Job mobility, reallocation and wage growth
A tale of two countries

Alexander Hijzen
Wouter Zwysen
Mats Erik Lillehagen

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OECD SOCIAL, EMPLOYMENT AND MIGRATION WORKING PAPERS No. 254

Alexander Hijzen (Alexander.HIJZEN@oecd.org) and Wouter Zwysen (Wouter.ZWYSEN@oecd.org).

JT03470126

OECD Social, Employment and Migration Working Papers

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Acknowledgements

Abstract

This paper analyses the role of job mobility for job reallocation and aggregate wage growth in Norway and the United States using linked employer-employee data. It provides four main findings. First, despite lower overall job mobility in Norway, the speed of worker reallocation from low-wage to high-wage firms is similar to that in the United States. Second, job reallocation tends to be counter-cyclical in Norway, but pro-cyclical in the United States, due to the weaker tendency of high-wage firms in the United States to hoard workers during economic downturns. Third, the reallocation of workers from low to high wage firms through job-to-job mobility disproportionately benefits high-skilled workers in Norway and low-skilled workers in the United States. Fourth, the slowdown in aggregate wage growth primarily reflects a weakening of on-the-job wage growth in both countries rather than a reduced role of job reallocation between low and high-wage firms (although this does also play a role in the United States).

Résumé

Ce document analyse le rôle de la mobilité professionnelle pour la réaffectation des emplois et la croissance globale des salaires en Norvège et aux États-Unis en utilisant des données employeur-employé couplées. Le document présente quatre conclusions principales. Premièrement, malgré une mobilité globale de l'emploi plus faible en Norvège, la vitesse de réaffectation des travailleurs des entreprises à bas salaires vers les entreprises à hauts salaires est similaire à celle des États-Unis. Deuxièmement, la réaffectation des emplois tend à être contracyclique en Norvège, mais procyclique aux États-Unis, en raison de la tendance moindre des entreprises à salaires élevés aux États-Unis à thésauriser les travailleurs en période de ralentissement économique. Troisièmement, la réaffectation des travailleurs des entreprises à bas salaires vers les entreprises à hauts salaires par la mobilité professionnelle profite de manière disproportionnée aux travailleurs hautement qualifiés en Norvège et aux travailleurs peu qualifiés aux États-Unis. Quatrièmement, le ralentissement de la croissance globale des salaires reflète principalement un affaiblissement de la croissance des salaires dans les deux pays plutôt qu'un rôle réduit de la réaffectation des emplois entre les entreprises à bas et haut salaires (bien que cela joue également un rôle aux États-Unis).

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Introduction

Understanding the role of "varieties of capitalism" for economic and labour market performance is one of the most important issues in the social sciences. Several promising models of policies and institutions have been identified that tend to be associated with good economic and labour market outcomes. This includes the market-based model of the United States and several other mainly English-speaking economies and the corporatist model of Norway and several other Northern European countries (Hall & Soskice, 2001; OECD, 2006). They mainly differ in the role of public policies and the social partners to protect workers and their emphasis on equity, while they share a certain emphasis on public policies that provide flexibility to firms. However, both models have recently come under pressure as it is proving increasingly challenging to sustain high productivity growth and contain wage inequality. Both Norway and the United States have witnessed slowing productivity growth, a declining labour share and rising wage inequality.

This paper seeks to shed light on the way different economic models, as exemplified by Norway and the United States, generate sustained increases in living standards through higher wages and why this has become more challenging in recent years. To this end, it makes use of linked employer-employee data for Norway that allow following workers across firms from the late 1990s to the early 2010s and allow replicating key stylised facts for the United States as documented by Haltiwanger et al. (2018), Haltiwanger et al. (2018), and Hahn et al. (2017). The use of rich micro data allows characterising how aggregate wage growth is generated, while the cross-country dimension provides an indication of the role of policies and institutions, including with respect to wage setting, for the way labour markets operate. While wages in the United States are largely determined through bargaining between individual workers and their employers (or unilateral wage-setting by employers), supported only by a modest statutory minimum wage for the most vulnerable, in Norway wages tend to be negotiated collectively through multiple levels of bargaining at the sector and firm level. Given the allocative role of wages in capitalist societies, these starkly different approaches to wage setting could have potentially important implications not only for wage inequality, but also for the operation of labour markets and the way economic growth is generated.

More specifically, this paper focuses on the role of job mobility in Norway and the United States for efficiency-enhancing reallocation, aggregate wage growth and, by extension, increasing standards of living. First, building on work for the United States by Haltiwanger et al. (2018) and Haltiwanger et al. (2018), it compares the role of job mobility in Norway and the United States for efficiency-enhancing reallocation as measured by the mobility of workers from low-wage firms, typically those with low productivity, to high-wage firms, typically those with higher levels of productivity. Second, building on decomposition methods developed by Hahn et al. (2017), it analyses the importance of job-to-job mobility and mobility in and out of employment for aggregate wage growth in Norway in comparison to the United States and the extent to which changes in job mobility since the early 2000s can account for the observed slowdown in wage growth in both countries.

The remainder of this paper is structured as follows. To set the scene, **Section 1** describes recent developments in aggregate wage and productivity growth in Norway and the United States. **Section 2** provides a conceptual framework for analysing the role of job mobility for job reallocation and aggregate wage growth, lays out the empirical methodology and describes the data used. **Section 3** presents the results with respect to the role of job mobility for reallocation between low and high wage firms and documents how this differs across different stages of the business cycle and different socio-economic groups. **Section 4** describes the main components of aggregate wage growth and their contributions to its slowdown. **Section 5** concludes.

Main findings summary

This paper analyses the role of job mobility for job reallocation and aggregate wage growth in Norway and the United States using linked employer-employee data. Its main findings are as follows:

Job mobility is lower in Norway than in the United States

Fluid labour markets characterised by healthy rates of job mobility are a precondition for the efficient reallocation of jobs from low to high productivity firms. Job mobility is considerably lower in Norway than in the United States, with job-to-job mobility being less than half and mobility in and out of employment being about two-thirds that in the United States. The lower rate of job-to-job mobility in Norway may be related to the fact that wage differences between firms are relatively small, resulting in potentially weak incentives for workers to move from one firm to another.

The speed of worker reallocation from low to high-wage firms is similar in Norway and the United States

Despite the much lower rate of overall job mobility in Norway, the labour market reallocates workers at a similar rate from low-wage to high-wage firms as in the United States. There is therefore no indication that wage compression in Norway slows job reallocation. To shed light on this issue, overall job mobility is decomposed into movements in and out of employment and movements from job to job. This shows that job-to-job mobility contributes to job reallocation from low to high-wage firms, but that employment mobility tends to reduce it. The counteracting role of employment mobility – employment inflows to low-wage firms and employment outflow from high-wage firms – is more important in the United States than in Norway, resulting in similar net flows from low-wage to high-wage firms in both countries.

Job reallocation tends to be counter-cyclical in Norway, but pro-cyclical in the United States

Job reallocation from low to high-wage firms is pro-cyclical in the United States, i.e. employment in high-wage firms is more pro-cyclical than in low-wage firms, possibly reflecting weak incentives for labour hoarding in high-wage firms during economic downturns. By contrast, in Norway job reallocation is countercyclical, consistent with the "cleansing effect" of recessions. Differences in the cyclicality of job reallocation between Norway and the United States largely reflect the role of employment mobility, with high-wage firms shrinking more slowly than low-wage firms during recessions in Norway, but more quickly in the United States.

Job reallocation mainly benefits high-skilled workers in Norway, but low-skilled workers in the United States

Job reallocation through job-to-job mobility disproportionately benefits high-skilled workers in Norway, but low-skilled workers in the United States. The greater importance of the job ladder for low-skilled workers reflects the limited propensity of high-wage firms in the United States to hoard low-skilled labour in bad times and recruit from non-employment in good times. Job-to-job mobility up the wage ladder is crucial for the career progression of young workers in both countries. Job-to-job mobility to high-wage firms is somewhat lower for women in in Norway (no comparable data are available for the United States).

Weak and slowing wage growth is mainly due to lower on-the-job wage growth

On-the-job wage growth is the main source of aggregate wage growth in both Norway and the United States and the main factor behind the slowdown in wage growth since the late 1990s/early 2000s. In the United States, weaker wage growth as a result of job-to-job mobility also contributed to the slowdown in aggregate wage growth. Changes in the composition of employment due to young workers entering and old workers leaving the workforce tended to mitigate the slowdown in aggregate wage growth.

1. Aggregate productivity and wage developments in Norway and the United States

This section provides an overview of recent developments in aggregate productivity and wages in Norway and the United States and situates these in the broader OECD context.

1.1. Norway and the United States enjoy among the highest standards of living in the OECD thanks to a highly productive workforce

Norway and the United States enjoy high standards of living. GDP per capita in Norway and the United States is respectively 34% and 30% above the OECD average (Figure 1). High living standards in Norway reflect to some extent the importance of the oil-sector. However, even when excluding the offshore oil-sector, GDP per capita in Norway remains 17% higher than the average in the OECD.

High living standards in terms of GDP per capita in Norway and the United States primarily reflect high labour productivity. In both countries (excluding the oil sector in Norway), labour productivity is about 25% above the OECD average. By comparison, differences in labour utilisation between the two countries and the OECD average are small.

