Onur Özdemir, "The Impact of Inflation on Income Distribution: The Role of Bargaining Power",
İzlek Akademik Dergi (Izlek Academical Journal), 3 (2), 2020, pp. 56-64.

The Impact of Inflation on Income Distribution: The Role of Bargaining Power

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Abstract

The inflation rate has been assumed as one of the core factors affecting the redistribution of income among different social strata. However, its effect on income distribution is rarely interacted by another variable. This paper investigates the implication of bargaining power indicators for workers on the relationship between inflation and income distribution (measured with labor share of income). The fixed effect is used to estimate balanced panel dataset which includes yearly data from 1980 to 2017 for selected 19 advanced economies. The estimates of inflation and bargaining power indicators show that an increase in inflation will unexpectedly increase the income shares accrued to labor and a higher degree of unionization will increase the labor's share. However, the unemployment rate as considered another bargaining power indicator has some mixed results with statistically insignificant coefficients. Meanwhile, the positive effect of inflation will be mitigated by higher degree of unionization and unemployment rate, suggesting the existence of a mediating effect from the bargaining power indicators. Therefore, the economic authorities are advised to consider fallback options of workers as they may have either direct or indirect effects on income distribution through its interaction with inflation.

Keywords: *Labor Share of Income, Inflation, Income Distribution, Bargaining Power, Panel Data Analysis*

JEL Classification: *C23, D33, E31*

Enflasyonun Gelir Dağılımı Üzerindeki Etkisi: Pazarlık Gücünün Rolü

Öz

Enflasyon oranı, farklı sosyal katmalar arasında gelirin yeniden dağılımını etkileyen temel faktörlerden biri olarak kabul edilmiştir. Bununla birlikte, gelir dağılımı üzerindeki etkisi, ender olarak başka bir değişkenle etkileşime sahiptir. Bu makale, emek kesimi için pazarlık gücü değişkenlerinin enflasyon ve gelir dağılımı (emek payı ile hesaplanmaktadır) arasındaki ilişkiyi incelemektedir. Seçili 19 gelişmiş ülke ekonomisi için 1980'den 2017'ye kadar yıllık serileri içeren dengeli panel veri seti sabit etkiler ile tahmin edilmek için kullanılmaktadır. Enflasyon ve pazarlık gücü değişkenlerine ait tahminler, enflasyondaki artışın emek kesiminin gelir payını beklenmedik bir şekilde artırdığını ve daha yüksek oranlı sendikalaşmanın emek payını aynı şekilde artırdığını göstermektedir. Ancak, bir başka pazarlık gücü göstergesi olarak kabul edilen işsizlik oranının, istatistiksel olarak anlamsız katsayı tahminlerine sahip olduğu görülmektedir. Öte yandan, elde edilen tahmin sonuçları, sendikalaşma ve işsizlik oranının yüksek olmasının enflasyonunun olumlu etkisini azaltacağını işaret etmektedir. Bu nedenle, ekonomik otoritelerin, enflasyonla etkileşimi yoluyla gelir dağılımı

Özgün Araştırma Makalesi (Original Research Article)
Geliş/Received: 19.07.2021
Kabul/Accepted: 21.07.2021
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üzerinde doğrudan veya dolaylı etkileri olabileceğinden, emek kesiminin geri dönüş seçeneklerini dikkate almaları belirtilmektedir.

Anahtar Kelimeler: *Emek Gelir Payı, Enflasyon, Gelir Dağılımı, Pazarlık Gücü, Panel Veri Analizi*

