



Does wage rigidity make firms riskier? Evidence from long-horizon return predictability



Jack Favilukis ^{a,*}, Xiaoji Lin ^b

^a Department of Finance, Sauder School of Business, University of British Columbia, 2053 Main Mall, Vancouver, Canada BC V6T 1Z2

^b Fisher College of Business, Ohio State University, United States

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ABSTRACT

The relationship between sticky wages and risk has important asset pricing implications. Like operating leverage, sticky wages are a source of risk for the firm. Firms, industries, regions, or times with especially high or rigid wages are especially risky. If wages are sticky, then wage growth should negatively forecast future stock returns because falling wages are associated with even bigger falls in output, and increases in operating leverage. Indeed, this is the case in aggregate, industry, and U.S. state level data. Furthermore, this relation is stronger in industries and U.S. states with higher wage rigidity.

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1. Introduction

Wage rigidity is an important determinant of firms' risk and cost of capital. Sticky wages (wages that are imperfectly correlated with the marginal product of labor) create an additional source of risk for the firm. This implies that firms, industries, regions, or time periods with especially high or rigid wages are therefore especially risky. In particular if wages are sticky, then wage growth should negatively forecast future stock returns because falling wages are associated with even bigger falls in output, and with increases in operating leverage. This paper indeed finds this to be the case in aggregate, industry, and U.S. state level data. Furthermore, this paper finds that industries and U.S. states with higher wage rigidity have a stronger relationship between wages and returns.

Sticky wages are an important and widely studied feature of labor markets (Calvo, 1982; Taylor, 1983, 1999; Shimer, 2005; Hall, 2006; Gertler and Trigari, 2009), however their asset pricing implications have received less attention. Danthine and Donaldson (2002) and more recently Favilukis and Lin (2016) have shown that they can improve the asset pricing implications of a production economy, while Gourio (2007) shows that they may help explain cross-sectional differences in returns as well. This paper shows that in the presence of sticky wages, wage growth becomes a state variable and negatively forecasts future returns. This forecastability is stronger in time periods, industries, or regions where wages are more rigid, or where the labor share is high.

This paper starts with a simple model to illustrate the intuition of the key mechanism. The key feature of this model is that wages are not equal to the marginal product of labor, as in standard models. Rather, as in Shimer (2010), wages follow an autoregressive process where the innovation is related to the marginal product of labor. Therefore, wages are backward looking. In bad (good) times, output falls (rises) but wages do not fall (rise) by as much as output, which makes equity riskier

* Corresponding author. Tel.: +1 604 822 9414.

E-mail address: jack.favilukis@sauder.ubc.ca (J. Favilukis).

because of relatively higher wage obligations by the firm. This model shows that wage growth negatively forecasts future stock returns if wage rigidity is present, with stronger forecastability if rigidity is stronger and no forecastability if the wage is equal to the marginal product of labor. The simple model also implies that wage growth and labor share are negatively correlated and that labor share positively forecasts stock returns due to the operating leverage effect.

The model is also extended to allow labor markets to affect returns through operating leverage as in the simple model, but also through changing the dividend's share in the pricing kernel – a channel emphasized by Santos and Veronesi (2006). Santos and Veronesi (2006) show that as labor share becomes a larger part of aggregate output, dividends become a smaller part and are therefore less correlated with aggregate output and less risky; this leads to lower expected stock returns. The extended model shows that (i) the effect of labor share on stock returns may be ambiguous depending upon model specification, and (ii) more importantly, the prediction that wage growth negatively forecasts future stock returns is robust when wage rigidity is present. This finding motivates us to focus on wage growth channel in our empirical tests. The results in the data are consistent with the model.

Then the implications of this model are tested. There are three main results. Our first result concerns aggregate data; long horizon returns are regressed on wage growth. This result shows that aggregate wage growth negatively forecasts aggregate excess return. This result appears robust to sub-sample analysis, and to the inclusion of standard predictors such as the price-to-earnings ratio or the consumption-to-wealth ratio (CAY), which do not weaken this relationship.