Figure 1.1. High livings standards in Norway and the United States reflect high productivity

Decomposition of GDP per capita into labour productivity (GDP per hour worked) and labour utilisation (hours worked per capita), log difference from OECD average, 2017
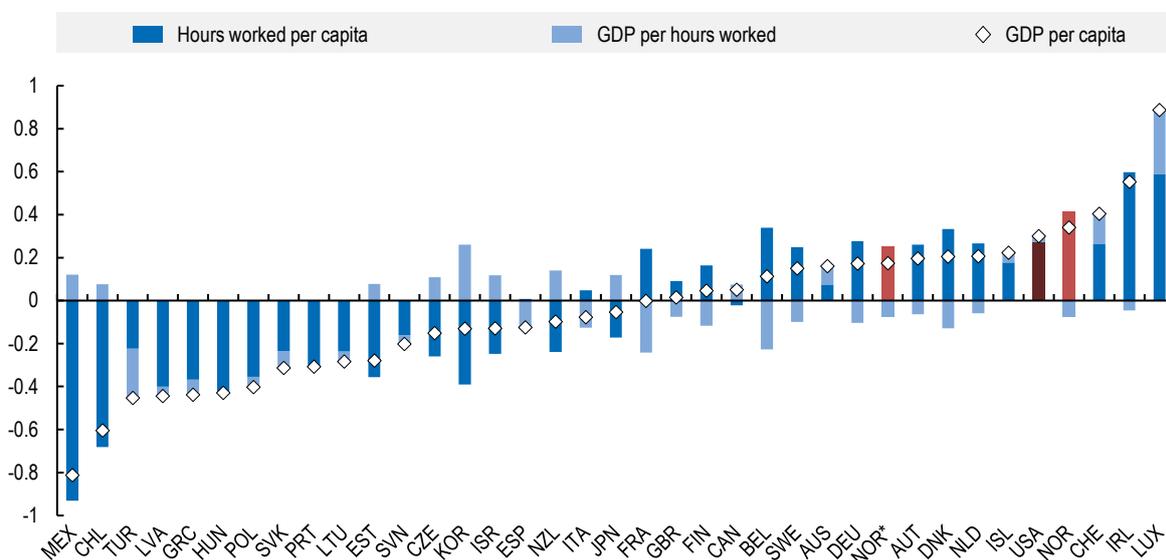
Note: GDP per capita is expressed in the difference in logs from the OECD average and decomposed into a component related to labour utilisation (hours worked per capita) and a component related to labour productivity (GDP per hour worked). Calculations are based GDP in 2017 PPP.
* shows results for only mainland Norway, excluding the offshore oil industry.
Source: OECD National accounts statistics.

1.2. High productivity is achieved in a context of starkly different approaches to wage-setting, resulting in polar outcomes in terms of wage inequality

Norway and the United States represent starkly different approaches to wage-setting. In the United States, hourly wages are largely determined at the worker level, supported only by a modest statutory minimum wage for the most vulnerable. Collective bargaining is absent in the large majority of private-sector firms. By contrast, in Norway wages tend to be negotiated collectively through multiple levels of bargaining at the sector and firm level.

The way wages are determined has important implications for the extent to which the benefits of high productivity are shared across the workforce (Figure 2, Panel D). Wage inequality in the United States is among the highest in the OECD, with persons in the top decile earning about 5 times as much as persons in the bottom decile. By contrast, wage inequality in Norway is among the lowest in the OECD, with those in the top decile earning 2.5 times as much as those in the bottom (compared with 3.3 for the OECD as a whole).[1]

Wage-setting can also have potentially important consequences for the way productivity growth is generated. In imperfectly competitive labour markets, wages act as an allocative device, with important implications for worker effort, investment in labour-market relevant skills and the efficient allocation of workers across firms. Wage-setting institutions in this context have to confront a trade-off between equity and efficiency (Criscuolo et al., 2020b).

1.3. Sustaining broadly shared productivity gains has become more challenging due to slowing productivity growth, a declining labour share and rising inequality

In recent years, productivity growth has been relatively weak in both Norway and the United States. It was below the average growth rate in the OECD and substantially lower than in previous decades (Figure 2, Panel A). To some extent, this is a legacy from the global financial crisis and its impact on investment. However, it is also likely to reflect deeper structural changes, related to the stagnation of productivity growth among lagging firms with low productivity (Andrews, Nicoletti, & Timiliotis, 2018; Andrews, Criscuolo, & Gal, 2016). This could reflect various factors including a slowdown in the diffusion of technologies or the reallocation of workers towards higher productivity firms.

The slowdown in wage growth appears to be even more pronounced than that in productivity growth, resulting not only in below-average wage growth, but also a decline in the labour share (Figure 2, Panel B and C). While the bulk of the slowdown in wage growth reflects the slowdown in productivity growth, in many countries, notably in the United States but to a less extent also in Norway, wage growth also has tended to decouple from productivity growth, resulting in a declining share of national income going to labour (OECD, 2018; Schwellnus, Kappeler, & Pionnier, Decoupling of wages from productivity: Macro-level facts, 2017).

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[1] Wage inequality in the United States is higher than in Norway in both the top and the bottom of the wage distribution. Workers in the 90th percentile earn more than twice the median wage in the United States and less than 1.5 times the median in Norway. The median wage in the United States is again more than twice as high as the 10th percentile, while the difference is substantially smaller in Norway.

At the same time, wage inequality has increased in both Norway and the United States. Wage inequality, as measured by the D1/D9 ratio, has increased sharply in Norway by around 25% between 1995 and 2016 but remains low by international standards. Wage inequality has continued to increase in the United States. One important difference is that the rise in wage inequality was concentrated in the bottom of the wage distribution in Norway, whereas it was concentrated in the top in the United States.

As delivering broadly shared productivity gains has become more challenging, the economic models of Norway and the United States have come under pressure. While the decoupling of wage from productivity growth and the rise in wage inequality partly stem from global megatrends associated with capital-enhancing technological changes and the deepening of global value chains, many country-specific factors, including policies and institutions also play an important role.[2]

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[2] Using harmonized cross-country data on firm performance, tight anti-competitive regulations are shown to limit reallocation which hampers productivity growth (Arnold, Nicoletti, & Scarpetta, 2008). The speed of adoption of digital technologies, driving divergence in productivity, is affected by policies increasing market access, competition and efficient reallocation (Andrews, Nicoletti, & Timiliotis, 2018).

Figure 2. Productivity and wage growth have slowed, the labour share fell and wage inequality increased
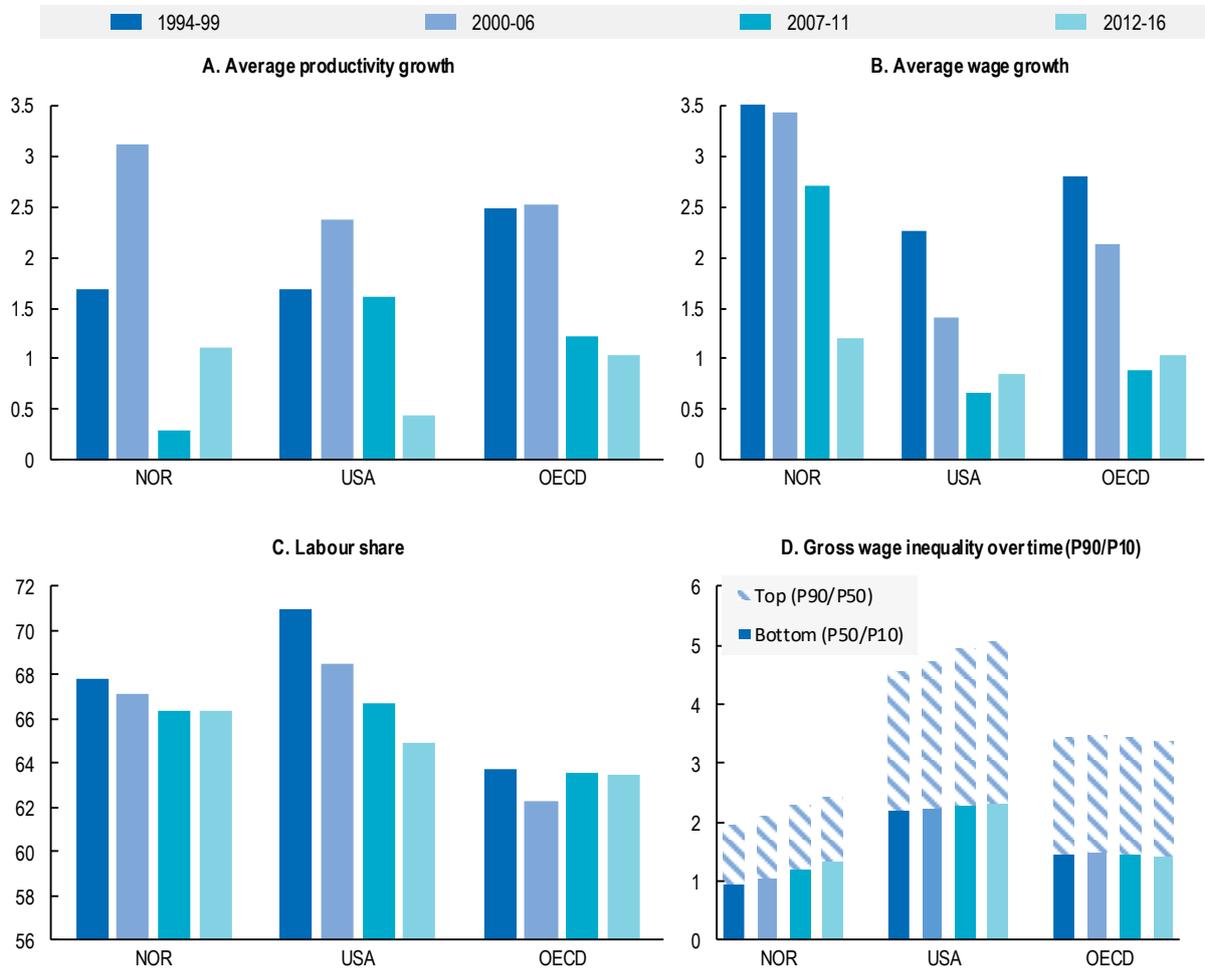
Note: <u>Panels A and B:</u> Average annual productivity and wage growth in constant prices. The OECD average is the simple average over other OECD countries. The figure for Norway only pertains to mainland Norway. <u>Panel C:</u> The OECD average is the simple average over OECD countries, except Chile, Poland, Mexico, and Iceland. <u>Panel D:</u> The bars show the relative contribution of P50/P10 (bottom) and P90/P50 (top) to overall wage inequality (P90/P10). The OECD average is the simple average over other OECD countries, except Chile, Denmark, Hungary, Iceland, Ireland, Japan, New Zealand, Switzerland and Turkey.
Source: OECD Annual National Accounts (Panel A and B); Schwellnus, Pak and Pionnier (forthcoming). (Panel C); OECD Earnings Distribution Database (Panel D).

2. Analysing the role of job mobility for reallocation and aggregate wage growth

This section provides a conceptual framework for analysing the role of job mobility for job reallocation and aggregate wage growth, lays out the empirical methodology and describes the data used.

2.1. Conceptual framework

Aggregate wage growth in the private sector can be decomposed into on-the-job wage growth within firms in the private sector, wage growth related to job-to-job mobility between private-sector firms, and wage growth related to employment mobility, i.e. the mobility of workers between employment in the private sector on the one hand and public-sector employment, unemployment or inactivity on the other, weighted by their respective employment shares (Figure 3):

- *On-the-job wage growth* within firms may reflect increasing worker productivity as workers acquire more experience or better skills, upward job mobility within firms as workers move to better paid occupations in the same firm (i.e. promotions) or increasing firm-wage premia as firms become more productive, more profitable or share a larger part of the rents with workers.

