

How does finance influence labour market outcomes? A review of empirical studies

How finance influences labour market outcomes

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Abstract

Purpose – This paper reviews economic studies on the effects of various aspects of finance on labour market outcomes.

Design/methodology/approach – The paper is a systematic literature review that reviews the weight of the evidence on the relationships between specific elements of finance and labour outcomes. The review is divided into three major sections: (1) job quantity and job quality; (2) distributional effects; and (3) resilience and adaptability.

Findings – Finance interacts with labour market institutions to jointly determine labour outcomes. Firm financial structures influence their labour practices – highly leveraged firms show greater employment volatility during cyclical fluctuations, and leverage strengthens firm bargaining power in labour negotiations. Bank deregulation has mixed impacts on labour depending upon the state of prior bank regulations and labour markets. Leveraged buyouts tend to dampen acquired-firm job growth as they pursue labour productivity gains. The shareholder value movement may contribute to short-termism among corporate managers, which can divert funds away from firm capital accumulation toward financial markets, and crowd out productive investment. Declining wage shares of national income in most OECD countries since 1990 may be driven in part by financial globalisation. The financial sector contributes to rising income concentration near the top of the distribution in developed countries. The availability of finance is associated with increased reallocation of labour, which may either enhance or impede productivity growth. Finally, rising interest rate environments and homeowners with mortgage balances that exceed their home's value may reduce labour mobility rates.

Originality/value – This review contributes to the understanding of the effects of finance on labour by reviewing and synthesising a large volume of literature.

Keywords Wages, Capital structure, Unemployment, Financial integration, Financial regulation, Labour mobility

Paper type Literature review

1. Introduction

Finance in financially developed economies has far-reaching effects on economic outcomes, including productivity, jobs and incomes. Finance is likely to influence distinct stakeholders – asset-rich investors, white and blue collar workers, retirees, the unbanked – in different ways given their varied holdings of financial assets and liabilities. Workers of all types make up the largest group of these stakeholders, and finance may affect them in an economically

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meaningful way. This survey reviews existing research to shed light on the body of empirical work on the relationship between finance and workers.

The breadth of the literature on finance and workers is wide, ranging from macro analyses of finance and labour market outcomes to firm-level assessments of leveraged buyouts to worker-level studies of personal credit ratings' effect on employment and income. At the same time, the depth of the literature appears relatively shallow as the number of studies on a given sub-topic is insufficient to arrive at a consensus viewpoint in some cases. Nonetheless, this review helps to organise and assess the extant studies and intends to aid awareness of the current state of the literature.

This review organises the discussion by three main types of labour outcomes. First, *job quantity and job quality* focuses on the effects of finance on employment, unemployment and wages. Second, *distributional effects* concentrates on the impacts of finance on income inequality and national wage shares. Third, *resilience and adaptability* discusses finance and labour mobility and reallocation.

The *job quantity and job quality* section includes a broad range of studies that share a finance-related starting point for analysis. The finance topics include, among others, financial development and financial shocks, and each topic operates through different channels. For instance, financial development may influence labour outcomes through productivity and growth. Among less financially developed countries, [1] more access to finance provides liquidity and loosens capital constraints, allowing for increased investment that promotes higher productivity and economic growth. Resulting economic growth expands labour markets and drives associated employment and wage outcomes. Feedbacks and interactions can muddy these channels. For example, financial frictions such as limited contract monitoring and enforcement can impair the potential favourable effect of finance on productivity by constraining access to finance and distorting incentives. Likewise, employment protection can offer workers greater job security, but it can reduce productivity-enhancing allocative dynamism, which can hinder growth rates.

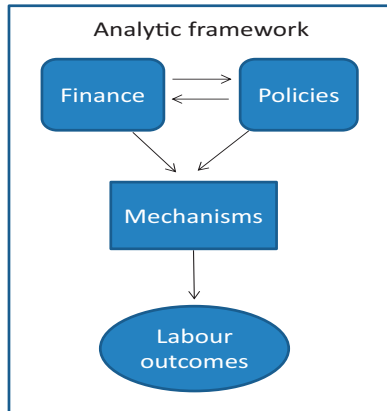
The *distributional effects* section highlights the means through which finance may influence income inequality. The potential finance-related channels influencing inequality appear to be diverse. For example, intra-state banking deregulation beginning in the 1970s in the United States facilitated access to capital, fuelled investment and boosted demand for unskilled labour, which reduced income inequality (Beck *et al.*, 2010). However, while there seems to be agreement in the literature that inequality is influenced by finance generally, whether deregulation or liberalisation will reduce inequality (and by what magnitude) is itself determined by a diverse range of factors, such as the particular channel of liberalisation in question and prior financial and institutional development (Delis *et al.*, 2014).

The *resilience and adaptability* section emphasises labour mobility and reallocation. One study suggests that financial development may have both reallocation-enhancing and reallocation-reducing effects (Pagano and Pica, 2012). Firms using finance to pursue new investment opportunities can contribute to growth and raise demand for workers. However, when low-productivity firms use finance as working capital, this may delay their exits and impede productive resource reallocation.

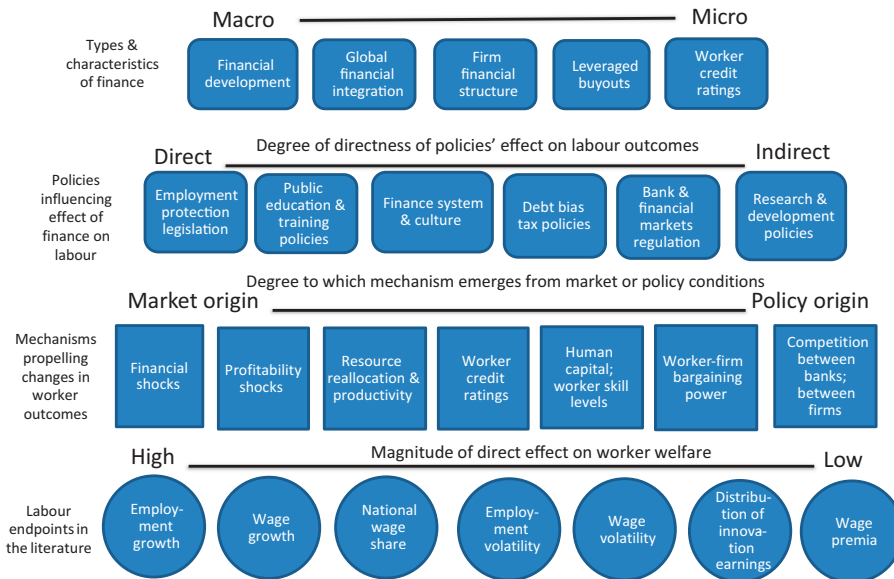
The resulting overview of the nexus between finance and workers helps illuminate this important relationship in an age of high financialisation in OECD countries. Nonetheless, the limited empirical work to date leaves unanswered questions that call for further research in order to better explain the interactions between finance, labour regulations and outcomes for workers.

Figure 1, Panel A, provides a framework for analysing the link between finance and labour market outcomes. It illustrates that the interaction of finance and policies generate impacts on labour through various channels. For example, bank finance and bank

Panel A. Finance and labour market outcomes: An analytic framework



Panel B. Finance and related factors influencing labour market outcomes



Source(s): OECD

Figure 1. Finance, policy and labour market outcomes

regulatory policies interact to generate credit flows which themselves interact with employment protection legislation (EPL) to affect labour outcomes through firm growth and reallocation channels.

Figure 1, Panel B, proposes an illustrative set of financial sector characteristics, policies influencing the effect of finance on labour, motivating mechanisms and labour market outcomes, ordered along relevant spectra. It highlights some of the drivers and pathways through which finance may influence labour market outcomes. The diagram conveys the variety of studies included in this review and the corresponding range of factors considered in

the analyses. It does not attempt to explain the relationships among the elements; the individual studies reviewed below provide such insights. The panel is not exhaustive, but it proposes that finance, policies and mechanisms influencing labour outcomes are heterogeneous, not necessarily well-coordinated and complex.

1.1 Reading this document

This paper is drafted with the intention of informing both analysts who read the entire document and those who read only selected sections. For this reason, the descriptions of the studies tend to be complete, even when the same study appears more than once. Those reading the full paper may elect to skim over the repeat descriptions of specific studies to save time.

2. Job quantity and job quality

2.1 Employment and unemployment

2.1.1 Employment. The literature suggests the effects of finance on employment are largely positive but depend on the type of finance, the countries and the development context as summarized in [Table 1](#) below. In brief (see [Table 1](#)), finance-related factors that appear to stimulate employment include financial development in non-OECD countries, some types of banking sector deregulation, positive financial shocks, and possibly removal of bankruptcy flags from individual credit ratings. Factors that may reduce employment include the effects of leveraged buyouts on acquired firms, banking crises, and negative credit shocks for firms. These diverging effects imply that finance is multifaceted and different facets can have countervailing effects on employment, which make it difficult to predict the net impacts. The empirical studies behind these findings are discussed in this section.

2.1.1.1 Financial development and employment. Recent empirical work shows that additional units of bank credit support economic growth in developing countries but excessive credit in developed countries tends to reduce growth rates [\[2\]](#). Is there similar evidence that bank lending yields contrasting outcomes for employment growth by level of development? [Pagano and Pica \(2012\)](#) examine the relationships between financial development and labour outcomes in 63 developed and developing countries from 1970 to 2003. They assess the effects of financial development (credit market) on employment growth and wage growth in sectors with high dependence on external finance, and find that it has no significant effects in a sub-sample of OECD countries. However, in a sub-sample of non-OECD nations, higher financial development does boost employment growth in finance dependent sectors (but has no effect on wage growth). This evidence does support a possible distinction in the effects of financial development on employment growth by the level of national development. The authors suggest that financial development affects employment more in non-OECD countries in part because firms there are more financially constrained.

2.1.1.2 Banking (de)regulation and employment. Prior research has suggested that significant state intervention in the banking sector, whether through state ownership or influence, subsidisation, or restrictive regulation, produces financial market distortions and reduces efficiency [\[3\]](#). Research by [Bertrand et al. \(2007\)](#) supports this hypothesis when extended to French labour markets. Specifically, the French banking reforms of 1985 increased bank competition and fostered a more efficient banking sector that better targeted credit flows. This improved allocative efficiency through asset and job reallocation, largely due to firm entry and exit. These changes raised employment, reduced average wages and increased outsourcing. Using firm-level panel data from 1978 to 1999 for regressions with interaction terms that differentiate firms' dependence on bank finance, they find large changes in capital structure among firms in sectors that were highly dependent on finance

before the reforms, with declines in debt and increases in equity and trade credit. After the reform, banks changed their lending practices, becoming much less willing to lend to poorly performing firms, but more ready to lend to high performers, when firms suffer negative performance shocks. This suggests that banks improved their screening and monitoring activities and placed more weight on the quality of borrowers. Firms in industries that strongly depend on bank loans saw greater employment growth after the reforms (but slower wage growth) compared with sectors less dependent on finance.

2.1.1.3 Financial shocks and employment. Previous studies have pointed to financial shocks as a source of overall volatility in the business cycle and the aggravation of labour-related shocks through increased financialisation [4]. Several studies examine the link between financial shocks and employment, and generally highlight a positive relationship. Two papers in this section identify changes in investment as a key channel through which employment effects occur, but the third paper considers the effects of financial shocks on employee bargaining power to be the primary mechanism.

Zanetti (2015) not only finds support for the real labour implications of financial volatility, but also shows evidence of feedback loops between labour shocks and financial outcomes, wherein shocks to job destruction rates influence the way firms' financial flows interact with labour market characteristics. Zanetti develops a dynamic stochastic general equilibrium model to provide insights on potential drivers of external shocks' effects on labour. The model shows that a positive financial shock through higher loan recovery rates results in increased hiring, higher wages and a drop in unemployment. This occurs through a sequence of responses. A lower firm loan default probability induces firms to reduce collateral capital and increase debt issuance, causing an eventual rise in investment. Firms increase hiring, which raises wages and reduces dividend payments. Conversely, a positive shock in the rate of job destruction increases unemployment and decreases investment and output.

