How does globalization affect the relationship between labor share and industrial relationship? A historical-empirical analysis

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Research indicates that the labor share of total income has steadily decreased since mid- 1970s when the globalization process started, which in turn has exacerbated inequality. In this paper, we use a game theoretic framework to examine how globalization affected labor share and changed industrial relationship in the long term. In our analysis, we consider a simple Nash bargaining model between workers and employers. Our model provides hypotheses that decline in overseas production costs as well as workers' bargaining power have a negative effect on labor share. Based on a panel data set of 18 OECD countries during the period 1975–2017, we then empirically confirm these hypotheses. We find that globalization negatively affected labor share throughout the period, whereas workers' bargaining power estimated by union density lost its positive effect on labor share after the early 1990s when offshoring started to increase. We conclude that a qualitative change in globalization with increased offshoring radically changed industrial relationship through the threat effect.

Keywords: Globalization; offshoring; labor share; union density; bargaining power; threat effect

1. Introduction

Recent decades have seen many attempts to investigate growing worldwide income inequality with more intensified competitive markets by globalization. Some studies discuss inequality as a consequence of personal income and wealth among individuals becoming more unequally distributed—those who own wealth and receive higher income get richer, whereas those who do not own property get poorer (Atkinson *et al*., 2011; Piketty, 2014; Piketty and Saez, 2014). As a result, top income shares and national Gini coefficients have increased steadily since the 1980s. Other studies, like that of Daudey and García-Peñalosa (2007), investigate inequality by examining factor income distribution—the share of total income received by each factor of production including labor, capital, and land. According to that study, the decline of labor income relative to other factors explains contemporary income inequality.

It is clear that the labor share has been gradually decreasing in many countries in recent decades, contributing to increased income inequality due to relatively lowered wage, as much of the literature points out (e.g., Kristal, 2010; Rodriguez and Jayadev, 2012; Piketty, 2014; Karabarbounis and Neiman, 2014; ILO and OECD, 2015; Stockhammer, 2017; Dünhaupt, 2017; Pariboni and Tridico, 2019). Rodriguez and Jayadev (2012, p. 16) argue that 'labor share is an indicator of the returns to the majority of the population,' and a declining labor share suggests 'a significant decline in

the power of one group … relative to another.' Empirical trends in the labor share and its determinants have been discussed, but there is no consensus about the determinants of labor's overall share of national income.

Some work by neoclassical economists attributes the decline of the labor share to changes in industrial organization and skill premia. Borjas and Ramey (1995) argue that foreign competition in concentrated industries causes a decline in the relative wage of less educated workers. An empirical study by Feenstra and Hanson (1996) shows that an increase in outsourcing in the US from 1972 to 1994 contributed to a decreased labor share for unskilled workers and increased demand for skilled workers relative to unskilled workers. Karabarbounis and Neiman (2014) emphasise that the decline in the labor share is related to the falling relative price of capital, accompanied by a rapid decline in equipment costs. Barkai (2020) shows that the increase in the profit share is large and offsets the decline in labor's share whereas the capital share—the ratio of capital costs to gross value added—does not offset the decline in the labor share.

Research by Post-Keynesian economists emphasises the effects of financialization and changes in government expenditure on the decline in the labor share. These studies use macro panel datasets to estimate the determinant factors of labor share using multiple regression analysis. Jayadev (2007) emphasises that capital account

openness depresses the labor share, as employer can enhance its bargaining power with labor by enhancing its global mobility. Guschanski and Onaran (2016) show that the determinants of labor share decline vary from country to country using detailed sectoral data with country-specific estimations from selected OECD countries. Dünhaupt (2017) found that increased dividend and interest payments are strongly associated with the decline of labor's share. Stockhammer (2017) found that financialization, welfare state retrenchment and globalization have strong negative effects on labor share. Kohler *et al*. (2019) decompose financialization's effect on the labor share into four channels, finding that international financial openness and the financial payments of firms have robust negative effects on labor share. Pariboni and Tridico (2019) claim that deindustrialization and financialization have a significant impact on the decline of the labor share.

It is also worth noting that many studies identify bargaining power as a determinant of labor's share. Blanchard and Giavazzi (2003) focus on the effects of regulation and deregulation in labor markets. They find that deregulation caused a decline in the bargaining power of labor and worsened macroeconomic conditions in Europe in the 1980s. Autor *et al*. (2020) also suggest that the rise of superstar firms can reduce labor's bargaining power by increasing labor market competition and using

offshoring threats in currently intensified labor market competition. Additionally, Sung *et al*. (2019) empirically show that there is a negative correlation between the strength of organized labor and the decline in the labor share.

Despite different theoretical explanations among authors, there is a consensus that structural changes in labor market or industrial relationship caused by globalization negatively affects labor share. Although previous studies have basically focused on macro and exogenous factors that contribute to a decline in the labor share, studies at the micro level, including those examining the endogenous dynamism of the industrial relationship, are scarce. However, because wage depends on employer–employee relationships, which was radically changed by globalization with extended labor market overseas, it is important to consider how globalization has affected said relationships and resulted in labor share.

In this paper, we focus on the effects of globalization, and workers' bargaining power to clarify the determinants of the current decline in the labor share, using a micro-level model of the industrial relationship and its influence in wage bargaining. We start with a simple Nash bargaining model between workers and employers following Blanchflower *et al*. (1996) and Rodrik (1999). Our model is a small open economy comprising rent-sharing (non-zero profit) sectors and the unemployed

receiving a fixed amount of unemployment compensation. The level of wage and employment in rent-sharing sectors is determined by Nash bargaining. For our research aim, we use comparative statics of globalization and workers' bargaining power to investigate the effects of each change on wage, employment and profits. Consequently, we derive two hypotheses on labor share: first, globalization ends to undermine labor share; second, workers' bargaining power has a positive effect on labor share.

Based on the proposed hypothesis, we also try to explore the decline in labor share in terms of the historical dynamics in employer–employee bargaining negotiations in the era of globalization. We therefore focus on relatively longer historical periods using the panel data set of OECD 18 countries, dividing the data into the two most recent twenty-five-year periods and comparing the trends we observe. Although 'globalization' may appear to be a generic concept, we first introduce it as a more integrated international production process considering our research aim. Next, we focus on its different aspects—expansion in trade-in-goods or offshoring—and discuss their effects on labor share and industrial relationships. While globalization in trade-in-goods negatively affected the overall labor share after the mid-1970s, workers' bargaining power lost substantial power on labor share after the early 1990s. This is because a qualitative change in globalization—increase in offshoring—had taken place.

