RETHINKING EMPLOYMENT RELATIONS: THE SOCIAL BARGAIN, PENSIONS, AND PRICE STABILITY

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Abstract

Elevated unemployment rates since 2008 have given firms a bargaining power advantage over their employees, allowing employers to reduce wage and compensation growth, including the scope and amount of pension contributions. This paper argues that a more equitable approach to employment relations can promote distributively just labor market outcomes and improve macroeconomic performance. A strong social bargain—the employment partnership between firms and their workers—is capable of reducing inflation rates at full employment by making workers less willing to demand wage increases in exchange for pensions. As such, the burden in achieving low inflation is equitably distributed between capital and labor. Using annual data for the 1960-2012 sample, a novel empirical proxy for the social bargain is developed and included in Phillips curve models that use four measures of the cost of job loss as alternate measures of bargaining power. Policy implications, such as alternative forms of pension provision that offer increased retirement income security and distributive justice, are discussed in terms of their effect on macroeconomic performance. Counterfactual analysis further suggests that increased pension provision can significantly reduce inflation rates, even at full employment, and create more equitable employment relations.

Keywords: Social bargain, pensions, cost of job loss, inflation, Phillips curve
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1. INTRODUCTION

The Great Recession is likely to accelerate and intensify the breakdown in the employment partnership between firms and their workers. This partnership can broadly be described as the degree to which the labor contract is an arrangement that not only specifies economic parameters, such as wages and working conditions, but also social and institutional relations, such as long-term employment commitments and the use of layoffs. This breakdown has become increasingly manifest in recent years as firms have switched to relying on permanent, as opposed to temporary, layoffs, causing the "implicit employment contract" to fray (Hallock 2009). Firms have also reduced the provision of the "two pillars of the late-20th-century employment relationship: employer-subsidized retirement benefits and employer-paid health care" (Dvorak and Thurm 2009), further contributing to the fraying of the employment partnership. Additionally, employers have been able to extract greater amounts of employee effort—or work intensity—from their labor force without raising wages due to rising costs of job loss caused by record high unemployment duration (Pacitti 2011). All of these events will continue erode labor's bargaining power, making them unable to bargain for higher wages and more comprehensive benefits even as the pace of economic recovery accelerates.[1]

This paper will empirically measure and historically examine the dynamics of this breakdown, tracing its roots to the shift in employment relations beginning in the 1980s. The analysis will rely on work of Cornwall (1990, 1994), who developed the theory of the "social bargain"—the implicit arrangement among workers, firms, and the state that gives workers an incentive to moderate their wage demands at or near full-employment to create price stability—and explored its macroeconomic implications. Social bargain programs include non-wage compensation such as pensions, health insurance, and profit sharing plans, to name a few. Intuitively, workers trade

[1] As of this writing, real compensation growth for all nonfarm workers has averaged 0.2 percent since start of the recovery in July 2009.

off nominal wage gains today for income gains, such as pensions, tomorrow. This should result in lower rates of inflation.

Despite the possible aggregate benefits, individual employers are likely to decrease the provision of social bargain programs to their employees coming out of the Great Recession, despite these programs having a positive macroeconomic externality in the form of low inflation.[2] There are four reasons for this: first, the rapid rise and slow decline in the unemployment rate has depressed labor's bargaining power, allowing for firms to pare back both wages and benefits. Second, expectations of future cost pressures and competition will force firms to allocate resources away from employee compensation and toward lower prices or cost-reducing technology. Third, firms generally resist transferring increases in the surplus product to employees. Finally, since low inflation can be considered a public good, individual firms will have the incentive to free ride on the willingness of other firms to provide non-wage compensation, while not themselves being excluded from enjoying the benefits lower inflation rates.

This paper argues that a strong social bargain can reduce inflation rates at full employment. The hypothesis is tested using annual data in Phillips curve models for the 1960-2012 sample. Labor market institutions supportive of the social bargain can promote wage restraint, and thus price stability, even at full employment by increasing the provision of pensions, incentivizing workers to defer compensation from the present to the future. Results indicate that the share of private employees receiving a pension is the best proxy for the social bargain, and has a robust significant negative effect on inflation. Since pensions have macroeconomic effects that have not previously been considered, these findings offer a novel mechanism by which labor markets can become more distributively just, without sacrificing full employment and price stability goals.

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[2] Dvorak and Thurm (2009) find that two-thirds of firms have no intention of reinstating these benefits when the economy improves.

Since private firms are unlikely to unilaterally commit to participating in a social bargain, the findings suggest a route for state involvement in subsidizing compliance. Alternatively, the state could take a more direct approach by expanding and strengthening Social Security, creating a new type of pension plan—Guaranteed Retirement Accounts (Ghilarducci 2007)—that offers increased retirement income security and distributive justice, in addition to improved macroeconomic performance.

2. CONCEPTS AND MODEL

The coexistence of price stability and full employment results from an inward shift of the Phillips curve and this shift is largely determined by labor market institutions, or the conventions, norms, and laws that affect labor market performance and outcomes. Setterfield (2005), Setterfield and Lovejoy (2006), and Pacitti (2015) argued that insecurity-enhancing labor market institutions, such as the increased reliance on part-time and temporary employment arrangements and thus rising expectations of unemployment, have reduced the ability of workers to bargain for higher compensation. The flexibilization of American labor markets as part of neoliberal structural reforms was very successful at reducing inflation, but at the expense of a redistribution of income from labor to capital.[3]

The social bargain provides an alternative institutional route that can facilitate an inward shift of the Phillips curve, but without the distributional bias. Cornwall (1990, 1994) defined a social bargain as an implicit arrangement between workers, firms, and the state that gives workers an incentive to moderate their wage demands at or near full-employment "in the interest of…national

[3] The distributional effects of this policy are biased against labor because the costs of achieving low inflation, which can be considered a public good, fall entirely upon labor. Capitalists benefit from low inflation as they tend to be creditors, and thus their real income depends negatively on unexpected inflation. Capitalists also hold many fixed-income assets whose value erodes primarily through inflation. Thus, capitalists dislike inflation and externalize the costs of suppressing it to labor.

goals such as wage and price stability and international competitiveness" (Cornwall and Cornwall 2001, p. 85). But workers will not unilaterally accept lower wages; they must receive something in return for their mitigated wage demands. It is hypothesized that workers will engage in a bargain if they have the ability to trade off lower wages today for higher income tomorrow, such as pensions. Firms and the state can also strengthen the bargain if they provide non-wage compensation to workers in exchange for their moderated wage demands. Each party benefits by the existence of and participation in a social bargain through lower rates of inflation.

