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THE STOCK MARKET AND AGGREGATE EMPLOYMENT

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ABSTRACT

We study the interactions between the stock market and the labor market. When aggregate risk premiums are time-varying, predictive variables for market excess returns should forecast long-horizon growth in the marginal benefit of hiring and thereby long-horizon aggregate employment growth. Consistent with this logic, we document that long-horizon payroll growth and change in unemployment rate are predictable with risk premium proxies. Lagged payroll growth and change in unemployment rate also forecast stock market excess returns.

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1 Introduction

We study the interactions between the stock market and aggregate employment by considering the effect of time-varying expected returns in the standard search and matching framework of the labor market (e.g., Mortensen (1982) and Pissarides (1985)). When the aggregate risk premiums are time-varying, labor market frictions imply that high risk premiums should forecast low short-term employment growth but high long-term employment growth, and that low risk premiums should forecast high short-term employment growth but low long-term employment growth. Moreover, the marginal benefit of hiring depends on the discount rate, meaning that lagged employment growth based on past hiring decisions should forecast stock market returns.

Our evidence lends support to these theoretical predictions. We use the growth rate of seasonally adjusted total non-farm payrolls and change in seasonally adjusted civilian unemployment rate from the Bureau of Economic Analysis as the dependent variables in long-horizon regressions. We find that high values of the log consumption-wealth ratio of Lettau and Ludvigson (2001) predict low payroll growth and rising unemployment rate at short horizons within two quarters, but high payroll growth and declining unemployment rate at subsequent horizons. High values of the relative Treasury bill rate predict high payroll growth and declining unemployment rate at short horizons, but low payroll growth and climbing unemployment rate at long horizons. Unlike the popular macroeconomic predictors such as lagged corporate profit growth and lagged growth of gross domestic product that forecast employment growth at short horizons within four quarters, the risk premium proxies contain predictive power primarily at long horizons that range from eight to 16 quarters.

We also find that lagged payroll growth is a strong negative predictor for future stock market excess returns. In univariate regressions ranging from one-quarter to 16-quarter horizons, the adjusted R^2 peaks at 9% at the four-quarter horizon. The slopes are universally negative, significant for horizons up to eight quarters, and marginally significant at subsequent horizons in our 1952–2007 sample. Intriguingly, judged on the t-statistics and adjusted R^2s in univariate regressions, the predictive power of payroll growth dominates that of standard risk premium proxies such as the default spread and the relative Treasury bill rate. Whereas the dividend yield and the term spread concentrate their predictive power at long horizons (in 12 and 16 quarters), the forecasting power of payroll growth is the strongest in relatively short business cycle frequencies within four quarters. Payroll growth even retains significant predictive power from four to 12 quarters ahead in multiple regressions that also include the dividend yield, the default spread, the term spread, the relative bill rate, and the log consumption-wealth ratio. Finally, change in unemployment rate has some predictive power for market excess returns, but is somewhat weaker than that of payroll growth.

Our work contributes to the literature in two ways. First, a long literature in macroeconomics has examined the impact of the stock market on aggregate investment (e.g., Fischer and Merton (1984), Barro (1990), Blanchard, Rhee, and Summers (1993), and Lettau and Ludvigson (2002)). However, probably because of the long-standing divide between labor economics and finance, we are not aware of any prior studies that examine the impact of the stock market on aggregate employment. This void is surprising, especially because employment and the stock market are of first-order importance in understanding aggregate economic fluctuations. We take a first stab at filling this gap. Going from the other direction, investment has received much attention in the finance literature as a driver for stock market returns (e.g., Cochrane (1991)) and cross-sectional returns (e.g., Cochrane (1996) and Xing (2008)). Employment again has largely been ignored. A few exceptions include Merz and Yashiv (2007), who quantify the role of labor in explaining aggregate stock valuation, and Bazdresch, Belo, and Lin (2009), who show that high firm-level employment growth predicts low average returns. Our work differs because we examine time series predictability of stock market returns and the impact of the stock market on aggregate employment.