Pagano and Pica (2012) expand on this hypothesis by tying the magnitude of the ultimate finance-induced labour shocks to financial development levels. They find that during banking crises, employment growth suffers disproportionately in sectors that depend more on external finance in countries with well-developed financial systems, while in normal times employment grows faster in these sectors and countries. Their test for a "dark side" of finance using sector-level data in 63 countries offers evidence that during banking crises, a higher total credit to GDP ratio is associated with lower employment growth in sectors dependent on external finance. However, a higher stock market capitalisation to GDP ratio shows no effect on employment growth in such sectors during crisis periods. They obtain these results using data that pre-date the Great Recession.

Monacelli *et al.* (2011) augment this hypothesis to show it also holds at firm level. They focus on the effects of credit market shocks on employment using a structural vector autoregression model that regresses the value of job vacancies on credit and employment variables, from 1984 to 2009. A standard "credit channel" *view* holds that credit-constrained firms may cut investment and employment due to limited access to capital. While that view helps explain widespread job losses during the Great Recession, the rapid rebound in liquidity after the crisis implies that employment should have recovered quickly. This paper argues instead that negative shocks to the availability of credit for firms allows for increases in the net surplus obtained by workers from wage bargaining, thus increasing their wages and lowering employment by firms (see "Financial shocks and wage rates" in section 2.2.1 for a discussion of firm debt and bargaining power). The authors posit that this bargaining-based model better explains the post-recession macroeconomy than a traditional credit-based model (which pins lower post-recession hiring and investment by firms on low liquidity).

2.1.1.4 Leveraged buyouts and employment. Leveraged buyouts (LBOs), whereby one firm gains a controlling interest in another with a mix of equity and debt, tend to rely heavily on financing to complete the transaction. The practice may be increasingly common and can

influence labour outcomes at the acquired firm. In light of this, how do LBOs affect employment, given their reputations for cost-cutting and efficiency enhancement? One reviewed paper shows that LBOs in the manufacturing sector can alter labour-management structures in a manner that incentivises efficiency gains. A second paper covering many sectors finds a modest decline in employment at the firm level, and reveals an economically meaningful decline in average earnings per worker. A third paper suggests that LBOs tend to slow employment growth rates among target firms.

US evidence suggests that LBOs affect acquired firms' labour practices and influence employment levels upward or downward, according to the type of job. [Lichtenberg and Spiegel \(1990\)](#) find that, during the period three years before a LBO to two years afterwards, manufacturing firms reduce the share of non-production workers and increase the compensation of production workers. This is consistent with [Jensen's \(1989\)](#) contention that LBOs can improve efficiency by "substituting incentives and compensation for direct monitoring by large bureaucratic staffs." Using a large plant-level database on manufacturing plants from 1983 to 1986, the authors test the hypothesis that LBOs can improve plant efficiency by implementing measures that substitute incentives and compensation for direct monitoring of workers. The data strongly support the hypothesis. The ratio of non-production (including managers) to production employees fell by 6.5% in buyout plants compared to the industry average, which is consistent with a decline in monitoring. Second, the compensation of production workers increased and compensation of non-production workers declined. The study suggests that LBOs of manufacturing firms improved the conditions of workers by reducing monitoring and raising wages in an effort to boost productive efficiency.

LBOs appear to result in modest employment losses at target firms. A study by [Davis et al. \(2014\)](#) covers buyouts of more than 3,000 target (acquired) firms in the United States from 1980 to 2005. Using non-parametric and regression techniques, they examine the effects of private equity acquisitions on employment and wages of acquired establishments and firms relative to control (non-acquired) establishments and firms in multiple sectors. The firm-level analysis captures the effects of post-buyout establishment births, acquisitions and divestitures. Relative to control firms, the target firms show less than a 1% decline in overall employment growth over two post-buyout years. Thus, while *organic* employment growth among post-buyout firms is substantially smaller than that of control firms, *overall* job growth is barely negative at the firm level, relative to control firms [5].

[Kaplan and Stromberg \(2008\)](#) review several studies and conclude that LBOs succeed by promoting operational efficiency and improved productivity in target firms. Productivity growth is consistent with slower employment growth, and the authors argue the weight of evidence supports this effect on employment.

2.1.1.5 Worker credit ratings and employment. The effects of credit information on noncredit outcomes like employment are important for welfare analysis. Since the financial crisis, personal credit ratings are increasingly used by employers as an input to their assessment of job candidates. The papers addressing this topic find mixed evidence on whether employers' reviews of personal credit ratings influence hiring decisions. However, the weight of the evidence appears to support the finding that negative credit information may reduce employment and income of the more vulnerable segments of the population.

[Dobbie et al. \(2016\)](#) and [Herkenhoff et al. \(2016\)](#) assess the effects of personal credit ratings on employment outcomes in the United States, using data on individuals filing for bankruptcy protection. Both studies use a difference-in-differences approach that analyses the effect of bankruptcy flag removal by comparing employment outcomes between individuals who have had the flag removed and those whose credit ratings still carry the flag. [Dobbie et al. \(2016\)](#) find no evidence of economically significant effects of flag removal on employment outcomes on average, over the period 1995–2004. This applies to effects on

employment and self-employment. The authors conclude that employers use a wide set of criteria to select among job applicants so that improvement in a credit report alone has no major effect on labour market outcomes among employers who run credit checks on job candidates. [Herkenhoff et al. \(2016\)](#) provide contrasting evidence using data from 2001 to 2007. They show that flag removal raises credit scores sharply and increases employment, compared to a cohort whose flags remain in place. Bankrupt individuals who transition into formal employment after flag removal (rather than before removal) tend to work at larger firms with non-wage benefits, and work more in jobs that require handling payments. The authors conjecture that one reason these individuals begin working at larger firms is that these firms may have previously declined to hire them due to the flags on their credit reports. Given that the authors do not have data that allows them to observe credit check activity directly, they acknowledge their evidence is not conclusive.

[Bos et al. \(2018\)](#) employ a unique identification strategy based on a natural experiment that isolates the effects of default flags on employment, wages, and self-employment in Sweden during 2000–2005. The paper analyses the effects of removal of negative credit information on employment and earnings of vulnerable groups in Sweden. The authors find that shorter retention durations of loan defaults on credit reports increases the probability of employment by 3% in the year default information is deleted, and a smaller boost persists for two subsequent years. This greater employment probability translates into about \$1,000 per year of higher annual wages, or 7% of the average earnings of the sample group. The main transmission channel is the employer use of credit reports to screen job candidates [6]. The study also tests the proposition that increased credit supply after deletion of negative credit information may help boost employment by facilitating the job search process or allowing investment in improved labour productivity. The results suggest that the credit supply channel may increase employment probabilities but the effects are relatively small.

The distinct outcomes between the [Dobbie et al. \(2016\)](#) and the [Bos et al. \(2018\)](#) analyses warrant comment. While it is possible that the labour market effects of removal of negative credit information differ between the United States and Sweden, all else equal, the contrasting samples and the divergent credit regulations in the two nations likely play a role in the findings. The sample examined by [Dobbie et al.](#) draws from consumers who went through formal bankruptcy processes, while the [Bos et al.](#) sample draws from consumers who defaulted on one or more pawn shop loans. The latter make up a substantially more economically marginalised group, as pawn shops are a last resort for credit [7]. Second, the difference in the durations of credit flags - three years in Sweden vs. seven or ten years in the US - could contribute to the divergent results. Employers who know a negative credit event on a job applicant's credit report occurred within the last three years might place more weight on that information relative to an event occurring over a longer duration, simply because the former appears more recent. These conjectures are consistent with the observation expressed by [Bos et al.](#) that negative events on credit reports have far more harmful employment effects for people with low education levels than for those with many years of schooling. The authors suggest that for well-educated individuals, credit information may be less relevant than other information like work experience, but less-educated people have fewer ways to signal their productivity.

2.1.1.6 Employment volatility. The studies reviewed here generally support the view that finance may increase employment volatility. Financial development, firm leverage and international financial integration tend to raise employment volatility. National financial models may indirectly affect volatility as well. In theory, finance could have opposing influences on employment volatility. On the one hand, access to finance may increase the investment options for firms, including hiring workers, but also potentially substituting capital for labour, which may raise employment volatility. On the other hand, finance may help firms to smooth their workforce spending in the face of unstable revenue conditions, which may reduce employment volatility.

Finance appears to affect the volatility of both hours worked and of income, sometimes differently according to worker skill levels. [Buch and Pierdzioch \(2014\)](#) use industry-level data across 11 countries from 1970 to 2004 to analyse domestic financial development and global financial integration [8]. The results suggest that domestic financial development increases the volatility of hours worked among medium- and high-skilled labour, but no effect was found for low-skilled workers. In contrast, greater global financial integration increases the volatility of hours worked only among low-skilled labour. The paper implies that financial integration reduces household adjustment costs for hours worked by facilitating access to consumption-smoothing finance. This affects primarily low-skilled workers because adjustment costs per unit of labour compensation are greater for them.

Firm leverage seems to affect employment volatility. [Sharpe \(1994\)](#) analyses firm-level data of more than 2,000 manufacturing firms from 1959 to 1985 to examine the potential employment effects of firm financial leverage during cyclical fluctuations. In models using macroeconomic instruments, he regresses employment growth on the change in industrial production to reflect the cycle, interacted with leverage. The results show that employment at highly leveraged firms is more sensitive to a decline in industrial production. This cyclical sensitivity is higher for firms manufacturing durable goods. In “accelerator model” simulations with instrumental variables and using changes in firm sales to represent cyclical fluctuation, highly leveraged durables manufacturers cut their labour force growth by over 40% more than would a zero leveraged (no net debt) durables firm in response to a 10% cut in sales. Thus, more leveraged firms lay off workers more rapidly during a recession, but are not necessarily quicker to hire during an economic expansion. The author argues that debt bias due to tax policy that encourages firms to become more leveraged may induce greater employment volatility. Such effects may have economic growth impacts through their influence on incomes of workers and suppliers.

More generally, the financial system in each country may influence employment stability and volatility. There is evidence of reduced job security and job tenure in the United States coinciding with the rise of the shareholder value movement.

The literature on corporate governance offers insights on the relationship between distinct national models of corporate finance and labour. [Gospel and Pendleton \(2003\)](#) assess this relationship and outline how finance influences labour management. The authors highlight the contrasting firm management practices across national models of corporate finance, which reflect regulatory frameworks and cultural norms. They classify the United States and United Kingdom as “market-outsider” systems marked by large equity markets and substantial equity financing shares. The reliance on equity finance pressures firm managers to maximise shareholder value and emphasises short-run earnings. They cite evidence that this can have harmful effects on labour through layoffs during downturns, which contributes to higher employment volatility. In contrast, Germany and Japan are representative of a “relational-insider” finance system, which emphasises long-term debt finance. These countries have more stable and longer-term employment on average than do market-outsider countries, in part due to less labour shedding during cyclical downturns. The contrast between the two systems is becoming blurred as more firms shift toward the market-outsider model.

2.1.2 Unemployment. Unemployment represents the portion of the labour force that is not employed and is actively seeking work, and therefore omits discouraged workers who drop out of the labour force. One study finds that financialisation may contribute to higher unemployment by crowding out productive investment by firms. Other research suggests the evidence on the effect of finance on unemployment is inconclusive because the unemployment outcomes depend critically on interactions with labour market institutions. For example, while equity finance generally promotes growth, labour market rigidities may blunt its effect on reducing unemployment.

Financialisation may affect unemployment rates by influencing firm capital accumulation. [González and Sala \(2013\)](#) use dividends and interest payments from the US non-financial corporate sector to represent financialisation in a multi-equation chain reaction theory model. The analysis shows financialisation reduces capital accumulation by diverting internal firm funds to financial markets, which crowds out productive investment and contributes to higher unemployment. The paper documents a structural shift toward financialisation occurred in the early 1980s, fuelled by financial deregulation. Since then, financialisation has contributed an estimated 2 percentage points of additional unemployment in the United States and these impacts intensified during the Great Recession. The authors argue that rising short termism among corporate managers, under pressure from shareholders to maximise near-term returns may propel the shift toward financialisation.