In general, "income maintenance programs" are institutions that can be supportive of a social bargain if labor can be persuaded to moderate its wage demands if employer- or state-provided benefits exist to increase post-employment and/or non-wage income (Cornwall 1994, pp. 28-29).[4] Financial incentives that can increase wage restraint are especially critical for economies, such as the United States, that have relatively weak unions and relatively uncoordinated wage negotiations. Additionally, whereas in many European nations the state is the main provider of welfare benefits, the American system relies heavily on privately-provided benefits, such as employee-sponsored health care and pensions. But even in the U.S. economy, where institutions are not explicitly designed to promote a social bargain, such an accord is still possible if "employers and government [seek] to convince labor that wage settlements must be influenced by their impact on…export success or the profitability of the firm" (pp. 95-96). Labor, in exchange for wage restraint, receive non-wage forms of compensation, such as pensions, health and life insurance benefits, social security, and unemployment compensation (1990, pp. 29-33). This can lead to lower rates of aggregate price inflation.

[4] For example, pensions were a highly effective tool in moderating wage demands during World War II as the state "wanted to hold down wages to prevent inflation [and] unions and employers negotiated postponed payment in the form of pensions, which pleased all three parties: big firms, big government, and big unions" (Nersisyan and Wray 2010, p. 4).

There is a paucity of literature on the empirical dynamics and effects of the social bargain and this paper attempts to fill this void. Cornwall (1990, 1994) provided the initial empirical evidence for the bargain hypothesis, and this approach is more rigorously examined by Setterfield and Lovejoy (2006), who included the social bargain in a Phillips curve model and found that it has a significant negative effect on inflation. However, they modeled the social bargain as a scaled dummy variable that imposes magnitude restrictions on their estimated coefficients. Pacitti (2009) found that such restrictions are not supported by the data, and created a more robust measure of the social bargain that also has significant negative effects on inflation.

The current modeling approach largely builds on Setterfield and Lovejoy (2006), who build on Cornwall (1990, 1994), Stiglitz (1997), and Ball and Moffitt (2001). They argued that institutions, such as the social bargain, can influence workers wage aspirations, which then affect inflation. A strong social bargain implies that labor and capital can agree on a mutually acceptable distribution of income and thus workers will be less willing to demand wage increases because of the provision of non-wage forms of compensation, which allow them to tradeoff wage gains today for gains in the future. This bargain dynamic reduces wage aspirations, which leads to lower rates of inflation, even at low rates of unemployment.

More formally, $(w-p)_T$ in equation (1) represents workers target rate of real wage growth, or their wage aspirations.

$$(w-p)_T = \alpha - \gamma U - \varepsilon B + \lambda q + (1-\lambda) w_L \tag{1}$$

w is nominal wage growth; p is rate of price inflation; α is a constant; U is the unemployment rate, or, more generally, a variable that measures the overall tightness of the labor market and thus

workers bargaining power; B is a proxy variable for the social bargain; q is the rate of productivity growth; w_L is a distributed lag of past real wage growth rates; and $\delta, \varepsilon, \lambda \leq 1$.

Equation (2) shows how target real wage growth and expected inflation, p^e, affect nominal wage growth, where $\eta \leq 1$ and $\mu = 1$.[5]

(2) $$w = \mu(w - p)_T + \eta p^e,$$

Equation (3) defines the rate of price inflation as nominal wage growth less productivity growth, while, following Gordon (1997, 1998), controlling for exogenous shocks, such as the relative change in food and energy prices (FE) and the relative rate of non-petroleum import inflation (M), where $\sigma_1, \sigma_2 \leq 1$.

(3) $$p = w - q + \sigma_1 FE + \sigma_2 M$$

Substituting equation (1) into (2) gives

(2a) $$w = \alpha - \gamma U - \varepsilon B + \lambda q + (1 - \lambda) w_L + \eta p^e,$$

which can then be substituted into equation (3) to derive the short-run price-Phillips curve in equation (4), which includes the inflationary dynamics of the social bargain and thus serves as the foundation for the empirical analysis that follows.

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[5] Setterfield and Lovejoy (2006) assume that $\mu \leq 1$. The assumption of unity imposes a strong assumption on workers' ability to translate target real wage growth into actual wage growth, an assumption that Setterfield and Leblond (2003) find too strong because this ability, they argue, depends on workers' bargaining power, which is a function of labor market institutions. However, the explicit inclusion of the social bargain in equation (1) means that this institution can *directly* influence nominal wage growth through its effect on target real wage growth.

$$p = \alpha + \eta p^e - \gamma U - \varepsilon B - (1 - \lambda)(q - w_L) + \sigma_1 FE + \sigma_2 M \quad (4)$$

3. DATA DESCRIPTION AND METHODOLOGY

The novelty of this analysis comes from the empirical specification and measurement of the social bargain, in addition to other bargaining power variables. The social bargain proxy is motivated by and structured according to the income maintenance hypothesis, which argues that workers will be more willing to moderate their wage demands, even at full employment, if they receive non-wage compensation, in addition to the degree of coordination in wage negotiations.

To capture this hypothesis, an unweighted index is developed according to the methodology from the United Nations (2000).[6] The index is conceptually grouped into three categories supportive of the income-maintenance hypothesis: post-employment income, privately-provided insurance, and the degree of wage coordination.

Post-employment income includes the share of private employees receiving an employer-sponsored pension, the defined benefit share of privately provided pensions, and employer contributions for pension and profit sharing plans a share of real wage and salary disbursements.

The justification for the inclusion of the *type* of pensions being provided—the share of defined benefit pensions—comes from Ghilarducci (2007, 2009), who argued that the shift to defined contribution plans offer less retirement income security since their value is determined by voluntary employee contributions and fluctuations in asset prices.[7] Since workers frequently do not save enough for retirement and since financial markets appear to be growing less stable, the type of

[6] The appendix contains a more thorough discussion of the data methodology and sources.
[7] The section on policy recommendations will offer a more thorough examination of this distinction and its implications.

pension matters for the strength of the social bargain because the lack of income security does not provide workers a sufficient incentive to moderate their wage demands.[8]

The second category, the provision of private insurance, is measured as the sum of employer contributions for health, life, and unemployment insurance; and social security, both expressed as a share of real wage and salary disbursements.

The final component of the bargain index, although not a direct measure of income maintenance, but integral to the bargain hypothesis (Cornwall 1990, 1994), is the degree of coordination in wage negotiations. This variable, proxied by union membership, captures the efficacy of coordinated wage negotiations in obtaining outcomes or policies that strengthen the social bargain.

The social bargain index, whose value can range between zero and one, is shown in Figure 1. After consistently growing during the first part of the sample, it began to fray in the early to mid-1980s, just as neoliberal economic reforms were being instituted on a nation-wide scale. The lack of stability in the bargain over the past three decades suggests that firms and the state have reduced their provision of income-maintenance programs, coupled with the decline in union membership has led to a weaker social bargain. The empirical effects of this dynamic will be explored in the following section.