The next two results are at the disaggregate level (independently either for industries or for U.S. states), where a two stage approach is employed. In the first stage long horizon industry (or state) returns are regressed on wage growth. This result shows that most of the coefficients are negative; this is consistent with our first hypothesis on aggregate coefficients being negative. The second stage regressions show that industries (or states) with the most wage rigidity also have the most negative coefficients from the first stage. We proxy for wage rigidity by measuring the autocorrelation of wage growth, the inverse of the volatility of wage growth, and the share of votes that was Democratic (available for states only).

Related literature: In addition to the macroeconomic literature on wage rigidity, our work relates to two separate strands of financial research, the first on (mostly aggregate) return predictability and the second on the interaction of labor markets and financial returns. It has been shown in the past that aggregate stock returns are forecastable by variables which proxy either for aggregate risk, aggregate risk aversion, or sentiment, for example the price-to-earnings ratio (Campbell and Shiller, 1988) or the consumption-to-wealth ratio (Lettau and Ludvigson, 2001).¹ Santos and Veronesi (2006) show that even without movements in aggregate risk, risk aversion, or sentiment the labor income to consumption ratio should also forecast stock returns due to changing importance of equity in the investors' total portfolio. This paper studies changes in operating (labor) leverage due to changes in wage growth, which also leads to aggregate return predictability but is unrelated to the channels described above. In addition, wage growth forecasts return in the cross-section. Interestingly, unlike much of the previous literature (i.e. Campbell and Shiller, 1988; Lettau and Ludvigson, 2001) but like Santos and Veronesi (2006), the forecasting variable in this paper is not a scaled stock price or other financial variable, but rather a pure macroeconomic variable.

There has been less work done on tying labor frictions to risk and asset returns. The two papers closest to ours are Gourio (2007) and Tuzel and Zhang (2016). Gourio (2007) explores the empirical implications of smooth wages for the cross-section of U.S. publicly traded firms. He finds that profits are most volatile for low market-to-book (value) firms because they have a smaller gap between output and wages. These firms are therefore more risky.² This paper differs in that Gourio (2007) focuses on the value premium and on average returns, while this paper studies risk in aggregate, industry, and regional portfolios through long run return predictability by wage growth. Tuzel and Zhang (2016) look at the reverse problem by identifying regions where wages co-move a lot with aggregate shocks – presumably these are regions with less wage rigidity. They show that average returns in these industries are relatively low. Stickiness need not only work through wages, Weber (2015) shows that firms with sticky prices earn higher average returns.

Other related work includes Belo et al. (2014), who show that firms with low hiring rates have significantly higher average equity returns. Rosett (2001) and Chen et al. (2011) both show that unionized industries have a higher cost of equity, while Schmalz (2012) shows that firms tend to decrease leverage after unionization. Unlike these studies, this paper relates labor market frictions to time-variations in risk and in expected return through long-horizon return predictability. Note that the approach in the paper would not be possible with union data because cross-sectional union data is only available starting in 1984, which gives too short of a time series to detect time-varying risk. However, since wage rigidity can arise even without unions, and since unions make up a fairly small fraction of the U.S. work force,³ we view our findings as a complimentary and more general confirmation for the importance of labor market frictions.

¹ Other notable forecasting variables include the dividend yield (Campbell and Shiller, 1988; Fama and French, 1988; Hodrick, 1992), the relative Treasury bill rate, defined as the Treasury bill rate minus its past four-quarter moving average (Fama and Schwert, 1973; Fama, 1981), the term and default premiums (Keim and Stambaugh, 1986; Fama and French, 1989), the aggregate investment-to-capital ratio (Cochrane, 1991), and new orders (Jones and Tuzel, 2013).

² Similarly, Carlson et al. (2004) and Novy-Marx (2011) argue that differences in operating leverage across are responsible for the value premium. However, neither paper discusses wages.

³ According to the Bureau of Labor Statistics 12% of the U.S. work force was unionized as of 2011.

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