Second, a voluminous literature in finance has studied the time series predictability of stock market excess returns (e.g., Fama and French (1989), Cochrane (1991), and Lettau and Ludvigson (2001)). However, this literature has largely ignored labor market variables. Our work shows that lagged payroll growth is a strong predictor of stock market excess returns, and that its predictive power is at least comparable with, if not stronger than, that of traditional forecasting variables such as the default premium, the short-term Treasury bill rate, the dividend yield, and the term spread.

The rest is organized as follows. Section 2 uses the standard search and matching model to guide the subsequent empirical analysis, Section 3 describes our data sources and empirical specifications, Section 4 presents our empirical results, and Section 5 concludes.

2 The Model

We formulate the search and matching model following Yashiv (2000) and Merz and Yashiv (2007). The model is analogous to q-theory of Tobin (1969) and Cochrane (1991).

2.1 The Setup

The economy is populated by identical workers and identical firms. Time is discrete and horizon infinite. Labor is the only input in a constant-return-to-scale production function: the operating profits are given by $\pi(n_t, x_t) = f(x_t)n_t$, in which n_t is total employment and x_t is productivity shock. To attract new workers, a firm needs to post a number of job vacancies, ν_t. For each vacancy posted, the firm takes as given the probability μ_t at which the vacancy is filled. The firm's gross hires are given by $\mu_t\nu_t$. Workers are paid a gross compensation rate of w_t. Hiring costs include both the cost of advertising, screening, and selecting new workers, and the cost of training. These costs depend on the stock of employment, the number of vacancies, and the probability of filling the vacancy.

For simplicity, we assume that the hiring costs function is quadratic: $(a/2)(\mu_t\nu_t/n_t)^2 n_t$, in which $a > 0$. In particular, the hiring costs are increasing and convex in the number of new hires (the costs depend on μ_t and ν_t only through their product) and are decreasing in the stock of employment. These properties are desirable because training costs and costs of time spent on screening and selecting new workers increase with the number of new hires. Firms make hiring decisions at the beginning of each period t, and the new hires enter production in the beginning of period $t+1$. Separation of workers from jobs occurs at a constant rate of $0 \leq s \leq 1$, which firms take as exogenous. The stock of employment therefore evolves as follows:

$$n_{t+1} = (1 - s)n_t + \mu_t\nu_t \tag{1}$$

Firms choose the number of job vacancies to post each period to maximize the discounted present value of future free cash flows. When discounting, firms take as given the stochastic discount factor from period t to $t+j$, denoted m_{t+j}. The dynamic problem of the firms is:

$$\max_{\{\nu_{t+j}, n_{t+j+1}\}} E_t \sum_{j=0}^{\infty} m_{t+j} \left(\pi(n_{t+j}, x_{t+j}) - w_{t+j} n_{t+j} - \frac{a}{2} \left(\frac{\mu_{t+j} \nu_{t+j}}{n_{t+j}} \right)^2 n_{t+j} \right) \tag{2}$$

subject to equation (1). Let q_t denote the Lagrangian multiplier associated with the constraint in equation (1), and is the marginal benefit of an additional unit of employment.

The first-order conditions with respect to ν_t and n_{t+1} are given by, respectively,

$$q_t = a \left(\frac{\mu_t \nu_t}{n_t} \right) \tag{3}$$

$$q_t = E_t \left[m_{t+1} \left(f(x_{t+1}) - w_{t+1} + \frac{a}{2} \left(\frac{\mu_{t+1} \nu_{t+1}}{n_{t+1}} \right) + (1-s) q_{t+1} \right) \right] \tag{4}$$

Equation (3) says that the marginal benefit of hiring equals the marginal cost of hiring. Equation (4) says that the marginal benefit of hiring equals the next period marginal product of labor net of gross compensation plus the saving of hiring costs due to economy of scale and the continuation value of the employment stock net of separation, discounted to t using m_{t+1}.

Combining the two first-order conditions, using equation (1) to substitute out $\mu_t \nu_t$, and simplifying, we obtain $E_t[m_{t+1} r_{t+1}] = 1$, in which r_{t+1} is defined as:

$$r_{t+1} = \frac{f(x_{t+1}) - w_{t+1} + (a/2)(n_{t+2}/n_{t+1})^2 - (a/2)(1-s)^2}{a(n_{t+1}/n_t) - a(1-s)} \tag{5}$$

This equation says that r_{t+1} is the ratio of the marginal benefit of hiring at period $t+1$ divided by the marginal cost of hiring at period t. Cochrane (1991) shows that under constant returns to scale, this ratio equals the stock return, state by state and period by period.