This article comprises six sections. In the second section, we explain the Nash bargaining model to formulate a hypothesis on labor share. In the third section, we explore historical trends in the labor share, globalization, and union density[1] for selected OECD countries from 1975 to 2017. In the fourth section, we perform empirical regression analysis, setting the labor share as the dependent variable. In the fifth section, we explain the empirical results as the change of industrial relationship caused by globalization. Finally, we summarise and offer our conclusions in the sixth section.

2. Theoretical framework: Game theoretic model in industrial relationship

For our analysis, we aim to depict the effects of globalization and labor organization on industrial relations in a small, open global north with a non-zero profit theoretical model in this section.

We consider a simple Nash bargaining model between workers and employers that determines the wage and employment of an offshorable company in a small, open economy. For simplicity, we assume that domestic workers and firms are homogeneous. The Nash bargaining is this maximization problem following Blanchflower *et al*. (1996) and Rodrik (1999) as

$$\max_{w,n} \ \phi \log\left[\left(u(w) - u(w^*)\right)n\right] + (1-\phi)\log(\pi - \pi^*)$$

where $u(w)$ denotes an individual worker's utility from their income and assumes $u'(w) > 0$ and $u''(w) < 0$. w is wage and w^* is unemployment compensation. The number of employees is written as n, and the production function is written as $f(n)$. The level of profits of firm are written as $\pi = f(n) - wn$, and π^* is the level of profits when firms replace their production tasks by international trade or offshoring.[1] Thus, increasing π^* stands for decreasing international trade and offshoring costs by globalization.

Here, w^* and π^* are workers' and firms' outside options or fall back positions. ϕ and $(1-\phi)$ donate the bargaining power of workers and employers, respectively. The first order condition can be written as follows.

$$w: \frac{\phi u'(w)}{u(w) - u(w^*)} - \frac{(1-\phi)n}{\pi - \pi^*} = 0$$
$$n: \frac{\phi}{n} + (1-\phi)\frac{f'(n) - w}{\pi - \pi^*} = 0.$$

From the first order condition for n, we set $w > f'(n)$ in this model. Following Blanchflower *et al*. (1996), we can get reduced expression for wages as

$$w \simeq w^* + \frac{\phi}{1-\phi}\left(\frac{\pi - \pi^*}{n}\right).$$

This wage formula shows that workers can get a premium above the unemployment compensation through bargaining negotiations. From the first order condition, the level of employment is

$$n = \frac{\phi}{1-\phi}\left(\frac{\pi - \pi^*}{w - f'(n)}\right).$$

Given our research aim, we focus on the effects of globalization π^* and labor organization ϕ on the labor share. Therefore, we determine the positive or negative impact of each exogenous variable from comparative statics. First, the results about globalization π^* are as follows.

$$\frac{dw}{d\pi^*} < 0 \quad (1)$$

$$\frac{dn}{d\pi^*} < 0 \quad (2)$$

As international integration strengthens and costs for substitution of overseas production fall, firms' outside options π^* rise, but this change has negative effects on both wages and employment. Conversely, this change is positive for firms' profits π that $d\pi/d\pi^* > 0$. Therefore, these results show that 'increased mobility by employers and an enhanced ability to outsource will redistribute income away from workers in rent-sharing sectors and in favor of profits' (Rodrik, 1999; p.126).

Furthermore, we consider the effects of bargaining power on labor income. In general, workers' bargaining power is conceptually positively related to the rate of union organization; thus, higher organizing rates are likely to improve wages and employment (Wright, 2000). To confirm this, we conduct comparative statics of the labor bargaining power ϕ within our theoretical framework and the results follow.

$$\frac{dw}{d\phi} > 0 \tag{3}$$

$$\frac{dn}{d\phi} > 0 \tag{4}$$

These indicate that increased bargaining power leads to higher wages and employment, as opposed to the globalization.

Lastly, we focus on income distribution. National income is $Y = wnK + w^*m + \pi K$, whereas m and K indicate the number of unemployment and domestic firms, respectively. Thus, the labor share *LS* can be written as

$$LS = \frac{wnK}{wnK + w^*m + \pi K}$$

We have examined individual comparative statics with respect to globalization π^* and bargaining power ϕ. From (1)–(4), we can express the change of total wage wnK with globalization and the decline in workers' bargaining power as $\partial wnK/\partial\pi^* < 0$ and $\partial wnK/\partial\phi > 0$. The number of unemployment m is relative to the number of employment *n*; thus, the change of total unemployment compensation w^*m contrasts with the change of total wage that $\partial w^*m/\partial\pi^* > 0$ and $\partial w^*m/\partial\phi < 0$. From these results, we can derive two hypotheses:

Hypothesis 1: More intensified globalization reduces labor share, $\partial LS/\partial\pi^* < 0$.

Hypothesis 2: Decline in workers' bargaining power reduces labor share, $\partial LS/\partial\phi > 0$.

After overviewing historical trends in labor share, globalization, and union density, these hypotheses will be empirically examined.

3. Historical trends: Labor share, globalization, and union density

Before we proceed empirical confirmation on the hypothesis proposed earlier, we provide an overview of historical trends for the labor share, globalization and union density from the static data of OECD 18 countries from 1975 to 2017 in this section.[2] Regarding globalization, we introduce different indicators of the KOF index and offshoring intensity to understand it from the qualitative perspective. We confirm the decline in the labor share and union density, and find that there was a qualitative change in globalization around 1990.

3.1 The labor share

First, we focus on the labor share and review its trends in current half century. As Krueger (1999) stresses, the labor share index has a problem due to its treatment of self-employed workers. To account for this bias, we employ the *adjusted labor share*, which is calculated by dividing the labor compensation per employee by the total economy GDP per worker.[3] Labor compensation is the sum of gross wages and salaries

and employers' social security contributions.

[Figure 1 near here]

In Figure 1, it is clear that the labor share has seen a decline in both the mean and median for 18 OECD countries for over forty years. However, it should be noted that the labor share remained at relatively higher levels, with yearly volatility, until the early 1980s, and started to drop thereafter. From 1975 to 1986, both the mean and median of the labor share remained over 60%. The labor share declined gradually after 1982, decreasing to 54% in 2017. One important aspect to note is that the decline in the labor share was more drastic in the 1980s than it was from 1990 to 2017.