<< FIGURE 1 HERE >>

[8] Hacker (2006) further argued that "responsibility for almost all the management and risk of private retirement planning has shifted onto workers" and away from employers (p. 113), so the shift from defined benefit pension plans to defined contribution plans is *in and of itself* representative of the deteriorating social bargain between firms and their employees.

4. EMPRICAL ANALYSIS

The empirical analysis is based on equation (4), with the addition of the service-share of GDP as an additional control variable, which is included to capture the effect of the shift of U.S. production and employment from goods to services. More directly, including the service share controls for the structural shift toward "firms that do not maximize profits by providing secure pensions," such as those who rely on non-union, part-time labor (Ghilarducci 2008, p. 59).

Non-stationary are first differenced, at which point they become stationary.[9] These variables are denoted with a "Δ" in the regression tables.

Table 1 provides Phillips curve estimates using the composite social bargain index, in addition to its component variables. However, the use of a composite index might include variables that, though theoretically and intuitively sound, do not have an independent effect on inflation. Their inclusion could introduce measurement error to the estimates and make them less efficient. The index is therefore disaggregated to identify which of the component variables have a significant independent effect on inflation.

<< TABLE 1 HERE >>

All variables have the predicted sign, but the social bargain index is not significant. The models with the best fit, as assessed by highest adjusted R-squared, are BGN03, which includes the only significant component variable, the pension share; followed by BGN02, which includes the insignificant composite bargain index.

The pension share variable is significant at the one percent level, even after controlling for expected inflation, food and energy prices, non-petroleum import prices, and the service-share of

[9] Stationarity is assessed using three unit root tests: the Augmented Dickey-Fuller, Phillips-Perron, and Kwiatkowski-Phillips-Schmidt-Shin tests. If two of three tests suggest non-stationarity, the variable is differenced.

GDP. This makes intuitive sense as the pension share is arguably the broadest measure of the social bargain. All other variables, including the proxies for other income maintenance programs and the level of coordination in the wage bargain, are never significant. This lack of significance coupled with the high significance of the pension share suggests the system of pension provision offers useful policy guidance in creating labor market institutions that can equitably generate full employment without fear of price inflation.

The unemployment rate is weakly and not robustly significant, suggesting that it is an incomplete measure of the overall condition of the labor market (Schor and Bowles 1987) and thus might be biasing the results. To better capture the state of the labor market, four estimates of the cost of job loss (Bowles 1985) will be included to see if the social bargain proxies are sensitive to a broader specification of workers' bargaining power. This approach builds on Matthews and Kandilov (2002) and Pacitti (2015), and details of variable constriction can be found in Pacitti (2011).

The cost of job loss is the expected weekly income loss associated with job loss and is mathematically defined as

$$cjl = w - [(UD)w_u + (1 - UD)w_r], \tag{5}$$

where w is pre-displacement income; UD is the average duration of unemployment in weeks, expressed as a percentage of one year; w_u is the total sum of unemployment income; $(1 - UD)$ is the average duration of reemployment in weeks, expressed as a percentage of one year; and w_r is reemployment income, or the income a worker can expect to receive if he is rehired by another firm.

The first two measures of the cost of job loss are the real weekly cost of job loss and the normalized cost of job loss—the cost of job loss as a percentage of a worker's previous weekly income. These measures are shown in Figure 2.

<< FIGURE 2 HERE >>

Figure 3 presents two measures of the expected cost of job loss, which control for the probability of job loss. The unemployment-rate-expected cost of job loss is the cost of job loss multiplied by the unemployment rate, and the layoff-rate-expected cost of job loss is the calculated the same way, but using the layoff rate.

<< FIGURE 3 HERE >>

All four measures of the cost of job loss are included in the estimates in Table 2, only one of which is robustly significant—the layoff rate cost of job loss. This specification improves the fit of the model relative to that from Table 1.

<< TABLE 2 HERE >>

All variables have the predicted sign. The models with the best fit are R02, which includes the unemployment rate and the bargain index; followed by R10, which includes the layoff-rate expected cost of job loss and the bargain index. However, although the social bargain index always improves model fit, it remains insignificant in all specifications. Based on the disaggregation analysis

from Table 1, this result is not surprising because the composite index includes insignificant component variables that are likely causing variable misspecification.

The estimates presented in Table 3 use the pension share, which was the only significant component of the bargain index from Table 1, to proxy for the social bargain, in addition to using the four measures of the cost of job loss.

<< TABLE 3 HERE >>

All variables have the predicted sign. The model with the best fit is R20, which includes, as in Table 2, the layoff-rate expected cost of job loss, but now uses the pension share. This is also the best fitting model in any of the specifications from Tables 1-3 and is thus the most representative power- and institution-based Phillips curve model.[10]

In addition to producing the best fitting model, the layoff-rate cost of job loss is the only cost of job loss variable that is robustly significant in these estimates, in addition to those from Table 2. As argued by Bowles (1985), this variable is the most accurate measure of labor's bargaining power and, as hypothesized here and argued by Schor and Bowles (1987), better captures the overall state of the labor market because it includes multiple dimensions of unemployment, including, perhaps most importantly, the aggregate probability of involuntary job loss.

The pension share proxy for the social bargain is always significant and insensitive to model specification. Pensions are positively related to the social bargain and are shown, as hypothesized, to

[10] Also, as can be seen in the bottom two rows of Table 3, autocorrelated error terms are no longer present at conventional levels of significance when the layoff-rate expected cost of job loss is used (R19 and R20), suggesting that these models are properly specified. This makes intuitive sense as these models use what is argued to be a more comprehensive measure of labor's bargaining power (Bowels 1985; Schor and Bowles 1987) and a proxy for the institutional structure of the labor market.

thus be negatively related to the rate of inflation because workers defer compensation from the present to the future.

5. THE FRAYING SOCIAL BARGAIN: PROBLEMS WITH THE CURRENT PENSION SYSTEM

The scope of pension provision has macroeconomics effects that have not been previously considered. As such, it offers a novel and equitable way in which labor markets can become more distributively just, without sacrificing full-employment goals and price stability. But how, specifically, can we achieve full employment and price stability without sacrificing equity? The flexibilization of American labor markets as part of neoliberal structural reforms was very successful at reducing inflation, but at the expense of a redistribution of income and burden from labor to capital (Setterfield 2005, Pacitti 2012). The analysis above suggests that inflation can be reduced through a more equitable channel by having capital or the state increase pension coverage and funding in exchange for a moderation of nominal wage demands.