JEL Sınıflandırması: *C23, D33, E31*

1. Introduction

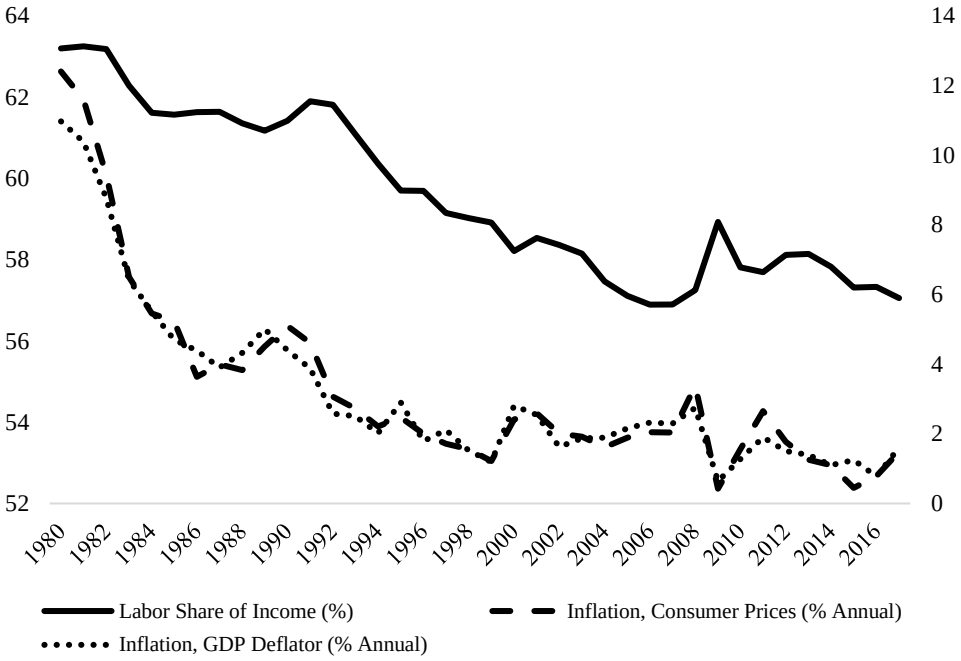
The redistributive role of inflation along with its impact on income shares accrued to capital and labor has been widely discussed in the literature[1]. Therefore, a bulk of studies have been taken to list several reasons that may lead inflation to affect income distribution through its effect on socio-economic changes. Among the studies that investigate the implications of inflation are those of Bulíř (2001), Lawless and Whelan (2011), Monnin (2014), Deyshappriya (2017), Saimi-Namini and Hudson (2019), and Law and Soon (2020). The common argument on inflation-income distribution nexus implies that an increase in inflation pushes up the degree of inequality for most of the social segments through its negative impact on purchasing power (especially of the poor), the income-based protections led by government (Saimi-Namini and Hudson, 2019), and the welfare services provided by the state (Onaran, 2009). In other words, it implies that an increase in inflation reduces the real value of those channels that may alter the distributional practices over time. For instance, Monnin (2014) points out the side-effects of monetary policy on income distribution in the context of Cantillon effect, which refers that inflation gradually affects income inequality due to the new supply of money. In that vein, the person who is the closest to the money creation process such as bank employees would be hard hit by an expansion of money (Williamson, 2008; Ledoit, 2011) since they falsely deem that their standards of living increase at the expense of later recipients (Rothbard, 1995). On the other hand, some other studies argue that inflation could lower the degree of income inequality which is conditioned to its positive impact on nominal income, leading to higher income tax payable by the upper segment of society (Yue, 2011).

The debate over the relationship between inflation and income distribution has been thus mixed and controversial. The erratic findings could be occurred from the reasons of ignoring the social relations of production. This paper contributes to the ongoing debate over the inflation-income distribution nexus by examining the role of bargaining power of workers. To best of our knowledge, this conditional linkage has not been directly explored in the empirical framework by considering the labor share of income for measuring income distribution. A distinguishing paper proposed by Lombardi et al. (2020) states that the progressive erosion of workers' bargaining power may stimulate a cyclical linkage between the price inflation and economic slack, through its impact on increasing degree of income inequality. The bargaining power of workers alone might increase or decrease the income share accrued to labor (Jayadev, 2007; Frederiksen and Poulsen, 2010; ILO, 2011; Lin and Tomaskovic-Devey, 2013; Alvarez, 2015; Stockhammer, 2017; Victor, 2019). Rather than estimating the direct impact of a fallback options of workers on their income shares, this paper investigates the indirect impact of bargaining power of workers on inflation-income distribution nexus. On the one hand, Figure 1 represents the trends in labor's

[1] This paper is largely inspired from the recent work of Law and Soon (2020) and thus its logical and theoretical structures are indebted to their knowledge on that issue.

share (on the left axis) and inflation (on the right axis). On the other hand, Figure 2 shows the trends in bargaining power indicators, covering the trade union density (on the left axis) and unemployment rate (on the right axis).