3.2 Globalization (KOF index and offshoring intensity)

The movement of people, goods and money across borders has become more active in the past thirty years than in the preceding decades, a phenomenon known as *globalization*. However, globalization is not a single concept that can be clearly defined, but a process that includes causes, courses and consequences of the transnational integration of human and non-human activities (Al-Rodhan and Stoudmann, 2006).

To measure globalization in its multi-faceted character, we employ an integrated index that uses various kinds of data, the KOF Index of Economic Globalization.[4] The

index ranges from 0 to 100, with higher values indicating greater economic openness. Figure 2 shows that the KOF index has rose constantly since 1975. The median value of economic globalization rose from 49.8 in 1975 to 79.3 in 2017, a nearly 60% increase. In addition, it is also worth noting that economic globalization has stagnated since 2000. The median value of economic globalization had already reached 78.6 by 2000 and did not increase significantly afterward.

[Figure 2 near here]

The KOF Index shows that globalization stagnated starting 2000. However, the patterns of international trade and investment have radically shifted as more active trade and investment have taken place since the early 1990s. This change is characterized as an increase in offshoring trade between developed countries and developing ones, rather than trade-in-goods and investment among developed countries (Baldwin and Lopez-Gonzalez, 2015). The KOF Index is an integrated index of actual flows and restrictions; thus, it cannot measure such change in globalization. To investigate the contents of globalization in detail, we identify the relationship between developed and developing countries.

For that reason, we employ another index for globalization, offshoring intensity, to elucidate the economic relationship between developed countries and developing

ones. Offshoring intensity is measured by determining the merchandise (manufacturing) imports from low- and middle-income countries as a share of total merchandise (manufacturing) imports for the 18 OECD countries we study.[5] As we observe in Figure 3, both the mean and median offshoring intensity values have more than doubled over the last three decades. The mean of offshoring intensity dropped from 13.5% in 1985 to 10.4% in 1986 after the Plaza Accord but, afterward, the mean of offshoring intensity constantly increased until it reached 26.5% in 2017. The median of offshoring intensity started to rise after 1991. This median value was 9.05% in 1991 as compared with 22.4% in 2017.

[Figure 3 near here]

These statistical figures demonstrate that the globalization has undergone a *qualitative turn* characterised by the rapid growth of offshoring trade between developed countries and developing ones, along with a quantitative increase in investment and trade flows. The surge of offshoring is consonant with the distinctive features of 'the new wave of globalization' which Milberg and Winkler (2013) identify. Furthermore, this change in the patterns of globalization corresponds with capitalism's transition from a phase of 'material expansion' to a phase of 'financial expansion' in the long twentieth century as Arrighi (1994) discusses. To summarize the new wave of

globalization, large firms in developed countries are transferring their production tasks to developing countries seeking cheaper wages.

3.3 Union density

In this paper, we use union density as a measure of the bargaining power of labor. Union density is net union membership as proportion of total employment. Empirical data for this measurement comes from the ICTWSS database version 6.1 (Visser, 2019). We regard the level of union density as a representative of not only labor organization but also the strength of labor's bargaining power, as seen as ϕ in our model in the previous section.

[Figure 4 near here]

As is shown in Figure 4, union density constantly decreased throughout the period. The median was cut almost in half from 48.0 in 1975 to 23.9 in 2017. On the other hand, the value of the mean has not declined as sharply the median, dropping from 45.2 in 1975 to 31.2 in 2017. From this, we can summarize the overall declining trend in labor power in recent decades.

To conclude this section, we summarise trends for the three variables—the labor share, KOF index, offshoring intensity and union density—for the 43 years we examine

in Table 1. This table presents the median levels for 18 countries in 1975, 1996 and 2017, and the changes of the levels of each variable from 1975 to 1996 and from 1996 to 2017 (Table A1 in the Appendix presents the trends for individual countries). The percentage changes for all variables during the first 22 years are large, but the rate of change became smaller in the latter 22 years.

[Table 1 near here]

Unlike the KOF Index, the rise of which became gradual after the mid-1990s, offshoring intensity took off. This indicates that globalization made a *qualitative turn* after the mid-1990s, characterized in the shift from international trade among developed countries to offshoring within developing countries.

4. Empirical analysis on the labor-capital game

We have seen overall trends in indicators measuring declining labor shares and increasing globalization and union density over a 43-year period in the previous section. Based on the theoretical framework and hypotheses proposed in the second section, we perform regression analysis in this section. First, we present our regression model; after explaining a periodization for our historical analysis; then, using the panel data set for the 18 OECD countries in the same period, we empirically examine the industrial

relationship and the change observed therein.

4.1 Regression model

We set the labor share as a dependent variable, as we think the labor share approximates well labor's payoff relative to capital's payoff within the overall game. Based on our discussion in the Section 3, we examine how globalization and union density affect the labor share in the dynamic process of the industrial relationship. Thus, our regression model is constructed as follows:

$$LS_{it} = \beta_0 + \beta_1 GLB_{it} + \beta_2 UD_{it} + \beta_3 Unemp_{it} + \beta_4 \Delta GDP_{it} + \beta_5 GE_{it} + u_{it}$$

Whereas LS_{it} indicates the labor share of a state i at a year t. The independent variable GLB indicates the degree of globalization evaluated by the KOF index as we explained in the previous section. Additionally, we introduce offshoring intensity as a qualitative indicator of globalization—whereas the KOF index only focuses on actual flows and restrictions, offshoring intensity indicates the relative weight of developing countries in manufacturing trade. Although FDI outflows are also an important variable indicating the quantitative level of financial globalization, we

have omitted the variable from our analysis since it is already contained in the KOF Index of Economic Globalization. UD indicates union density, which represents the level of labor organization. Following the employer–worker game model hypothesis, we expect that GLB will have a negative effect on LS, as it should work to weaken labor power via the threat effect to replace domestic labor with foreign labor through offshoring. Conversely, UD is expected to positively affect LS, as it should work to strengthen labor power in collective bargaining over wages.

We introduce the unemployment rate ($Unemp$) as well as GDP growth (ΔGDP) as control variables, because we assume that these are important macro factors that affect the labor market. Government expenditure (GE) is also added as a control variable, because it functions as a proxy variable for the importance of government activity (Jayadev, 2007; Dünhaupt, 2017). If the government expenditure of a country is relatively higher, it means that the country will tend to have more restrictions on the labor market like minimum wages. Government regulations as well as the welfare state should affect the labor share.