The finding that pensions—and only pensions—are the main driver of the social bargain dynamic suggests a variety of interesting policy recommendations to improve macroeconomic performance, and make labor markets more equitable by allowing for expansionary policies—such as an employer of last resort—that generate full employment without the threat of accelerating inflation. In this case, efficiency and equity are not mutually exclusive, and can be accomplished without a tradeoff.

Prior to World War I, retirement was a luxury that could only the wealthy could afford (Ghilarducci 2008). Old-age leisure had a severe class bias. It was not until World War II that the ability to retire was democratized. Pensions arose on a large scale out of necessity during World War II as firms used them as recruiting tools; government provided tax benefits to encourage

participation, which reduced wage inflation; and unions were able to make them part of standard collective bargaining agreements as a supplement to wages (Munnell 2009). For three decades, this system—dominated by the provision of defined benefit (DB) plans—increased aggregate retirement savings, increased pension coverage rates, and led to guaranteed and secure retirement incomes for American workers. However, beginning in the late 1970s and early 1980s, this manifestation of the social bargain began to give way to a pension system dominated by defined contribution (DC) plans, that, effectively, shifted risk away from firms and onto workers (Hacker 2006).

The shift from DB plans to DC plans also intensified and shifted the distributive biases associated with pensions. Low- and middle-income earners stopped saving, in part because of stagnating wages and a voluntary retirement plan. However, high-income earners, since they received the majority of government subsidies for retirement savings, began to save more, but not enough to offset the decline from lower-income earners (Ghilarducci 2007). Thus, government subsidies have not increased aggregate retirement savings or pension coverage since DC plans are voluntary; their main effect has been to provide subsidies to workers who need them the least.

This shift has not only led to decreasing retirement incomes, but also decreasing retirement income security. As Ghilarducci argued, "if current trends continue, poverty rates among the elderly will increase and middle-class retirees will find that their retirement income will not pay for the lifestyle they achieved while working" (p. 1). Furthermore, "the early baby boomers will be the last generation with more retirement security than their parents" (p. 4). Due to rising health care costs, 60 percent of households will not be able to achieve their pre-retirement income (Munnell 2009, pp. 10-11). The trouble with pensions has become more intense and visible since the start of the Great Recession because of the decline in private pension provision and funding, and increased financial market volatility.

The conventional rhetoric suggests that solutions to these problems include increasing the retirement age, working longer hours, and/or decreasing retirement benefits (Organization for Economic Cooperation and Development 2012). These options, however, ignore the inherent problems and distributive biases associated with the current private pension system, which is based on DC plans, such as IRAs and 401(k)s.

A voluntary pension system built around DC plans is inefficient and inequitable for six reasons (Ghilarducci 2009), and therefore unlikely to be successful in promoting a social bargain. First, DC plans do not provide retirement income security, adequate income levels, and are distributively biased. The shift to DC from DB has transferred all of the risk of saving enough for retirement onto workers (Hacker 2006).[11] DC plans are voluntary and workers can, and frequently do, opt out of participation, thus not saving sufficiently for retirement. Munnell (2009, p. 16) estimated that one quarter of workers eligible for DC plans choose not to participate. Workers who do participate might lack the information to make rational long-term investment decisions, and thus fail to sufficiently save or diversify.[12] Pension participants can also be myopic, in that they withdrawal their savings prematurely, or cash out when they switch jobs, leaving them less savings for a distant retirement. Finally, employers are not legally obligated to contribute to workers' DC plans, or provide a match. Given these issues, it should not be surprising that 46 percent of retirees die with less than $10,000 in financial assets (Poterba, Venti, and Wise 2012).

Second, current pensions have low net rates of return due to hidden fees and misaligned incentives. Administrative fees average 0.5 percent to 2.5 percent of assets annually (Ghilarducci

[11] DB plan were more successful in protecting workers from risk, with the exception of default risk—the risk that a firm will face bankruptcy and not be able to payout promised retirement benefits. Also, employers used DB plans as a recruitment tool to attract and retain high-skilled labor. DB plans were able to increase pension coverage rates because participation is automatic and employer contributions are mandatory. Also, pension wealth grows more rapidly for workers with a DB plan relative to those with a DC plan. DB plans have lower fees due to economies of scale, are better structured for long-term stability, allocate assets to yield higher, but more secure returns than DC plans (Ghilarducci 2006).

[12] About half of all DC participants fail to adequately diversify because they overinvest in their own companies stock (Munnell 2009, p. 16).

2007, p. 7) and can reduce the final net value of retirement accounts by 23 percent (Congressional Budget Office 2004). The fee structure associated with pension funds creates incentives for fund managers to push workers into heavily managed, high fee products, which effectively transfer income from workers to the financial sector (Nersisyan and Wray 2010). Thus, the financial sector's incentives are not aligned with that of savers as financial firms tend to have a larger preference for short-term risk, which could generate higher fees, but at the expense of long-term retirement income stability. And since workers are not professional investors, they face large information barriers in accurately assessing the true costs and risks associated with their choices.

Third, DC plans force individuals to assume higher than desired risk because one person cannot adequately insure against overall market risk as they near retirement. Exogenous forces, such as business cycles and financial market fluctuations, could adversely affect plan balances for workers nearing retirement. Munnell (2009) estimated that during the Great Recession, IRA balances fell by $2 trillion, or 42%. Older workers planning to retire found that, through no fault or mismanagement of their own, that they would have to delay retirement.

Fourth, even if workers do save enough, they face uncertainty in deciding how to allocate it over their retirement given their unknown lifespan.

Fifth, current tax treatment for DC plans is highly regressive, in that the majority of tax breaks go to high-income earners. For example, 70 percent of tax subsidies for 401(k) plans go to the top 20 percent of earners and 50 percent accrue to the top 10 percent of earners (Ghilarducci 2007, p. 5).

Sixth, pensions funds are destabilizing due to the large, mobile, and volatile volume of "managed money" (Nersisyan and Wray 2010). When massive pensions funds move *en masse* so too do financial markets, creating the conditions for huge swings in asset prices and bubbles, and subjecting workers to increased financial market and asset return risk. The current private pension

system thus creates negative externalities for society as a whole and individual investors, for it exposes each to too much risk.

Given these inefficiencies, inequalities, and destabilizing forces, why has there been a shift toward DC plans and away from DB plans? Ghilarducci (2008, pp. 67-68) argued that the reduced bargaining power of labor made it difficult for unions to collectively bargain for pensions, especially DB plans. There have been structural shifts toward service employment, with higher turnover and less long-term investment in workers that reduces the need for firms to use pensions as a recruitment tool. Employers have been the main beneficiary of this shift, mainly because they are not required by law to contribute to an employee's IRA and this serves to reduce employer pension costs by 3.5 to 5 percent.[13] Also, the financial sector has benefited as they manage pension funds for large fees—$40.5 billion in 2009 (Ghilarducci 2009a, p. 94).