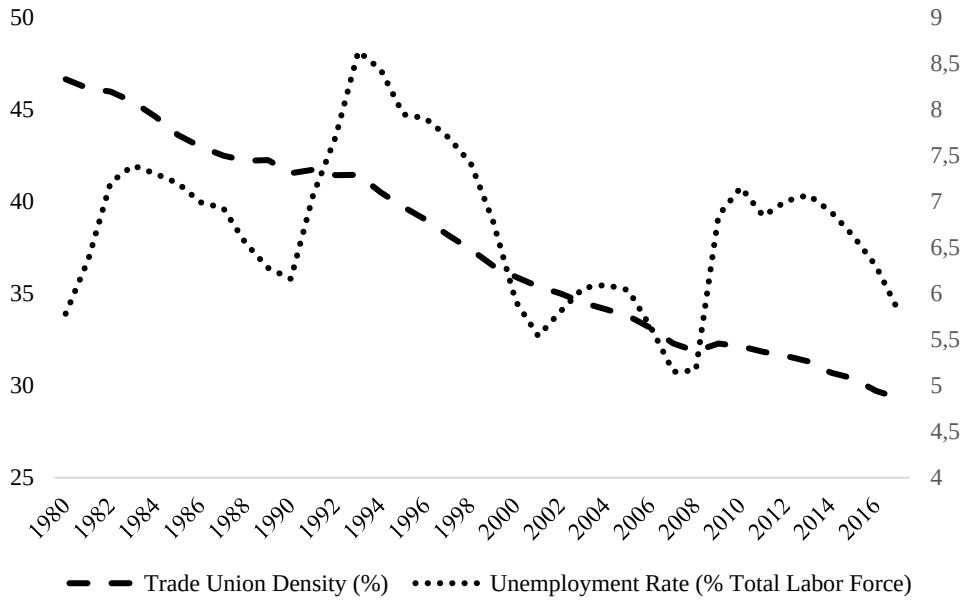
Figure 1. Trends in Labor's Share and Inflation, 1980-2017



Source: Penn World Table 9.1; World Bank, World Development Indicators Database; Authors' Calculation

It is hypothesized that the lower of workers' bargaining power can exacerbate the negative pressure of inflation on labor share of income due to three reasons. First, an increasing trend in inflation over time can possibly reduce the purchasing power and hence the consumption level for an aggregate economy. It may lead then to squeeze of profits resulting from a decrease in production level. Therefore, firms lay off workers in which there would be concluded with excess supply of labor, implying that the wage level would be much lower in contrast to the pre-episode of high inflation. In particular, the nominal wage contracts would be eroded against the employees, especially for those who are not actively participated in unions. Second, an increase in inflation can cause low-paid workers to become more indebted from the financial sector due to the reduction of purchasing power. In that vein, those individuals will be financially dependent in terms of paying an increasing amount of interest from the principle, which may also ensue with no repayment of their debts to creditors. Third, the cyclical reproduction of inflation and lower degree of bargaining power can also lead to a decrease in labor's share. When workers' bargaining power weakens, firms counteract to a decrease in aggregate demand by laying off some workers rather than reducing the hours per employee. However, shrinking away from the reduction of hours per employee will simultaneously lead to an increase in marginal cost of production and thereby the inflation. This is also called inflation inequality in which the overall prices may rise more quickly for some part of individuals who have lower incomes.