2.2 Empirical Implications

When the left-hand side is equated to the stock market return, equation (5) provides the theoretical foundation for our empirical analysis. The empirical finance literature has documented a list of proxies that forecast market excess returns. Because the interest rate is essentially unpredictable, these predictors are proxies for the expected market return, $E_t[r_{t+1}]$. Equation

(5) implies that regressing short-horizon employment growth, n_{t+1}/n_t, on proxies for $E_t[r_{t+1}]$ should yield negative slopes, but regressing long-horizon employment growth, n_{t+2}/n_t, on these proxies should yield positive slopes. Specifically, the conditioning variables that predict future market excess returns with a positive sign (such as the log consumption-wealth ratio) should have significantly negative slopes in forecasting short-term employment growth, but significantly positive slopes in forecasting long-term employment growth. The conditioning variables that predict future stock returns with a negative sign (such as the relative Treasury bill rate) should have significantly positive slopes in forecasting short-term employment growth, but significantly negative slopes in forecasting long-term employment growth.

Equation (5) also has implications for the predictability of market excess returns. If employment growth is persistent, meaning that lagged employment growth, n_t/n_{t-1}, forecasts current employment growth, n_{t+1}/n_t, with a positive slope, then lagged employment growth also should forecast market excess return, r_{t+1}, with a negative slope. And this forecasting power should concentrate in short horizons: it is r_{t+1}, not, for example, r_{t+2}, that shows up in the left-hand side of equation (5). A careful reader may wonder why we use lagged employment growth, instead of just current employment growth, to predict returns. Strictly speaking, in the context of the model with one-period time-to-build (more accurately, time-to-fill), n_{t+1} is known at the beginning of period t. As such, n_{t+1}/n_t can be used, at least in principle, to predict r_{t+1} that goes from the beginning to the end of period t. However, in the data, both r_{t+1} and n_{t+1} are observable only at the end of period t, meaning that we should use lagged employment growth to avoid look-ahead bias in forecasting returns.

2.3 The Importance of Labor Market Frictions

Equation (5) highlights the importance of labor market frictions in driving the predictability of employment growth with risk premium proxies and the predictability of market excess returns with lagged employment growth. There are two types of frictions embedded in the model: hiring costs and one-period time-to-build. Without search and matching costs, $a = 0$, equation (5) collapses to $r_{t+1} = f(x_{t+1}) - w_{t+1}$. There is no connection between the labor and financial markets, and the stock market return is independent of aggregate employment growth across various horizons. Intuitively, in a frictionless world, employment is perfectly elastic to changes in the discount rate, meaning that a small change in the discount rate is associated with an infinite magnitude of change in employment. As such, regressing future returns on past employment growth yields a zero slope: returns are not predictable using past employment growth.[1]

The one-period time-to-build is embedded in equation (1): hiring at time t, $\mu_t \nu_t$, only leads to more productive workers at the beginning of $t+1$. The effect of this friction is intuitive. The length of the decision period (one month, one quarter, one year, or longer) is unspecified in the model. If the decision period is one year, then equation (5) says that regressing employment growth up to four quarters ahead on risk premiums should yield negative slopes, and that regressing employment growth at longer horizons on risk premiums should yield positive slopes. If the decision period is one quarter instead, then we should only see negative slopes from using the one-quarter ahead employment growth as the dependent variable. Employment growth at longer-than-one-quarter horizons should give us positive slopes. As such, the horizon at which the regression slopes switch signs empirically provides at least an informal sense about the length of the decision period.