- *Aggregate wage growth related to job-to-job mobility* - not involving an intermediate spell of non-employment – contributes to aggregate wage growth when it represents moves up the wage ladder towards larger, better paying and more productive firms or enhanced match quality (Moscarini & Postel-Vinay, 2016). As a result, job-to-job mobility is a potentially important channel for the career advancement of workers as well as aggregate wage and productivity growth (Haltiwanger J. , Hyatt, Kahn, & McEntarfer, 2018; Faberman & Justiniano, 2015; Moscarini & Postel-Vinay, 2018).[3] Wage differences between firms with different levels of productivity play a potentially important role in shaping incentives for such efficiency-enhancing job-to-job mobility.

- *Wage growth related to employment mobility* in and out of private-sector employment may be due to changes in worker composition, i.e. differences in the composition of workers leaving and entering employment as a result of changes in the business cycle, structural change or cohort effects (Daly & Hobijn, 2017; Hyslop & Rice, 2019) as well as changes in firm composition (reallocation) when separations followed by non-employment are concentrated among low-wage firms and hires following non-employment are concentrated among high-wage firms.

In sum, job reallocation affects aggregate wage growth directly through job-to-job mobility from low to high wage firms in the private sector as well as indirectly through worker

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[3] In a perfectly competitive setting, wage growth due to job-to-job mobility is likely to result from production complementarities. In imperfectly competitive labour markets, this may also reflect changes in productivity-related rents or the bargaining position of workers. Indeed, by offering higher wages more productive firms can "poach" better workers from less productive firms and it is through this channel that job-to-job mobility contributes to aggregate productivity growth (Haltiwanger J. , Hyatt, Kahn, & McEntarfer, 2018; Kahn & McEntarfer, 2014).

movements from low-wage private-sector firms to public-sector employment and non-employment and from public-sector employment and non-employment to high-wage private-sector firms in the private sector. To the extent that high-wage firms are more productive – as argued in Box 1 – this process is efficiency-enhancing. This paper analyses the importance of job reallocation between low and high wage firms and its importance for aggregate wage growth.

Figure 3. Job mobility, job reallocation and aggregate wage growth: A simple framework

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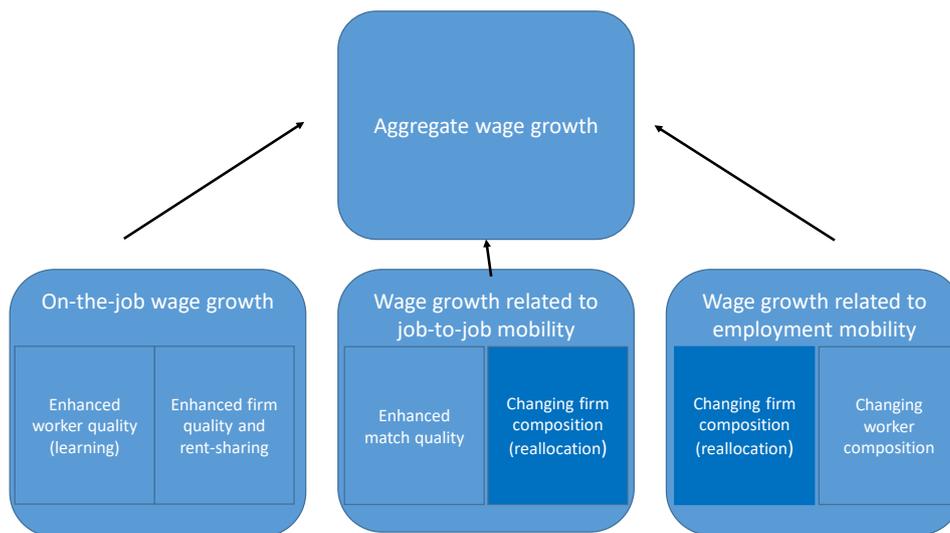
Box 1. Wage and productivity dispersion between firms

There is substantial variation in firm productivity, even within narrowly defined industries in all countries including Norway and the United States (Berlingieri & Criscuolo, 2017; Syverson, 2004; Syverson, 2011). An important question is whether such productivity differences translate into average wage differences across firms. In perfectly competitive labour markets, firms take the level of wages as given. Firm productivity determines the number of workers that is hired, but not the wage at which they are hired. In imperfectly competitive labour markets characterised by frictions, firms have considerable latitude to set wages themselves, potentially inducing a positive relationship between productivity and average wages.

There is widespread empirical evidence that productivity differences translate to an important extent into differences in average wages across firms even after controlling for differences in worker composition. OECD (2019) suggests that about two thirds of the dispersion in average wages between firms reflects differences in firm wage premia for identical workers across a sample of 14 OECD countries, including Norway and the United States. These differences in wage premia reflect productivity differences and differences in the degree of productivity pass-through to wages (wage-setting).

The dispersion in firm wage premia tends to be considerably smaller than the dispersion in firm productivity. For example, OECD (2020) estimates using data for 14 OECD countries that productivity wage pass-through tends to be about 0.2. A number of studies further suggest that productivity wage pass through is smaller in Norway than in the United States (Dale-Olsen & Nilsen, 2009; Song, Price, Guvenen, Bloom, & von Wachter, 2019; Barth E. , Bryson, Davis, & Freeman, 2016; Barth, Moene, & Willumsen, 2014; Moene & Wallerstein, 1997). This is consistent with evidence by OECD (2020) that productivity pass through is smaller in countries with coordinated collective bargaining systems such as in Norway.

2.2. Methodology, concepts and definitions

This sub-section describes the methodology for the empirical analysis of job mobility, reallocation and aggregate wage growth. The methodology for the analysis of job mobility and reallocation follows that used by Haltiwanger, Hyatt, Kahn & McEntarfer (2018) and Haltiwanger, Hyatt and McEntarfer (2018), while that for aggregate wage growth builds on Hahn, Hyatt, Janicki and Tibbets (2017). This allows comparing the results for Norway with previous ones for the United States.

Job mobility, excess turnover and job reallocation

Job reallocation is defined here as the change in the structure of private-sector employment between low and high wage firms. Following Haltiwanger et al. (2018) firms are divided into low-paying (20%), middle-paying (40%) and high-paying (40%) firms based on their employee-weighted quarterly earnings.[4] To the extent that higher-wage firms are more productive the reallocation from lower to higher-wage firms is efficiency-enhancing. To the extent that higher-wage firms reflect firm wage premia, i.e. pay higher wages to identical workers, job reallocation from lower to higher wage firms contributes to the wage progression of workers over their career as well as aggregate wage growth.

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[4] To compute average firm wages, only full-quarter earnings are used, i.e. earnings of workers who were employed in the previous, current and next quarter.

A key assumption is that average firm wages reflect at least to some extent firm wage premia and not just differences in worker composition. Figure A1 of the annex of this paper shows for Norway that workers moving from higher-wage firms to low-wage firms experience significant earnings declines, whereas workers moving from lower-wage firms to high-wage firms experience significant earnings increases. This suggests that average wage differences between firms capture to an important extent firm wage premia, i.e. differences in pay between firms for identical workers (Criscuolo, et al., 2020).[5] Previous work has shown that flows between types of firms are very similar when ranking firms by wage or directly by productivity (Bertheau, Bunzel, & Vejlin, 2020).[6]

The rate of job mobility is defined as the sum of hires and separations within a quarter over employment in the corresponding quarter. Job mobility may contribute to job reallocation by bringing about changes in the structure of employment between low and high wage firms, but not all job flows bring about such changes. Job flows that do not affect the structure of employment are referred to as excess turnover (Davis, Haltiwanger, & Schuh, 1998). Consequently, one can decompose the overall rate of job mobility (g_j) for low, medium and high-wage firms – denoted with subscript j - into the rate of excess worker turnover (x_j, twice the minimum of hires and separations over employment) and the rate of job reallocation (n_j, the difference between hires and separations over employment). Time subscripts are removed for ease of exposition.

$$(1)\ g_j = \frac{H_j + S_j}{E_j} = x_j + n_j = \frac{2min(H_j, S_j)}{E_j} + \frac{H_j - S_j}{E_j}$$

The rate of excess turnover (x_j) in turn can be decomposed into the job-to-job mobility rate between firms of the same type (x_{jj}), the job-to-job mobility rate between different types firms (denoted j and k) that cancel each other out (x_{jk}), and the employment mobility rate between firms of type j and non-employment that cancel each other out (x_{jn}).

$$(2)\ x_j = x_{jj} + x_{jk} + x_{jn} = \frac{2H_{jj}}{E_j} + \frac{\sum_{k \neq j} 2min(H_{kj}, S_{jk})}{E_j} + \frac{2min(H_{nj}, S_{jn})}{E_j}$$

Similarly, net employment growth (n_j) can be decomposed into net employment changes between firm type j and k (n_{jk}) and employment changes between firm type j and non-employment (n_{jn}).

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[5] Criscuolo et al. (2020) shows that two thirds of the dispersion in average wage between firms in Norway and the United States can be attributed to firm wage premia, with the remainder reflecting differences in worker composition (see Box 1).

[6] In other words, worker-to-worker and worker-to-firm sorting tend to go together (Criscuolo, et al., 2020).

$$(3)\ n_j = n_{jk} + n_{jn} = \frac{\sum_{k \neq j}(H_{kj} - S_{jk})}{E_j} + \frac{H_{nj} - S_{jn}}{E_j}$$

Equation (3) shows that job reallocation between low and high-wage firms can take place through job-to-job mobility, for which wage incentives may play an important role, and employment mobility, for which flexibility-enhancing policies may be particularly important (e.g. employment and product market regulations, active labour market policies).