Figure 2. Trends in Bargaining Power Indicators, 1980-2017



Source: OECDstat.; World Bank, World Development Indicators Database; Authors' Calculation

In consideration of those three hypotheses, the rest of the paper is structured as follows. Section 2 explains the details of empirical methodology. Section 3 summarizes the research data. Section 4 discusses the empirical findings. Section 5 concludes with some policy implications.

2. Empirical Methodology

In this study we are concerned with fixed effects method to examine the mediating effect of bargaining power of workers on inflation-income distribution nexus. In particular, the fixed effects (within) estimators are produced by using the approach of robust standard errors (Driscoll and Kraay, 1998). This is also called robust standard error estimators for panel models since each one is calibrated to cross-sectional and temporal dependence (Hoechle, 2007). It is also assumed as the estimation of standard errors with nonparametric technique in which the number of panels are not restricted in terms of their limiting behavior. In the context of fixed effects method, the model is represented in Equation (1):

$$LS_{i,t} = \beta_0 + \beta_1 INF_{i,t} + \beta_2 UNION_{i,t} + \beta_3 UNEMP_{i,t} + \beta_4 UNION_{i,t} * INF_{i,t} + \beta_5 UNEMP_{i,t} * INF_{i,t} + \beta_6 FOPEN_{i,t} + \beta_7 TOPEN_{i,t} + \beta_8 FD_{i,t} + \beta_9 FDSQ_{i,t} + \beta_{10} INV_{i,t} + \beta_{11} CRISIS_{i,t} + \theta_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

where *LS* is the labor share of income, *INF* is the inflation rate (annual %) which is comprised of two alternative variables: (i) inflation, consumer prices (*INF_CPI* hereafter) and (ii) inflation, Gross Domestic Product (GDP) deflator (*INF_DEF* hereafter), *UNION* indicates the trade union density, *UNEMP* denotes the unemployment rate, θ_i is the unobserved individual effects, μ_t is the unobserved time effects, and $\varepsilon_{i,t}$ is the independent and identically distributed (i.i.d) error term. The major role of inclusion of the interaction terms (i.e., *UNION*INF* and *UNEMP*INF*) is to capture the mediating effect from the bargaining power measures on the implication of inflation on labor's

share[2]. Both measures on bargaining power can exacerbate or mitigate the impact of the *INF* on *LS* if the sign of β_1 is negative or positive, while β_4 and β_5 have a negative sign and vice versa. The control variables included here are the financial openness (*FOPEN*), trade openness (*TOPEN*), financial development (*FD*) and its square term (*FDSQ*), the investment share (*INV*), and the crisis dummy for 2007/2008 economic downturn (*CRISIS*).

3. Research Data

The paper tests a balanced panel set (yearly data from 1980 to 2017) across selected 19 advanced economies[3]. The labor share of income from the Penn World Table (PWT) version 9.1 database is used to represent the income distribution (Feenstra et al., 2015). The core reason for obtaining this data from PWT database depends on the fact that it provides a balanced series for many countries along with reliable estimation technique. The inflation is measured by the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, which is obtained from the World Bank, World Development Indicators (WDI) database. The bargaining power of workers is proxied by the trade union density and the unemployment rate in the OECD statistics and WDI database, respectively.

Table 1. Summary Statistics

Variable	Mean	Median	Std. Dev.	Min.	Max.	Skewness	Kurtosis
LS	59.553	60.204	5.591	32.862	73.852	-0.6504	4.3289
INF_CPI	3.2797	2.3287	3.4512	-4.4781	28.698	2.5654	12.302
INF_DEF	3.1822	2.1846	3.4397	-5.2139	24.651	2.0210	9.0225
UNION	37.507	32.350	21.479	8.5	97.2	0.6885	2.4914
UNEMP	6.7291	6.3195	3.1814	0.2	18.1	0.7340	3.5957
FOPEN	1.8093	2.3336	0.9395	-1.9203	2.3336	-1.6674	4.6014
TOPEN	70.928	64.142	35.520	16.014	226.04	1.1487	4.6827
FD	63.535	64.788	18.301	11.713	100	-0.3773	2.5584
INV	27.252	26.538	4.9804	16.987	51.293	1.0833	5.0256