6. POLICY RECOMMENDATIONS

The current private pension system has been failing on all fronts. It has not provided adequate retirement income and income security, and is regressive in the distribution of subsidies to encourage retirement savings. But, returning to the theme of this paper, it has failed to maintain the post-World War II social bargain that has been effective in taming inflation.

This section proposes an alternative pension system that provides the four pillars necessary for an efficient and equitable pension system: adequate retirement income, income security, flexibility, and sustainability (Ghilarducci 1992, p. 134). This system can also promote a social bargain by building on the success of World War II experiment, where the state, seeking to control war-time inflation, incentived workers to reduce wage demand in exchange for pensions (Nersisyan

[13] Wolff (2011) argued that in the 1980s and 1990s, the rise of DC plans resulted in large gains for workers since their value was tied, at least loosely, to stock market performance. However, these gains slowed between 2001 and 2007, and likely decreased from 2008 until the present.

and Wray 2010). The government offered Treasury bills and firms promised to—and did—increase pension funding to supplement wage income, thus relieving wage inflation during the war while guaranteeing workers a secure income upon retirement.

Specifically, what would an alternative pension system look like?[14] The first option is to replace the current system of private pensions with publicly provided ones—an expanded Social Security system whose holdings would be limited to Treasury and highly-rated corporate bonds (Nersisyan and Wray 2010). This approach could lead to higher net returns because "a simple strategy of buying Treasuries should do better than the average managed position because hiring an above-average fund manager would require above-average compensation" (p. 10), in addition to reducing fees because of the government's monopsony power in hiring fund managers, and eliminating advertising and marketing expenses. It would also free up capital for firms as they need not dedicate resources to funding their own pension program, theoretically allowing them to lower prices.

Another option, which builds on and refines this policy are Guaranteed Retirement Accounts (GRAs) (Ghilarducci 2007, 2008), which would replace private pensions with an expanded and modernized version of Social Security. Furthering the reach of Social Security is itself an equitable policy since about 40 percent of household income for those over 65 comes from Social Security (Burtless 2009). Indeed, while IRA plan balances fell by over 40 percent during the Great Recession, Social Security payments remained stable.[15]

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[14] Both policy proposals have a large role for state involvement because a shift back to DB plans might produce counter-productive results. For example, if firms had to devote more working capital to pension funding, it could force them to raise prices, thus negating the inflation-mitigating effects of the social bargain.

[15] Social Security retirement income replaces about the same income in retirement as private pensions do—on average about 40 percent—but does so within a much narrower range. For Social Security, replacement ratios are 42-46 percent, as compared to private pensions, which replace 12-89 percent of employment income (Burtless 2009, pp 75-76).

Similar to Social Security, GRAs would be mandatory through individual contributions of five percent of earnings deducted though payroll taxes.[16] The system would be managed by the Social Security Administration and would take the $80 billion in annual tax subsidies for IRAs and redistribute it so that each individual would receive a $600 tax credit to offset their payroll contributions. GRAs would guarantee a minimum three percent real rate of return by investing in low cost, low risk assets.[17] Upon retirement, but not before, workers would be able to withdraw their savings as an inflation-indexed annuity, eliminating the risk of underestimating how long one will live by withdrawing funds too rapidly. The system would be progressive, providing the highest retirement income replacement rates for low earners, averaging a 71 percent replacement ratio, compared to Social Security's 40 percent (Ghilarducci 2009a, p. 97). GRAs are also progressive because they would cover low wage, part-time, and low skill workers, who typically do not have access to employer-based pensions.[18]

GRAs are designed to manage, bear, and distribute risk more efficiently and equitable than individual savers. Indeed, the risk of not saving enough for retirement, working for firms that do not contribute to an individual's IRA, financial market volatility, outliving one's savings, inflation risk, early withdraw risk, etc., are eliminated with GRAs because they can take advantage of pooling workers' savings.[19] Since the government would manage GRAs, they would be perfectly portable, allowing workers to shift employers without incurring penalties or administrative costs.

GRAs will also serve as a more effective automatic stabilizer than the current pension and Social Security systems because they would permit workers to retire and supplement their incomes

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[16] Individuals could always contribute more, should they desire.
[17] For comparison purposes, TIAA-CREF offers a minimum fixed three percent real rate of return on its traditional annuity.
[18] Wolff (2011) found that Social Security wealth, because of the progressive nature of its benefit calculus, reduces overall pension wealth inequality.
[19] GRAs are superior to automatic enrollment in IRAs, which have been favored by the Obama administration, because workers who are enrolled in any DC plan face the same risks whether their participation is voluntary or automatic. GRAs eliminate or mitigate these risks at their source.

during recessions. This would also serve to increase aggregate productivity as elderly workers would exit the labor force and be replaced by younger, more productive workers due to their updated skill set. If older workers were to remain employed, it could reduce mobility and employment opportunities for younger workers. Given the current weak labor market, this could lead to high levels of unemployment and unemployment duration for young workers, leading to both short and long-term economic costs, such as lower aggregate demand and skill depreciation. Also, elderly workers who lose their job and search for one during weak labor markets might find themselves unable to successfully switch industries due to the heightened pace of technological change. To the extent they do find a job, it would likely be at a lower wage (Farber 2011).

In the wake of the Great Recession, when IRA values plunged and remain volatile, while the workforce continues to age and baby boomers near retirement, such an alternative pension system appears more desirable than ever. GRAs offer stability, security, portability, efficiency, and equity at a time when the future of the current private pension system is at risk. Indeed, polls suggest the public favors compulsory savings plans (HSBC 2007).

However, there will likely be political backlash against a more comprehensive Social Security system as such a switch would reduce the power and profits of the financial sector, and enlarge the role for the state. Since finance is a large contributor to political campaigns for both Republicans and Democrats, opposition will be strong. There is also the myth that Social Security is experiencing a crisis (Baker and Weisbrot 1999).

But the economic case for reforming the pension system is strong. GRA can accomplish all four goals of an efficient and equitable pension system. It will ensure adequate retirement income through low management fees obtained by the government's bargaining power and a guaranteed real rate of return. GRAs will also provide secure retirement incomes though not only a guaranteed real rate of return, but efficiently managed and distributed risk. Flexibility will be provided by

accommodating the needs of all types of workers in all industries, and providing for portability for workers with a preference for employment and geographic mobility. Finally, GRAs will offer a sustainable pension system by ensuring the parity of people's retirement income expectations and retirement income payments. Indeed, it is a system of guaranteed and predictable returns, insensitive to financial market volatility.[20]

In summary, an alternate policy approach to the current system of private pensions will reduce inflation as workers tradeoff wages today for retirement income tomorrow, increase retirement income security and levels, decrease the power of the financial sector, stabilize financial markets and aggregate demand, counter the disappearance of DB plans, offer income to help offset rapidly rising health care costs, and transform current retirement income tax policy to become more progressive. GRAs would promote the equality of retirement leisure and income, especially for low and middle-income workers.