Empirical studies show evidence that finance interacts with labour market institutions to influence labour market outcomes. [Gatti et al. \(2009\)](#) use dynamic panel regressions with a generalised method of moments estimator to analyse the determinants of unemployment in 18 OECD countries from 1980 to 2004. The estimated results suggest the effects of finance on unemployment depend strongly on labour market characteristics and are economically meaningful. For example, a 1% rise in stock market capitalisation, because it loosens financial constraints, is associated with a 1.6% decline in unemployment, when the labour market is weakly regulated and not strongly unionised, but has no effect otherwise. Conversely, a 1% increase in bank credit is associated with a 2.8% decline in unemployment only at high levels of union density, which the authors interpret as indicative of the positive effect of bank monitoring on borrower firms' profitability and employment when highly unionised. Taken together, the evidence on equity finance and intermediated finance suggests potential trade-offs in employment effects, depending on the labour market context.

[Rault and Vaubourg \(2011\)](#) suggest finance may affect the relationship between labour institutions and unemployment, but the effect appears country-specific and the results imply other forces not captured in their models may be at work. They use data on 18 OECD countries over 1980–2004 to assess whether finance indirectly affects unemployment by testing for Granger causality running from labour market indicators to unemployment for each country. The authors employ separate sets of models for each country, both including finance variables and excluding them. The results show that finance may influence the effect of labour institutions on unemployment, but the direction and magnitude depends on the country, with no readily discernible pattern. In some countries (Australia, Belgium, Finland, Ireland, Italy, Japan and Spain), finance reduces the positive effect of greater labour market flexibility on employment. In others (Austria, Canada, Portugal and Sweden) it has the opposite influence [9].

2.2 Wages

Wages are a primary area of interest because they directly link to worker welfare. The studies discussed in this section cover finance and wage rates, wage shares and wage volatility as highlighted in [Table 2](#) below.

2.2.1 Wage rates. Wage rates often lie at the core of worker concerns. External shocks and policy actions that influence wages merit high interest among workers and producers. Wage changes may work through mechanisms such as shifting labour market supply and demand dynamics, changes in productivity, or via trade-offs in income shares accruing to labour and capital. Distinct aspects of finance likely affect wages differently, and sometimes in opposing directions. Financial factors that appear to help boost wages include positive financial shocks, some types of bank deregulation, leveraged buyouts (among production workers), low credit availability for firms and possibly removal of bankruptcy flags from individual credit ratings. Factors associated with reduced wage growth include bank deregulation in

1980s France and leveraged buyouts (especially among non-production workers). Financial development appears to have no consistent direct effect on wage rates.

2.2.1.1 Financial development and wage rates. There is ample evidence of a positive relationship between financial development and economic growth [10]. Is there a similarly positive link between financial development and wage rates? Pagano and Pica (2012) use cross-country data to assess the effects of financial development on wage growth in sectors with high dependence on external finance, and find that it has no significant effects in the sample of all countries or in separate sub-samples of OECD countries and of non-OECD nations. This result gives rise to the authors' interpretation that financial development tends to help firms raise production by increasing capital and labour inputs, instead of through more intensive technology, which would increase productivity and wages.

2.2.1.2 Capital market openness and wage rates. Ample literature analyses the effects of international merchandise trade and of cross-border labour migration on wage rates, but little empirical work has examined the influence of international financial flows on wage levels. One study of the effects of stock market openness to foreign capital shows that greater openness in emerging market economies is linked to higher real wage growth.

Chari *et al.* (2012) find that countries opening their stock markets to foreign investors experienced a sharp rise in real wage growth rates on average, relative to peer countries whose markets remained closed to external capital. Difference-in-differences panel regression models with data on 25 developing countries from 1960 to 2003 control for other events that may accompany market opening measures, such as trade liberalisation and inflation stabilisation. The results show that the average real wage growth rate during market liberalisation periods exceeded the long-run mean growth rate by roughly 3 to 4 percentage points per year. The authors estimate the wage boost results in a permanent rise of \$487 PPP-adjusted US dollars per year in the real wage level on average during the four years the market opening effect persists, a substantial gain in the developing country context.

2.2.1.3 Financial shocks and wage rates. Shocks to job destruction rates influence the way firms' financial flows interact with labour market characteristics, yet the direction of influence of such shocks is not *a priori* self-evident. The two studies reviewed here suggest that financial shocks may help to increase wage rates.

Zanetti (2015) develops a dynamic stochastic general equilibrium model to provide insights on potential drivers of external shocks' effects on labour. The model shows that a positive financial shock through improved loan recovery rates results in higher wages, increased hiring and a drop in unemployment. This occurs through a sequence of responses. A lower loan default probability induces firms to reduce collateral capital and increase debt issuance, causing an eventual rise in investment. Firms increase hiring, which raises wages and reduces dividend payments.

Shocks to business credit availability can likewise induce changes to wage rates. Monacelli *et al.* (2011) develop a structural vector autoregression model that regresses the value of job vacancies on time series credit and employment variables from 1984 to 2009 in the United States. Their theoretical model and empirical findings show that shocks that reduce the availability of credit to firms generate economically meaningful expansion in the net surplus obtained by workers. This occurs through the mechanism of strengthened worker bargaining power, and results in higher wages. The model is consistent with the literature suggesting that firms may strategically modify their debt loads to counter the bargaining power of unionised workers [11].

2.2.1.4 Bank deregulation and wage rates. Does bank deregulation influence wage rates? If so, it is not obvious in which direction deregulation would nudge wages. The limited empirical evidence appears mixed overall, and depends on national regulatory and labour market contexts. One study of the US finds deregulation helped to boost wages among low-skilled labour, but another based on the French experience shows declines in wage growth.

Some evidence points to positive income effects of banking deregulation for lower wage workers. A study by [Beck et al. \(2010\)](#) uses the gradual implementation of intra-state deregulation of the banking sector from the 1970s through the 1990s in the United States to consider its effect on income inequality and hours worked. They find that deregulation raised incomes of the lower part of the distribution while leaving the higher income groups unchanged (the result holds even when excluding unemployed individuals from the sample). Banking deregulation resulted in greater demand for lower income workers, and larger gains in wages and working hours among unskilled workers relative to skilled labour. The authors test for and rule out the potential channels that deregulation increased unskilled workers' educational attainment or that low-income workers moved into higher-income entrepreneurship.

[Bertrand et al. \(2007\)](#) show that increased bank competition due to the 1985 banking reforms in France fostered a more efficient banking sector and improved allocative efficiency, although wage growth rates declined. These changes reduced average wages, raised employment and increased outsourcing. Using firm-level panel data from 1978 to 1999, they find large changes in capital structure among firms in sectors that were highly dependent on finance before the reforms, with declines in debt and increases in equity and trade credit. After the reform, banks improved their screening and monitoring activities and placed more weight on the quality of borrowers. Firm performance as measured by the return on assets grew by 6.5 percentage points more among firms in an industry that strongly depends on bank loans, relative to firms in sectors that are less dependent. The former industries saw slower wage growth but greater employment growth after the reforms, compared with sectors less dependent on finance.

2.2.1.5 Leveraged buyouts and wage rates. US evidence suggests that LBOs can transform acquired firms' labour practices, resulting in either faster- or slower-growing wages relative to peer firms, depending on the LBO business model. [Lichtenberg and Spiegel \(1990\)](#) found that, during the three year period before a LBO to two years afterwards, manufacturing firms reduce the share of non-production workers and increase the compensation of production workers. This is consistent with [Jensen's \(1989\)](#) contention that LBOs can improve efficiency by "substituting incentives and compensation for direct monitoring by large bureaucratic staffs." Using a large plant-level database on manufacturing plants from 1983 to 1986, the authors test the hypothesis that LBOs can improve plant efficiency by implementing measures that substitute incentives and compensation for direct monitoring of workers. The data strongly support the hypothesis. Compensation of production workers increased and compensation of non-production workers declined, such that the ratio of annual compensation of non-production to production workers dropped by 8.8% relative to plants not involved in LBOs. The study suggests that LBOs of manufacturing firms improved the conditions of workers by reducing monitoring and raising wages in an effort to boost productive efficiency.

More recent empirical work finds that LBOs appear to result in reduced wage rates at target firms on average in the short-run. [Davis et al. \(2014\)](#) analyse buyouts of more than 3,000 target (acquired) firms in the United States from 1980 to 2005. The firm-level analysis captures the effects of post-buyout establishment births, acquisitions and divestitures. The authors estimate a meaningful decline of 4 log points on average in earnings per worker at target firms relative to control firms in the two year post-buyout periods. Continuing plants at target firms account for a large majority of the overall reductions in earnings per worker, acquisitions and divestitures account for more than a quarter, while net entry of new plants contributes to *increasing* earnings per worker at target firms. The authors show that total factor productivity at target firms increased over control firms after buyouts, mainly due to greater job reallocation through plant entry and exit.

2.2.1.6 National finance systems and wage rates. Might the character of the national finance models discussed earlier help shape wage rates? The evidence appears thin, but is suggestive of a potential upward influence on wages under certain conditions. The two types of national finance systems outlined by [Gospel and Pendleton \(2003\)](#) suggest that the “market-outsider” model used by the United States and the United Kingdom may help to increase wages among remaining workers when job layoffs occur. This model is marked by the prominence of equity financing and the influence of shareholder value on managerial labour practices. The paper does not include quantitative analysis.

2.2.1.7 Personal credit and wage rates. It is not obvious how individual credit ratings might influence wage rates, and the emerging empirical literature appears inconclusive. Two studies cited earlier, [Dobbie et al. \(2016\)](#) and [Herkenhoff et al. \(2016\)](#), assess the effects of personal credit ratings on US employment outcomes, using data on individuals filing for bankruptcy protection. Both studies analyse the effect of bankruptcy flag removal by comparing employment outcomes between individuals who have had the flag removed and those whose credit ratings still carry the flag. [Dobbie et al. \(2016\)](#) find no evidence of economically significant effects of flag removal on earnings outcomes on average. This applies to the level of wages and the level of earnings among the self-employed. The authors conclude that employers use a wide set of criteria to select among job applicants so that improvement in a credit report alone has no major effect on labour market outcomes among employers who run credit checks on job candidates. This rationale does not explain the lack of effect of flag removal among self-employed individuals.

By contrast, [Herkenhoff et al. \(2016\)](#) show that flag removal raises credit scores sharply and increases employment, compared to a cohort whose flags remain in place. Bankrupt individuals who transition into formal employment after flag removal (rather than before removal) earn higher wages, tend to work at larger firms with non-wage benefits and work more in jobs that require handling payments. The authors lack data that allows them to observe credit check activity directly, so they acknowledge the evidence is suggestive but not conclusive.

The mixed evidence across the two studies implies that the debate on the effects of credit ratings on wage rates has not yet been resolved, even in the extreme case of personal bankruptcy. The effects of credit ratings in more common non-bankruptcy cases were not examined in these papers, but may be difficult to find because smaller differences in credit ratings may have undetectable impacts on wages (see [Tables 1–5](#)).

[Bernstein \(2019\)](#) analyses housing, income and liabilities data for US households from 2010 to 2014 to assess potential effects of housing price shocks on labour supply, and shows that negative home equity causes roughly a 2–6% decline in labour supply. The analysis concludes this is consistent with housing lock-in (discussed in [section 4.3](#)) and “debt overhang” effects. The debt overhang effect is the disincentive to work created by public and private mortgage loan modification programs among negative equity homeowners. Such programs may disincentivise household earnings both when households must meet a specified debt-to-income ratio to qualify, and when the programs require the transfer of marginal household earnings to mortgage lenders, creating moral hazard incentives to decrease work hours.