4.2 Periodization

To examine the effects of globalization and union density on the labor share, we first

perform regression for the long span of 1975 to 2017, then we observe the changes within each period. As we have seen in Section 3, globalization started to expand in the 1970s, involving qualitative and quantitative changes like the expansion of FDI outflows and offshoring intensity starting around the beginning of the 1990s.

To see a change in the industrial relationship in a long historical process of globalization, we also performed regressions for two quarter centuries—1975–1999 and 1993–2017—for comparison. In both periods, globalization continues to rise; however, there is a qualitative difference. The former is a period of constant expansion of globalization as we saw in Figure 2 with KOF index as more integrated measure of globalization. The latter period is the years when offshoring intensity increased as we also have seen in Figure 3. The latter also overlaps with a period of financialization that has continued until recent years. Thus, we could distinguish the following two periods: the former as a process of an expansion of international goods trades, and the latter as a globalization with more intensified offshoring and financialization. We compare these two periods to observe the changes in the industrial relationship over the long term.

4.3 Regression results

Our regressions used a panel data set for 18 developed OECD countries from 1975 to

2017. Since a Hausman test did not determine whether a fixed effects model or random effects model was appropriate for our regressions, we show both results for each model in Tables 2 and 3.[6] The Hausman test results are economically reasonable because the industrial relationship is partly affected by institutional conditions that are specific to each country on the one hand, but is also affected by general trends like globalization and liberalization that are common to most countries on the other. For instance, north European countries like Denmark, Sweden and Finland had higher levels of union density even in the mid-1980s, when union density was decreasing in most other countries, and this trend continued into the 1990s.[7] This extraordinary trend is due to special institutional conditions like the Ghent system, wherein labor unions take responsibility for managing unemployment insurance instead of government or private organizations. However, we also find trends in common for all countries, including the north European welfare states, over the observed half century—including a declining labor share and union density accompanied by globalization.

Table 2 shows the results of our regressions for the period from 1975 to 2017. Moreover, the Multicollinearity test results are found in Table A2 in the Appendix. These significantly support our hypothesis—globalization is negatively correlated with the wage share, whereas union density is positively correlated with it. The KOF and *UD*

significantly affect the labor share in Model 1 as well as Model 2 along with offshoring intensity, including both fixed and random effect models, demonstrating statistical robustness. Offshoring intensity also has a significantly negative effect on the labor share. Naturally, the unemployment rate negatively affects the labor share, which is compatible with orthodox labor market models. It is interesting that GDP growth negatively correlates with the labor share, although this is beyond the scope of our research and different interpretations have been provided by several previous studies (e.g., Barkai, 2020; Acemoglu and Autor, 2011). Government expenditure has a positive correlation with the labor share, as welfare states tend to have more regulations on labor markets that work to the advantage of labor as discussed by Blanchard and Giavazzi (2003).

[Table 2 near here]

Table 3 summarises the regression results for the periods 1975-1999 and 1993-2017 according to the classification we proposed above. The KOF Index has a negative effect on the labor share in all models, similarly to the regression results for the long term. Interestingly, we can find radical declines in the coefficients for union density in 1993-2017 as compared with the models for 1975-1999. The coefficients in Model 5 are less than two thirds of those of Model 3, while Model 6 even shows that

union density has no more significant effect on the labor share. Furthermore, offshoring shows significant negative impacts on the labor share in 1993–2017 in Model 6, whereas we cannot find any significant effect in 1975–1999 in Model 4. To summarise, we can say that the effect of union density on the labor share declined, whereas offshoring increased its negative effect on the labor share in the more recent period.

[Table 3 here]

5. Discussion: Historical change in the industrial relationship

Our regression results correspond well with our industrial relationship game model suggests that globalization will place downward pressure on the labor share, while organized labor will place upward pressure on the labor share over the long term (see Table 2). The regression results are basically compatible with our game model. However, we could also find that effects of offshoring and union density on labor share changed after the mid-1990s. Figure 5 summarises the historical changes in the effects of globalization and industrial relationship on labor share, based on our regression results in the previous section. In this section, we discuss the results from the perspectives of power balance between workers and employers changed by globalization.

[Figure 5 near here]

Globalization measured by the KOF Index has significant negative effects on the labor share in both periods, which is consistent with *hypothesis 1* and the findings of other previous studies, such as Pariboni and Tridico (2019) and Sung *et al.* (2019). Increasing international flows and easing restrictions have allowed firms to earn higher profits than relying on their workers; thus, the labor share has declined.

It is interesting to note the contrasting relationship between offshoring intensity and union density. Offshoring intensity, which had no significance in the first period

when it remained low, has significant negative effects on the labor share in the second period, after growing. Conversely, union density, which had significant positive effects on labor share in the first period, lost its significance in the second period and this change is inconsistent with *hypothesis 2*. The changes in the effectiveness of offshoring and union density suggest that the weakening labor unions in the second period are not due to globalization but due to the expansion of offshoring. Consequently, Figure 5 shows remarkable changes between the first and second periods that cannot be considered by globalization as measured by the KOF Index.

Now we consider why union density, as an indicator of labor power in collective wage bargaining, lost its effects on the labor share in the second period. Therefore, we first analyze the historical changes in industrial relationships followed by a *qualitative turn* in globalization from trade-in-goods among developed countries to offshoring with developing ones. As Krugman (2008, p.108) described this qualitative turn, 'the countries where growth in trade is occurring today have even lower average wages than those where the growth was occurring in the early 1990s.' Therefore, we can distinguish globalization in the initial stage limited in trade-in-goods among global north, from the new wave of globalization with expansion of offshoring between global north and south after the mid-1980s.

Principally, labor unions are expected to hold their power in wage bargaining because they may strike to pressure their employers as Wright (2000) presumed. If employers choose opposition strategies like wage cut or layoffs, labor organization harms their interests, because the risk of strikes or collective bargaining increases with a higher level of union density. In the Golden Age of capitalism, for three decades after WWII (Marglin and Schor, 1990), workers held the final option to strike to raise its wages within the industrial relationship. Our empirical results show that even after the end of the Golden Age, labor unions retained their bargaining power in the initial stage of globalization.