Job mobility, reallocation and aggregate wage growth

We distinguish four types of job transitions: a job-to job hire or poaching hire (H_{ee}), a job-to-job separation or poaching separation (S_{ee}), a hire from non-employment (H_{ne}) and a separation towards non-employment (S_{ne}). Job-to-job hires and separations relate to persons who change employer from one quarter to the next.[7] Hires from non-employment and separations to non-employment involve at least one full quarter of non-employment, defined here as not being employed in the (non-agricultural) private sector.[8]

The job-to-job separation rate (s_{ee}) is defined as the number of moves from a firm in the previous quarter to a new firm in the current quarter as a share of private-sector employment in the current quarter. The employment separate rate employment mobility rate (s_{en}) is defined as the number of separations from private-sector employment in the previous quarter to non-employment in the current quarter, as a share of private-sector employment in the current quarter. The job retention rate (r) is defined as the share of jobs in the previous quarter that survives to the current quarter, which is equal to one minus the separation rate to another job and the separation rate out of employment.

$$(4)\ r = 1 - s_{ee} - s_{en} = 1 - \frac{S_{ee}}{E} - \frac{S_{en}}{E}$$

The average wage change associated with stable jobs is defined as the average change in log quarterly earnings between the current and the previous quarter among persons who stay in the same firm (Δw_r). The average wage change associated with job-to-job mobility is defined as the average change in log quarterly earnings between the current and the previous quarter among persons who move between firms without an intermediate spell of non-employment (Δw_{ee}). The wage change associated with employment mobility is defined as the log difference in the average wage of jobless persons who are hired and the average wage of persons who separate from their job and become jobless (Δw_{en}).[9]

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[7] While we tend to think of job-to-job moves as direct transitions their definition implies that they could involve short spells of joblessness. Haltiwanger et al. (2018) show that using a different definition does not change the patterns of earnings gains/losses associated with job-to-job moves substantially.

[8] This means that non-covered sectors such as some agriculture or the public sector are effectively included in the definition of non-employment. See Fontaine et al. (2019) for an analysis of the role of public sector for labour market flows in the United States and selected European countries.

[9] In the case of job-to-job and employment mobility, wages are based on the yearly earnings at the previous and current employer, adjusted to a full quarter to be comparable to the nearest full-quarter earnings as used in in Hahn, Hyatt, Janicki and Tibbets (2017).

Aggregate wage growth is the sum of on-the job wage growth, wage growth associated with job-to-job mobility and wage associated with employment mobility weighted by their average employment shares plus the sum of the changes in each mobility component weighted by the average wage of workers in each mobility category (Hahn J. K., Hyatt, Janicki, & Tibbets, 2017):

$$(2) \quad \Delta w = (\bar{r}\Delta w_r + \bar{s}_{ee}\Delta w_{ee} + \bar{s}_{en}\Delta w_{en}) + (\Delta r\bar{w}_r + \Delta s_{ee}\bar{w}_{ee} + \Delta s_{en}\bar{w}_{en})$$

The first term on the right captures the evolution of wages for given mobility patterns (within-group wage growth), while the second term captures the role of changes in mobility patterns for given wage growth (between-group wage growth).

2.3. Data

The analysis for Norway is based on original work using linked employer-employee data from Statistics Norway. The analysis for the United States does not represent new work, but instead makes use of published results from three previous studies (Hahn J. K., Hyatt, Janicki, & Tibbets, 2017; Haltiwanger J. , Hyatt, Kahn, & McEntarfer, 2018; Haltiwanger, Hyatt, & McEntarfer, 2018).

Longitudinal Employer-Household Dynamics for the United States

The analysis for the United States in this paper draws directly from published results by Haltiwanger, Hyatt, Kahn & McEntarfer (2018), Haltiwanger, Hyatt and McEntarfer (2018) and Hahn, Hyatt, Janicki and Tibbets (2017) based on the Longitudinal Employer-Household Dynamics (LEHD). The LEHD is an administrative dataset with quarterly data on the universe of workers in the United States. It combines worker-level data on earnings drawn from social security records with establishment-level data drawn for the Census of Employment and Wages. The data used by Haltiwanger, Hyatt, Kahn & McEntarfer (2018) and Haltiwanger, Hyatt and McEntarfer (2018) relate to 28 states for the period 1998 to 2011, while Hahn, Hyatt, Janicki and Tibbets (2017) use data from all available states, which enter the administrative records at different times. For the same years and states, there are slight differences in the sample related to the definition of quarterly earnings.[10]

The analysis of aggregate wage growth is based on detailed quarterly information from Hahn, Hyatt, Janicki and Tibbets (2017) on wage growth for job-stayers and employment movers. The job and employment mobility rates, as well as the relative wage changes for job-to-job moves over the firm wage distribution are based on Haltiwanger, Hyatt, Kahn & McEntarfer (2018). The analysis of reallocation is based on detailed quarterly information in Haltiwanger, Hyatt, Kahn & McEntarfer (2018) on mobility and wage gains along the firm wage distribution and quarterly information in Haltiwanger, Hyatt and McEntarfer (2018) on mobility and wage gains by age, education and firm-wage type.

Aa-registeret and lto-registeret for Norway

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[10] Hahn, Hyatt, Janicki and Tibbets (2017) measure earnings consistently on the nearest full-quarter. This restricts the sample to workers that have been employed for at least three consecutive quarters at each employer. This reduces the estimated rate of job mobility, but yields similar trends.

Norwegian figures are obtained from two registries covering 1995Q2 to 2014Q4: the State Register of Employers and Employees (*Aa-registeret*) which contains all employment arrangements in Norway, and the End of the Year Certificate Register containing information on annual wages, including bonuses and extra payments, for each worker in a firm. As the registry data include information on the time worked in each quarter, earnings are equivalised to full-quarter earnings. In order to minimise the role of outliers, we restrict the data to workers who stayed at the same job for at least a month in the quarter, earned more than 25% of the median wage, and winsorized the top 1% of earnings. The analysis is restricted to mainland Norway, excluding the offshore oil sector.

As in the case of the United States, the analysis focuses on workers aged 18 to 64 in their main job. The main job is identified by the job with the highest earnings in a quarter similar to the studies for the United States. Age is divided into four categories: less than 25 years; 25-34 years; 35-44 years; and 45-64 years. Education is divided into three categories: less than upper secondary; upper secondary; post-secondary non-tertiary and tertiary (which corresponds to some college or a college degree in the United States). In this paper we classify firms based on the average wage of workers. As this reflects differences in the composition of workers as well as actual firm premia independent of worker composition, we repeat the analysis by classifying firms based on their average earnings net of observed worker characteristics (education, gender, experience).

The analysis is further restricted to firms in the non-agricultural private sector as in (Haltiwanger J. , Hyatt, Kahn, & McEntarfer, 2018) and in addition excludes the offshore and mining/extraction industries. Since the public sector in Norway plays a more important role than in the United States we test whether our findings with respect to employment mobility change significantly when explicitly distinguishing between public-sector employment and non-employment.[11] Time series are seasonally adjusted.[12]

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[11] Figure A2 in the appendix shows that flows between private and public sector employment make up only a small part (3%) of overall flows. There is a small outflow from low- and especially middle-wage firms to the public sector, and a very small net inflow at high-wage firms. Overall, there is a small outflow from the private sector to the public sector – which is mainly driven by going from middle-wage firms. By conflating public sector and employment flows there is some underestimation of the net inflow from non-employment to middle-paying firms.

[12] This is done by regressing the real wage and frequencies of moves on quarter dummies over the entire period at the cell level - defined by all possible combinations of origin firm type, destination firm type, categories of education, age and gender - and removing the common quarterly effect.

3. Job mobility and reallocation

This section documents the role of job mobility, both between jobs in different firms and in and out of employment, for the efficiency of job reallocation. It starts by documenting aggregate patterns related to job mobility and job reallocation. It then analyses in more detail how the process of job reallocation varies over the business cycle and across different socio-economic groups.

3.1. Aggregate patterns in job mobility, excess turnover and reallocation

Overall job mobility is lower in Norway than with the United States

Overall job mobility is significantly lower in Norway than in the United States (Figure 4, all firms). The overall job mobility rate, defined by the sum of hires and separations in employment, equals 17 % in Norway and 31% in the United States. In other words, overall job mobility is almost twice as high in the United States as in Norway. Low mobility in Norway reflects both lower job-to-job mobility– less than half that in the United States – and lower employment mobility – about two thirds of the rate in the United States. Low job-to-job mobility in Norway may reflect the role of wage compression for the incentives of workers to move to better paying firms. Low employment mobility in Norway may indicate that Norwegian workers face a lower risk of job loss relative to their counterparts in the United States.

Overall job mobility is higher in low-wage than in high-wage firms in both Norway and the United States. The overall job mobility rate in low-wage firms, defined as firms in the bottom 20% of the firm-wage distribution, is 33% in Norway and 50% in the United States, while the job mobility rate in high-wage firms, defined here as firms in the top 40% of the firm-wage distribution, is 13% in Norway and 18% in the United States. In both countries, both job-to-job and employment mobility are higher in low-wage firms. While the relative importance of both types of mobility is broadly similar among low and high wage firms in the United States, in Norway the share of mobility made up by employment mobility is substantially higher in low-wage firms (70%) than in high-wage firms (50%). The job-to-job mobility rate declines much less over the firm wage distribution in Norway than in the United States.

Importantly, overall job mobility in both Norway and the United States overwhelmingly reflects excess turnover (not shown), i.e. does not result in changes in net employment or the structure of employment between firm types. Consequently, the importance of overall job mobility says little about the role of job mobility for the efficiency of job reallocation towards higher-wage firms.[13]

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[13] To some extent, this reflects the fact that the current paper only distinguishes three different firm types. Distinguishing a greater number of firm types reduces the relative importance of excess turnover.