[Gopalan et al. \(2019\)](#) find that higher home loan-to-value (LTV) ratios, especially those greater than 1.0 (“underwater” homeowners), are associated with lower incomes and slower income growth than “base” ($0.3 < \text{LTV} < 0.4$) ratios in the US between 2010 and 2015. Their IV model estimates that individuals with LTVs between 0.8 and 1.0 earn \$263 less per month on average, and those with LTVs between 1.0 and 1.5 earn \$352 less than individuals with base LTV ratios. These economically significant effects represent 3.8% and 5.1% of sample mean incomes. The evidence also suggests individuals with high LTVs experience slower income growth rates. The paper finds no significant relationship between LTV and income and

Authors (year)	Analytic approach	Main results
<i>Employment</i> Pagano and Pica (2012)	Panel regressions with interaction terms to gauge impact of banking crises on labour outcomes in sectors with high dependence on finance in financially developed countries	Evidence of negative effects on employment growth when FD is proxied by bank credit; no apparent effect on wage growth
Bertrand <i>et al.</i> (2007)	Regressions using interaction terms for post-reform period and for finance dependent sectors with firm-level panel data	Efficiency enhancing bank reforms improved allocative efficiency and increased employment but slowed wage growth
Zanetti (2015)	DSGE model estimated with Bayesian methods on US data	Financial shocks increase volatility of unemployment, wages and vacancy announcements
Lichtenberg and Siegel (1990)	Analysis of differences between LBO and non-LBO plants in growth rates of production and non-production labour variables by period relative to year of LBO	Manufacturing firms reduce the share of non-production workers and increase the compensation of production workers after a LBO
Davis <i>et al.</i> (2014)	Non-parametric and DD analyses of large US data set. Control firms incorporate sector, size, age, multi-unit status, buyout year and pre-buyout employment history	Target (acquired) firms have slightly slower job growth and lower compensation for workers two years after a buyout than do control firms
Dobbie <i>et al.</i> (2016)	DD regressions comparing two distinct versions of bankruptcy protection to test for labour outcome effects	No economically significant effects of flag removal on employment outcomes. Results are robust to numerous checks
Herkenhoff <i>et al.</i> (2016)	DD regressions comparing individuals whose bankruptcy flags have been removed to those whose flags remain, and individuals who transitioned to jobs before flag removal to those transitioning after	Transitions to employment after flag removal yields higher paying jobs with benefits at larger firms relative to those transitioning before flag removal
Bos <i>et al.</i> (2018)	Employment probability model with fixed effects and interaction terms to estimate differential probabilities of being employed between pre- and post-policy regimes	Earlier removal of loan default information on credit reports increases employment probabilities by 3% among vulnerable populations in Sweden
Buch and Pierdzioch (2014)	Descriptive statistical trends, fixed effect panel regressions of hours worked volatility and wage volatility, and DSGE model	FD is positively linked to volatility of hours worked for high- and medium-skilled workers. Financial integration is positively associated with hours worked volatility among low-skilled and wage volatility across all skill levels
Sharpe (1994)	ES regressed on macro cyclical indicators interacted with leverage and six semi-annual lags. ES regressed on firm sales interacted with leverage and firm size and controls, estimated via OLS and IV models	Highly leveraged firms' employment practices are more responsive to cyclical variation than are less leveraged firms. Debt bias of the tax system may contribute to employment volatility
Gospel and Pendleton (2003)	Qualitative synthesis of the literature. No quantitative analysis	Capital structure and governance practices influence management of labour at firms using external finance

(continued)

Table 1. Studies of finance and employment and unemployment

Authors (year)	Analytic approach	Main results
Monacelli <i>et al.</i> (2011)	Structural VAR that regresses the value of a vacancy on time series credit and productivity shocks. Includes simulations of the effects of negative credit and productivity shocks on debt-to-output, output, employment, and wages	Increase in firm leverage/credit availability decreases net wage bargaining surplus and in turn wages paid to workers, thus increasing employment
<i>Unemployment</i> González and Sala (2013)	Dynamic, multi-equation CRT model in which unemployment rate is driven by capital stock and capital accumulation is endogenous. Uses a 3SLS estimation strategy	Finance helps determine unemployment by interacting with factor investment decisions by firms. Financialisation inversely influences capital accumulation, which in turn inversely links to unemployment rates
Gatti <i>et al.</i> (2009)	Dynamic panel regression with interaction variables and country fixed effects, estimated by GMM. Alternative metrics of FD and of labour market characteristics are included as direct regressors and as interaction terms	Finance interacts with labour market characteristics to help determine unemployment. Credit and equity finance may have distinct effects on unemployment because they interact differently with labour institutions
Rault and Vaubourg (2011)	Granger causality tests and panel VAR models	Finance affects the link between labour institutions and unemployment in complex ways. Effects vary by country

Note(s): FD is financial development; DSGE is dynamic stochastic general equilibrium; LBO is leveraged buyout; DD is difference-in-differences; ES is employment sensitivity; OLS is ordinary least squares; IV is instrumental variable; GMM is generalised method of moments; VAR is vector autoregression; 3SLS is three-stage least squares; CRT is chain reaction theory

Table 1.

income growth in a sample of renters, reinforcing the main findings. The authors conclude this reduced income occurs via diminished labour mobility rates among high LTV groups (see section 4.3).

2.2.1.8 Within-firm financial conditions. While it seems plausible that wage rates and wage growth may be linked to the financial conditions of firms, such linkages may be weak where wages are market determined. One paper offers evidence that financial conditions within firms can directly shape the wage rates paid to their employees.

Michelacci and Quadrini (2009) estimate models of firm wages using matched employer-employee data from Finland (1988–2002) the United States (1986–2002). They find that financially constrained firms at early stages of development may effectively “borrow” from their employees by compensating them with relatively low wages augmented by stock options or similar instruments. These firms tend to grow more rapidly than older, larger firms and their workers experience higher wage growth in later stages of firm development. The authors imply this borrowing mechanism has been effective because it shares firm default risk with employees, incentivises them to remain with the company which helps the firm retain its investment in staff knowledge and human capital, and allows financially constrained firms to operate initially at a discount while generating cash flows to finance growth. Their results support evidence from other studies that financially constrained firms more commonly use stock options than do unconstrained firms [12].

2.2.2 Wage shares. The wage share of income represents the share of GDP accruing to labour and offers another perspective on the labour outcomes of finance. The research outlined below suggests that financial globalisation and rising household debt independently contribute to declining wage shares by reducing the relative bargaining power of workers.

Authors (year)	Analytic approach	Main results
<i>Wage rates</i>		
Pagano and Pica (2012)	Panel regressions with interaction terms to gauge impact of banking crises on labour outcomes in sectors with high dependence on finance in financially developed countries	Evidence of negative effects on employment growth when FD is proxied by bank credit; no apparent effect on wage growth
Chari <i>et al.</i> (2012)	DD model for developing countries with stock market openness and control variables to account for other measures that may accompany market liberalisation	During market liberalisation periods average real wage growth exceeds long-run pre-liberalisation means by 3 to 4 percentage points per year
Zanetti (2015)	DSGE model estimated with Bayesian methods on US data	Financial shocks increase volatility of unemployment, wages and vacancy announcements
Beck <i>et al.</i> (2010)	DD model with five alternative inequality indicators and control variables. Deregulation designated by state-year dummy variable in the 49 US sample states	US banking deregulation reduced income inequality by increasing incomes of unskilled workers relative to skilled labour
Bertrand <i>et al.</i> (2007)	Regressions using interaction terms for post-reform period and for finance dependent sectors with firm-level panel data	Efficiency enhancing bank reforms improved allocative efficiency and increased employment but slowed wage growth
Lichtenberg and Siegel (1990)	Analysis of differences between LBO and non-LBO plants in growth rates of production and non-production labour variables by period relative to year of LBO	Manufacturing firms reduce the share of non-production workers and increase the compensation of production workers after a LBO
Davis <i>et al.</i> (2014)	Non-parametric and DD analyses of large US data set. Control firms incorporate sector, size, age, multi-unit status, buyout year and pre-buyout employment history	Target (acquired) firms have slightly slower job growth and lower compensation for workers two years after a buyout than do control firms
Gospel and Pendleton (2003)	Qualitative synthesis of the literature. No quantitative analysis	Capital structure and governance practices influence management of labour at firms using external finance
Dobbie <i>et al.</i> (2016)	DD regressions comparing two distinct versions of bankruptcy protection to test for labour outcome effects	No economically significant effects of flag removal on employment outcomes. Robust to numerous checks
<i>Wage rates (continued)</i>		
Herkenhoff <i>et al.</i> (2016)	DD regressions comparing individuals whose bankruptcy flags have been removed to those whose flags remain, and individuals who transitioned to jobs before flag removal to those transitioning after	Transitions to employment after flag removal yields higher paying jobs with benefits at larger firms relative to those transitioning before flag removal
Bernstein (2019)	Household income IV regressions with multiple FE specifications and controls	Negative home equity is associated with a 2% to 6% decrease in labour supply. Effects are greater for households receiving mortgage modification
Gopalan <i>et al.</i> (2019)	Income IV regressions with multi-dimensional FEs are determined by LTV and control variables. Synthetic LTV that assumes uniform loan maturity and interest rate across the sample instruments for LTV. Parallel placebo model of renters	The IV model estimates average individuals with LTVs between 0.8 and 1.0 earn \$263 less per month, and those with LTVs between 1.0 and 1.5 earn \$352 less than individuals with base LTV ratios

(continued)

Table 2.
Studies of finance and wages

Authors (year)	Analytic approach	Main results
Monacelli et al. (2011)	Structural VAR that regresses the value of a vacancy on time series credit and productivity shocks. Includes simulations of the effects of negative credit and productivity shocks on debt-to-output, output, employment, and wages	Increase in firm leverage/credit availability decreases net wage bargaining surplus and in turn wages paid to workers
Michelacci and Quadrini (2009)	Labour market equilibrium model of firms' optimal long-term wage contracts with workers as a function of the level of financial constraint. Regressions of wages on firm's age, size, and growth, and of wages on the level of financial constraint	Whether or not firms are financially constrained (and in turn, whether they will "borrow" from employees) significantly determines the nature of wage growth and the rising wage schedule
<i>Wage shares</i>		
Kohler et al. (2016)	Panel regressions of wage shares on financial openness, firm dividend and interest payments, stock market turnover, household debt, with a range of control variables	Evidence that wage shares may be constrained by financial openness which raises capital's investment options and by household debt which reduces workers' wage negotiating leverage
Dühaupt (2017)	Panel regressions of adjusted labour shares on trade openness, FDI, import prices, union dynamics, unemployment, dividend payments, interest payments, and public sector size	Increasing shareholder financialisation has negative effects on wage shares across OECD countries
<i>Wage volatility</i>		
Darcillon (2016)	Panel regressions with fixed effects; threshold regressions to test for non-linear relationships	FD is positively related to labour market volatility. Labour regulations influence the impact of FD. In countries with weak (strong) labour regulations, FD has a greater (smaller) effect on labour volatility.
Buch and Pierdzioch (2014)	Descriptive statistical trends, fixed effect panel regressions of hours worked volatility and wage volatility, and DSGE model	FD is positively linked to volatility of hours worked for high- and medium-skilled workers. Financial integration is positively associated with hours worked volatility among low-skilled and wage volatility across all skill levels

Note(s): FD is financial development; DD is difference-in-differences; DSGE is dynamic stochastic general equilibrium; LBO is leveraged buyout; ES is employment sensitivity; FDI is foreign direct investment; VAR is vector autoregression; FLEED is Finnish Longitudinal Employer-Employee Data; NLSY79 is the 1979 National Longitudinal Survey of Youth; FGLS is feasible generalised least squares; PCSE is panel-corrected standard errors

Table 2.

Wage shares have been declining in OECD countries since about 1990 (ILO/OECD, 2015). Figure 2 shows the downward labour share trend in a sample of OECD countries. While numerous potential factors weigh on the observed trends, the simple dynamics of average wage rates and labour productivity growth help to determine labour shares [13]. Generally, the wage share rises when average wages increase at a faster pace than average labour productivity and declines when average wage growth trails behind average labour productivity growth (ILO/OECD, 2015).