However, offshoring provides employers an alternative strategic option, which may replace (often costly) domestic labor with cheaper overseas labor by transferring production tasks to developing countries. This replacement possibility served as a threat to workers and decreases the cost for employers to punish insubordinate workers. As per Burke and Epstein (2001) and Choi (2001), such negative effects of offshoring on the labor union are called 'threat effect.'[8] Even if labor unions still held a legal right to negotiate over wages with firms via collective bargaining, that power was more limited because of the threat to move capital overseas. Simultaneously, it is harder for workers to choose an opposition strategy like strike because growth of offshoring enhances the

substitutability of labor (Acemoglu and Autor, 2011; Elsby *et al*., 2013). The possible strategic options in the industrial relationship have been changed by potential labor replacement to overseas by offshoring and, consequently, the bargaining power of labor unions has been reduced by the threat effect (see the right side of Figure 5).[9] As a result, labor unions could not keep substantial power in labor share or wage bargaining. Our regression results reflect this qualitative turn in globalization and the threat effect—in the second period when offshoring came to hold substantial negative effect while union density lost its effect. As Pariboni and Tridico (2019, p.1086) described, '...the looming threat of relocation can suffice to deter higher wage claims or to make wage cuts more palatable to workers.'

From our analysis, we find that globalization measured by the KOF Index decreases labor share, and the increase in offshoring after the 1990s brought a qualitative turn in globalization, which led labor unions to lose their power in wage bargaining by threat effect. Thus, we could say that g*lobalization aggregated flows and restrictions matters for labor shares* but *aggregated offshoring matters for labor share and industrial relationship with its threat effects*, changing power balance between employers and workers.

6. Conclusion

Based on a simple Nash bargaining model, we have analyzed how labor share and industrial relationship have changed due to globalization. We have seen that globalization has a negative effect to decrease labor share, as is expected in our model, whereas union density lost its positive effect on labor share after the 1990s through structural changes in the industrial relationship. We have described a qualitative change like globalization after the mid-1980s, with expanded offshoring acting as intensified threats of direct labor replacement overseas. This article has argued that one of the most crucial causes of the decrease of the labor share is weakened bargaining power relative to employer as a result of employer's threat to move domestic production processes overseas made possibly by the accelerated process of globalization. Overall, this paper shows that the decline in the labor share is explained not only by exogenous macroeconomic conditions like financialization, but also by endogenous micro dynamics in the industrial relationship.

In our research we analysed general trends in the labor share and the industrial relationship under globalization which were common to developed countries, without taking national differences in institutional conditions or economic policies into consideration. However, how certain institutions, like specific regulations and customs

that govern industrial relationships in Nordic countries, affect the labor share. Examining the precise character of the effects of these institutions provides a fruitful area for further research.

Notes

[1] In the initial model, Rodrik (1999) limited the definition of π^* to offshoring; however, we extended it to a more generalized meaning of profit in globalized production.

[2] The 18 countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Republic of Korea, Japan, the Netherlands, Norway, Spain, Sweden, the United Kingdom and the United States. Several countries like New Zealand, Portugal and Switzerland were excluded from our analysis due to critical shortages of historical data.

[3] The data comes from the annual macroeconomic database (AMECO) of the European Commission's Directorate General for Economic and Financial Affairs.

[4] The KOF Index of Economic Globalization is based on actual flows and restrictions for 123 countries since 1970 (Dreher, 2006). Flows comprise trade, FDI, portfolio investment and income payments to foreign nationals. Restrictions comprise hidden import barriers, mean tariff rates, taxes on international trade and participation in UN Security Council missions.

[5] The definition of low- and middle-income countries is based on classifying countries by income according to the World Bank. The income classification is based on a measure of national income per person.

[6] The Hausman test results are significant in Model 3, 4, 5 and 6 (Prob>chi2 were less than 0.05) but not significant in Model 1 and 2.

[7] Union densities were 84.08% in Sweden, 77.55% in Denmark, 69.06% in Finland, 57.49% in 1985. Sweden even recorded the highest rate—97.165% in 1994.

[8] The 'threat effect' caused by rising labor substitutability weakening bargaining power is corroborated by empirical studies on labor unions in the US (Zhao, 1998; Bronfenbrenner, 2000; 2001) and factory-level regression analysis in Korea (Jeon and Kwon, 2018).

[9] The simultaneous change in globalization and industrial relationship via threat effect may lead a question of internality of our regression model between offshoring and union density. However, 'threat effect' is not defined as an observable cause and effect in the short term but rather a process in the long term that would bring qualitative changes in labor organization. Since offshoring is recognized as a 'potential threat' for workers where employers can replace labor; it may occur even if actual amounts of offshoring do not increase but offshoring environment such as deregulation in overseas investment changes.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

[Table A1 near here]

[Table A2 near here]

Table 1. *Median Trends for 18 OECD Countries*

	1975	1996	% change 1996-1975	2017	% change 2017-1996
Labor share	65.7	57.6	−12.3	54.7	−5.0
KOF index	49.8	70.0	40.5	79.3	13.2
Offshoring intensity	9.4	13.2	40.0	21.7	64.4
Union density	48.0	33.4	−30.4	23.9	−28.4

Table 2. *Regression Results Over the Long Term*

	1975–2017			
	Model 1		Model 2	
	Fixed Effect	Random Effect	Fixed Effect	Random Effect
KOF	−0.3243***	−0.3338***	−0.3132***	−0.3249***
	(0.0134)	(0.0130)	(0.0150)	(0.0143)
Offshoring			−0.0363*	−0.0365**
			(0.0185)	(0.0183)
UD	0.1184***	0.0952***	0.1077 ***	0.0800 ***
	(0.0180)	(0.0167)	(0.0192)	(0.0179)
Unemp	−0.1314***	−0.1111**	−0.1551***	−0.1304***
	(0.0436)	(0.0432)	(0.0456)	(0.0450)
ΔGDP	−0.2022***	−0.2017 ***	−0.2161***	−0.2161***
	(0.0436)	(0.0440)	(0.0448)	(0.0454)
GE	0.1417*	0.1252*	0.1724**	0.1512*
	(0.0755)	(0.0751)	(0.0802)	(0.0793)
Intercept	74.3123***	76.1318***	74.1239***	76.4098***
	(1.7196)	(1.8577)	(1.7624)	(1.8522)

R-square	0.6624	0.6617	0.6633	0.6621
Wald chi2		1403.81		1353.40
Num. Obs.	760	760	738	738

Note: $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table 3. *Regression Results, 1975–1999 vs. 1993–2017*