Figure 4. Overall job mobility is low in Norway compared with the United States

The overall job mobility rate, the job-to-job mobility rate and the employment mobility rate by firm type, average for 1998Q1-2011Q4
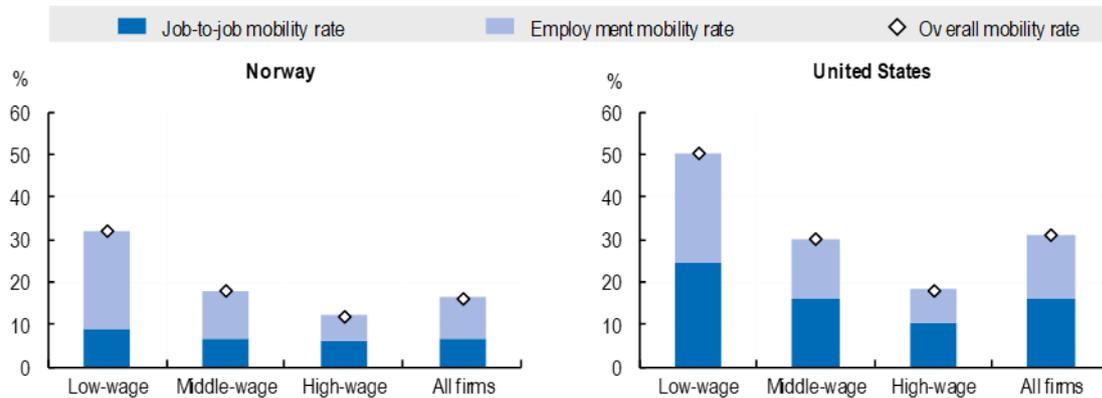
Note: Job-to-job mobility rate: the sum of hires and separations associated with direct job-to-job moves as a percentage of employment; Employment mobility rate: the sum of hires and separations associated with movements in and out of employment as a percentage of employment; Overall mobility rate: the sum of hires and separations as a percentage of employment. Low-wage firms: firms with average pay in the bottom quintile of the firm-wage distribution; Middle-wage firms: firms offering average pay in the second and third quintiles of the firm-wage distribution; High-wage firms: firms offering average pay in the top two quintiles of the firm-wage distribution.
Source: Employment and poaching flows in the United States are based on Haltiwanger et al. (2018). Calculations for Norway are based on employer-employee registry data (*Aa-registeret*) and the end-of year certificate register (*lto-registeret*).

The speed of worker reallocation from low to high-wage firms is similar in Norway and United States

The labour market reallocates jobs similarly quickly from low to higher-wage firms in Norway than in the United States (Figure 5). This is surprising in light of the much greater degree of job mobility in the United States and the presence of larger pay differences between firms. This apparent puzzle can be understood better when decomposing overall job mobility into job-to-job and employment mobility.

Job-to-job mobility is an important source of job reallocation from low to higher wage firms in both countries, but more important in the United States. However, employment mobility plays the opposite role by slowing the pace of job reallocation, and is also more important in the United States. The reason why the pace of job reallocation is similar in both countries is therefore that job-to-job and employment mobility contribute in opposite directions to job reallocation.

Job-to-job mobility contributes to job reallocation because high-wage firms expand by poaching workers from lower-wage firms. The contribution of job-to-job mobility to job reallocation is more important in the United States because larger wage differences between firms make it easier for high-wage firms to poach workers from lower-wage firms. Employment mobility reduces the pace of job reallocation because low-wage firms stem the effects of poaching by high-wage firms on employment by hiring workers from non-employment. These findings are in line with a recent Danish study (Bertheau, Bunzel, & Vejlin, 2020) who also find that employment growth at high-wage firms is driven wholly

by poaching flows. They find very little overall growth however as there is a large counteracting employment flow out of high-wage firms.

Figure 5. The speed of reallocation from low to high-wage firms is similar in Norway and the United States
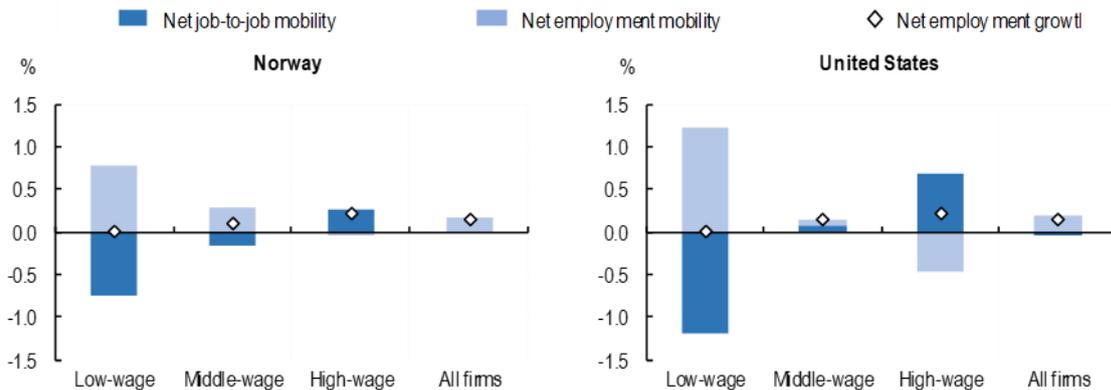
Note: <u>Net job-to-job mobility</u>: the differences in hires and separations associated with direct job-to-job moves as a percentage of employment; <u>Net non-employment mobility</u>: the difference in hires and separations associated with movements in and out of private sector employment as a percentage of employment; <u>Net employment change</u>: the differences in hires and separations as a percentage of employment. <u>Low-wage firms</u>: firms with average pay in the bottom quintile of the firm-wage distribution; <u>Middle-wage firms:</u> firms offering average pay in the second and third quintiles of the firm-wage distribution; <u>High-wage firms</u>: firms offering average pay in the top two quintiles of the firm-wage distribution.
Source: Employment and poaching flows in the United States are based on Haltiwanger et al. (2018). Calculations for Norway are based on employer-employee registry data (*Aa-registeret*) and the end-of year certificate register (*lto-registeret*).

3.2. Reallocation between low and high wage firms over the business cycle

While the analysis so far explains why low-wage firms simultaneously recruit workers from non-employment and lose workers to higher-wage firms it does not explain why high-wage firms poach workers from low-wage firms while at the same time exhibit net outflows to non-employment. One possible explanation may be that average flows over time hide important fluctuations over the business cycle. This section therefore analyses the role of job mobility for job reallocation by differentiating between periods of negative and positive employment growth.

Job reallocation is pro-cyclical in the United States, but counter-cyclical in Norway

Employment in the United States is more pro-cyclical in high-wage firm than in low-wage firms, with high-wage firms expanding more quickly in good times, but also contracting more quickly in bad times. As a result, job reallocation from low to high wage firms is concentrated in good times, while it tends to come to a standstill during bad times, i.e. job reallocation in the United States is strongly pro-cyclical. This is consistent with recent work for the United States. For example, Moscarini and Postel-Vinay (2012) show that employment is more cyclical in large than in small firms. They argue that this reflects the weaker incentives of large firms to hoard workers during bad times. Since larger firms tend to be more productive, they can poach workers from smaller firms during expansions relatively easily by offering higher wages.

By contrast, employment tends to be more pro-cyclical in low-wage firms in Norway. This means that job reallocation is counter-cyclical, i.e. stronger in periods of negative employment growth, consistent with the "cleansing effect" of recessions (Caballero & Hammour, 1994) and similar evidence for Denmark (Bertheau, Bunzel, & Vejlin, 2020). This may reflect the fact that it is more difficult for more productive firms in Norway to poach workers from low productivity firms during expansions due to the role of sector-level bargaining – which compresses wages mainly between firms within sectors – in combination with wage coordination – which tends to compress wages mainly between sectors. As a result, differences between low and high wage firms in access to credit may play a relatively more important role in determining the cyclicality of net hires from non-employment in Norway (Sharpe & A, 1994; Gertler & Gilchrist, 1994).

Differences in the cyclicality of job reallocation between Norway and the United States largely reflect the role of employment mobility. Employment mobility contributes to the stronger pro-cyclicality of low-wage employment in Norway and the stronger pro-cyclicality of high-wage employment in the United States. The role of job-to-job mobility for reallocation in good and bad times is qualitatively similar in both countries, although it tends to be more positive in good times, and particularly so in the United States (Haltiwanger J. , Hyatt, Kahn, & McEntarfer, 2018).

Figure 6. Job reallocation is pro-cyclical in the United States, but counter-cyclical in Norway

Employment growth by firm type and sub-period and the contributions of net job-to-job mobility and net employment mobility, average over periods with negative and positive employment growth, 1998Q1-2011Q4

A. During years with negative employment growth

B. During years with positive employment growth

Note: Net job-to-job mobility: the differences in hires and separations associated with direct job-to-job moves as a percentage of employment; Net non-employment mobility: the difference in hires and separations associated with movements in and out of employment as a percentage of employment; Net employment change: the differences in hires and separations as a percentage of employment. Low-wage firms: firms with average pay in the bottom quintile of the firm-wage distribution; Middle-wage firms: firms offering average pay in the second and third quintiles of the firm-wage distribution; High-wage firms: firms offering average pay in the top two quintiles of the firm-wage distribution.
Source: Employment and poaching flows in the United States are based on Haltiwanger et al. (2018). Calculations for Norway are based on employer-employee registry data (*Aa-registeret*) and the end-of year certificate register (*lto-registeret*).

3.3. Reallocation between low and high firms for different groups of workers

Job reallocation from low to high wage firms is not only important for aggregate wage growth, but also for the career progression of workers. However, there are important differences in the role of job reallocation across workers groups.

3.3.1. Job reallocation disproportionately benefits high-skilled workers in Norway, but low-skilled workers in the United States

In Norway, college-educated workers account for a disproportionate share of workers leaving low-wage firms to higher wage firms (35%) and entering high-wage firms from lower-wage firms (30%), compared with an employment share of 23% (Figure 7, Panel A). Moreover, hiring from non-employment by low-wage firms consists almost entirely of workers without college education, while hiring from non-employment in high-wage firms consists almost exclusively of college-educated workers. In the United States, by contrast, less educated workers account for a disproportionate share of flows from low-wage firms to higher-wage firms (11%) and from lower wage firms to high-wage firms (18%), compared with a population share of 27%. College-educated workers are also over-represented in flows from high-wage firms to non-employment (39%).[14] The greater importance of the job ladder for low-skilled workers reflects the limited propensity of high-wage firms in the United States to hoard low-skilled labour in bad times and recruit from non-employment in good times.

Job reallocation is crucial for the career progression of young workers

Job-to-job mobility up the wage ladder is crucial for the career progression of young workers in both Norway and the United States (Panel B). Young workers aged 35 or less account for a disproportionate share of job-to-job flows from low-wage firms to higher wage firms and from lower-wage to high-wage firms (more than 80%) compared with an employment share of about 40% in both countries. Net movements into employment are positive for young workers in both low and high wage firms in both countries due to labour market entry, whereas they tend to be negative for older workers due to the role of early retirement. Interestingly, younger workers are relatively more likely to enter high-wage firms in Norway than in the United States, while older workers are more likely to retire early from high-wage firms in the United States than in Norway. This could reflect the possibility that formal education plays a more important role in determining in which firms young workers enter the labour market in Norway, while upward job mobility plays a greater role in the United States.

