious assumption is that demand for qualified employees is higher in relation to supply than demand for low-skilled employees. This is not because low-skilled workers are *generally* less needed, but because the supply of low-skilled workers is usually larger and more flexible.[11] In the context of wages, the main benefit from qualification is therefore being a member of a group whose supply cannot easily adjust to demand. Belonging to such a group increases individual bargaining power because companies compete more keenly for potential employees than these employees compete with each other – provided that there is at least more than one company demanding the respective skillset.

Maintaining a high wage level through individual bargaining power requires that the skills are not only scarce in the short run but continue to be so. High wages in a particular area always create an incentive for others to acquire the necessary qualifications to work in this area. Even if a job requires a specific skillset – giving individuals who possess them a strong bargaining position – the advantage would quickly be offset by others who aim at receiving the wages observed in this particular field.[12] This does not mean that there is no return to education in areas where supply can adjust to demand but rather that individual bargaining power is higher if supply is less flexible.

An illustrative example for individual bargaining power through qualification are the salaries currently paid by tech companies to Artificial Intelligence researchers (Metz, 2017). It can hardly be argued that AI researchers are paid accor-

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[11]   Highly qualified individuals can usually perform activities which do not require specific skills but not vice versa.

[12]   In the US between 1950 and 1970 for example, starting salaries of engineers could be observed to fluctuate with the number of graduates (Freeman, 1976).

ding to their marginal productivity since they produce no immediate output.[13] Instead, tech companies are betting on future profitability of AI applications which cannot be quantified yet. Since top AI researchers are extremely scarce, these companies vigorously compete with each other for every individual available, simply to keep up in the race for future profits and are therefore forced to pay particularly high wages. This example also highlights the importance of the accessibility of certain skills. Even though talent and years of education are needed for a lot of professions, it is hard to imagine a qualification which is more difficult to acquire than Ph.D. level AI specialist.[14]

The way in which individual bargaining power can influence wages is relatively straight forward and can hardly be disputed. Nevertheless, differences in wages for specific jobs are often associated with differences in productivity (e.g. Hellerstein et al., 1996). The idea that high wages are a result of higher productivity is a common yet problematic perception, as can be shown using a simple example. Suppose there are two kinds of jobs. Both require a certain skillset and both activities are absolutely essential for the production process. Further assume that both activities are equally productive but the skillset for one is more common among the working population than the other which makes one of the employees easier to be replaced than the other. Individuals that possess the rarer skillset are certainly more likely to negotiate high wages than the ones that could only perform the other task – regardless of the respective productivity. It is not argued here that individuals who perform more productive tasks are not generally paid higher wages. Instead it is argued that bargaining power is needed to achieve higher compensation. Higher productivity – presumed or real – can be a source of individual bargaining power but in the absence of sufficient bargaining power, productivity does not automatically translate into higher wages.

Another issue which is of vital importance in the context of demand for specific skills and qualifications is technological change. The hypothesis of capital-biased technological change, which was mentioned in the introduction, indicates that technological change affects functional income distribution via changes in the relative productivity of capital and labour. It is however possible that technological change influences income distribution through bargaining power. If the

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[13]   In the sense of products or services which are monetizable in the immediate future.
[14]   Accordingly, experts expect demand to outweigh supply in this particular area for years to come (Metz, 2017).

emergence of new technologies leads to an adjustment of business operations, the demand for individuals who can handle the new technologies would increase. As argued above, these individuals would therefore most likely be able to assert higher wages. Conversely, if technological change leads to a decrease in demand for certain professions, individual bargaining power of the corresponding workers would decrease.[15] Since technological change is one of the most important determinants of demand for certain skills, it also plays a crucial role in determining the distribution of income. As a result, this paper does not reject the theory that technological change influences income distribution but rather the conception that it does so through affecting relative productivity of input factors.

3.3 Collective Bargaining Power

As in the case of the dominant position of capital owners, the notion that workers can gain bargaining power through collective action has been established for a long time. John Stuart Mill for example already noted in 1871:

"If it were possible for the working classes, by combining among themselves, to raise or keep up the general rate of wages, it needs hardly be said that this would be a thing not to be punished, but to be welcomed and rejoiced at. […] If they could do so, they might doubtless succeed in diminishing the hours of labour and obtaining the same wages for less work. They would also have a limited power of obtaining, by combination, an increase of general wages at the expense of profits." (Mill, 1965 [1871], pp. 929–930)

In this remark, the key issue is already addressed: The ability of workers to influence the division of income between capital and labour through collective action. Although it seems trivial that collective action is beneficial for the achievement of common goals, it is nevertheless necessary to examine the mechanisms which facilitate collective bargaining power to understand its scope and development over the last decades.

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[15]   A recent example for persistent changes caused by technological change is the demand of highly skilled workers that is linked to digitalisation (Falk & Biagi, 2016).

As argued in chapter 3.1, one of the most vital factors that ensures low wages is the competition between workers. In the hypothetical situation where *all* workers demand the same wage and none of them tries to get an advantage over other workers by accepting a lower wage, the employer has no choice but to pay the demanded wage provided that it is feasible.[16] In this respect, collective bargaining can be regarded as a form of cartel. Just as for any other type of cartel, a specific demand can only be sustained if every member sticks to the agreement. It is therefore imperative to not only agree on the same wage but also to collectively negotiate this wage in order to ensure that no one steps out of line and diminishes the prospects for the whole group. Both aspects require a certain degree of institutionalisation, otherwise reducing competition would only work temporarily. The respective institution that has developed over the course of history are trade and labour unions which provide the necessary framework for the coordination of workers. Centralised negotiations by union representatives ensure that possible deviations, which would undermine the bargaining position, are eliminated.