	1975–1999				1993–2017			
	Model 3		Model 4		Model 5		Model 6	
	Fixed Effect	Random Effect	Fixed Effect	Random Effect	Fixed Effect	Random Effect	Fixed Effect	Random Effect
KOF	−0.2555***	−0.2814***	−0.2551***	−0.2821***	−0.3497***	−0.3590***	−0.2785***	−0.2985***
	(0.0178)	(0.1734)	(0.0184)	(0.0179)	(0.0250)	(0.0238)	(0.0257)	(0.0243)
Offshoring			0.0159	0.0320			−0.1687***	−0.1595***
			(0.0302)	(0.0311)			(0.0235)	(0.0227)
UD	0.1391***	0.0808***	0.1407***	0.0778***	0.0796***	0.0497**	0.0018	−0.0256
	(0.0234)	(0.0250)	(0.0242)	(0.0219)	(0.0235)	(0.0207)	(0.0249)	(0.0228)

Unemp	−0.4445***	−0.3637***	−0.4602***	−0.3710***	−0.1598***	−0.1404***	−0.1649***	−0.1493***
	(0.0550)	(0.0545)	(0.05659)	(0.05607)	(0.0456)	(0.0452)	(0.0434)	(0.0431)
ΔGDP	−0.2933***	−0.2946***	−0.3032***	−0.2999***	−0.1343***	−0.1348***	−0.1368***	−0.1407***
	(0.0470)	(0.0491)	(0.0491)	(0.0517)	(0.0428)	(0.0430)	(0.0408)	(0.0411)
GE	0.3891***	0.2923***	0.3550***	0.2629***	0.5095***	0.4746***	0.8020***	0.7436***
	(0.0946)	(0.0952)	(0.0985)	(0.0997)	(0.0852)	(0.0841)	(0.0905)	0.0886
Intercept	67.2213***	72.5085***	67.3324***	72.9243***	70.3650***	72.6290***	65.4653***	68.8024***
	(2.2001)	(2.2031)	(2.2592)	(2.2893)	(2.4996)	(2.4652)	(2.4671)	(2.4420)
R-square (within)	0.6516	0.6444	0.6557	0.6472	0.4560	0.4538	0.5147	0.5118
Num. Obs.	440	440	418	418	446	446	442	442

Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table A1. *Trends in Individual Countries*

Country	Variable	1975	1996	% change 1975-1996	2017	% change 1996-2017
Australia	Labor share	66.4	58.4	−12.0	52.1	−10.7
	KOF index	39.9	61	52.8	68.2	11.8
	Offshoring	8.1	16.7	103.8	42.8	156.4
	Union density	50.1	31	−38.1	13.7	−55.8
Austria	Labor share	65.5	58.2	−11.1	54.3	−6.7
	KOF index	57	76.1	33.5	82.9	8.9
	Offshoring	9.4	7.9	−15.8	13.8	75
	Union density	52.6	40.1	−23.7	26.7	−33.4
Belgium	Labor share	63.9	61.9	−3.1	58.9	−4.8
	KOF index	71.1	84.1	18.2	88.5	5.2
	Offshoring	No data	11.8		18.1	53.8
	Union density	51.9	56	7.8	51.9	−7.3
Canada	Labor share	60.2	56.7	−5.8	54.7	−3.5
	KOF index	44.4	65	46.3	71.7	10.3
	Offshoring	9.1	9.7	6.3	27.4	182.4
	Union density	34.3	34.1	−0.5	29.4	−13.7
Denmark	Labor share	62.6	54.7	−12.6	54.8	0.1
	KOF index	54	77.8	44.0	84.5	8.6
	Offshoring	9	8.5	-5	15.8	84.3
	Union density	68.9	76.4	10.8	66.1	−13.4

Finland	Labor share	67.3	56.4	−16.1	52.2	−7.4
	KOF index	47.3	73	54.3	83	13.6
	Offshoring	7.8	13.5	73.2	20.9	54.3
	Union density	65.3	80.8	23.7	62.2	−23.0
France	Labor share	65.7	56.9	−13.3	58.1	2.1
	KOF index	49.3	67.5	36.9	78.1	15.7
	Offshoring	16.6	13.2	−20.6	17.6	33.3
	Union density	22.8	9.2	−59.6	8.8	−4.3
Germany	Labor share	64	59.1	−7.6	57.7	−2.3
	KOF index	55.1	67.7	22.8	80.5	18.9
	Offshoring	16	14.4	−10	21.1	46.7
	Union density	34.6	27.8	−19.6	16.7	−39.9
Ireland	Labor share	67.5	52.8	−21.7	35.2	−33.3
	KOF index	68.4	88.4	29.2	88	−0.4
	Offshoring	6.2	6.5	5.2	8.1	24.2
	Union density	55.3	44.2	−20.0	24.3	−45.0
Italy	Labor share	66.4	53.7	−19.1	51.9	−3.3
	KOF index	41.2	63.7	54.6	70.2	10.2
	Offshoring	23.1	19.6	−15.1	29.5	50.8
	Union density	48	36.7	−23.5	34.3	−6.5
Japan	Labor share	72.1	63.7	−11.6	57	−10.5
	KOF index	33.2	44.2	33.1	66.7	50.9
	Offshoring	32	31.6	−1.2	47	48.4

	Union density	34.4	23.2	−32.5	17.1	−26.2
Korea	Labor share	79.2	73.2	−7.5	59.4	−18.8
	KOF index	28.3	36.2	27.9	64.3	77.6
	Offshoring	5.7	19.3	234.1	41.2	112.9
	Union density	15.8	12.1	−23.4	10.5	−13.2
Netherlands	Labor share	70.2	60.7	−13.5	57.3	−5.6
	KOF index	70.1	82.7	17.9	89.4	8.1
	Offshoring	13.9	13	−6.5	34.4	164.9
	Union density	37.8	25	−33.8	16.8	−32.8
Norway	Labor share	60.5	49	−19.0	50.1	2.2
	KOF index	59.9	72.3	20.7	77.5	7.1
	Offshoring	7.7	8.6	11.2	21.2	145.2
	Union density	53.8	56.3	4.6	49.3	−12.4
Spain	Labor share	66.4	59.1	−10.9	52.6	−10.9
	KOF index	34.5	65.1	88.6	76.6	17.6
	Offshoring	22.3	16.8	−24.6	29.7	76.2
	Union density	13.3	17.8	33.8	14.2	−20.2
Sweden	Labor share	52.8	48.7	−7.7	49.2	1.0
	KOF index	50.3	73.9	46.9	83.4	12.8
	Offshoring	8.1	4.7	−42	14.8	212.7
	Union density	74.5	95.1	27.6	65.6	−31.0
UK	Labor share	67	51.8	−22.6	57.5	11.0
	KOF index	63.1	74.2	17.5	81.5	9.8