7. CONCLUSION

This paper demonstrated that a rising social bargain can reduce inflation by giving workers an incentive to moderate their wage demands in exchange for guaranteed retirement income. A social bargain index was developed according to Cornwall's income maintenance hypothesis and empirically tested in a variety of Phillips curve models. The disaggregation analysis identified the share of employees receiving an employer-provided pension as the only social bargain variable that has a significant negative effect on inflation rate, providing robust emprical support to the bargain hypothesis.

The discovery that pensions have macroeconomic implications that have not previously been considered—being able to generate price stability at full employment—opens the door for

[20] Again, individuals who have a larger preference for risk could supplement their GRAs by investing in separate, private IRAs whose values would be tied to financial market performance.

novel policy recommendations. Since pensions are only effective at moderating wage demands when workers can rely on an adequate level and secure stream of retirement income, Guaranteed Retirement Accounts provide an efficient and equitable alternative to the current system of private pension provision. Although such a recommendation will face political hostility, the economic justification for such a policy well supported.

The Great Recession has had significant negative impacts on the structure and performance of labor markets. But this collapse might provide an opportunity to rebuild labor markets so that they operate more efficiently and equitably. Economic policy makers should consider intuitions that advance the dual goals of full employment and price stability by designing retirement programs that simultaneously improve labor market and retirement outcomes.

APPENDIX

All of the variables used in the social bargain index are transformed from their raw value to an index value, according to the below formula (*United Nations Human Development Report* 2000, p. 269).

$$\frac{x_t - x_{min}}{x_{max} - x_{min}}$$

The component variables thus have a maximum range between zero, where the bargain is absent, to one, where the bargain operates with its maximum strength. An unweighted average of these index values is taken to give the aggregate index value.

Table 4 provides the descriptions and sources for the data used. A data methodology, which provides variable transformations, adjustments, and detailed source information, is available from the author upon request.

<< TABLE 4 HERE >>

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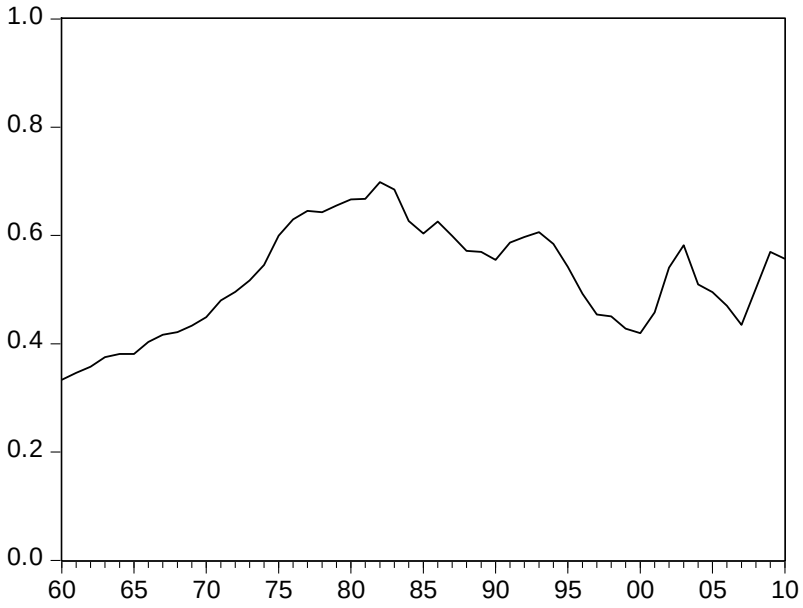

Figure 1. Social Bargain Index
Source: Author's calculations. See Table 4 for details.

Figure 2. Real Cost of Job Loss and Normalized Cost of Job Loss ($2012)
Source: Author's calculations. See Table 4 for details.

Figure 3. Real Expected Costs of Job Loss: Unemployment Rate and Layoff Rate ($2012)
Source: Author's calculations. See Table 4 for details.

Table 1. Social Bargain Index Disaggregation: Short-Run Phillips Curve Estimates, 1960-2012

	BGN01	BGN02	BGN03	BGN04	BGN05	BGN06	BGN07	BGN08
Constant	1.603153** (0.752847)	1.499099** (0.737670)	1.219053 (0.731481)	1.675946** (0.781911)	1.583012** (0.753654)	1.329062* (0.752664)	1.618835** (0.774713)	1.439406** (0.705877)
ΔExpected Inflation	0.371390** (0.162433)	0.356120** (0.157321)	0.323854* (0.168500)	0.415634** (0.167638)	0.367262** (0.162637)	0.396619*** (0.146791)	0.370071** (0.164583)	0.427164*** (0.150756)
Unemployment Rate	-0.231335* (0.133218)	-0.217843* (0.127543)	-0.156176 (0.125581)	-0.271239* (0.147563)	-0.228683* (0.132510)	-0.189211 (0.129364)	-0.232134* (0.135159)	-0.187288 (0.124154)
ΔSocial Bargain Index		-8.310055 (6.587752)						
ΔPension Share			-0.151749*** (0.055205)					
ΔDB Share				-0.151879 (0.174167)				
ΔContributions for Pensions and Profit Sharing					-0.390519 (0.498242)			
ΔContributions for Insurance						-0.363554 (0.335473)		
ΔContributions for Social Security							-0.125764 (0.873454)	
ΔUnion Membership								0.329339 (0.299292)
Productivity-Wage Gap	-0.142014 (0.097027)	-0.091171 (0.088786)	-0.176446* (0.097163)	-0.120203 (0.093431)	-0.114367 (0.086389)	-0.085834 (0.096159)	-0.142734 (0.097771)	-0.145561 (0.093242)
Food & Energy Prices	0.615783*** (0.156026)	0.611790*** (0.148248)	0.511373** (0.211279)	0.583743*** (0.167633)	0.629844*** (0.154741)	0.621358*** (0.150990)	0.615137*** (0.157748)	0.598738*** (0.160734)
Non-Petroleum Import Prices	0.100075** (0.045491)	0.123787*** (0.043118)	0.120758*** (0.039889)	0.111426** (0.049053)	0.108177** (0.042805)	0.107445** (0.043891)	0.101302** (0.048177)	0.094229** (0.040752)
ΔService Share of GDP	-0.225332 (0.159628)	-0.065387 (0.167857)	-0.116635 (0.122414)	-0.198516 (0.150481)	-0.176888 (0.169823)	-0.022500 (0.232158)	-0.225497 (0.162104)	-0.229422 (0.172312)
R-squared	0.747927	0.763315	0.790031	0.752174	0.752157	0.755851	0.748062	0.757262
Adjusted R-squared	0.713554	0.724784	0.755850	0.711830	0.711811	0.716106	0.707049	0.717746
F-statistic	21.75880	19.81082	23.11311	18.64409	18.64243	19.01745	18.23958	19.16367
Ljung-Box Q p-value (a)	0.068 (1)	0.068 (4)	0.051 (4)	0.079 (1)	0.151 (4)	0.072 (1)	0.065 (1)	0.073 (1)
Breusch-Godfrey p-value (a)	0.0861 (1)	0.0421 (4)	0.0165 (4)	0.1426 (4)	0.0960 (4)	0.0690 (4)	0.0864 (1)	0.1579 (4)