This line of argument considers the hypothetical case that all workers are unionised which is certainly rare if not non-existent. For the restriction of competition among workers in practice, there are two possibilities. Collective bargaining is only effective if either a sufficient share of workers is organised – so that the competition from non-union members is negligible – or if wage agreements also apply for non-union members.[17] This applies not only to the labour market as a whole but also to specific areas or industries. It is for example possible that collective bargaining can be realised in one industry – due to one of the mentioned prerequisites – but not in another. Regarding the reduction of competition, it seems necessary that one or both of these conditions are met for unions to significantly affect the distribution of income between capital and labour.

Besides competition among workers, there are other factors which determine the relative bargaining power of capital and labour. One point that was stressed

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[16] Under any circumstances, the overall sum of wages is – in the long run – restricted by the overall revenue. Furthermore, if labour income is so high that capital income is *zero*, private business, in the way it is conducted in capitalist societies, would cease because there would be no incentive for investors to provide the necessary capital.

[17] The extension of wage agreements to non-union members may create a free-rider problem since it reduces the incentive for union membership and therefore decreases collective bargaining power in the long run.

in chapter 3.1 is the ability of capital owners to hold out much longer in the case of labour disputes. This kind of disadvantage for workers can also be offset by unions. In the absence of collective bargaining, the refusal of the offered wage rate by a single employee is of no particular concern for the employer but definitely for the employee who faces unemployment. Even if employers are legally not allowed to fire striking workers, the effect of a single striking worker would certainly be limited, and he would ultimately be confronted with the decision to accept his initial wage or to leave the company. However, if workers combine their efforts and collectively lay down their work, the employer may face a substantial loss of profits, the threat of which may already convince him to consider wage renegotiation. Coordination is once again a vital requirement which can only be provided through institutionalisation of collective action. Moreover, unions may establish strike funds which reduce the pressure on single workers to prematurely settle the dispute.

It is often argued that unions negatively affect investment behaviour through their negative influence on profitability (e.g. Addison & Hirsch, 1989). However, this perception ignores the fact that there is always an incentive to invest as long as a business operation is profitable *at all*. The issue that diminished profits through high labour costs reduce investments only arises if investors can choose between projects with differing labour costs which are otherwise similar. In this case, capital owners would obviously favour the investment which is associated with lower labour costs and the positive effect of successful wage negotiations on labour income may be overcompensated in the long run by a reduction of overall income available for distribution. In the context of distribution of income between wages and profits, the question whether capital owners can gain an overall benefit by avoiding collective wage agreements is therefore of significant importance.

If wages are negotiated at the company level, it may by possible that companies with collective wage agreements are avoided by investors and cannot compete in the product market which would certainly restrict the scope of collective bargaining. Therefore, it seems beneficial for workers if wages are negotiated at the national or at least at the sectoral level because it would decrease the incentive for capital owners to shift investments, provided that they want – or have to – stay in the same country.

One possibility for capital owners to avoid unionised employees is to relocate business operations from a country where union membership is common to a country where unions are weak or non-existent. As mentioned above, differences in labour costs are most relevant if all other factors are similar. But if avoiding organised labour entails disadvantages in other areas, capital owners face a trade-off. In the case of relocation from developed countries to less developed ones, such disadvantages may include poorer infrastructure, less legal certainty, a less qualified labour force, or a greater distance to the targeted consumer market. These considerations influence the level and the persistence of collective bargaining power. From the perspective of developed countries, sectors in which low-skilled jobs are predominant are more likely to be affected by relocation of business operations while activities which are capital-intensive and require a high skill-level are more likely to remain in the respective country.[18] In sectors where relocation is less likely, collective bargaining power is certainly higher and more stable in the long run. It is however also important to bear in mind that for a large proportion of businesses, relocation is difficult. For the majority of service activities for example, offshoring is not possible. Nevertheless, the internationalisation of product and labour markets undermines collective bargaining power as long as there are significant differences in labour organisation across countries.[19]

Another argument that was put forward in chapter 3.1 is that employers have an informational advantage in wage negotiations. This type of disadvantage for employees can also partially be offset by unions. It is for example easier for an organisation to gather information regarding the financial scope of a company than it is for an individual worker. Collective bargaining power therefore improves workers' ability to correctly assess the situation before entering negotiations. Furthermore, workers may be uncertain about their legal rights or afraid to insist on them due to possible negative repercussions, a situation which may be exploited by employers.[20] In this case, unions may help workers by providing information and legal aid. Compared to the possibility to reduce competition

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[18] In addition to the possible disadvantages of offshoring from industrialised to developing countries, high initial investments may reduce the incentive to relocate activities regardless of the situation in the home country.

[19] Compared to the increasing organisation of production across national borders, labour organisation at a transnational level is not very prominent (Bieler, 2012).

[20] A recent study for example reports that in Germany 8 percent of all employees are paid less than the legally binding minimum wage (Pusch, 2018).

among workers and to exert pressure on employers via strikes, it may be a minor yet considerable point.

The depiction of unions as cartels is widespread and almost always has a negative connotation based on the perception that free markets provide efficient allocation of resources and the best possible distribution of income. As a result, it is argued that unions are necessarily harmful to the overall economy. The conservative US think tank *Heritage Foundation* for example repeatedly pointed out that unions act as cartels and therefore increase the compensation of their members at the expense of other employees (Heritage Foundation, 2009; Sherk, 2015). It is not argued here that unions are not similar to cartels – in a technical sense, they certainly are. The crucial point however is that collective bargaining balances the distribution of power which is otherwise biased towards capital. Unions create "fair" competition in the labour market in the first place. Therefore, unions redistribute income from capital to labour and not between different groups of workers. In this sense, one could also – like John Kenneth Galbraith – argue that unions are a necessary *countervailing power* against the naturally occurring power of the employing corporations (Galbraith, 1952).

Excursus: The Development of Trade and Labour Unions

One of the first generally accepted definitions of unions is provided by Webb and Webb who described unions as "a continuous association of wage-earners for the purpose of maintaining or improving the conditions of their working lives" (Webb & Webb, 1920, p. 1).