	Offshoring	16.8	11	−34	22.1	99.8
	Union density	43.8	32.6	−25.5	23.4	−28.2
US	Labor share	61.4	59.6	−2.9	56.8	−4.6
	KOF index	40.1	59.1	47.3	68.1	15.2
	Offshoring	28.9	31.8	10	51.6	62.1
	Union density	25.3	14	−44.6	10.5	−25

Table A2. *Multicollinearity test*

Variable	VIF	1/VIF
KOF	2.47	0.404668
Offshoring	1.98	0.505177
UD	1.57	0.635046
Unemp	1.44	0.693553
ΔGDP	1.41	0.711349
GE	1.08	0.929429
Mean VIF	1.66	

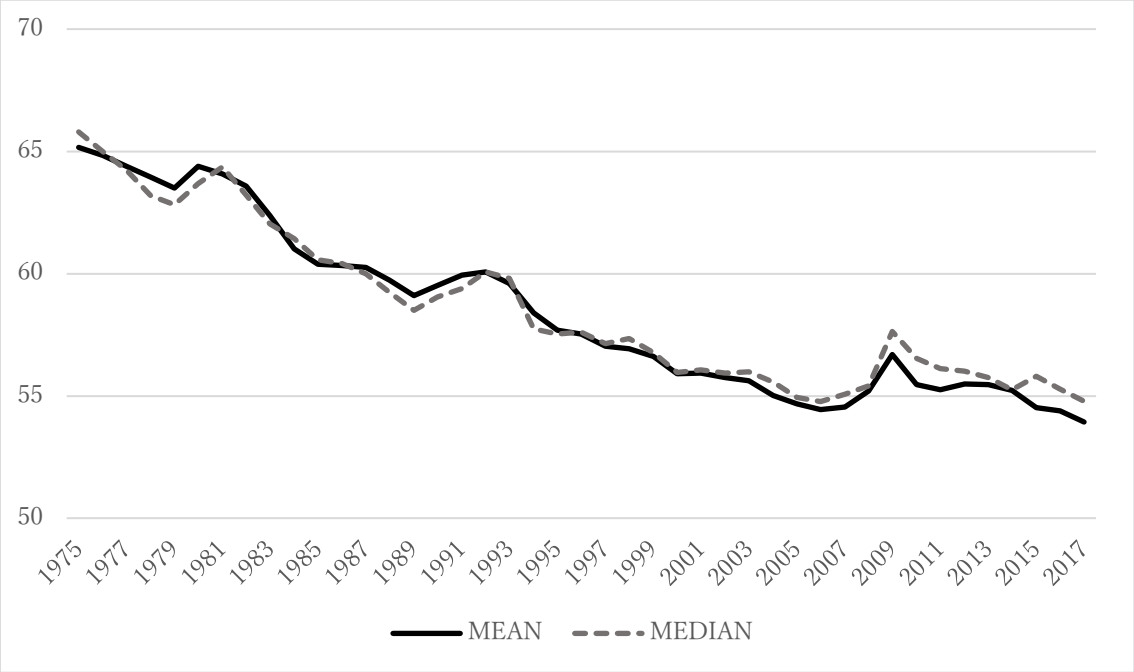

Figure 1. *Adjusted Labor Share for 18 OECD Countries, 1975–2017*

Source: AMECO and authors' representation

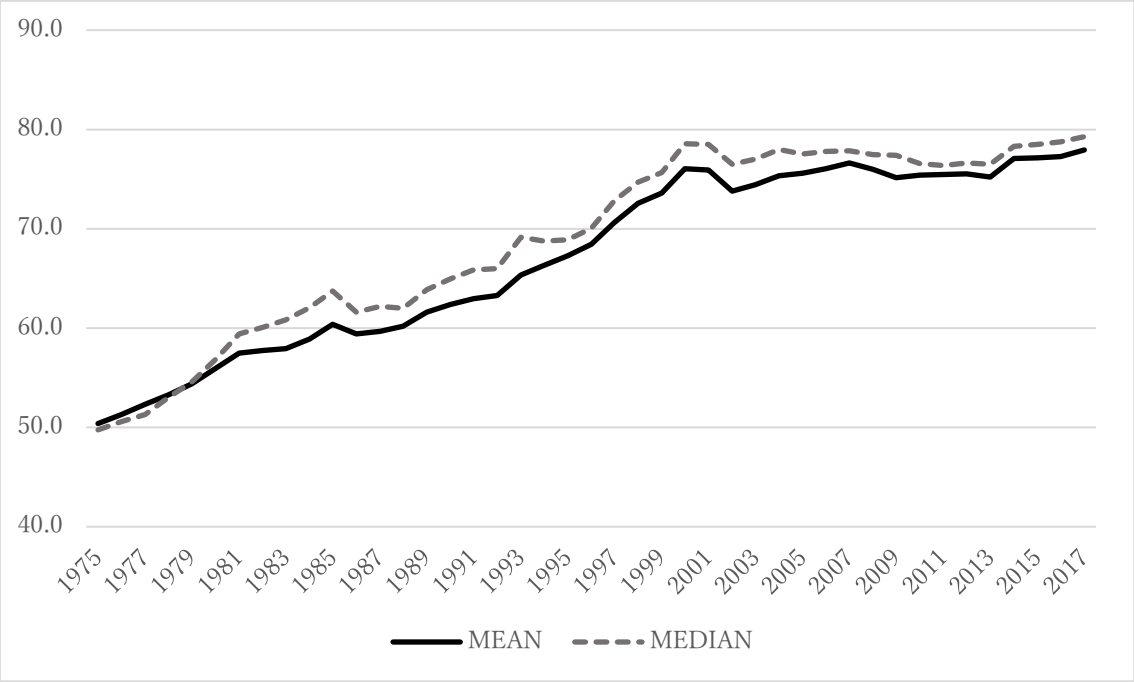