Financial development has also been related to trends in the wage share. A recent study uses a bargaining power framework to consider the role of finance in the decline of the wage share in many OECD countries over time, and concludes that financialisation has contributed to wage share shrinkage. Kohler et al. (2016) test four potential effects of financialisation on

Authors (year)	Analytic approach	Main results
<i>National wage shares</i>		
Kohler <i>et al.</i> (2016)	Using panel data, regresses wage shares on financial openness, firm dividend and interest payments, stock market turnover, household debt, with a range of control variables	Evidence that wage shares may be constrained by financial openness which raises capital's investment options and by household debt which reduces workers' wage negotiating leverage
<i>Bank (de)regulation and income inequality</i>		
Beck <i>et al.</i> (2010)	DD model with five alternative inequality indicators and control variables. Deregulation designated by state-year dummy variable in the 49 US sample states	US intra-state banking deregulation reduced income inequality by increasing incomes of unskilled workers relative to skilled labour
Delis <i>et al.</i> (2014)	Panel 2SLS with income inequality (Gini and Theil indices) regressed on measures of banking restrictions (credit, interest rates, entry barriers, etc.), lagged income inequality, and control variables	Bank deregulation reduces income inequality in general, but effect depends on prior institutional/financial development and the type of liberalisation. Liberalising securities markets increases inequality
Philippon and Reshef (2012)	Time-series regression models using long-run data on the US to explain education and wages in the financial sector	Deregulation of the financial sector led to the sector contributing 14% to the increase in the Gini index over 1970-2006
Jerzmanowski and Nabar (2013)	Endogenous growth theoretical model with imperfect labour markets. Individual-level Mincerian wage regressions	Banking deregulation is associated with higher wage inequality between and within labour skill levels
<i>Finance and returns to innovation</i>		
Lazonick and Mazzucato (2012)	Qualitative discussion drawing on the literature	Financialisation contributes to highly concentrated returns to innovation that undercompensate workers and taxpayers for their contributions
Bell and Van Reenen (2014)	Analysis of trends in the upper end of the income distribution based on income percentiles	Financial sector accounts for a large and growing share of the top percentile earners in the UK
Philippon and Reshef (2013)	Dynamic panel regressions with country fixed effects to assess determinants of finance sector relative wages	ICT shares are positively associated with relative wages in finance
Denk (2015)	OLS regressions of log wages on controls and finance sector*control interaction terms to estimate wage premia	The average finance sector wage premium in Europe is 28% but it rises over the income distribution and peaks at 40% at the upper end
Note(s): DD is difference-in-differences; 2SLS is two-stage least squares; ICT is information and communication technology; OLS is ordinary least squares		

Table 3. Studies of finance and distributional effects

the wage share in national income in 14 OECD countries from 1989 to 2011. Their framework regards the distribution of income between firms' earnings and workers' wages to be an outcome of a bargaining process, rather than a simple market clearing result. The four potential effects are: (1) financial globalisation increases exit options for capital (investment capital has the option of flowing abroad to outsource jobs through FDI) and boosts its bargaining power relative to labour; (2) higher dividend and interest payments by non-financial businesses may raise their overhead costs and encourage them to reduce the wage share; (3) more competition in capital markets encourages firms to emphasise returns to shareholders which may put downward pressure on wage growth; and (4) greater household

Authors (year)	Analytic approach	Main results
<i>Finance and labour reallocation</i>		
Pagano and Pica (2012)	1) Regressions of employment growth and of wage growth on FD interacted with dependence on external finance and control variables. 2) Regressions of dispersion of employment growth and of wage growth on the interaction of the dispersion of stock returns and financial development and controls	Higher FD boosts employment growth in finance dependent sectors of non-OECD countries but has no effect on wage growth. FD can promote intersectoral reallocation when profitability dispersion is high but not when it is low
Bai <i>et al.</i> (2015)	Productivity growth decompositions and DD regressions of small firms' employment changes on fixed effects interacted with MPL, deregulation interacted with MPL and controls	State-level banking deregulation is associated with economically significant increases in within-sector reallocation of labour to more productive small firms
Borio <i>et al.</i> (2015)	Productivity growth regressed on private credit and controls. Allocation and common component are regressed on same variables. Allocation component is further decomposed into productivity- and employment-driven elements	Credit booms are associated with lower concurrent productivity growth rates, driven by labour reallocation toward low productivity sectors
Caballero <i>et al.</i> (2008)	Productivity regressed on industry characteristics including zombie firms and share of capital sunk in those firms	Negative spillovers from rising sector shares of zombie firms harm healthy firms and contribute to lower productivity and slower employment growth
<i>Finance and adaptability of firm labour management practices</i>		
Abe and Hoshi (2004)	Descriptive statistics and probit models of firm labour policies on firm financial characteristics	Japanese firms with high foreign ownership presence are more likely to have flexible labour practices
<i>Housing finance and labour mobility</i>		
Donovan and Schnure (2011)	OLS regressions of alternative distance-based mobility metrics on magnitudes of housing price drops. Large housing price drops proxy underwater mortgages. Controls and robustness tests confirm moves are related to housing price changes	The labour market skills-matching process is unimpaired by underwater mortgages. Underwater mortgages are linked to lower mobility overall, but long-distance job-related moves are not reduced
Aaronson and Davis (2011)	Graphical and descriptive statistical analysis of the panel SIPP survey, with four-month observations from 2008-2010	House "lock-in" due to negative home equity not shown to significantly drive post-recession labour mobility (as measured through state-to-state migration)
Quigley (2002)	Proportional and non-proportional hazard regression models of the determinants of mobility	Existing mortgages with lower interest rates than current rates can reduce mobility of households with tenures over 10 years
Ferreira <i>et al.</i> (2011)	Probit models using improved mobility metrics. Models compare results through 2007 to results through 2009 to estimate the effect of the housing bust	Underwater mortgages and interest rate lock-in both are associated with lower mobility rates. But authors do not expect these effects to have large impacts on labour markets
Bernstein and Struyven (2017)	IV regressions with FE isolate the effects on mobility of the probability that a house has negative home equity	Low SLTV levels do not alter mobility, but for SLTVs above 100%, the effect on mobility is large and negative

Table 4.
Studies of finance and
resilience and
adaptability

(continued)

Authors (year)	Analytic approach	Main results
Gopalan <i>et al.</i> (2019)	Mobility IV regressions with multi-dimensional FEs are explained by LTV and control variables. Synthetic LTV that assumes uniform loan maturity and interest rate across sample instruments for LTV	Individuals with LTVs between 0.8 and 1.5 are 0.1 percentage points less likely to move in a month relative to those with base LTVs, an economically meaningful effect
<i>Housing finance and labour mobility</i>		
Brown and Matsa (forthcoming)	Panel regressions with data on job application patterns by labour market, housing values and controls for local economic conditions. Regression discontinuity analysis on the same variables plus state recourse data	Job seekers in areas with housing price downturns apply for fewer positions that require relocation. Mortgage debt in such markets can have lock-in effects that impair workers' ability to move and impede the efficiency of job-skills matching

Note(s): FD is financial development; FE is fixed effect; DD is difference-in-differences; MPL is marginal product of labour; OLS is ordinary least squares; SIPP is Survey of Income and Program Participation; IV is instrumental variable; LTV is loan-to-value ratio

Table 4.

Authors (year)	Analytic approach	Main results
<i>Unionisation and finance</i>		
Chen <i>et al.</i> (2011)	Panel OLS and IV regression models. Implied cost of equity regressed on unionisation, unionisation interacted with regulatory environment and control variables	Unions increase firms' costs of equity by reducing firms' operating flexibility. Effect is stronger in areas where unions have more favourable regulatory framework
Chen <i>et al.</i> (2012)	OLS regressions of yield spreads on unionisation and numerous controls. Endogeneity tests use 2SLS	Firms in more unionised industries have economically meaningfully lower bond yields. Unions' influence on corporate affairs serves to protect bondholders' wealth
Marciukaityte (2015)	DD approach with GLS regression using two alternative variables for leverage, and unionisation interacted with state union regulations	Unionised firms have higher leverage in states that are more favourable to unions. Managers are more likely to use high leverage when their compensation is sensitive to changes in share prices
Matsa (2010)	Firm-level cross-sectional and panel regressions of debt ratios on labour laws, earnings variability and controls	Robust evidence that firms with higher earnings volatility operating in sectors with high unionisation use debt strategically to influence collective bargaining negotiations
Chino (2016)	Tobit regressions with pay-out indicators regressed on unionisation, unionisation interacted with ROA and controls. Endogeneity tests use IV models	Link between unionisation and firm pay-outs depends on firm profitability. Unionisation reduces (increases) pay-outs in low (high) profitability firms

Note(s): OLS is ordinary least squares; IV is instrumental variable; 2SLS is two-stage least squares; DD is difference-in-differences; GLS is generalised least squares; ROA is operating income before depreciation divided by total assets

Table 5. Studies of the effects of unionisation on finance

indebtedness may curtail employee wage shares in part by increasing workers' financial vulnerability, which may reduce their leverage in wage negotiations. The authors' panel regressions support the first and fourth hypotheses – that financial globalisation proxied by

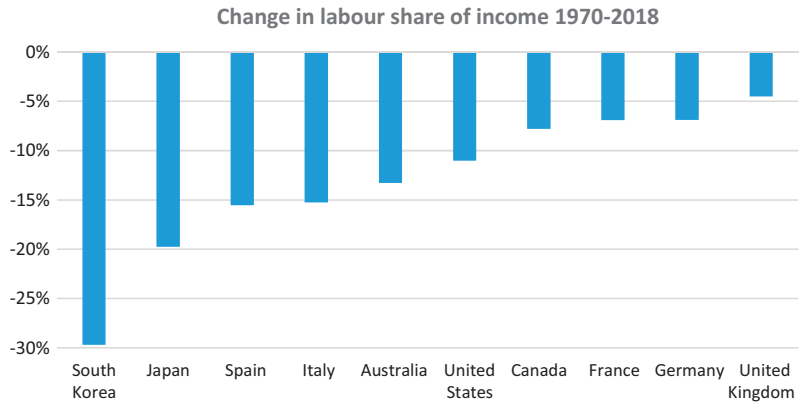


Figure 2.
Labour share declines,
1970–2018 [14]

Source(s): Derived from European Commission, AMECO data

financial openness and higher household debt levels both reduce the wage share. The effects are economically significant, with household debt having a particularly large effect, although the authors caution that the theoretical underpinnings for its impact are not well developed.

Similarly, [Dünhaput \(2017\)](#) tests the effects of rising financialisation on the adjusted labour share using panel data for 13 OECD countries between 1986 and 2007, and finds support for previous results. Models include controls for globalisation (trade openness, FDI flows, and import prices) and labour dynamics (unemployment, union density, and strike intensity). The paper shows that firm shareholder value orientation and net dividend payments are inversely related to the adjusted labour share. The main channels through which financialisation affects the labour share are: shrinking bargaining power of workers driven by growing shareholder value orientation and globalisation; rising firm financial overhead costs causing higher mark-ups; and declining government shares of economic activity.

2.2.3 Wage volatility. The studies in this section suggest that higher financial development and deeper international financial integration may independently be associated with greater wage volatility. Rising wage volatility trends may reflect a number of influences such as increasing employer flexibility regarding labour management practices, declining unionisation and the growth of performance contracts. These can contribute to productivity growth but may also reduce the income security of workers, who may respond by increasing their precautionary savings and adjusting hours worked ([Hong et al., 2019](#)).

Evidence suggests that labour market institutions can soften the effect of financial development on wage volatility. Using regression methods covering 15 OECD countries from 1974 to 2007, [Darcillon \(2016\)](#) assesses the links between financial development (stock market capitalisation/GDP and the employment share of the financial sector) and wage volatility. A higher employment share of finance is strongly associated with increased labour market volatility (both hours worked and wages). There is no statistically significant difference in outcomes between low- and high-skilled workers. The paper appears to consider EPL as a purely favourable volatility cushion for workers and does not mention its potential dampening effect on productivity growth.