Dependent variable: First-difference of log change in the CPI-U (SA) (Δp). All equations estimated using OLS. Figures in parentheses are Newey-West standard errors

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

(a) P-value for the joint test of the first N autocorrelations of the error terms, up to order four. Null hypothesis is that there is no serial correlation up to order N, where N is reported to the right of the p-value in parentheses. The greatest lag length where autocorrelation is present at a conventional level of significance is reported.

Table 2. Composite Social Bargain Index with Cost of Job Loss Measures: Short-Run Phillips Curve Estimates, 1960-2012

	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10
Constant	1.603153** (0.752847)	1.499099** (0.737670)	0.216493 (0.160929)	0.190406 (0.145003)	0.190631 (0.162416)	0.167763 (0.147544)	0.139787 (0.177602)	0.131309 (0.164858)	0.053375 (0.178122)	0.042420 (0.167267)
ΔExpected Inflation	0.371390** (0.162433)	0.356120** (0.157321)	0.511349*** (0.152261)	0.486986*** (0.162969)	0.522113*** (0.144579)	0.497276*** (0.156836)	0.483023*** (0.142613)	0.464588*** (0.154495)	0.569774*** (0.125919)	0.541554*** (0.135469)
Unemployment Rate	-0.231335* (0.133218)	-0.217843* (0.127543)								
ΔCJL			-0.014369 (0.009907)	-0.014128 (0.009354)						
ΔCJL^n					-12.69813 (8.211668)	-12.00960 (7.586304)				
ΔCJL^c: Unemployment Rate							-0.127409 (0.090151)	-0.110800 (0.084369)		
ΔCJL^c: Layoff Rate									-0.482239*** (0.178134)	-0.446632*** (0.160179)
ΔSocial Bargain Index		-8.310055 (6.587752)		-9.268095 (6.217791)		-8.688919 (6.158237)		-6.768333 (6.280522)		-8.272433 (6.448147)
Productivity-Wage Gap	-0.142014 (0.097027)	-0.091171 (0.088786)	-0.042655 (0.104145)	0.012028 (0.099602)	-0.044277 (0.099545)	0.003535 (0.096095)	-0.027149 (0.096227)	-0.000103 (0.096849)	-0.105254 (0.085448)	-0.057239 (0.090501)
Food & Energy Prices	0.615783*** (0.156026)	0.611790*** (0.148248)	0.707494*** (0.168820)	0.696594*** (0.159950)	0.723742*** (0.167015)	0.713025*** (0.158916)	0.732256*** (0.159934)	0.722244*** (0.154543)	0.794597*** (0.164714)	0.779023*** (0.152840)
Non-Petroleum Import Prices	0.100075** (0.045491)	0.123787*** (0.043118)	0.083134* (0.045571)	0.110366** (0.044885)	0.081550* (0.043781)	0.107418** (0.043561)	0.092321** (0.044373)	0.111781** (0.044755)	0.083607* (0.046447)	0.108263** (0.045406)
ΔService Share of GDP	-0.225332 (0.159628)	-0.065387 (0.167857)	-0.220234 (0.135480)	-0.039354 (0.150326)	-0.197906 (0.143471)	-0.031794 (0.154827)	-0.000504 (0.246355)	0.096028 (0.228687)	0.110086 (0.192350)	0.243698 (0.220651)
R-squared	0.747927	0.763315	0.732811	0.752109	0.738173	0.755055	0.744991	0.754673	0.741127	0.756331
Adjusted R-squared	0.713554	0.724784	0.696376	0.711755	0.702470	0.715180	0.710217	0.714737	0.705826	0.716664
F-statistic	21.75880	19.81082	20.11294	18.63765	20.67501	18.93562	21.42383	18.89665	20.99455	19.06696
Ljung-Box Q p-value (a)	0.068 (1)	0.068 (1)	0.047 (1)	0.064 (4)	0.062 (1)	0.061 (4)	0.039 (1)	0.046 (1)	0.413 (4)	0.316 (4)
Breusch-Godfrey p-value (a)	0.0861 (1)	0.0421 (4)	0.0323 (4)	0.0124 (4)	0.0360 (4)	0.0122 (4)	0.0188 (4)	0.0105 (4)	0.2235 (4)	0.1879 (4)

Dependent variable: First-difference of log change in the CPI-U (SA) (Δp). All equations estimated using OLS. Figures in parentheses are Newey-West standard errors

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

(a) P-value for the joint test of the first N autocorrelations of the error terms, up to order four. Null hypothesis is that there is no serial correlation up to order N, where N is reported to the right of the p-value in parentheses. The greatest lag length where autocorrelation is present at a conventional level of significance is reported.

Table 3. Social Bargain Significant Component Variable with Cost of Job Loss Measures: Short-Run Phillips Curve Estimates, 1960-2012