The *FOPEN*, *TOPEN*, *FD,* and *FDSQ* are represented by the financial openness index, trade openness index, the overall financial development index, and its square term, respectively. While *FOPEN* is introduced in Chinn and Ito (2006) measuring a country's degree of capital account openness, *TOPEN* and *FD* are available in the WDI and IMF database, respectively. Also, *INV* is represented by the investment share (% of GDP) obtained from PWT version 9.1. Finally, *CRISIS* denotes the crisis dummy variable used to estimate the effects of 2007/2008 economic downturn. To check the robustness of the baseline results, the annual growth rate of the GDP deflator is used as an alternative indicator of inflation (*INF_DEF*) (Law and Soon, 2020: 1736), which is obtained from

[2] To get rid of high correlation between interaction terms and *UNION* and *UNEMP*, the interaction terms are regressed on the *UNION*, *UNEMP*, *INF_CPI*, and *INF_DEF*. Then, the residuals from the regressions are used to estimate the coefficients of interaction term. For further information, please see Azman-Saini et al. (2010).

[3] The selected countries can be listed as follows: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Republic of Korea, Sweden, Switzerland, United Kingdom, United States.

WDI database. All in all, Table 1 describes the summary statistics for the variables that we use in the empirical analysis.

4. Empirical Findings

In Table 2 Columns (1)-(4) present the baseline model results and Columns (5)-(8) contain the findings where *INF_DEF* refers to a proxy variable for inflation. All results from the estimates are calculated by implementation of fixed effects model. The results from the inclusion of crisis dummy variable are also considered along with the trend effects.

To begin, the coefficients of *INF_CIP* imply that in times of high inflation, a redistributive mechanism is interestingly worked in favor of the workers in selected sample countries, which of those are widely known as advanced economies[4]. While there may be several reasons and theoretical supports for that positive correlation between inflation and labor share of income, some of the potential factors can be ranged as follows: First, if the number of inflation-adjusted employment contracts are widely accepted by the firms and legally implemented by government, it helps to protect workers against high and unexpected inflation. Second, the income-equalizing effect of fiscal redistribution can be reinforced and promoted against a decline in the purchasing power of workers and hence may lead income shares to redistribute in favor of labor. Third, the relative correlation between the wage growth and the productivity level should be considered to a large extent where the former can exceeds the latter indicator in times of inflationary periods, resulting with a relative increase in labor's share against the capital share. Finally, increases in inflation pro-actively stimulate the dynamics for implementing the protective aids aimed at workers. While those potential reasons among the positive linkage of the two variables are given, the effect of *INF_CPI* is nonetheless small, as represented by its coefficient size.

Besides, as expected, the coefficient sign of *UNION* is positive, suggesting that higher rate of unionization increase the income share accrued to labor. Next, the *UNEM*P is found to be statistically insignificant with a mixed coefficient sign. Also, the mediating effects of *UNION* and *UNEMP* on the impact of *INF_CPI* and *INF_DEF* on the labor's share are statistically demonstrated by the negative sign of the interaction terms. It proves the hypothesis that the positive impact of inflation on the labor share of income is weakened by the higher rate of unionization and the unemployment rate. On the one hand, the inflation with a higher degree of trade union density leads firm to find new strategies for the continuum of their *ex-ante* profits and thus lowers the labor share of income. On the other hand, the inflation with higher rate of unemployment reduces the income share accrued to labor due to a decrease in the fallback options of workers.

[4] However, the coefficient of *INF_DEF* is statistically insignificant, and its sign is mixed.