The origins of unions can be traced back to 18th century Great Britain. In the wake of industrialisation, particularly unskilled and semi-skilled workers started to organise themselves to improve their working conditions. These early forms of organised labour were severely combated by the British government especially through the 1799 *Combination Act* that banned unions and collective bargaining for British workers. Unions were finally legalised in 1824 but it took until 1872 for unions to obtain a legally protected status (Webb & Webb, 1920). The world's first national umbrella organisation for unions was founded in 1868. This organisation – the *Trades Union Congress* (TUC) – continues to be the largest union federation in the United Kingdom until today (Martin, 1980; TUC, 2018). Historically, union membership has been especially strong in the mining, railway, and port sectors, as well as among teachers (Martin, 1980). Beginning in the 1970s, the Conservative Party increasingly opposed national unions which were seen as an obstacle to economic growth. Following a series of strikes that turned public opinion against unions, the newly formed conservative government under Margaret Thatcher significantly weakened the trade union movement through restrictive legislation (Reitan, 2003). Subsequently, union membership in the United Kingdom fell dramatically.[21]

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[21] See chapter 4.2.

As in the United Kingdom, the development of unions in other countries is also closely tied to the advancement of industrialisation. In Germany for example, the first nationwide unions were founded in the printing and tobacco industry in 1848. Until the end of the 19th century, unions were established in nearly every sector (Schneider, 2000, pp. 30–46). Although prohibited from 1878 to 1890, they gained significant influence in the latter days of the German Empire. In the Weimar Republic the labour movement became increasingly disunited, with several federations holding conflicting political views,[22] before they were forced into line during the National Socialist period (Schneider, 2000, pp. 69-83; 174-229). After World War II, unions were reorganised under the umbrella association *Deutscher Gewerkschaftsbund* (DGB).[23] As of today, the largest single union is the *IG Metall* which represents over 2.2 million workers, mainly in the metal, electronics, and automotive industry, followed by *ver.di* with roughly 2 million members from several service sectors.

In Sweden, the first unions were founded in the 1870s. These unions were organised in an umbrella organisation called *Landsorganisationen i Sverige* (LO) in 1898 which remains the largest organisation until today. Besides the LO, which mainly organises blue-collar workers, there are two additional confederation, the *Tjänstemännens Centralorganisation* (TCO) for white-collar employees and the *Sveriges Akademikers Centralorganisation* (SACO) especially for academics and graduate professionals. Swedish unions are often considered one of the most influential unions in the world, not only because of their strength in recruiting members and negotiating wage agreements but also due to their long history of successful cooperation with employers' associations that is mostly regarded as beneficial for both sides (Bruhn et al., 2013). One characteristic of the Swedish welfare system is the fact that – like in Denmark, Finland, and Belgium – unemployment benefits are not administered by the government but by unions.

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[22]   The socialist *ADGB*, the largest union federation in the Weimar Republic, was opposed by the Christian union federation *GCG* and an association of liberal unions known as the *Hirsch-Dunckersche Gewerkvereine.*

[23]   In East Germany (GDR), unions were organised in the umbrella association *Freier Deutscher Gewerkschaftsbund* (FDGB). However, the FDGB cannot be described as union in the classical sense due to its role as government and party instrument and its mandatory membership for all workers (Schneider, 2000, p. 405).

Establishment of unions accompanied industrial development also in the US. Although never explicitly banned like in most European countries, unions were strongly opposed not only by employers but also by the government. The *Wagner Act* however gave legal protection to unions in 1935 (Hogler, 2015). In 1955, the *American Federation of Labor and Congress of Industrial Organizations* (AFL-CIO) was founded which remains the largest federation of unions in the US until today. Besides coordinating collective action, the AFL-CIO is especially concerned with issues connected to global trade (AFL-CIO, 2018). Compared to other developed countries, the political influence of unions in the US is relatively weak which can at least in part be attributed to the *Taft-Hartley Act* from 1946, which – among other restrictions – banned union contributions to political candidates and strikes in certain areas (Hogler, 2015). Another event that is mostly regarded as a severe weakening of unions in the US is the forced termination of the strike of air traffic controllers by the Reagan administration in 1981 (Brenner et al., 2009, pp. 234–235).

In Japan, early labour disputes took place following the rapid industrialisation after the *Meiji Restauration* in 1868, but unions only gained significant influence after World War II when anti-union legislation was abolished (Nimura, 1990; Dower, 2000). Today's largest union federation is the Japanese Trade Union Confederation or *RENGO* which represents roughly 6.8 million workers (RENGO, 2018).

On an international level, unions today are organised in different umbrella associations, most notably in the *International Trade Union Confederation* (ITUC) which represents 315 national unions and union federations from 156 countries (ITUC, 2012).

Considering the examples above, it can be seen that the development of unions is closely tied to industrialisation. The fact that unions evolved at different times in different countries can be attributed to the differing industrial development. Another similarity is that union membership is generally more common in large companies compared to SMEs[24] and more common in the public than in the private sector. [25]

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[24] The average union density in OECD countries in 2015 was 25.6 percent for large firms, 15.9 for medium, and 5.3 for small firms (OECD, 2017).

[25] In the US for example, the share of union members in the public sector was 34.4 percent in 2017, compared to 6.5 percent in the private sector (U.S. Bureau of Labor Statistics, 2018). In

Despite their similar history, there are a few differences between unions in todays developed countries. First, unions in some countries are officially or unofficially affiliated with political parties. The British TUC for example has close ties to the *Labour Party* and the Swedish LO is closely associated with the Swedish Social Democratic Party SAP while unions in other countries are considered to be politically independent. Second, the majority of unions are in the tradition of socialist or social democratic labour movements, some others are church-affiliated. Especially catholic workers' associations are prominent in some countries.[26] Finally, there are important differences in the way unions are organised which often influences the way in which collective bargaining is carried out (Martin, 1989; Hartog & Theeuwes, 1993).

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the United Kingdom, the share in the public sector was 56.5 percent in 2011, compared to 14.1 percent in the private sector (Brownlie, 2012).