International finance appears to affect wage volatility. [Buch and Pierdzioch \(2014\)](#) use industry-level cross-country data from 1970 to 2004 to develop models of domestic financial development and of global financial integration [15]. They find no evidence that domestic financial development influences wage volatility, but deeper international financial

integration may increase wage volatility roughly equally across all worker skill levels. These results are confirmed in simulations using a dynamic stochastic general equilibrium model.

3. Distributional effects

Some have expressed concern that growing financialisation may contribute to increasing income inequality trends [16]. However, the potential income distributional effects of financialisation are not clear *a priori*. There is evidence supporting both potential inequality-increasing and inequality-decreasing effects, so the debate remains unresolved. On the one hand, finance can support investment that generates growth, new jobs and advancement opportunities for those at the lower end of the income distribution. On the other hand, finance may flow disproportionately toward larger firms and individuals with collateral assets, and those working in the financial sector may receive generous compensation packages that exacerbate income inequality. Table 3 above lists the studies discussed in this section.

3.1 National wage shares

It is worth repeating in brief the main findings of two studies of wage shares in the context of this equity section. The wage shares metric is too broad to explain much about distributional effects, however, its shrinking share over time in many countries is suggestive of rising inequality between labour and capital. As noted previously, Kohler *et al.* (2016) test four potential effects of financialisation on the wage share in national income in 14 OECD countries from 1989 to 2011. The authors' panel regressions with finance variables, controls and country fixed effects support two hypotheses. Both financial globalisation proxied by financial openness, and higher household debt levels independently reduce the wage share in their models. The effects are economically significant, with household debt being particularly sizeable in magnitude. Empirical work by Dünhaput (2017) strengthens the evidence that financialisation contributes to lower wage shares in a cross-country sample of OECD countries spanning 1986–2007. The two studies agree that financialisation has contributed to declining bargaining power of workers but they differ in the perceived mechanisms through which this occurs. While Kohler *et al.* find no direct evidence of shareholder value orientation on wage shares, Dünhaput concludes it (and associated manager short termism) is a key driver. This and other distinctions may be unsurprising, given that the two studies use different models [17] but both help to advance understanding of the relationship between financialisation and national wage shares.

3.2 Bank (de)regulation and income inequality

There is no clear prior consensus regarding the inequality effects of bank deregulation, making the question an empirical one. The reviewed evidence suggests that bank (de) regulation does affect income inequality, but the direction and magnitudes of influence are determined by the type of regulation studied.

Different kinds of regulation may have competing influences on certain social conditions like inequality. For example, bank regulations that facilitate access to financial services among underserved populations should help to reduce income inequality by improving opportunities for entrepreneurship and income generating activities [18]. However, supervisory regulations such as capital adequacy requirements that enhance the stability of the financial system and reduce the likelihood of financial crises [19] may have ambiguous net effects on inequality. Since financial crises can disproportionately harm the well-being of the poor, these regulations may help to reduce inequality [20]. Yet, the same requirements may reduce credit availability, which can constrain investment and growth rates, potentially

resulting in less job creation and lower earnings by both workers and businesses, depending on the capital requirement level [21].

Some US evidence points to income equalising effects of one form of banking deregulation. A study by Beck *et al.* (2010) exploits the gradual implementation of intra-state deregulation of the banking sector from the 1970s through the 1990s in the United States to examine its effect on income inequality and hours worked (data cover 1976 to 2006). The removal of intra-state banking restrictions allowed greater local competition among banks and influenced labour markets. The authors use a difference-in-differences approach to estimate the impacts of deregulation and the channels through which they occur. They find that deregulation reduced income inequality by boosting demand for unskilled labour. The magnitude of the effect is meaningful, as eight years after deregulation the Gini coefficient of income inequality is 4% below the pre-deregulation level. The evidence does not support the view that improved access to financial services among the poor (increasing investment in education or entrepreneurship) contributed to these inequality trends. The reduction in inequality was largest in states that had particularly severe restrictions to banking operations prior to deregulation. Further analysis shows that banking deregulation resulted in larger gains in wages and working hours among unskilled workers relative to skilled labour.

In the aggregate, these results are corroborated by Delis *et al.* (2014). Based on an 87-country panel of developed and developing nations from 1997 to 2005, they observe that the effect of regulatory liberalisation *in the aggregate* on inequality is significantly negative. However, both the significance and the direction of the effect varies when the authors examine specific regulatory policies. The evidence suggests that liberalising interest rate controls and privatising the banking sector impart strong downward effects on inequality across the sample countries. By contrast, liberalisations of credit controls, entry barriers, banking supervision, and international capital flows produce weaker (albeit still negative) effects on inequality, and liberalisation of securities markets produces a significant *positive* effect on income inequality. The authors imply that security market liberalisation merely provides short-term liquidity without expanding long-term credit access to the poor, as the other deregulatory measures do. Moreover, a model interacting aggregate banking deregulation and GDP per capita shows that the previously observed negative effect on inequality is weakened, suggesting that financial and institutional development are prerequisites to liberalisation significantly reducing inequality.

Philippon and Reshef (2012) reach a different conclusion in finding that financial deregulation disproportionately raises the demand for skilled labour in the US financial sector over the long run, and the financial sector accounted for 14% of the overall increase in the Gini index from 1970 to 2006. Using a regression model that analyses five-year periods between 1909 and 2006, the authors find that among a set of explanatory variables, [22] financial deregulation consistently has the largest and highly significant effects on both financial sector education and wages relative to other sectors. Further regression analysis of alternative types of financial regulation finds that the Glass-Steagall Act (separating commercial banking activities from investment bank activities) had especially strong predictive power for relative education and relative wages in the sector, suggesting it influenced the labour profile of the sector [23]. The study reasons that deregulation widens the freedom of skilled workers to use their creativity to produce complex (and profitable) innovations. Overall, this study shows that deregulation has been a persistent long-run driver of higher financial sector wages through the channel of increasing demand for skilled labour.

Jerzmanowski and Nabar (2013) find evidence supporting the view that banking deregulation raises wage inequality. They develop an endogenous growth model with imperfect credit markets and test it empirically with US data from 1977 to 2006. The paper estimates that wages of skilled workers grew by 0.5% to 6.3% after deregulation, while those of unskilled workers fell by 3.5% to 8.7%. These shifts in relative wages increased inequality,

as the 90–50 percentile ratio rose by 4.2%. The authors believe the dynamic driving this result is the increased labour reallocation due to organisational structural change allowed by improved credit access that raises relative demand for skilled labour. Improved finance raises the share of firms specialising in either unskilled labour tasks or skilled labour work, and new entries tend to prefer the latter and raise the share of firms needing skilled workers. This raises demand for skilled labour and drives up the skilled/unskilled labour wage differential.

The varied inequality effects of bank deregulation outlined in the studies reviewed in this section merit comment. The intra-state bank deregulation analysed by [Beck *et al.* \(2010\)](#) had the broad effect of elevating competition in local markets for retail banking activities in the United States. This helped to improve bank operating efficiency and lowered the price of capital, which expanded output and increased net labour demand, particularly at the lower end of the income distribution, supporting a rise in hours worked and wages for unskilled workers. [Delis *et al.* \(2014\)](#) study a range of financial deregulation actions and find evidence that their inequality effects depend on the type of regulation being loosened. Economic development interacts with financial deregulation to influence inequality (reduction in inequality due to deregulation requires well developed institutions). In contrast, [Philippon and Reshef \(2012\)](#) concentrate narrowly on the effects of deregulation on human capital flows in and out of the US financial sector relative to the non-financial sector. This approach yields the result that less financial regulation can incentivise banks to attract highly skilled workers who may develop innovative financial products that boost wage premiums over non-financial sector workers. The deregulation that drives this finding is likely to be that which expands potentially high-earning bank investment and market activities. [Jerzmanowski and Nabar \(2013\)](#) study essentially the same deregulation in the United States as do [Beck *et al.* \(2010\)](#), yet they arrive at seemingly different conclusions. However, the contrasting outcomes may be due to the distinct endpoints used in the studies. Jerzmanowski and Nabar study relative wage rates by skill level and observe increased differentials after deregulation, which implies rising inequality. Beck *et al.* emphasise incomes (wages \times hours worked), and find that deregulation increased unskilled worker incomes relative to skilled incomes, largely due to relative gains in hours worked.

3.3 Finance and returns to innovation

One study suggests that the structure of the innovation process tends to concentrate the returns among the wealthy, at the expense of workers. Since the study lacks testable hypotheses, it may not provide a definitive view, however, more traditional economic analyses appear unavailable. High-technology sectors that develop innovative products and processes account for disproportionately large shares (relative to their employment levels) of output, exports and productivity gains while offering greater compensation to workers [24]. The single study in this section considers the questions, where do the returns to innovation accrue and how might they affect inequality?

An alternative perspective on finance and wealth extraction based on business organisation contrasts with the neoclassical paradigm that emphasises market forces, and finds the innovation process can help deepen inequality. [Lazonick and Mazzucato \(2012\)](#) analyse how organisational structures promote innovation whose returns are highly concentrated among firm executives and financiers. They argue that the innovation process is cumulative and collective, as many factors (government infrastructure development, research subsidies, human capital development, workers and private financiers) combined yield technological advances. In Lazonick and Mazzucato's view, due in large part to growing financialisation, a disproportionately large share of the returns to innovation accrue to a small minority of individuals, so that their returns greatly exceed their risk contribution to creating innovations. Members of this minority accomplish this by positioning themselves to exploit key allocation mechanisms within an innovation development pathway, including,

but not limited to, controlling access to initial public offerings, exercising stock options, stock buybacks and lobbying for low capital gains taxes. This concentration of returns dampens incentives among workers and taxpayers to contribute to innovation and increases income inequality. The organisational structure of innovation can reduce firm investment in human capital because large firms may underinvest in their own employees and instead rely on the public sector and small companies to bear the risks of innovation. The authors advocate reforms that would reward innovation contributors in a manner more consistent with their risk exposure and value creation.

3.4 Financial sector labour compensation

Popular perceptions hold that financial sector professionals earn outsized compensation packages. But is their compensation commensurate with that of similarly skilled professionals in other fields, or is it indeed disproportionately high? The research shows that in OECD countries employee earnings in the financial sector are higher on average than in other areas of the economy and contribute to greater labour income inequality [25]. These elevated earnings are not fully explained by worker productivity, signalling that the financial sector enjoys a wage premium. The studies discussed below use data that excludes self-employed individuals in the financial sector, which may affect the results.

Bell and Van Reenen (2014) argue that this sector has contributed strongly to rising income inequality in the United Kingdom. They show that the national income share accruing to the top percentile of earners increased sharply from 6% in 1979 to over 15% by 2007. The financial sector makes up a disproportionate one-third (and rising) share of the top percentile earners. Annual compensation trends in the United Kingdom from 1999 to 2008 reveal that financial sector employees alone enjoyed three-quarters of the total increase in the top 1 percentile's share of the national wage bill over the period. Much of the gains were due to rising bonuses in the sector. This concentration appears to have been little affected by the global financial crisis, as the sector further increased its share of the total wage bill by 0.2 percentage points between 2008 and 2011 [26].

Cross-country studies show that the income share of the finance sector reflects long-run upward trends in many developed countries. Philippon and Reshef (2013) consider possible explanations for the trend and conclude that financial deregulation is a key driver of increased demand for skilled labour in the sector. For instance, the financial sector has a higher intensity of information and communications technology (ICT) investment relative to the full economy, which requires skilled employees to develop and operate. However, the link between deregulation and rising wages appears less certain. Their regressions show a robust positive relationship between lagged relative ICT shares and relative wages in finance, but the financial deregulation variable appears unrelated [27].