Table 2. The Fixed Effects Regression Results

	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**	**Model (7)**	**Model (8)**
INF_CPI	0.079**	0.097**	0.131***	0.149***				
	(0.038)	(0.036)	(0.038)	(0.041)				
INF_DEF					-0.032	-0.018	0.003	0.011
					(0.061)	(0.056)	(0.069)	(0.066)
UNION	0.043***	0.054**			0.054***	0.063***		
	(0.015)	(0.020)			(0.014)	(0.020)		
UNEMP			0.020	0.013			-0.004	-0.008
			(0.073)	(0.071)			(0.069)	(0.068)
UNION*INF_CPI	-0.004***	-0.004***						
	(0.001)	(0.001)						
UNEMP*INF_CPI			-0.027***	-0.028***				
			(0.006)	(0.007)				
UNION*INF_DEF					-0.005***	-0.005***		
					(0.002)	(0.001)		
UNEMP*INF_DEF							-0.016**	-0.017**
							(0.007)	(0.007)
FOPEN	-0.323**	-0.355**	-0.335*	-0.359**	-0.382***	-0.406***	-0.406**	-0.415**
	(0.144)	(0.133)	(0.183)	(0.174)	(0.129)	(0.118)	(0.177)	(0.170)
TOPEN	-0.099***	-0.106***	-0.109***	-0.115***	-0.097***	-0.102***	-0.106***	-0.107***
	(0.016)	(0.020)	(0.016)	(0.020)	(0.017)	(0.021)	(0.017)	(0.021)
FD	-0.026	-0.038**	-0.025	-0.034**	-0.036**	-0.046***	-0.043***	-0.044***
	(0.016)	(0.016)	(0.015)	(0.013)	(0.016)	(0.017)	(0.016)	(0.015)
FDSQ	0.001***	0.001***	0.001**	0.001**	0.001***	0.001***	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
INV	0.066*	0.079**	0.056	0.063	0.072**	0.083***	0.066*	0.071*
	(0.033)	(0.033)	(0.035)	(0.037)	(0.031)	(0.030)	(0.036)	(0.037)
CRISIS		-0.770***		-0.685**		-0.615**		-0.610**
		(0.255)		(0.261)		(0.275)		(0.273)
Constant	65.106***	64.804***	67.372***	67.665***	65.494***	65.245***	68.742***	68.656***
	(1.541)	(1.500)	(1.739)	(1.777)	(1.584)	(1.560)	(1.872)	(2.044)
R-squared (within)	0.5656	0.5719	0.5634	0.5674	0.5626	0.5665	0.5490	0.5510
No. of obs.	722	722	722	722	722	722	722	722
No. of countries	19	19	19	19	19	19	19	19

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.10.

Next, in contrast to the mainstream arguments, the proxy variables for financial and trade liberalization, namely *FOPEN* and *TOPEN*, is statistically found to lower the labor share of income. *INV* shows a positive impact on labor's share. It means that higher share of investment accrued from GDP increases the labor's share by way of generating more employment opportunities and excess demand over supply of labor. Furthermore, the regression analysis considers the *FD* and its square, namely *FDSQ*, to analyze the former and latter effects of financial development on the labor share of income. The statistical significance of the estimated coefficients states that the former period negatively affects the labor's share whereas the latter period indicates that this negative relationship turns into positive. It explicitly means that financial development provides less advantage for the workers in the former period to obtain financial resources but later it benefits relatively more to them in case of trading activities as they have the advantage of having

more assets and loans for wealth- and income-generating processes, respectively. Also, *CRISIS* dummy variable shows a negative impact on labor's share.

5. Concluding Remarks

This paper investigates the mediating effect of bargaining power of labor on inflation-income distribution nexus. The empirical findings imply that the mediating effect is statistically validated by the negative sign of the interaction terms organized between the inflation and bargaining power indicators (i.e., trade union density and unemployment rate). While a higher rate of unionization increases the labor's share, the coefficient sign of unemployment rate is mixed. However, this controversial sign of unemployment rate should not be a serious concern as it is statistically insignificant in all the estimated models, covering fixed effects procedure. Hence, the economic authorities should consider existing policy structures in labor market institutions in detail and they should investigate thoroughly the strategic behaviors of both firms and workers in every step of the production process, as a part of the overall implication through the way of enhancing the income distribution in favor of workers.

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