[26]   For example, the Belgian *CSC*, or the Italian *CISL*.

4 Bargaining Power and Changes in Income Distribution in the Last Decades

The last chapters discussed two sources of bargaining power for workers, individual bargaining power and collective action. In this chapter, both alternatives are examined with regard to their ability to theoretically explain the development of income distribution over the last decades.

Changes regarding both sources of bargaining power may have contributed to the relative decrease of workers' income. Individual bargaining power is determined by a variety of factors, some of which may even be of solely psychological nature. Therefore, it seems impossible to measure individual bargaining power directly and, correspondingly, an assessment whether it declined in the last decades entails a high level of uncertainty. However, as argued in the previous chapters, workers' individual bargaining power is largely determined by companies' demand for labour. It seems reasonable to assume that a decrease in overall demand for labour results in a higher unemployment rate. A higher rate of unemployment may therefore be an indicator for a reduction in individual bargaining power. Considering the development of income distribution presented in Figure 1 and 2, an increase of unemployment starting in the 1980s would point towards individual bargaining power as key driver of income inequality.

Figure 3 displays the unemployment rates in several industrialised countries. The development of unemployment rates shows some similarities to the development of income shares. First of all, unemployment increased in the late 1970s and 1980s which corresponds to the decline of labour incomes in this period. However, unemployment decreased again in most countries in the 1990s while the downward trend of the income shares of workers continued. A strong

overall correlation of income distribution and unemployment would require that unemployment was low and stable until the 1980s and steadily increased since then. Considering the presented data, this is not the case, especially if the sharp rise in unemployment that occurred in some European countries[27] in the aftermath of the financial crisis 2008 is excluded. It is possible that a decline of individual bargaining power contributed to the observed trends in income distribution via increased competition among employees, especially in the 1970s, but the indications are inconclusive.
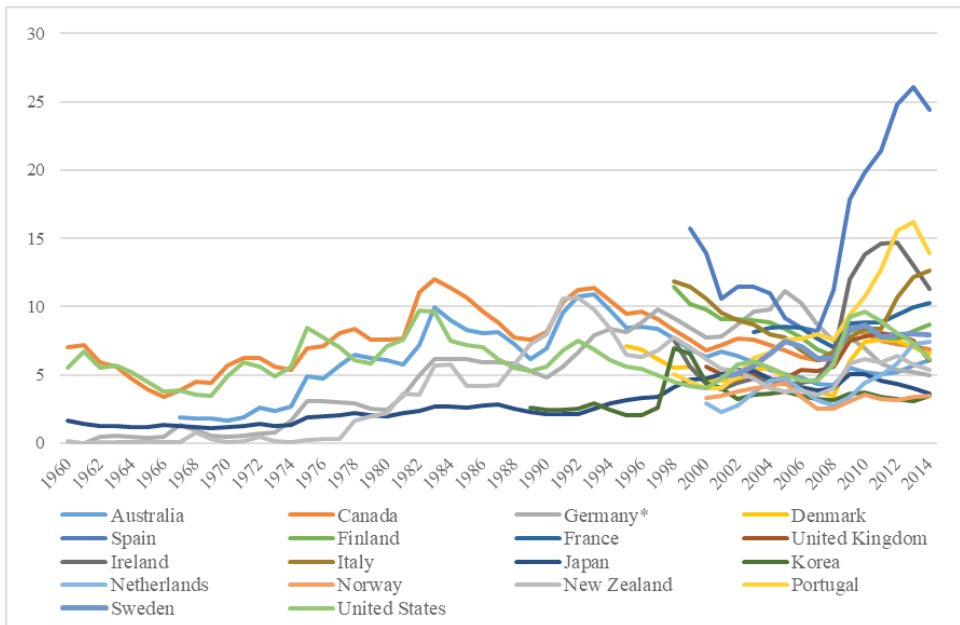
Figure 3:   Unemployment rates in selected OECD countries 1960 – 2014 (*until 1990 West Germany, Unemployment as percentage of the labour force). Source: Own representation based on OECD (2018).

Regarding individual bargaining power of specific groups through qualification, the demand for highly skilled workers ought to have declined since the 1980s weakening the ability of the respective employees to assert high wages. Empirical evidence however suggests that bargaining power of highly qualified individuals increased. A large number of studies provide evidence for the rise

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[27]   Spain, Ireland, Portugal, and Italy.

of top labour incomes in the last decades which can partially be attributed to an increased demand for highly skilled workers (Bauer & Kunze, 2004; Bresnahan et al., 2002; Falk & Biagi, 2016; Juhn et al., 1993).[28] It could therefore be concluded that highly qualified workers – against the general trend of labour compensation – managed to expand their share of income most likely due to increased individual bargaining power that stems from increased demand for their skills.

At the same time, the wage share of middle and low-skilled workers decreased substantially, otherwise the overall development of wage shares would be different. As argued in previous chapters, middle and low-skilled workers are not likely to possess significant individual bargaining power due to the fact that they are easily replaced. Therefore, a downward trend that is primarily driven by low skilled workers' income is not likely to be linked to individual bargaining power. As a result, the first source of workers' bargaining power is most likely not suited to explain the decline of workers' income since the 1980s.

The second source of workers' bargaining power is collective action. There are two possible ways in which collective bargaining power may have caused or at least contributed to the development of income distribution in industrialised countries in recent decades: Either the prevalence of collective bargaining substantially decreased since the 1980s, the bargaining position of unions was weakened during this period, or a combination of both.