Job mobility to high-wage firms is somewhat lower for women in in Norway

Men and women account for a similar share of job-to-job flows out of low-wage firms in Norway to higher wage firms (46%), but men account for a disproportionate share of job-to-job flows to high-wage firms from lower-wage firms (36%, Panel C). One possible explanation could be that women are less well positioned to take advantage of career opportunities in high-wage firms due to for example the need for putting in long working hours and the role of family responsibilities. While no data are available for the United States, Barth et al. (2017) show that job-to-job mobility explains a significant part of the increase in the gender gap over the working life, particularly for the low-skilled.

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[14] The full results for three types of firms are reported in Table A2 of the Annex.

Figure 7. The relative importance of different socio-demographic groups in reallocation flows

Net job-to-job flows by firm type decomposed into different socio-demographic groups, 1998 Q1-2011Q4

Panel A. Less versus more highly educated
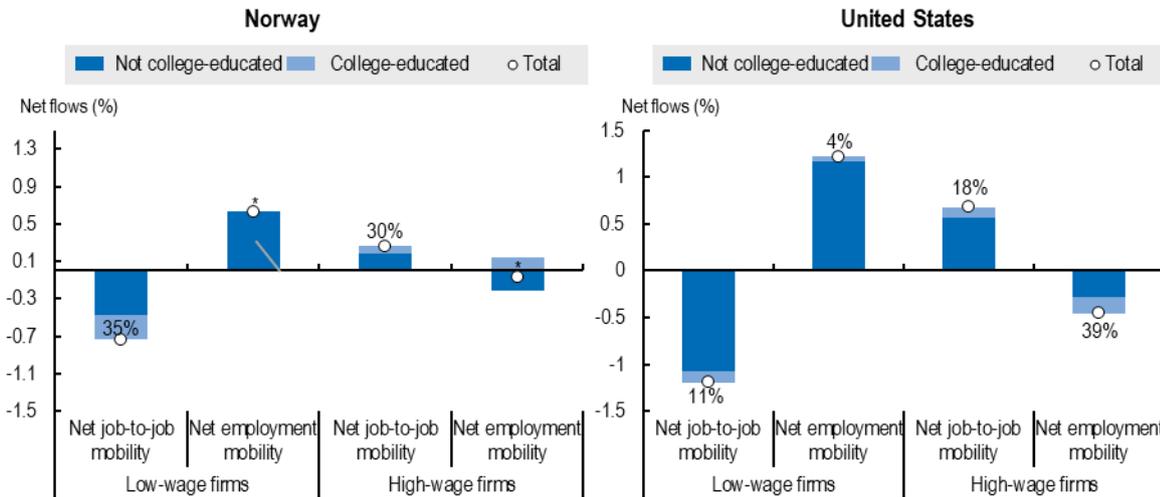
Panel B. Young versus old
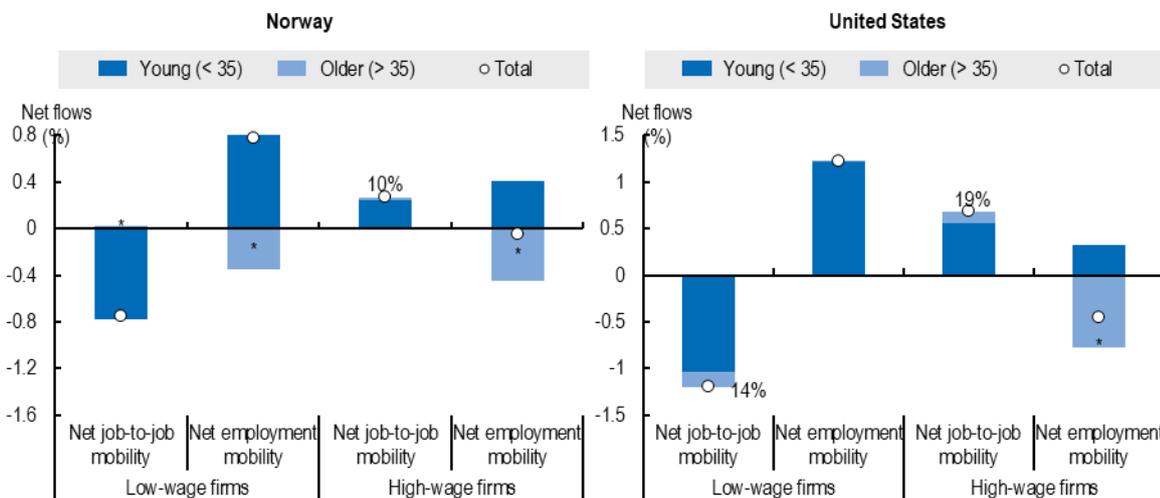
Panel C. Men versus women
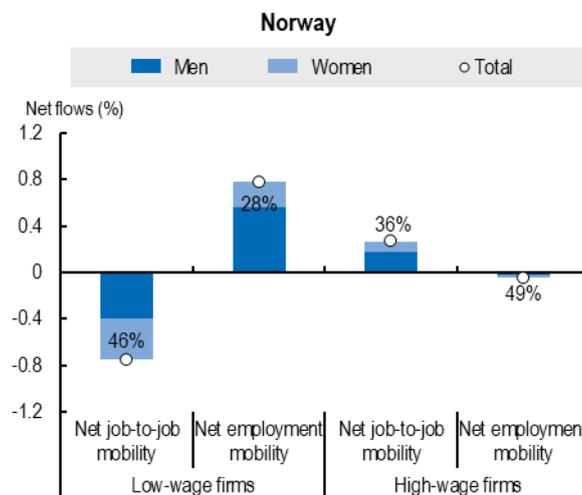
Note: <u>Net job-to-job mobility</u>: the differences in hires and separations associated with direct job-to-job moves as a percentage of employment by firm type; <u>Net employment mobility</u>: the difference in hires and separations associated with movements in and out of employment as a percentage of employment by firm type. <u>Low-wage firms</u>: firms with average pay in the bottom quintile of the firm-wage distribution; <u>High-wage firms</u>: firms offering average pay in the top two quintiles of the firm-wage distribution. Total flows are decomposed by education level, age and gender. If flows for a specific group go in the same direction as the total their share is shown (high educated, older and women).

Source: Net job-to-job flows for different firm types by groups and the overall share of groups in the workforce for the United States are based on Haltiwanger, Hyatt and McEntarfer (2018). Calculations for Norway are based on employer-employee registry data (*Aa-registeret*) and the end-of year certificate register (*lto-registeret*).

4. Job mobility, reallocation and aggregate wage growth

This section describes the three main components of aggregate wage growth following the framework laid out in Section 2: i) on-the-job wage growth; ii) wage growth associated with job-to-job mobility; and iii) wage growth associated with employment mobility. It first discusses the components of aggregate wage growth on average for the period since the late 1990s/early 2000s and then discusses their contribution to the slowdown of aggregate wage growth. The results are reported in Table 1.

On the job-wage growth is the main source of aggregate wage growth, while job-to-job mobility also plays an important role in the United States

On the job-wage growth is the main source of wage growth in Norway and the United States. However, on-the-job wage growth is consistently higher in Norway, averaging 4.6% compared with 2.9% in the United States during the period 2001-2011, despite exhibiting lower wage growth overall. The relative importance of on-the-job wage growth in Norway reflects both higher average wage growth among job stayers and a higher incidence of job stayers (as documented in the previous section).

In the United States, job-to-job mobility constitutes an important source of aggregate wage growth, contributing 2.7% to aggregate wage growth on average during the period 2000-2011. By contrast, in Norway, the contribution of job-to-job mobility is negative.[15] The greater importance of job-to-job mobility for aggregate wage growth in the United States reflects both its greater importance for the reallocation of jobs from low to high wage firms as discussed in the previous section and the larger wage gains associated with job mobility from low to high wage firms as well as between firms paying similar wages.

Employment mobility contributes negatively to aggregate wage growth in both countries and more so in the United States. The contribution of employment mobility to aggregate wage growth is negative because of cohort effects associated with the labour market entry of young inexperienced workers – often with below-average wages - and the retirement of older experienced workers – with typically above-average wages. To the extent that earnings-experience profiles are steeper in the United States such cohort effects may be more important there.

Weakening aggregate wage growth reflects slower on-the-job wage growth and in the United States also a weaker contribution of job-to-job mobility

In both countries, the slowdown in aggregate wage growth is mainly due to a decrease in the average wage gains for job stayers. In Norway, on-the-job wage growth has tended to decline from 5.6% in the late 1990s to 3.0% in the early 2010s, accounting for the entire slowdown in aggregate wage growth over the period. In the United States, the decline in aggregate wage growth is both attributable to a decline in on-the-job wage growth and to a lesser extent weaker wage growth associated with job-to-job mobility. Composition effects

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[15] This may reflect various factors. A first possibility is that excess turnover reflects a larger share of involuntary job-to-job movements in Norway. One explanation could be that wage compression reduces incentives for voluntary job-to-job movements. A second possibility is that workers accept initially lower wages after moving in return for higher future wage growth (Postel-Vinay & Robin, 2002). A third possibility is measurement error in the earnings data related to the last year of a job due the role of bonus or other payments that pile up at the end of the employment relationship.

have tended to become less negative, particularly during the financial crisis, mitigating the slowdown in aggregate wage growth. These findings are broadly consistent with research for the United States (Daly & Hobijn, 2017; Hahn J. K., Hyatt, Janicki, & Tibbets, 2017).

While the relative importance of on-the-job wage growth for aggregate wage growth may be striking, it should not be interpreted as evidence that job mobility is not important. Indeed, at least some part of on-the-job growth is likely to reflect the role of outside opportunities and the threat of poaching. Such interactions between on-the-job wage growth and job-top-job mobility are not taken into account in the accounting exercise conducted here. Another factor that may lead one to understate the role of job mobility for aggregate wage growth is that the current exercise only focuses on the direct effects that accrue to workers that move, while in practice some of the benefits of job mobility and improved job matching may also occur to co-workers and firms (Cornelissen, Dustmann, & Schönberg, 2017).