	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20
Constant	1.603153** (0.752847)	1.219053 (0.731481)	0.216493 (0.160929)	0.287815* (0.170628)	0.190631 (0.162416)	0.269248 (0.170840)	0.139787 (0.177602)	0.230538 (0.181208)	0.053375 (0.178122)	0.149407 (0.181800)
ΔExpected Inflation	0.371390** (0.162433)	0.323854* (0.168500)	0.511349*** (0.152261)	0.410584** (0.166586)	0.522113*** (0.144579)	0.420661** (0.160686)	0.483023*** (0.142613)	0.397309** (0.151869)	0.569774*** (0.125919)	0.466258*** (0.122578)
Unemployment Rate	-0.231335* (0.133218)	-0.156176 (0.125581)								
ΔCJL			-0.014369 (0.009907)	-0.008941 (0.009113)						
ΔCJL[a]					-12.69813 (8.211668)	-8.299799 (7.452163)				
ΔCJL[c]: Unemployment Rate							-0.127409 (0.090151)	-0.089607 (0.078651)		
ΔCJL[e]: Layoff Rate									-0.482239*** (0.178134)	-0.412684** (0.170730)
ΔPension Share (Social Bargain)		-0.151749*** (0.055205)		-0.162634*** (0.059236)		-0.159099*** (0.056683)		-0.089607*** (0.054665)		-0.168057*** (0.056090)
Productivity-Wage Gap	-0.142014 (0.097027)	-0.176446* (0.097163)	-0.042655 (0.104145)	-0.116875 (0.099725)	-0.044277 (0.099545)	-0.114189 (0.096152)	-0.027149 (0.096227)	-0.096843 (0.096050)	-0.105254 (0.085448)	-0.150274 (0.096639)
Food & Energy Prices	0.615783*** (0.156026)	0.511373** (0.211279)	0.707494*** (0.168820)	0.563955*** (0.209117)	0.723742*** (0.167015)	0.577464*** (0.204971)	0.732256*** (0.159934)	0.586785*** (0.194530)	0.794597*** (0.164714)	0.631257*** (0.199559)
Non-Petroleum Import Prices	0.100075** (0.045491)	0.120758*** (0.039889)	0.083134* (0.045571)	0.111391*** (0.040523)	0.081550* (0.043781)	0.109591*** (0.039279)	0.092321** (0.044373)	0.116235*** (0.037910)	0.08360* (0.046447)	0.111134*** (0.039283)
ΔService Share of GDP	-0.225332 (0.159628)	-0.116635 (0.122414)	-0.220234 (0.135480)	-0.107246 (0.118844)	-0.197906 (0.143471)	-0.093751 (0.126440)	-0.000504 (0.246355)	0.046331 (0.220811)	0.110086 (0.192350)	0.193614 (0.183660)
R-squared	0.747927	0.790031	0.732811	0.782491	0.738173	0.785470	0.744991	0.790515	0.741127	0.797147
Adjusted R-squared	0.713554	0.755850	0.696376	0.747083	0.702470	0.750547	0.710217	0.756413	0.705826	0.764124
F-statistic	21.75880	23.11311	20.11294	22.09905	20.67501	22.49119	21.42383	23.18077	20.99455	24.13940
Ljung-Box Q p-value (a)	0.068 (1)	0.051 (4)	0.047 (1)	0.035 (4)	0.062 (1)	0.039 (4)	0.039 (1)	0.025 (4)	0.413 (4)	0.137 (4)
Breusch-Godfrey p-value (a)	0.0861 (1)	0.0165 (4)	0.0323 (4)	0.0058 (4)	0.0360 (4)	0.0055 (4)	0.0188 (4)	0.0030 (4)	0.2235 (4)	0.0719 (4)

Dependent variable: First-difference of log change in the CPI-U (SA) (Δp). All equations estimated using OLS. Figures in parentheses are Newey-West standard errors

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

(a) P-value for the joint test of the first N autocorrelations of the error terms, up to order four. Null hypothesis is that there is no serial correlation up to order N, where N is reported to the right of the p-value in parentheses. The greatest lag length where autocorrelation is present at a conventional level of significance is reported.

Table 4. Data Description and Sources

Variable	Definition & Description	Source
Inflation Rate (p)	Log change in CPI-U	Bureau of Labor Statistics
Inflation Expectations (p^e)	One-year ahead Livingston Survey forecast of CPI-U	Federal Reserve Bank of Philadelphia
Unemployment Rate (U)	Annual average of unemployment rate for all civilian workers	Bureau of Labor Statistics
Cost of Job Loss (CJL)	One-year income loss associated with job loss	Author
Pre-Displacement Income (w)	Average weekly income in unemployment-insurance-covered employment	Bureau of Labor Statistics
Unemployment Duration (UD)	Average weeks unemployed, expressed as a percentage of one year	Bureau of Labor Statistics
Unemployment Income (w_u)	Income from unemployment insurance and total family assistance	Author
Unemployment Insurance	Average weekly benefit amount from unemployment insurance income	Department of Labor
Total Family Assistance	Weekly family assistance and social welfare income per person in poverty	Bureau of Economic Analysis, Census Bureau
Reemployment Duration (1 – UD)	Average weeks reemployed following unemployment, expressed as a percentage of one year	Bureau of Labor Statistics
Reemployment Income (w_r)	Reemployment average weekly income	Author, Farber (2011), Bureau of Labor Statistics
Expected Cost of Job Loss (CJL^e)	Probability of job loss multiplied by cost of job loss	Author
Unemployment Rate	Unemployment rate for all civilian workers	Bureau of Labor Statistics
Layoff Rate	Unemployment level for job losers on layoff divided by total private employment	Author, Bureau of Labor Statistics
Social Bargain Index (B)	Unweighted index of variables that affect employment insecurity	Author
Pension Share	Percentage of private employees covered by an employer-provided pension	Author, Department of Labor, Bureau of Labor Statistics
Defined Benefit Share of Pensions	Percentage of private pension plans that are defined benefit	Author, Department of Labor (2010), Kotlikoff and Smith (1983), Beller and Lawrence (1992)
Pension and Profit-Sharing Contributions	Real employer contributions for private pension and profit-sharing plans as a percentage of real total wage and salary disbursements (deflated by PCE)	Author, Bureau of Economic Analysis
Insurance Contributions	Real employer contributions for private group health, life, workers' compensation, and unemployment insurance as a percentage of real total wage and salary disbursements (deflated by PCE)	Author, Bureau of Economic Analysis
Social Security Contributions	Real employer contributions for social security as a percentage of real total wage and salary disbursements (deflated by PCE)	Author, Bureau of Economic Analysis
Unionization Rate	Percentage of all wage and salary employees who are members of a union	Bureau of Labor Statistics, Hirsch, Macpherson, and Vroman (2001), Troy and Sheflin (1985)
Productivity-Wage Gap (q-w_1)	Productivity growth less distributed lag of past real wage growth, adjusted for effort	Author, Ball and Moffitt (2001)
Productivity Growth (q)	Quarterly percent change in output per hour in non-farm business sector at an annual rate, adjusted for variation in effort	Bureau of Labor Statistics
Distributed Lag of Past Real Wage Growth (w_1)	Recursive estimation using Hodrick-Prescott filter (smoothing parameter of 6.25) applied to real wage growth	Author
Real Wage Growth	Quarterly percent change in real hourly compensation in non-farm business sector at an annual rate	Bureau of Labor Statistics
Relative Food and Energy Price Change (FE)	Log change in the CPI-U less the log change in the core CPI-U	Bureau of Labor Statistics
Relative Non-Petroleum Import Price Change (M)	Log change in the non-petroleum import price index less the log change in the GDP deflator	Bureau of Economic Analysis
Service Share	Share of GDP from the service-producing sector	Bureau of Economic Analysis