One factor which makes it more likely that collective and not individual bargaining power is the main driver of the decline of labour's share of income is the fact that individual bargaining power, as argued in chapter 3.2, is especially relevant for small groups of workers whose skills are difficult to acquire. If the size of these groups would increase, their importance for the development of labour shares would also increase because more workers would benefit from enhanced individual bargaining power. At the same time, their bargaining position would be weakened because it would be easier for employers to replace them. Inversely, if less workers – at least in relation to demand – possess the needed skillsets, the individual bargaining power of the respective workers would in-

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[28] Another important factor in the rise of top labour incomes is the increase in compensation for financial and executive activities. The increase of these compensation may have contributed to the rise of top labour incomes to a greater extent (Bell & van Reenen, 2013; Bivens & Mishel, 2013). However, the relevant point here is that the demand for and the wages of high-skilled employees increased rather than declined.

crease. That means that individual bargaining power is per se not likely to drive the overall development of labour shares because the effects may neutralise each other. The opposite is true for collective bargaining. The more workers join a union and collectively negotiate their wages, the higher is the bargaining power for all workers. An increase of collective bargaining power would therefore evenly benefit the working population while a weakening of unions would correspondingly decrease wages in relation to profits for the majority of workers.

The next chapter empirically examines the development of unionisation in recent decades and its effect on income distribution in order to confirm the hypothesis that a decline in collective bargaining power is the key reason for the decline of workers' share of income.

5 Empirical Evidence for the Effects of Collective Bargaining

This section intends to provide evidence for the hypotheses elaborated in the previous chapters. If the division of income between labour and capital is determined by the distribution of power, measurements of workers' collective bargaining power should have a positive effect on the wage share. Similarly, these measurements should have a positive effect on the income share of middle and low-paid individuals if an increase in collective bargaining power primarily favours workers which receive these incomes. Using shares of pre-tax national income, it is possible to investigate the effect of collective bargaining power on the distribution of market incomes, excluding government redistribution. This approach may provide evidence on how unions affect individual income distribution with their influence on wages rather than with their influence in the political sphere.

The biggest challenge for the investigation of the effects of bargaining power is measurability. Since it seems impossible to measure bargaining power directly, it is necessary to find a correlated proxy. In the case of collective bargaining power, a variable is needed that depicts the strength of labour unions. Following Kristal (2010) and Bengtsson (2014), union density, i.e. the share of union members in the dependent labour force, is used as a proxy for union strength. There are several reasons to assume that union density is correlated with collective bargaining power. First, more members mean higher revenues from membership fees for unions. Second, it raises the public profile of unions which may be important because labour disputes are linked to public opinion. The main reason however is the fact that higher union density translates into higher pressure on employers in the event of a strike due to higher losses in corporations' revenue. If collective wage agreements do *not* apply to non-union members, a

higher union density also increases workers' bargaining position by reducing the competition among themselves. Of course, using union density as a proxy has some weaknesses. First of all, workers' bargaining power is not only influenced by the potential consequences of a strike, but also by their willingness to strike, which is not necessarily correlated with union density.[29] Another important factor is the legal framework.[30] The assumption that an increase of union density strengthens the bargaining position of workers whereas a decrease weakens it, seems however plausible. Moreover, union density displays not only the bargaining position of unions but also the prevalence of collective bargaining in general.

5.1 Data

For the empirical analysis, data from 18 OECD countries from 1960 to 2013 will be analysed. The sample includes data from Australia, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States. The selection of countries is primarily based on data availability. However, countries from all major areas in which industrialised countries are located – Europe, North America, East Asia, and Australasia – are included.

The dataset includes five variables for all countries: Wage share, the bottom 90 percent income share, union density, GDP growth, and growth of Total Factor Productivity (TFP). The data on wage shares originates from the European Commission's *Annual Macro-Economic Database* and is defined as compensation of employees as a share of GDP at current prices (European Commission, 2017).

The variable concerning individual income distribution is provided by the *World Wealth and Income Database* (Alvaredo et al., 2017). The bottom 90 percent income share refers to the share of pre-tax national income attributable to the bottom 90 percent of income recipients. The original data contains values for the top 10

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[29] It is conceivable that a small union that clearly demonstrates its ability and willingness to strike achieves better results than a union that represents a large portion of workers but is for some reason not willing to strike at all.

[30] Legal provisions that may affect collective bargaining power are for example the right to strike or regulations regarding the extensions of wage agreements.

percent income share. The values for the bottom 90 percent income share are derived from this variable to allow for a more intuitive interpretation of the regression results.

The main explanatory variable of the model is union density. This indicator refers to the number of union members as a proportion of wage and salary earners in employment. Union members outside the active, dependent, and employed labour force (i.e. retired workers, independent workers, students, unemployed) are excluded. The data originates from the *ICTWSS Database* of the Amsterdam Institute of Advanced Labour Studies (Visser, 2016). The only exception are values for union density in the US between 1983 and 2013 which originate from the *U.S. Bureau of Labor Statistics* (2015).

The last two variables included in the data set are GDP and TFP growth, acquired from the *Penn World Table 9.0* (Feenstra et al., 2015). TFP growth is the residual part of GDP growth that cannot be explained by growth in production factors and is traditionally seen as an indicator for technological progress.[31]

While data for wage shares, GDP, and TFP growth is available for all years and countries, data for individual income shares and union density are not. For example, data for union density in Spain and Portugal is only available starting from 1977 and 1978, respectively,[32] resulting in an unbalanced panel.

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[31] The interpretation of TFP growth as technological progress poses several problems and must be treated with caution. The calculation of TFP growth requires a neoclassical production function for which specific assumptions must be made. And even if these assumptions are accepted, TFP growth displays only disembodied technological change (e.g. general knowledge, spill-overs, organisational change) since improvements of design and quality of capital assets are attributed to the growth of the respective factor. Moreover, TFP growth also captures other factors such as adjustment costs or economies of scale. For a discussion on the insufficiencies of TFP growth as an indicator for technological progress see for example Reati (2012).

[32] Other gaps include: Union density for Australia 1997-2013; Korea 1960-62; New Zealand 1960-69; bottom 90 percent income share for Canada 2011-13; Denmark 2011-13; Spain 1960-80; Finland 1960-89 and 2010-13; Ireland 1960-74 and 2010-13; Italy 1960-63 and 2010-13; Japan 2011-13; Korea 1960-78 and 1986-94; Portugal 1960-75, 1983-88, 2006-13. Data for bottom 90 percent income shares in Germany prior to 2001 is only available in three-year intervals, in the Netherlands prior to 1989 only in irregular intervals.

