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Time-dependent or state-dependent wage-setting? Evidence from periods of macroeconomic instability

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ABSTRACT

Administrative data on monthly wages in Iceland during 1998–2010 provide new insight into nominal wage rigidity. Unlike the data used in previous work, ours have a higher frequency, minimal measurement error, and a long sample including a period of substantial macroeconomic instability. We find that the monthly frequency of nominal wage changes is 13 percent. Although nominal wage cuts are rare, their frequency rises following a large macroeconomic shock. Timing of wage changes is both time-dependent and state-dependent: we find evidence of synchronization of adjustment and contracts of fixed duration, but also that inflation and unemployment over the wage spell affect the timing of adjustment.

1. Introduction

How rigid are nominal wages, and what factors determine the timing of wage adjustments? In the Keynesian paradigm, nominal wage rigidity is central to the explanation of variations in output and employment. An extensive literature uses models for analysis of monetary policy and business cycles that rest on the assumption that wages and prices are sticky. Still, detailed evidence on wage rigidity has been very scarce.

In this paper, we use a unique administrative dataset on monthly wages to provide new insight into nominal wage adjustment. The main focus is on the frequency of nominal wage changes as a measure of wage stickiness and on the factors influencing the timing of wage adjustments.[1] The dataset used has numerous advantages for studying wage-setting and wage rigidity, allowing us to present more accurate results than has been done in previous studies. Four main advantages are emphasized. First, the data are at monthly frequency, as are the majority of actual wage payments; hence, most wage changes that occur can be measured. Estimating the frequency of wage changes using lower-frequency data, as is done in most of the literature, could lead to biased results, as some changes are unobserved in the data. Second, wage changes are measured at the employer–employee level. Thus, the data allow for measuring actual wage changes for the same employee working at the same job for the same firm. Third, the data are collected directly from firms' payroll software rather than through interviews or postal surveys. This should limit measurement errors such as rounding or misreporting. Furthermore, it includes detailed and accurate information on both wages and working hours, segregated into daytime and overtime

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[1] Much of the previous research on wage rigidity using microdata has focused on the assessment of downward nominal wage rigidity. See, for example, McLaughlin (1994), Card et al. (1997), Kahn (1997), Smith (2000), Nickell and Quintini (2003), Dickens et al. (2007), and Elsby (2009).

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hours. Fourth, the dataset covers a long and continuous period characterized by substantial macroeconomic instability. Significant variability in macroeconomic variables, both in inflation and unemployment, allows us to test empirically for time-dependency and state-dependency of wage adjustments.

This papers presents a series of indicators of the degree of nominal wage rigidity. Wages are rigid at the microeconomic level: The mean monthly frequency of change in the base wage, our preferred measure of nominal wage rigidity, is measured at 12.9 percent. When changes due to union wage settlements are excluded, the frequency drops to 6.5 percent. There is a substantial seasonal component in wage changes, indicating synchronization in the timing of adjustments. In January, the frequency of wage increases is more than 50 percent, while other changes are staggered throughout the year. Moreover, there is ample heterogeneity in the distribution of wage spell duration, with most spells lasting less than a year but a distinct mass of spells lasting exactly 12 months.

Whether the timing of individual wage changes is exogenous or influenced by changes in the state of the economy has differing implications for the degree of monetary non-neutrality. If wage-setting is state-dependent, the output response to a monetary shock will be attenuated by a more pronounced response in wages selected for adjustment. In comparison, time-dependent wage-setting implies a larger and longer effect of monetary policy on employment and output. As a result, it is important to distinguish empirically between these determinants of the timing of wage adjustments. To this end, we first estimated a hazard model of wage change. The hazard function is mostly flat throughout the first year, but with a large spike at 12 months, consistent with time-dependent adjustment. Then an empirical model of wage adjustment was estimated, incorporating elements of both time-dependency and state-dependency of wage changes. The results provide strong evidence of state-dependent behavior, contradicting previous empirical studies. The timing of wage increases depends on cumulative inflation and unemployment over the current wage spell and also on the state when wages were adjusted in the past. In addition, large macroeconomic shocks are followed by an increased frequency of nominal wage cuts, contradictory to the notion of downward nominal wage rigidity. In contrast to findings in earlier studies, the results therefore highlight how the frequency of wage change, in addition to its magnitude, is determined endogenously in the economy.

This paper contributes to a recent but growing literature on the micro-level evidence of nominal wage rigidity. The study is most closely related to recent papers by Lünnemann and Wintr (2009), Le Bihan et al. (2012), and Barattieri et al. (2014). However, unlike ours, these papers have used data of lower frequency and/or datasets that are subject to various types of measurement errors, either in wages or in working hours, and cover periods of low macroeconomic variability. As we will discuss in greater detail, these issues affect both the accuracy of their results and their ability to identify empirically the underlying mechanisms of wage adjustment.

The remainder of the paper is organized as follows. Section 2 presents an overview of wage-setting and labor market institutions in Iceland. Section 3 describes the data. In Section 4 we present evidence of the frequency of wage changes, the distribution of wage spell duration, the size of wage changes, synchronization, and heterogeneity in wage adjustment. Section 5 provides econometric evidence on nominal wage adjustment. In Section 6 the results are compared to those in previous studies, and Section 7 concludes.

2. Wage-setting in the icelandic labor market

There are clear differences between the US and European labor markets, and within labor markets in Europe, as regards the institutions that affect wage formation. To interpret our results more effectively and put our findings into perspective, we present a short overview of the main characteristics of wage-setting in Iceland.

Iceland has a high degree of collectivization of wage bargaining, with union density among the highest among OECD countries. Furthermore, bargaining coverage is around 85 percent, a rate similar to that in the Nordic countries, Austria, France, Italy, and the Netherlands, but much higher than in the UK and the US (Du Caju et al., 2008). Icelandic private sector unions are organized on either a sectoral or an occupational basis and are affiliated with the Icelandic Confederation of Labour (ASI). Employers are highly organized as well. Centralized wage bargaining tends to produce nationwide settlements that provide for minimum wage increases and can then be followed by more decentralized and less dominant negotiations at lower levels. The structure of the union wage bargains is usually the same: wage increases take effect upon signing and then on January 1 each year.

During our sample period, the duration of union contracts was 3–4 years. As a rule, contracts contain some kind of trigger clauses according to which settlements can be revoked if the premises on which they are based – usually some type of CPI threshold – fail to hold. If assumptions do not hold, which has been the case more often than not, the contracting parties can either review the wage package within the settlement or revoke the settlement *en bloc*. Reviews generally result in wage increases that are nonetheless far smaller than those that would have been necessary to maintain the purchasing power originally intended when the agreements were signed.[2] Employees are commonly paid wages above the rates specified in the union contracts; therefore, contracts function as floors for the wage level and wage growth. Above these

[2] Table A.9 in Online Appendix D compares average yearly changes in the wage index, calculated by Statistics Iceland, and predetermined yearly wage increases resulting from union negotiations, which are lower than the growth in the wage index in all periods, indicating ample flexibility for wage adjustment at the discretion of firms.