Table 1. The sources of aggregate wage growth in Norway and the United States

Average annual growth rates (%)

Norway	1998-2014	(i) 1998-2000	(ii) 2001-06	(iii) 2007-11	(iv) 2012-2014	Change (i) to (iv)
Total wage growth	1.4	1.6	1.0	1.6	0.9	-0.8
Job-stayer	4.6	5.6	5.1	4.1	3.0	-2.7
Job-to-job	-1.4	-1.5	-1.4	-1.4	-1.5	0.0
Upward reallocation	0.2	0.3	0.3	0.2	0.1	-0.2
Downward reallocation	-1.0	-1.1	-1.0	-1.0	-1.1	0.0
Excess job-to-job	-0.6	-0.7	-0.7	-0.6	-0.6	0.1
Employment mobility	-1.8	-2.5	-2.7	-1.1	-0.6	1.9

United States	2001-11		(ii) 2001-06	(iii) 2007-11		Change (ii) to (iii)
Total wage growth	2.8		3.6	1.9		-1.7
Job-stayer	2.9		3.6	2.1		-1.5
Job-to-job	2.7		3.0	2.3		-0.7
Upward reallocation	2.3		2.5	2.1		-0.4
Downward reallocation	1.1		1.3	1.0		-0.3
Excess job-to-job	-0.8		-0.8	-0.7		0.1
Employment mobility	-2.8		-3.0	-2.5		0.5

Note: The table shows average annual wage growth decomposed into the contributions of job stayers, job-to-job movers, and movers into and out of non-employment. These contributions are based on the average wage growth for job stayers and job-to-job movers and the average difference in wages between workers leaving to non-employment and new entrants as well as the proportion of each of these groups in employment.
Source: For the United States, mobility rates and average wages are based on Hahn et al. (2018), while the distribution of job-to-job moves (upward, downward, excess) and the average wage change is based on the work by Haltiwanger et al. (2018). Calculations for Norway are based on employer-employee registry data (*Aa-registeret*) and the end-of year certificate register (*lto-registeret*).

Concluding remarks

Norway and the United States exemplify widely different approaches to economic performance and social progress. While Norway places a greater emphasis on the role of public institutions and the social partners for achieving strong and broadly shared productivity gains, the United States relies more heavily on the efficiency of markets to achieve good outcomes for firms and workers. Yet, both countries face important challenges due to a combination of slowing wage and productivity growth, a declining labour share and rising wage inequality.

In an effort to enhance our understanding of the way economic and social progress materialises under different institutional settings, this paper focuses on the role of job mobility for reallocation and aggregate wage growth in Norway and the United States. To this end, the paper mobilises detailed linked employer-employee data that allow following workers across firms and in and out of employment, while tracking their earnings as they evolve in their jobs or move to different firms. This allows shedding light on the role of job mobility for the career progression of workers, the reallocation of workers between low and high wage firms as well as aggregate economic and labour market performance. The main findings on these elements can be summarised as follows:

- *The speed of worker reallocation from low to high-wage firms is similar in Norway and the United States,* despite the much lower rate of overall job mobility in Norway. There is therefore no indication that wage compression in Norway slows job reallocation. To shed light on this issue, overall job mobility is decomposed into movements in and out of employment and movements from job to job. This shows that job-to-job mobility contributes to job reallocation from low to high-wage firms, but that employment mobility tends to reduce it. This counteracting role of employment mobility – employment inflows to low-wage firms and employment outflows from high-wage firms – is more important in the United States than in Norway, resulting in similar net flows from low-wage to high-wage firms in both countries.

- *Job reallocation tends to be counter-cyclical in Norway, but pro-cyclical in the United States.* Job reallocation from low to high-wage firms is pro-cyclical in the United States, i.e. employment in high-wage firms is more pro-cyclical than in low-wage firms, possibly reflecting weak incentives for labour hoarding in high-wage firms during economic downturns. By contrast, in Norway job reallocation is countercyclical, consistent with the "cleansing effect" of recessions. Differences in the cyclicality of job reallocation between Norway and the United States largely reflect the role of employment mobility.

- *Job reallocation mainly benefits high-skilled workers in Norway, but low-skilled workers in the United States.* The greater importance of the job ladder for low-skilled workers reflects the limited propensity of high-wage firms in the United States to hoard low-skilled labour in bad times and recruit from non-employment in good times. Job-to-job mobility up the wage ladder is crucial for the career progression of young workers in both countries. Job-to-job mobility to high-wage firms is somewhat lower for women in in Norway (no comparable data are available for the United States).

- *Weak and slowing wage growth is mainly due to lower on-the-job wage growth.* On-the-job wage growth is the main source of aggregate wage growth in both Norway and the United States and the main factor behind the slowdown in wage growth since the late 1990s/early 2000s. In the United States, weaker wage growth as a result of job-to-job mobility also contributed to the slowdown in aggregate wage growth. Changes in the composition of employment due to young workers entering and old workers leaving the workforce tended to mitigate the slowdown in aggregate wage growth.

The main question for policy makers may therefore not be how to promote overall job mobility, but rather how job mobility can be made more effective from the perspective of workers, firms and the economy as a whole. This paper does not analyse how this can be achieved. However, effective employment and social policies that promote the efficiency of job matching are likely to be key. The role of wage-setting institutions is complex. While a more compressed wage structure is likely to slow job mobility as it reduces incentives for job search, it also is likely to affect the extent and nature of labour demand by firms. There is no indication that wage compression is associated with a reduced efficiency of job matching in Norway. While wage compression could reduce the scope of poaching workers by high-wage firms, it may also make high-wage firms more willing to hire workers from non-employment. The greater scope for poaching in the United States may increase the signalling value of being employed, resulting in discrimination against those out of work.

Annex A.

Figure A1. Relative wage change for workers who move between firms

Real quarterly earnings (in Norwegian Krone) before and after move by origin and destination firm by quintile of the firm-wage distribution
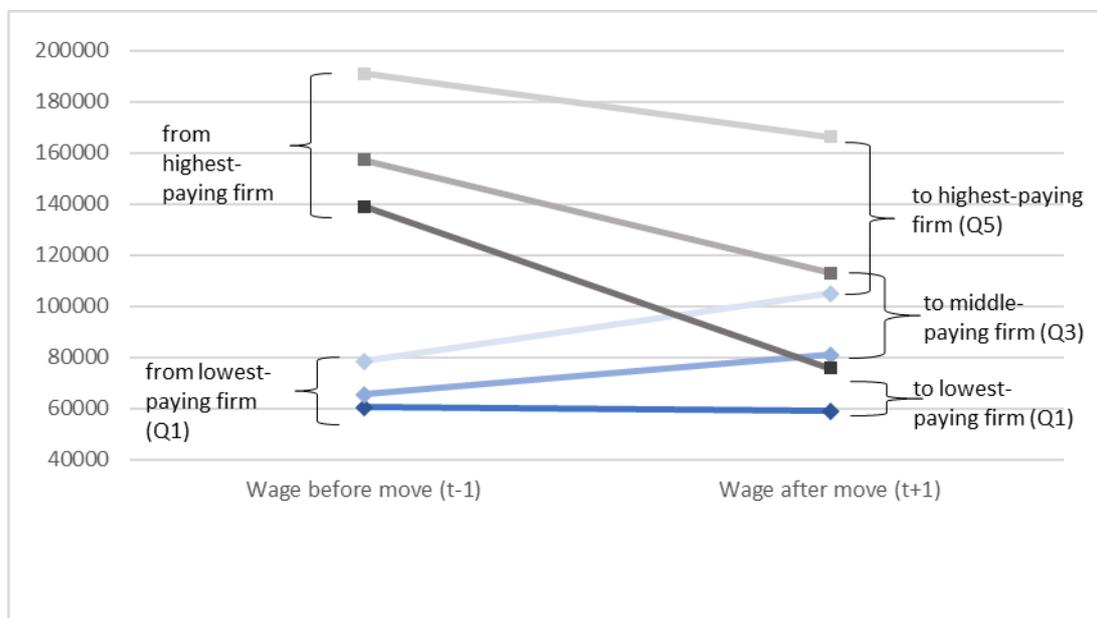

Note: The figure shows the wage (real Norwegian krone) in the quarter prior and the quarter after moving between employers in Norway 1998-2014 for a balanced sample of workers with the average wage prior to the move (left) and after the move (right) grouped by their firm type in the previous firm (left) and after the move (right). Firms are grouped by the firm-average wage: lowest quintile, middle quintile, top quintile.
Source: Calculations for Norway are based on employer-employee registry data (*Aa-registeret*) and the end-of year certificate register (*lto-registeret*).

Figure A2. Public sector flows are minor part of non-private sector employment flows

Total and net mobility over firm wage distribution from 1998-2011 in Norway
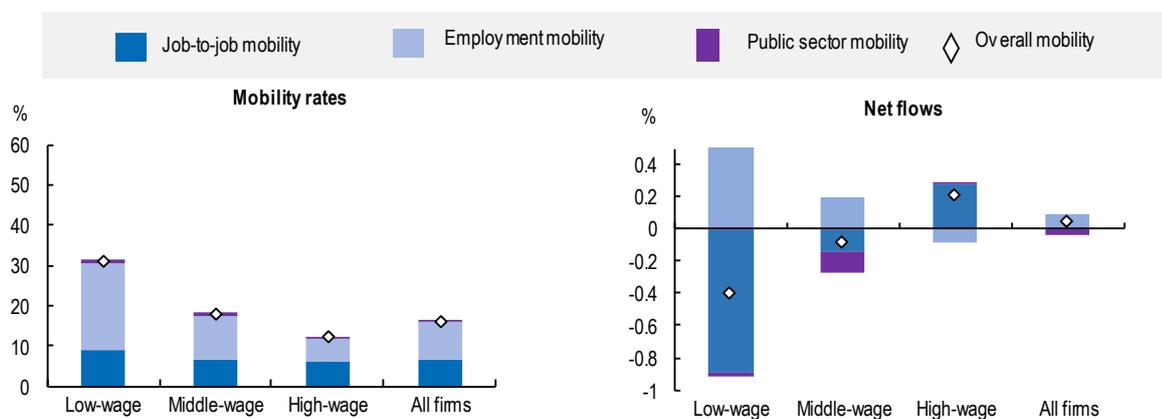
Note: The figure shows total mobility and net mobility, decomposed into job-to-job; flows in and out of non-employment and the private sector; and flows in and out of public sector and the private sector.

Source: Calculations for Norway are based on employer-employee registry data (*Aa-registeret*) and the end-of year certificate register (*lto-registeret*).

References

Andrews, D., Criscuolo, C., & Gal, N. (2016). *The best versus the rest: The global productivity slowdown, divergence across firms, and the role of public policy.* OECD Publishing. Retrieved 06 26, 2019, from https://www.oecd-ilibrary.org/docserver/63629cc9-en.pdf?expires=1561561712&id=id&accname=ocid84004878&checksum=2720FBCA062783DCDB0AA3EB4F00B6C9

Andrews, D., Nicoletti, G., & Timiliotis, C. (2018). Digital technology diffusion: A matter of capabilities, incentives or both? *OECD Economics Department Working Papers*(1476).