5.2 Descriptive Statistics

The wage shares as well as the individual income shares have been subject to profound changes between 1960 and 2013. As displayed in Figure 1, the data reveals a relatively stable wage share in a range between 52 and 76 percent of GDP in the selected countries until about 1980, in some countries the wage share has indeed been rising up to that point. Beginning in the early 1980s however, wage shares have experienced a steady decline in every country included in the sample. Individual income shares follow a similar pattern although the developments vary more widely across countries.[33] As shown in Figure 2, the share of top 10 percent incomes declines in the 1960s and 70s and increases again beginning in the 1980s. That means that since the 1980s recipients of middle and low incomes suffered substantial income losses relative to recipients of top incomes.

Concerning the main explanatory variable, Figure 4 displays the developments of union density grouped by regions, Scandinavia, East Asia, Anglo-Saxon countries, and Continental Europe.

The first thing that strikes the eye are the enormous differences in the level of union density. At the one end of the spectrum, the highest union density can be found in Scandinavia. None of the four countries in the Scandinavian region have shown union densities below 50 percent since 1970, with Sweden reaching the highest density in the whole sample in 1994. A possible reason for the particularly high union density in Scandinavia may be the fact that in Denmark, Finland, and Sweden welfare payments, especially unemployment benefits, are administered by unions and union membership is in many cases a requirement to receive these payments (Scruggs, 2016).[34] This is however not the case in Norway.

On the other end of the spectrum, there are two countries in East Asia, Japan and South Korea. While Japan has had levels of union density between roughly 18 and 35 percent, the union density in South Korea never exceeded 20 percent.

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[33] Countries with particularly pronounced changes in individual income distribution did not necessarily experience equally pronounced shifts in functional income distribution. For a recent discussion on this topic see for example Behringer and van Treeck (2017).

[34] This type of arrangement is sometimes referred to as the *Ghent system*.
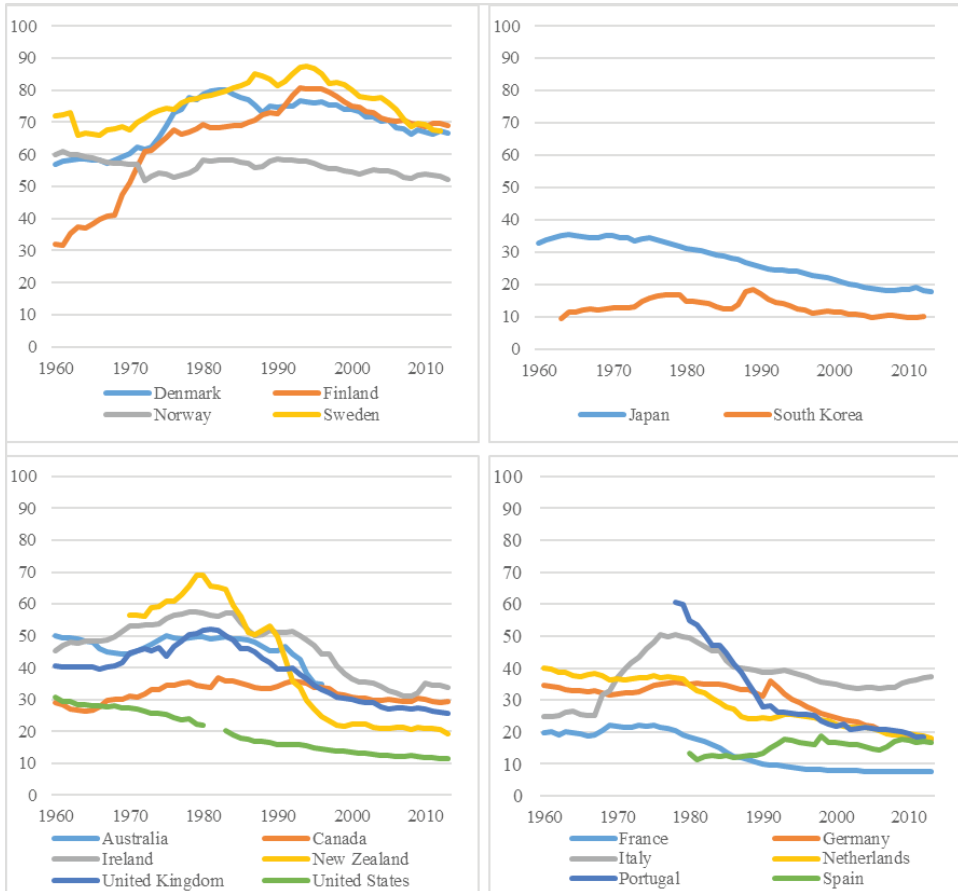
Figure 4: *Union density in selected OECD countries 1960 – 2013. Source: Own representation based on Visser (2016) and U.S. Bureau of Labor Statistics (2015).*

Anglo-Saxon and Continental-European countries are located in the middle, with some countries closer to Scandinavia in terms of union density (Italy, as well as Ireland and New Zealand prior to 1990) and some closer to East Asia (France and the US).

In most countries, union density increased during the 1960s and 70s and has been decreasing since the early 80s. The largest decline can be observed in New Zealand where union density dropped from 69 percent in 1980 to 19 percent in 2013, and in Portugal where it declined from 60 percent in 1979 to 19 percent in

2012. Notable exceptions are Sweden, Finland, and Germany where union density followed a similar pattern but peaked in the 1990s, Norway, Spain, and South Korea, which – although on entirely different levels – do not seem to follow a clear upward or downward trend, as well as the US which faced a steady decline of union density over the whole period.

Without further examining causality, it is remarkable that the observed trends in income distribution as well as in union density reversed in the early 1980s.