Figure 2. *KOF Index of Economic Globalization for 18 OECD countries, 1975–2017*

Source: KOF Swiss Economic Institute and authors' representation

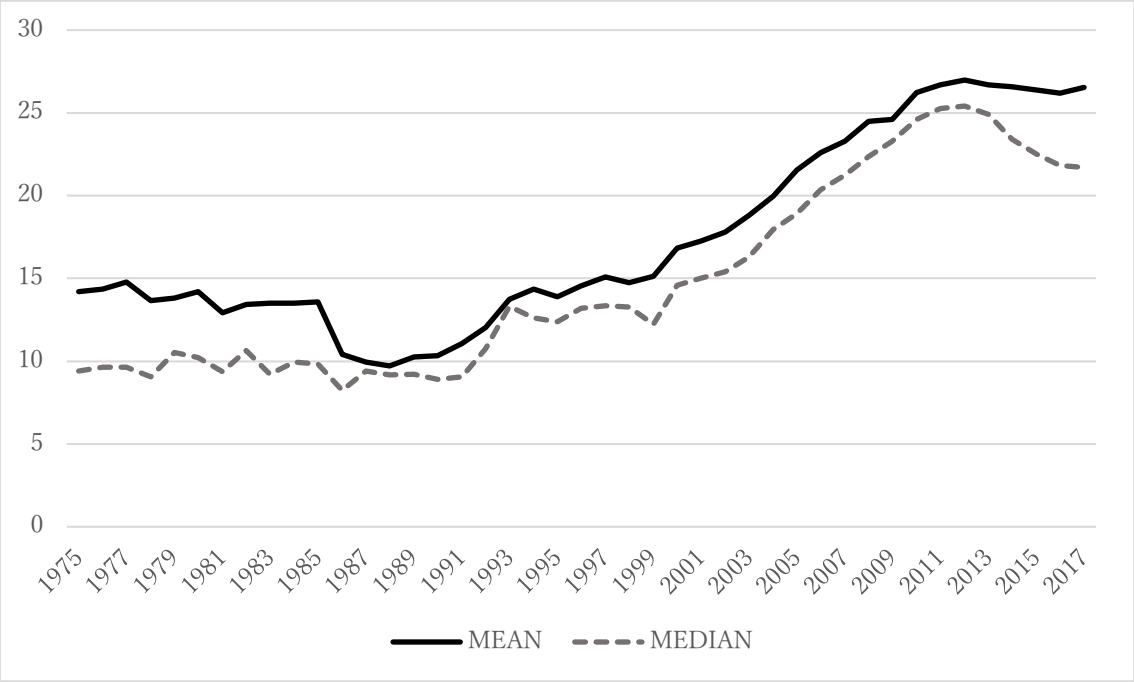

Figure 3. *Offshoring Intensity for 18 OECD Countries, 1975–2017*

Source: World Development Indicators (World Bank) and authors' representation

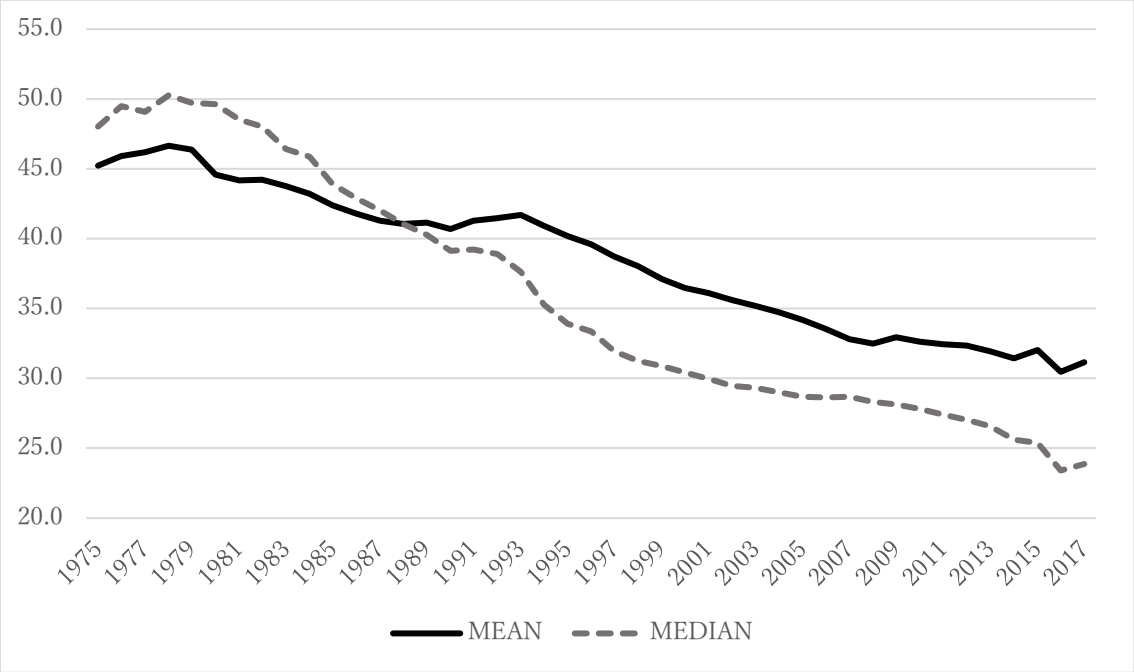

Figure 4. *Union Density for 18 OECD Countries, 1975–2017*

Source: ICTWSS database ver. 6.1 and authors' representation

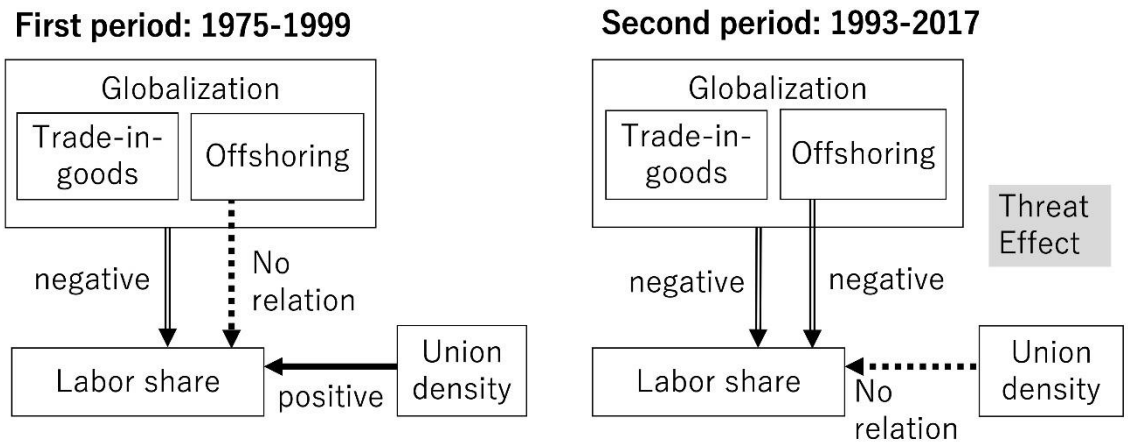

Figure 5. *Effects of globalization and industrial relationship on labor share: historical change*

Source: Authors' representation