Arnold, J., Nicoletti, G., & Scarpetta, S. (2008). Regulation, allocative efficiency and productivity in OECD countries: industry and firm-level evidence. *OECD Economics Department Working Paper*(616).

Autor, D., Dorn, D., Katz, L. F., Patterson, C., & Van Reenen, J. (2017). Concentrating on the Fall of the Labor Share. *American Economic Review, 107*(5), 180-185.

Barth, E., & Kerr, S. (2017). The Dynamics of Gender Earnings Differentials: Evidence from Establishment Data*. Retrieved 06 22, 2018, from http://fmwww.bc.edu/EC-P/wp923.pdf

Barth, E., Bryson, A., Davis, J. C., & Freeman, R. (2016). It's Where You Work: Increases in the Dispersion of Earnings across Establishments and Individuals in the United States. *Journal of Labor Economics, 34*(S2), S67-S97.

Barth, E., Bryson, A., Davis, J., & Freeman, R. (2016). It's Where You Work: Increases in the Dispersion of Earnings across Establishments and Individuals in the United States. *Journal of Labor Economics, 34*(S2), S67-S97. doi:10.1086/684045

Barth, E., Moene, K., & Willumsen, F. (2014). The Scandinavian model—An interpretation. *Journal of Public Economics, 117*, 60-72. doi:10.1016/J.JPUBECO.2014.04.001

Berlingieri, G., & Criscuolo, C. (2017). The Great Divergence(s). *OECD Science, Technology and Innovation Policy Papers*(39).

Berlingieri, G., Calligaris, S., & Criscuolo, C. (2018). The productivity-wage premium: Does size still matter in a service economy. *OECD Science, Technology and Industry Working Papers*(13).

Bertheau, A., Bunzel, H., & Vejlin, R. (2020). Employment reallocation over the business cycle: evidence from Danish data. *IZA Discussion Paper Series*.

Bertheau, A., Bunzel, H., & Vejlin, R. (2020). *Employment Reallocation over the Business Cycle: Evidence from Danish Data.* Retrieved 11 13, 2020, from www.iza.org

Caballero, R., & Hammour, M. (1994). The Cleansing Effect of Recessions. *Quarterly Journal of Economics*. Retrieved 11 13, 2020, from http://about.jstor.org/terms

Card, D., Cardoso, A. R., Heining, J., & Kline, P. (2018). Firms and Labor Market Inequality: Evidence and Some Theory. *Journal of Labor Economics, 36*(S1), S13-S70.

Card, D., Heining, J., & Kline, P. (2013). Workplace Heterogeneity and the rise of West German wage inequality. *The Quarterly Journal of Economics, 123*(3), 967-1015.

Cornelissen, T., Dustmann, C., & Schönberg, U. (2017). Peer Effects in the Workplace †. *American Economic Review, 107*(2), 425-456. doi:10.1257/aer.20141300

Criscuolo, C., Hijzen, A., Leidecker, T., Schwellnus, C., & Zwysen, W. (2019). *Productivity and Pay: The Role of Firms in Wage Inequality Developments.*

Criscuolo, C., Hijzen, A., Schwellnus, C., Barth, E., Chen, W.-H., Fabling, R., . . . Zwysen, W. (2020). Workforce composition, productivity and pay: The role of firms in wage inequality developments. *IZA DP 13212.*

Dale-Olsen, H., & Nilsen, K. M. (2009). *Lønnsspredning, lederlønninger og andre topplønninger i det norske arbeidsmarkedet .*

Daly, M. C., & Hobijn, B. (2017). Job change and earnings growth: Composition and Aggregate Real Wage Growth. *American Economic Review: Papers & Proceedings, 107*(5), 349-352.

Davis, S., Haltiwanger, J., & Schuh, S. (1998). Job Creation and Destruction. *MIT Press Books, 1.* Retrieved 12 08, 2020, from https://ideas.repec.org/b/mtp/titles/0262540932.html

Doeringer, P. B., & Piore, M. J. (1985). *Internal Labor Markets and Manpower Analysis.* Routledge.

Eriksson, S., & Rooth, D. (2014). Do employers use unemployment as a sorting criterion when hiring? evidence from a field experiment. *American Economic Review, 104*(3), 1014-1039. doi:10.1257/aer.104.3.1014

Faberman, J., & Justiniano, A. (2015). Job switching and wage growth. *Chicago Fed Letter*(337).

Fontaine, I., Gomes, P., & Vila-Martin, D. (2019). Labour market flows: Accounting for the public sector. In *IZA Discussion Paper.* Retrieved 10 07, 2019, from https://www.researchgate.net/publication/333611268_Labour_market_flows_Accounting_for_the_public_sector

Gertler, M., & Gilchrist, S. (1994). Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms. *The Quarterly Journal of Economics, 109*(2), 309-340. doi:10.2307/2118465

Hahn, J. K., Hyatt, H. R., Janicki, H. P., & Tibbets, S. R. (2017). Job-to-Job Flows and Earnings Growth. *American Economic Review: Papers & Proceedings, 107*(5), 358-363.

Hahn, J., Hyatt, H., & Janicki, H. (2018). Job Ladders and Growth in Earnings, Hours, and Wages. *2018 Meeting Papers 908, Society for Economic Dynamics.*

Hahn, J., Hyatt, H., Janicki, H., & Tibbets, S. (2017). Job-to-Job Flows and Earnings Growth. *American Economic Review, 107*(5), 358-363. doi:10.1257/aer.p20171077

Hall, P., & Soskice, D. (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage. .* Oxford University Press.

Haltiwanger, J., Hyatt, H., & McEntarfer, E. (2018). Who Moves Up the Job Ladder. *Journal of Labor Economics, 36*(S1), S301-S336.

Haltiwanger, J., Hyatt, H., & McEntarfer, E. (2018). Who Moves Up the Job Ladder? *Journal of Labor Economics, 36*(S1), S301-S336. doi:10.1086/694417

Haltiwanger, J., Hyatt, H., Kahn, L., & McEntarfer, E. (2018). Cyclical Job Ladders by Firm Size and Firm Wage. *American Economic Journal: Macroeconomics, 10*(2), 52-85. doi:10.1257/mac.20150245

Haltiwanger, J., Hyatt, H., Kahn, L., & Mcentarfer, E. (n.d.). Cyclical Job Ladders by Firm Size and Firm Wage †. doi:10.1257/mac.20150245

How Do Industry, Firm and Worker Characteristics Shape Job and Worker Flows? (2009). Retrieved 10 30, 2018, from http://www.oecd.org/els/emp/45219606.pdf

Hyatt, H. R., & Spletzer, J. R. (2016). The shifting job tenure distribution. *Labour Economics, 41*, 363-377.

Hyslop, D. R., & Rice, A. (2019). Contributions of Employment Change to Annual Wage Growth in New Zealand. *The Australian Economic Review, 52*(1), 107-115.

Kahn, L. B., & McEntarfer, E. (2014). Employment cyclicality and firm quality. *NBER Working Paper Series, 20698*.

Kroft, K., Lange, F., & Notowidigdo, M. (2013). DURATION DEPENDENCE AND LABOR MARKET CONDITIONS: EVIDENCE FROM A FIELD EXPERIMENT*. *Quarterly Journal of Economics*. doi:10.1093/qje/qjt015

Lazear, E. P., & Shaw, K. L. (2009). Wage Structure, Raises and Mobility: An Introduction to International Comparisons of the Structure of Wages Within and Across Firms. In E. P. Lazear, & K. L. Shaw (Eds.), *The Structure of Wages: An International Comparison.* University of Chicago Press.

Moene, K., & Wallerstein, M. (1997). Pay Inequality. *Source: Journal of Labor Economics, 15*(3), 403-430. doi:10.1086/209866

Moscarini, G., & Postel-Vinay, F. (2012). The Contribution of Large and Small Employers to Job Creation in Times of High and Low Unemployment. *American Economic Review, 102*(6), 2509-2539. doi:10.1257/aer.102.6.2509

Moscarini, G., & Postel-Vinay, F. (2016). Wage Posting and Business Cycles. *American Economic Review: Papers & Proceedings, 106*(5), 208-213.

Moscarini, G., & Postel-Vinay, F. (2018). The Cyclical Job Ladder. *Annual Review of Economics, 10*, 165-188.

OECD. (2006). *OECD Employment Outlook 2006.* OECD Publishing.

OECD. (2018). *The Productivity-Inclusiveness Nexus.* OECD Publishing.

OECD. (2019). Workforce composition, productivity and pay: The role of firms in wage inequality developments.

OECD. (n.d.). Workforce composition, productivity and pay: The role of firms in wage inequality developments.

Postel-Vinay, F., & Robin, J.-M. (2002). Equilibrium Wage Dispersion with Worker and Employer Heterogeneity. *Econometrica, 70*(6), 2295-2350. Retrieved 10 07, 2019, from https://ideas.repec.org/a/ecm/emetrp/v70y2002i6p2295-2350.html

Schwellnus, C., Kappeler, A., & Pionnier, P.-A. (2017). Decoupling of wages from productivity: Macro-level facts. *OECD Economics Department Working Papers, 1373*.

Schwellnus, C., Pak, M., & Pionnier, P.-A. (forthcoming). The impact of declining business dynamism and changing firm demographics on labour shares. *Economie et Statistique*.

Sharpe, & A, S. (1994). Financial Market Imperfections, Firm Leverage, and the Cyclicality of Employment. *American Economic Review, 84*(4), 1060-1074. Retrieved 10 07, 2019, from https://ideas.repec.org/a/aea/aecrev/v84y1994i4p1060-74.html

Song, J., Price, D. J., Guvenen, F., Bloom, N., & von Wachter, T. (2019). Firming Up Inequality. *The Quarterly Journal of Economics, 134*(1), 1-50.

Syverson, C. (2004). Product Substitutability and Productivity Dispersion. *The Review of Economics and Statistics, 86*(2).

Syverson, C. (2011). What Determines Productivity? *Journal of Economic Literature, 49*(2), 326-365. doi:10.1257/jel.49.2.326

Syverson, C. (2011). What Determines Productivity? . *Journal of Economic Literature, 49*(2), 326-365.