Denk (2015) analyses a sample of European countries with individual-level 2010 data using regression methods with controls for employee, employer and job characteristics to estimate the wage premium of financial sector workers. He finds an average wage premium of 28%, meaning that these workers receive wages above the level corresponding to their productivity as represented by earnings of workers with similar characteristics in other sectors. Next, the author shows that the wage premium accrues to the highest earners in the sector. A decomposition by earnings decile finds that while the wage premium remains flat at 15–20% for the lower six deciles, it rises sharply at the upper end of the distribution and reaches 40% in the top decile. The sector adds to overall labour income inequality in each sample country except the Netherlands. Earnings of financial sector employees are estimated to contribute 0.8 Gini points on average toward the Gini index value of 28 across the full earnings distribution in the sample economies. Finally, the 21% average male wage premium in the sector is not significantly different from the average male wage premium across all

other sectors. However, it rises more steeply at the upper end of the income distribution, indicating that the gender earnings gap is greatest at the highest income levels.

4. Resilience and adaptability

As countries develop they may experience structural shifts from agricultural- to industrial- to services-oriented economies. This economic progress normally is accompanied by financial development and productivity growth. This evolution is not frictionless and involves a churning dynamic that may result in short-run losses associated with stranded capital assets, worker dislocation and misallocation of resources, but such costs are outweighed in the medium- to long-run by the welfare gains derived from productivity growth.

As shown in [Table 4](#) above, this section includes studies that examine the resilience and adaptability of economies and firms through the effects of shocks and capital structure. The effect of finance on the reallocation of labour in the presence of external shocks is a key factor influencing the resilience of an economy [\[28\]](#). At the firm level, ownership of equity capital may affect the adaptability of firms' labour practices.

4.1 Finance and labour reallocation

The availability of finance should improve resource allocation and efficiency to the extent it facilitates productivity-enhancing reallocation of labour. However, not all labour reallocation is necessarily productivity enhancing, as outlined in four papers below. An international study shows that financial development is usually associated with reduced labour reallocation rates, except during high productivity shock periods. Research on US bank deregulation suggests that it enhances labour reallocation across small firms within sectors and improves productivity. During credit booms, capital and labour misallocation to less productive industries and firms reduces productivity growth rates.

[Pagano and Pica \(2012\)](#) provide evidence of a positive impact of financial development on inter-industry labour reallocation, conditional on severe shocks to sector profitability dispersion (profitability is proxied by stock returns). Financial development can have varied influences on labour reallocation. On the one hand, it can provide finance to smooth firm spending across business cycles, which may reduce incentives to reallocate (in part because finance can help low productivity firms remain in the marketplace and retain employees). On the other hand, financial development can help firms seize new investment opportunities that can lead to profitability shocks, which may promote reallocation when they drive high profitability dispersion across sectors. The model suggests the reallocation-dampening effect of financial development dominates under normal conditions, but the pro-reallocation effect dominates in the event of a severe profitability shock. The analysis addresses inter-industry reallocation, but does not test for intra-industry reallocation, which is a more important driver of productivity growth [\[29\]](#).

A study of the influence of state-level banking deregulation on small firms by [Bai et al. \(2015\)](#) uses data for the United States from 1977 to 1993, an active period of deregulation. It suggests that deregulation improves productivity primarily through within-sector reallocation of labour across firms, as it raises the sensitivity of labour reallocation to the marginal product of labour. This result does not apply to large, multi-plant firms, because they are less affected by state-level deregulation and have access to national capital markets. The authors believe banking deregulation relaxes small firms' financial constraints by improving access to credit, thereby allowing firms with high marginal products of labour to expand their workforces more readily. This labour reallocation increases productivity through the intensive margin (labour reallocation between firms in a given sector). In contrast, the paper finds no favourable effect of deregulation on capital reallocation rates. It

conjectures that financing improvements are less influential for capital reallocation because physical capital can serve as collateral or be rented (making it readily obtainable), and possibly, capital responds less to banking conditions due to high firm adjustment costs.

Borio *et al.* (2015) use one digit sector-level data of 21 developed economies from 1969 to 2009 to shed light on the relationship between credit booms, productivity and labour reallocation. The results show that on average, credit booms tend to reduce contemporaneous aggregate labour productivity growth by roughly one-quarter percentage point annually, an economically meaningful decrease. This decline in productivity growth is driven mainly by reallocation of labour to lower productivity sectors during the credit boom period [30]. In combination, employment expansion in the relatively low productivity construction sector and employment shrinkage or slower job growth in the relatively high productivity manufacturing sector account for most of this productivity loss from reallocation. The study also assesses the effect of financial crises after credit booms on labour productivity, and shows that the misallocation effects of boom periods intensify and become considerably more persistent when the credit boom is followed by a financial crisis.

Finance can sometimes indirectly contribute to the *misallocation* of labour and other factors of production when financial institutions face distorted incentives. Caballero *et al.* (2008) show that credit flows to financially troubled “zombie” firms in Japan during the 1990s, contributed to lower firm destruction and creation rates. This reduced dynamism trapped labour and capital in zombie firms and impeded reallocation toward more productive new firm entries. The paper finds that higher shares of zombie firms in a market are associated with lower investment and slower employment growth among *healthy* firms, and thereby creates negative spillover effects that can depress labour markets. For example, the estimated cumulative loss of investment among non-zombies ranged between 19% and 43% for five key industries between 1993 and 2002 [31]. Estimated cumulative losses of employment were between 6% and 12% over the same period. Banks were incentivised to keep lending to troubled firms in order to avoid non-performance of prior loans to these firms (which could cause them to write-off existing capital and threaten their compliance with minimum capital standards) and sometimes were prodded by the government to continue credit flows.

4.2 Finance and adaptability of firm labour management practices

A mark of firm resilience is the ability to adapt successfully to evolving economic and social environments. Foreign ownership appears to influence firm labour management and may help them adapt away from traditional practices. Abe and Hoshi (2004) find evidence that higher foreign ownership shares of firms in Japan help to increase labour force dynamism, which is associated with greater firm resilience and higher productivity growth [32]. This result comes from analysis of 58 Japanese firms from 1995 to 2000. The ongoing evolution of labour management away from traditional Japanese approaches appears influenced by whether the main shareholders are domestic banks or foreign institutions. Firms with high shares of foreign ownership are more likely to modify labour practices. Probit analysis shows that high foreign ownership of stock shares is negatively related to length-of-service awards from firms to workers, which is associated with the traditional practice of lifetime employment. Presence of female managers is linked positively to large foreign share holdings and negatively to high ownership concentration by Japanese firms.

4.3 Housing finance and labour mobility

The sudden collapse of the US housing market starting in 2007 after a boom period resulted in a large number of homeowners with mortgage balances exceeding the value of their homes. This has led to concerns that these “underwater” homeowners may be less likely to relocate for a new job (the “lock-in” effect), because selling their homes would require paying the

difference between the sale price and the remaining mortgage debt. If systematic, then it could harm labour market matching of skills to jobs and contribute to higher unemployment. Similarly, a rising interest rate environment that increases financing costs over those currently enjoyed by a homeowner could increase lock-in and reduce mobility rates [33]. The studies in this section reflect evolving understanding of housing finance lock-in effects on labour market skills mismatches. Studies published just after the financial crisis find some evidence of reduced mobility, but tend to downplay its effect on labour market inefficiency. More recent papers using well-specified models and more complete data show stronger evidence of lock-in and acknowledge its harmful effects on labour market matching efficiency.

Donovan and Schnure (2011) find evidence of the lock-in effect in the United States on a broad scale using regressions of mobility on housing price changes and control variables with data from 2007 to 2009, but do not believe it impedes labour market efficiency. When dividing mobility into local, intra-state, and interstate moves, they show virtually the entire decline in mobility occurs in the local and intra-state categories, while interstate moves appear to *increase* when housing prices fall. Since interstate housing moves are more likely to be job-related, the authors conclude that underwater mortgages have little effect on the efficiency of the labour market matching process. Aaronson and Davis (2011) likewise contest the influence of lock-in on labour mobility using the US Census Bureau Survey of Income and Program Participation panel dataset from 2008 to mid-2010. The authors find that (1) both homeowners and renters have fairly low rates of interstate migration, (2) the difference in the change in interstate migration rates between renters and homeowners is statistically insignificant and (3) homeowner interstate mobility decreased the most in states with less severe home-price shocks. The paper acknowledges that this does not necessarily rule out a “lock-in” effect on *intrastate* mobility, however.

Quigley (2002) examines the effect of interest rate changes on homeowner mobility rates to test the hypothesis that homeowners are incentivised to postpone moving when current interest rates are less favourable than those of their existing mortgage. The study uses hazard regression models with US data for 1991 and 1992 and shows that homeowners living in their homes for over ten years are less likely to move when they have fixed-rate mortgages with interest rates below current rates. Thus, in a rising interest rate environment, long-time residents may delay moving in order to avoid higher financing costs associated with a new mortgage. The magnitude of the effect is small but grows with each year of increased tenure.

Ferreira *et al.* (2011) use data covering the US housing boom and bust period (1985–2009) to retest both the negative equity lock-in and interest rate lock-in effects, and tentatively conclude that substantial effects on labour markets are unlikely. The analysis distinguishes between temporary and permanent moves and finds that underwater mortgages reduce permanent moves by roughly 2.5 percentage points from a baseline mobility rate of 10%, which is statistically unchanged from the results obtained before the housing bubble burst [34]. The study does show evidence of interest rate lock-in, estimating that mobility declines by 1.6 percentage points per \$1,000 annual additional financing costs for an identical mortgage balance due to higher interest rates. Despite these results, the authors note that effects on labour markets may not be substantial because only a small fraction of household moves are long-distance and likely to be job-related.

More recently, Bernstein and Struyven (2017) find large housing lock-in effects by analysing 2007 to 2012 data from the Netherlands, where strict recourse laws virtually eliminate incentives for underwater homeowners to engage in strategic defaults. Since such defaults are predicted to increase mobility rates, the Dutch data provide a clearer signal on the mobility effects of negative home equity when homeowners continue to pay their mortgage. Using an instrument that eliminates variation in home equity caused by differences in down payments, pre-payments, and time-varying local economic conditions, the authors find that

negative home equity is tied to a 74–79% decline in mobility rates overall, with greater reductions for moves across labour markets. Further analyses show (1) households with sufficient liquid assets to relax the negative home equity constraint experience less mobility impairment and (2) no relationship between synthetic loan-to-value ratios (SLTV) and mobility in a placebo test of cash home buyers. Both points strengthen the overall result of a substantial housing lock effect on labour mobility in the Netherlands.

[Gopalan *et al.* \(2019\)](#) show evidence that reduced labour mobility rates associated with high loan-to-value (LTV) ratios are a key channel through which housing price declines led to lower wages and wage growth. Using a sample of 300,000 individuals in the United States with an active mortgage at the start of 2010, they find that higher LTV ratios, especially those greater than 1.0 (“underwater” homeowners), are associated with lower incomes and slower income growth than “base” ($0.3 < \text{LTV} < 0.4$) ratios. To test if this income effect is tied to labour mobility, the paper examines the effect of LTV on mobility rates and finds that individuals with high LTV values are less likely to move than those with base LTV ratios by an economically meaningful margin. This negative mobility effect is greater for homeowners with below median credit scores and among those with less than median undrawn credit limits, suggesting that high LTV individuals who are credit constrained are less likely to move.