5.3 Methodology

In order to determine the effect of union density on wage shares, the following equation is estimated:

$$WS_{av} = \alpha + \beta_1 UD + \beta_2 UD^2 + \beta_3 \Delta TFP + \beta_4 \Delta GDP + \delta C_s + \varepsilon$$

where *UD* denotes union density in year *t*, *UD2* union density squared in year *t*, *ΔTFP* the change of TFP between *t-1* and *t*, *ΔGDP* growth of GDP between *t-1* and *t*, and *WSav* the average wage share in year *t+1* to *t+3*. *Cs* represents dummies for each country in the sample. Union density is the main explanatory variable, the quadratic term is added to capture a possible non-linear effect.

The reason for using the average of the following three years instead of the wage share in year *t* is the assumption that a certain adjustment time is necessary for collective bargaining power to translate into higher income. This assumption is based on the fact that wages usually are not negotiated every year.[35] Since the terms of collective wage agreements differ both over time and across countries, determining the appropriate time lag which depicts the adjustment period may prove difficult. However, if union density has a short-term effect on income shares, the effect should be visible sometime in the near future. Although the quantification of the effects becomes less precise, calculating the average renders the determination of the *exact* adjustment time unnecessary.

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[35] In Germany for example, the average duration of collective agreements in 2014 was roughly two years (Hans-Böckler-Stiftung, 2016), in the US, the usual term for a collective agreement is three years (Compa, 2014).

Change in TFP is included in the equation to account for the effect of technological progress. As argued in chapter 3.2, technological progress may change the bargaining position of different groups and therefore affect income distribution, although the direction of the effect is unclear and may change over time. However, this paper primarily attempts to determine the effect of collective bargaining power rather than the effect of technological change. Therefore, the TFP variable is primarily included to control for effects of changes in bargaining power which are directly related to technological change. GDP growth controls for business-cycle effects.

The model for estimating the effect of union density on the bottom 90 percent income share is similar to the first equation:

$$b90p_{av} = \alpha + \beta_1 UD + \beta_2 UD^2 + \beta_3 \Delta TFP + \beta_4 \Delta GDP + \delta C_s + \varepsilon$$

The three-year average of the dependent variable is also used in this model. The reason for using the three-year average of the income share is analogous to the wage share model since union density is assumed to influence the distribution of individual income through changes in middle and low wages.

In both models, country fixed effects are applied taking into account the differences in the level of union density across countries. Time-fixed effects are not included in either model due to the fact that all countries follow similar time trends regarding the development of income shares, as well as the development of union density. Time-fixed effects would therefore also capture the effect of union density.

5.4 Regression Results

According to the theoretical discussion in the previous chapters, a significantly positive effect of union density on the two measures of income distribution would be expected. The regression results of the described models are displayed in Table 1. The estimated coefficients in all models strongly support the main hypotheses.

Table 1:   *Coefficients from panel regression of three-year average of wage and bottom 90 percent income share 1960 – 2013*

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*WSav*	*WSav*	*WSav*	*b90pav*	*b90pav*	*b90pav*
Union density	0.737***	0.719***	0.675***	0.316***	0.334***	0.281***
	(0.0518)	(0.0520)	(0.0528)	(0.0425)	(0.0423)	(0.0430)
Union density 2	-0.00714***	-0.00697***	-0.00642***	-0.000932**	-0.00110**	-0.000430
	(0.000567)	(0.000569)	(0.000582)	(0.000469)	(0.000466)	(0.000478)
ΔTFP		0.191***	-0.189		-0.222***	-0.583***
		(0.0711)	(0.121)		(0.0578)	(0.0932)
ΔGDP			0.336***			0.332***
			(0.0869)			(0.0682)
Constant	44.55***	44.70***	44.63***	57.03***	56.85***	56.86***
	(1.070)	(1.068)	(1.059)	(0.862)	(0.854)	(0.839)
Observations	833	833	833	643	643	643
R-squared	0.204	0.211	0.225	0.310	0.326	0.351
Countries	18	18	18	18	18	18

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

First of all, the coefficients for union density are positive and highly significant. It can therefore be concluded that the share of union members in the working population has indeed a positive effect on labour income and on the share of middle and low incomes. In the case of functional income distribution, an increase of union density of one percentage point increases the wage share by roughly 0.7 percentage points on average in the sample countries. The coefficient becomes smaller when TFP and GDP growth are subsequently added to the model. In the case of individual income distribution, an increase of union density of one percentage point increases the bottom 90 percent income share by roughly 0.3 percentage points on average in the sample countries. Again, the coefficient gets smaller when TFP and GDP growth are included in the model.

These results are in agreement with the theoretical argumentation of this paper and with the empirical research cited in previous chapters. The fact that cont-

rolling for technological change and business-cycle effects does not fundamentally change the results is also in line with the presented arguments.

As displayed in Table 1, the coefficients for union density are twice as large in the wage share models compared to the models that estimate the influence on individual income shares. An obvious conclusion would be that collective bargaining power affects labour income more strongly than it affects individual income distribution. This interpretation seems conclusive since a notable proportion of self-employed individuals is likely to be included in the bottom 90 percent income share. The link between collective bargaining power and labour income seems therefore more immediate than the one between collective bargaining power and individual income shares. The different results, however, may also be connected to the different average development of functional and individual income distribution. Although the coefficients are smaller in magnitude, the proportion of the variance in the dependent variable that can be explained by the independent variables (R-squared) are higher for models 4 – 6.

Regarding a possible non-linear effect, the most obvious hypothesis would be that the positive effect of union density diminishes when the level of union density increases. The intuition behind this hypothesis is that important improvements can already be achieved once a certain threshold is passed.[36] The fact that the coefficients for union density squared are negative in all four models indicates that this hypothesis can be verified meaning that the positive effect is indeed smaller for higher levels of union density. Although highly significant, the coefficients are still small in magnitude compared to the coefficients that capture the linear effect.