[Brown and Matsa \(forthcoming\)](#) present evidence that housing price fluctuation can influence job search practices in ways that hinder labour market efficiency, and conclude that housing-related constraints on job searches have mixed effects on firms but are clearly harmful to workers. The authors analyse employment applications in the financial services industry from a national online job search platform in the United States from May 2008 through December 2009. First, panel regressions show the shares of job applications for positions outside of the applicant’s local labour market are related positively to housing price changes. For example, a specification that controls for local labour markets, changing economic conditions, and zip code fixed effects finds that a 30% drop in home values is associated with a 20% decline in applications for jobs outside of one’s local labour market. This effect is amplified for homeowners with low equity value, but non-existent for renters, suggesting mortgage lock-in influences job search and labour mobility. Second, the paper analyses the effects of state recourse laws on job application rates for non-local positions by otherwise similar populations that reside in the same housing and labour markets. State recourse laws hold homeowners personally liable for their mortgage debt, providing a channel for lenders to seize other assets to pay for debt not covered by a foreclosure sale. Regression discontinuity analysis shows that applications for jobs in distant markets are substantially lower in recourse states in areas that see large declines in home values. The effect is particularly strong among higher-income groups, who have more valuable assets subject to seizure, suggesting that recourse for unpaid mortgage debt can limit labour mobility and impair the efficiency of employer–employee matching.

5. The reverse link: effect of labour market institutions on finance

This section emphasises labour unions and provides a reminder that labour market institutions affect financial markets as well [35], see [Table 5](#) above for a brief summary of selected studies. A sizable literature on the effects of labour unionisation on various facets of finance exists. This empirical work highlights the dynamics between unions, workers, firm managers and finance. This work falls outside the scope of the current literature survey because the direction of influence of the institutions analysed is the reverse of the direction of the core topic of interest – the effects of finance on labour outcomes.

Studies of the effects of labour unions on finance address a range of finance-related endpoints with mixed results. [Chino \(2016\)](#) provides a useful summary of the recent literature

in this area. Previous studies have analysed the effects of unionisation on the cost of equity finance (Chen *et al.*, 2011), on corporate bond yields (Chen *et al.*, 2012), on corporate leverage (Marciukaityte, 2015; Matsa, 2010) and pay-out policy (Chino, 2016), among others.

5.1 Cost of equity

Chen *et al.* (2011) analyse sector-level US data from 1984 to 2006 and show evidence that the reduced firm operating flexibility associated with unionisation increases the implied costs of equity, particularly during market downturns. This inflexibility can impose costs and raise risk because it hinders firms' ability to adjust their inputs when demand for their products ebbs.

5.2 Cost of debt

Chen *et al.* (2012) examine data for the United States from 1984 to 1998 to assess the effects of unionisation on corporate bond yield spreads. They find that firms in more highly unionised sectors have lower bond yields than firms in other sectors, and attribute this to less risky investment practices on average and lower risk of corporate takeovers.

5.3 Corporate leverage

Marciukaityte (2015) exploits the inter-state variation in union regulations in the United States to analyse their effects on corporate financial leverage between 1995 and 2012. He shows a positive and economically meaningful link between unionisation in states with more pro-union regulations and leverage (but not in states with weaker unions). The author interprets the result as supportive of the view that firms use higher leverage to fortify their bargaining power in states with stronger unions. Similarly, Matsa (2010) uses exogenous variation in union bargaining power across US states to test the hypothesis that firms in states with more pro-labour regulations also take on more debt. The study finds strong evidence to back this view among firms with high earnings volatility (which increases firm exposure to union rent seeking).

5.4 Pay-out policy

Chino (2016) finds the effect of unionisation on firm dividend and stock repurchase pay-outs are dependent on firm profitability, based on US data for the period 1983 to 2015. While the average impact of unionisation on firm pay-outs is close to zero, the inclusion of firm profitability in the model reveals heterogeneity. Unionisation tends to reduce pay-outs among low profitability firms, but boosts pay-outs among high profitability firms.

6. Conclusion

The economic literature on finance and labour markets appears less developed than that of other finance topics such as finance and growth. Despite this lack of depth, finance and labour research offers preliminary insights that may inform policy making, even as the body of empirical work continues to grow. The main finance dimensions discussed in this survey include domestic financial development, financial globalisation, financial shocks, bank deregulation, firm capital structure, firm leverage or credit availability and personal credit. The key labour outcomes examined include the growth and volatility of (un)employment and wages, income inequality, mobility and reallocation.

The studies suggest that finance has real bearing on *job quantity and job quality*: (1) labour market characteristics like employment protection legislation interact with finance to influence labour outcomes; (2) financial development helps fuel employment growth in non-OECD countries but additional finance does not have this effect in highly developed

countries; (3) financial globalisation contributes to higher wages in emerging markets but may reduce national wage shares in OECD countries; (4) employment at highly leveraged firms may be more sensitive to changes in industrial production; (5) domestic financial development and global financial integration tend to increase the volatility of hours worked; (6) firms acquired through leveraged buyouts tend to have slightly lower job growth rates and lower wages, although one LBO model increases the wages and incentives of production workers.

Finance also has *distributional effects*: (1) certain types of bank deregulation can reduce income inequality and raise employment opportunities in countries with well-developed institutions, however, the effects of deregulation on human capital flows in the financial sector places upward pressure on inequality; (2) financial sector workers earn higher labour income than do workers with comparable skill levels in other sectors, contributing to greater income inequality.

Finally, the evidence suggests that finance can contribute both positively and negatively to *resilience and adaptability*: (1) finance is linked to increased reallocation of labour, however, depending upon the firms and broader economic conditions, this reallocation may either enhance or weaken productivity growth; (2) evidence is inconclusive regarding the potential effect of individual credit ratings on the employment and earnings of workers; (3) housing price downturns can create mortgage lock-in effects that reduce the mobility of homeowners, which contributes to labour market inefficiency.

Notes

1. The effect of greater credit provision within already financially developed countries tends to have limited or even negative effects on growth. See [Cournède and Denk \(2015\)](#) and the nonlinear finance and growth studies outlined in [Law and Singh \(2014\)](#).
2. See for example, [Cournède et al. \(2015\)](#).
3. See for example, [Chortareas et al. \(2012\)](#), [Peek and Rosengren \(2005\)](#) and [Sapienza \(2004\)](#). [Chortareas et al. \(2012\)](#) use a sample of banks operating in 22 European countries from 2000 to 2008, and find that regulations that restrict bank activities such as insurance underwriting and securities brokering are associated with lower bank efficiency. It also shows that more supervisory power and associated capital adequacy standards are linked to greater bank efficiency.
4. Analyses by [Abildgren \(2016\)](#), [Fuentes-Albero \(2014\)](#) and [Buch and Pierdzioch \(2014\)](#) support this view.
5. Organic employment growth includes employment changes at continuing establishments, deaths and births. Acquisitions and divestitures are the non-organic elements included in the firm-level analysis.
6. The authors do not investigate the potential benefits to the efficiency of matching between employees and firms.
7. For example, 84% of the US sample were employed or self-employed while this condition applied to just 48% of the Swedish sample, and annual pre-tax earnings averaged about \$35,000 in the [Dobbie et al.](#) sample while after-tax earnings averaged \$12,000 in the [Bos et al.](#) sample. Part of these differences may be attributable to the broader age range of the sample used by [Bos et al.](#), which includes non-working age people.
8. Domestic financial development is captured by deposit money bank assets divided by GDP. International integration of finance is proxied by the share of cross-border debt assets plus liabilities over GDP.
9. The authors offer little assessment of the underlying reasons for these diverse results.
10. This positive relationship may not hold permanently. It applies to debt finance in countries at low to medium levels of financial development, but when the volume of intermediated credit to the non-

financial private sector exceeds GDP, this appears to have a negative effect on growth rates. Similarly, stock market capitalisation is positively linked with growth until it reaches the GDP level, then turns negative. See [Cournède and Denk \(2015\)](#) for an empirical analysis of OECD and G20 countries.

11. See for example, [Matsa \(2010\)](#) (discussed below) for evidence of rising firm leverage rates in response to unionisation.
12. See for example, [Core and Guay \(2001\)](#) and [Kedia and Abon \(2002\)](#).
13. This review does not provide a complete assessment of labour shares. Several studies analyse the contributing factors to declining labour shares. See, for example, [ILO \(2011\)](#).
14. Compensation per employee as a percentage of GDP at market prices per person employed. Data for Japan begin in 1980. Data for Germany covers only West Germany over the period 1970–1990. Accessed 24 October 2019.
15. Domestic financial development is captured by deposit money bank assets divided by GDP. International integration of finance is proxied by the share of cross-border debt assets plus liabilities over GDP.
16. For example, see [Van Arnum and Naples \(2013\)](#) and [Charpe and Tobin \(2011\)](#).
17. For example, Dünhaupt includes inward and outward foreign direct investment (FDI) variables and a government activity variable but does not include a technology variable nor an explicit employment protection legislation (EPL) variable. Kohler *et al.* include technology and EPL variables, but not FDI in their model.
18. There is evidence that community development financial institutions (CDFIs) in the United States lend disproportionately to traditionally underserved client consumers and small businesses. However, partly due to data limitations, researchers have not conclusively found that these institutions foster greater credit flows to underserved groups from mainstream lending institutions ([Swack *et al.*, 2014](#)). While self-reported survey information suggests that communities served by CDFIs benefit economically and socially, there appears to be little quantitative analysis that demonstrates this clearly ([Kolodinsky *et al.*, 2006](#)).
19. See, for example, [Berger and Bouwman \(2013\)](#) and [Gauthier *et al.* \(2012\)](#).
20. [Delis *et al.* \(2014\)](#) show suggestive evidence that banking crises disproportionately hurt the poor, but they find little correlation between a bank supervision indicator and income inequality.
21. See [Aiyar *et al.* \(2016\)](#) on credit supply effects of bank capital requirements. [Martinez-Miera and Suarez \(2014\)](#) and [Clerc *et al.* \(2015\)](#) use stylised macro models to illustrate the economic dynamics between bank capital levels, lending, and several downstream outcomes.
22. The remaining explanatory variables include indicators of financial patents, initial public offering activity, corporate default rates, US foreign assets, and the top marginal tax rate.
23. Although the authors do not mention it, this result suggests that large banks offering both commercial and investment bank services may be likelier to demand higher skilled employees and generate high wage jobs than are community banks that provide traditional services without investment banking.
24. Evidence of this in the United States is particularly strong. The data vary according to the definition of high-technology sectors, but one study shows that they made up 12% of all jobs while producing 23% of output in 2014 ([Wolf and Terrell, 2016](#)). Analysis defining the sector differently finds that average wage rates were more than double those in the private non-technology sectors over the 2010–15 period ([Gascon and Karson, 2017](#)). A third study estimates that advanced technology sectors saw 2.7% annual productivity growth since 1980, nearly double the rate of the rest of the economy ([Muro *et al.*, 2016](#)).
25. Several studies apart from the ones reviewed in this section support this broad conclusion. See, for example, [Bakija *et al.* \(2012\)](#).

26. However, the authors suggest that the post-crisis policy reforms adopted in the United Kingdom may put some downward pressure on financial workers' earnings. The data assessed in the study did not provide sufficient coverage of the post-reform period to capture this potential effect.
27. ICT is measured as the share of ICT capital in total capital compensation, which indicates the intensity of ICT capital use accounting for both quantities and prices (see the paper for more information). Financial deregulation is measured by a deregulation index developed by the authors and composed of seven dimensions of financial reform.
28. See [Heil \(2017\)](#) for a more detailed discussion of finance and reallocation.
29. For example, see the literature review by [Kolev and Tanayama \(2015\)](#).
30. The analysis does not account for within-sector or within-firm reallocation.
31. The cumulative percentages are relative to the case where the share of zombies remained at their 1981–1992 average. The estimates are those reported as Case 1. The five industries include wholesale, retail, construction, real estate and services.
32. For example, [Preenen et al. \(2017\)](#) find positive associations between internal labour flexibility and labour productivity and product innovation for a large sample of Dutch firms.
33. This section describes a few well-known studies. Several additional empirical papers exist, including for example, [Oswald \(1997\)](#), [Chan \(2001\)](#), [Engelhardt \(2003\)](#) and [Munch et al. \(2008\)](#).
34. These results are considered preliminary because it takes about five years for housing transitions data to be resolved, so more recent data are needed to determine final outcomes.
35. Unionisation is just one type of labour market institution that may influence firm finance. See [Matsa \(2018\)](#) for a thoughtful review of economic studies on a broad range of labour market institutions and firm capital structures.

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