The fact that adding control variables for technological change and business-cycle effects change the magnitude of the effect of union density indicates that both variables play an important role in determining income distribution. Especially, GDP growth seems to affect income shares which is in line with the argument presented in chapter 3. The models' assertion regarding technological change is less clear which at least doesn't contradict the ambivalent theoretical effects

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[36] For example, a certain proportion of union members may be sufficient to cause a complete shutdown of a plant or factory. Once this threshold is passed, additional members may not increase collective bargaining power significantly.

of technological change described in chapter 3.2.[37] Regarding the mechanism that determines the effect of technological change, the explanatory power of the model is however limited.[38]

In order to test the models' robustness towards the influence of specific countries, all four models are re-estimated excluding one country at a time. This analysis confirms the results since the coefficient for union density does not change signs and the effect remains significant at any reasonable level regardless of the exclusion of any country. The coefficient for union density squared however becomes insignificant in model 3 and 4 if the US are excluded which means that the non-linear effect is negligible for individual income distribution. Therefore, it could not be concluded that the positive effect on the bottom 90 percent income share generally diminishes with an increased level of union density.

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[37]   Nevertheless, the negative effect of TFP growth on the bottom 90 percent income share (even when controlling for GDP growth) could be an indication that technological change primarily favours top incomes.

[38]   Moreover, the interpretation of TFP growth as technological progress is generally problematic. See also footnote 31.

6 Conclusion

Contrary to neoclassical theory, the labour market is neither characterised by the identifiability of specific contributions of input factors to the output nor by perfect competition – in the sense that no single employer has influence over wages. As a result, changes in income distribution are not deviations from a determinable equilibrium but rather a reflection of the division of power between the groups involved. Due to competition among workers that stems from the vital importance of labour income, informational advantages, and the overall wealth of capital owners as well as their access to additional sources of income, bargaining power in the labour market is usually biased towards capital. There are two theoretical possibilities for labour to offset the power of capital. The first one is individual bargaining power that results from qualification, the second one collective bargaining power through organisation in unions. From a theoretical perspective, it seems likely that the decline of collective bargaining power contributed to the observed trends in income distribution to a large extent whereas the argument that a decrease of individual bargaining power caused the decline of worker' share of income seems less plausible.

The empirical analysis supports the theoretical arguments regarding the effect of collective bargaining on income distribution. Union density, which is used as a proxy for collective bargaining power, has a significant and relevant effect on labour's share of income as well as on the income share that accrues to recipients of middle and low income.

The fact that unions substantially increase workers' income at the expense of recipients of capital income invalidates the argument that unionisation primarily increases income of union members at the expense of other employees. Furthermore, the positive effect on the bottom 90 percent income share indicates that unionisation primarily affects middle and low labour incomes.

The presented findings contain notable policy implications. Although it is difficult to judge whether technological change or the decline of collective bargaining power is relatively more important for the development of income shares, it can hardly be disputed that workers significantly benefit from unionisation. The political interference in the area of technological progress and the demand for specific skillsets may prove to be difficult and may entail unintended side-effects. The consolidation of unions' bargaining position on the other hand seems far more feasible. As a result, policy measures that aim at stopping the trend of declining income shares of workers should focus on supporting unions. This approach may also reduce the need for redistribution which may be desirable due to problems with the accuracy of redistributing policies.

Despite supporting the hypothesis of positive effects of unionisation on workers' income shares, the presented evidence primarily considers changes of collective bargaining power *within* countries and does not allow for the conclusion that the labour share is generally higher in countries which have a higher level of union density. This shortcoming raises the question whether union density is a sufficient indicator for collective bargaining power. One factor that constitutes collective bargaining power is the ability and willingness to strike, which is not necessarily correlated to union density. Another factor that may have significant influence on collective bargaining power, and through that on income distribution, is the legal framework. Legislation that may affect collective bargaining power may include freedom of association and the right to collective bargaining, restrictions on the right to strike, as well as regulations regarding wage agreements and work councils. Investigating these factors may give some implications why the level of union density alone is not a sufficient explanation for differences in national labour shares between countries. It may also shed some light on the effects of a series of labour market reforms that accompanied the decline of labour shares in the majority of developed countries in the last decades.

Another question that has to be answered by future research is which groups of income recipients are primarily affected by collective bargaining power. The presented evidence focuses on the overall labour share and on individual income shares. However, the labour share does not only include compensation of typical dependent employees but also top labour incomes. Two groups of top

dependent labour incomes seem especially relevant – wages for highly skilled professionals and compensation for managerial occupations. As argued above, highly skilled professionals are less likely to be dependent on collective bargaining power because they may possess individual bargaining power that stems from limited supply of the corresponding qualifications. Managerial occupations are even less likely to be positively influenced by collective bargaining because they are more strongly associated with capital than labour. Including these two groups in the investigated labour share may bias the results concerning the effect of collective bargaining power. It is, for example, possible that a decrease in the share of low labour incomes is accompanied by an increase in the share of top labour incomes, which may overcompensate the decrease of the former. If indicators of collective bargaining power, such as union density, decrease over the same period, this may lead to the false conclusion that collective bargaining power has no, or even a negative, effect on labour income. Regarding individual income shares, a distinction between dependent workers and self-employed individuals is not possible which is problematic since income of self-employed individuals is not likely to be directly affected by collective bargaining power. A more detailed examination may give some indications regarding the connection between the development of collective bargaining and wage polarisation and also further invalidate the argument that unions primarily redistribute income between different groups of workers.

Although the present study gives clear indication that the decline of collective bargaining power has significantly contributed to the increasing income inequality, these problems should be addressed by future research to give a more in-depth understanding of the way in which collective bargaining power influences income distribution.

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Neoclassical theory omits the role of bargaining power in the determination of wages. As a result, the importance of changes in the bargaining position for the development of income shares in the last decades is underestimated. This paper presents a theoretical argument why collective bargaining power is a main determinant of workers' share of income and how its decline contributed to the severe changes in the distribution of income since the 1980s. In order to confirm this hypothesis, a panel data regression analysis is performed that suggests that unions significantly influence the distribution of income in developed countries.