This mechanism of time-to-build is subtly different from the investment (hiring) lag story discussed in Lamont (2000) and Lettau and Ludvigson (2002). Hiring lag is also called time-to-plan: there are lags between the decision to hire and the actual hiring expenditure. To clarify the issues, Figure 1 illustrates further the basic intuition by depicting the hypothetical responses of realized returns, stock prices, employment growth, and hiring to a one-time shock to the expected return. For the standard one-period time-to-build model (Panel A), a discount rate drop at the beginning of t generates higher stock prices and positive stock returns observed at the beginning of t. Without additional frictions, the level of hiring over period t rises immediately. With one-period time-to-build, employment stock, n_{t+1}, increases only at the beginning of $t+1$, meaning that employment growth over period t is positive. Further, because the discount rate at the beginning of t drops, the realized return over period

[1] Li and Zhang (2009) argue that without investment costs, investment is perfectly elastic to discount rate changes. With investment costs, investment is less elastic, and a given change in investment is associated with a larger change in the discount rate. Equivalently, investment is a more powerful predictor of future returns.

t, denoted r_{t+1}, declines on average. Stock prices also drop, along with the hiring over period $t+1$. Again, with the standard one-period time-to-build, employment stock decreases at the beginning of $t+2$, meaning that employment growth over period $t+1$ is negative. The bottomline is that regressing short-term employment growth, n_{t+1}/n_t, on the discount rate, $E_t[r_{t+1}]$, should yield negative slopes, but regressing long-term employment growth, n_{t+2}/n_{t+1}, should yield positive signs. However, regressing change in hiring rate, $(\mu_{t+1}\nu_{t+1} - \mu_t\nu_t)/n_t$, on the discount rate should only yield positive signs without sign flips at longer horizons.

Panel B of Figure 1 illustrates the effect of two-period time-to-build, which means that hiring commitment at the beginning of t, $\mu_t\nu_t$, only leads to more productive workers at the beginning of $t+2$. A discount rate drop at the beginning of t generates higher stock prices and positive stock returns observed at the beginning of t. Hiring goes up immediately, but with two-period time-to-build, employment stock at the beginning of $t+1$ remains unchanged. Because the discount rate at the beginning of t drops, the realized return over period t, denoted r_{t+1}, declines on average. Stock prices at the beginning of $t+1$ and hiring over period $t+1$ both fall. However, employment stock at the beginning of $t+2$ now increases as a result of hiring two periods ago. At period $t+2$, stock prices, stock returns, and hiring remain constant because we only analyze one-time shock to the discount rate at the beginning of t. However, employment stock at the beginning of $t+3$ now decreases as a result of firing at $t+1$. The bottomline is that regressing employment growth up to $t+2$, n_{t+2}/n_t, on the discount rate, $E_t[r_{t+1}]$, should yield negative slopes, but regressing long-term employment growth, n_{t+3}/n_{t+2}, should yield positive signs. As such, the effect of two-period time-to-build is to prolong the horizon over which the slopes switch signs by one more period. However, the dynamics of the change in hiring rate remains the same: regressing $(\mu_{t+1}\nu_{t+1} - \mu_t\nu_t)/n_t$ on the discount rate continues to yield only positive signs without sign flips at longer horizons.

Panel C of Figure 1 analyzes the effect of one-period time-to-build along with one-period time-to-plan as in Lettau and Ludvigson (2002). As in the previous two cases, a discount rate drop at the beginning of t generates higher stock prices and positive stock returns. With one-period time-to-plan, hiring only rises in the next period, while remaining unchanged in the current period. Accordingly, employment stock at the beginning of $t+1$ remains unchanged. Because the discount rate at the beginning of t drops, the realized return over period t, denoted r_{t+1}, declines on average. Stock prices at the beginning of $t+1$ drop and cause firms to commit to decreasing hiring over the next period. However, because of the hiring commitment made at period t, hiring rises in period $t+1$. With only one-period time-to-build, employment stock increases at the beginning of $t+2$. At period $t+2$, stock prices and returns are constant, hiring falls per the prior commitment, and employment stock falls at the beginning of $t+3$. Comparing Panels B and C shows that the dynamics of employment growth are the same. However, the hiring dynamics are different: regressing change in hiring rate, $(\mu_{t+1}\nu_{t+1} - \mu_t\nu_t)/n_t$, on the discount rate now yields negative slopes in short horizons but positive slopes in long horizons.

3 Data and Empirical Specifications

For stock market returns, we use the returns on the Standard and Poor (S&P) index of 500 stocks from the Center for Research in Security Prices (CRSP). The sample is quarterly from 1952 to 2007. Let r_t denote the log return of the S&P index and r_{ft} the log return on the one-month Treasury bill as a proxy for the risk-free rate. The log market excess return is $r_t - r_{ft}$.

We use two variables from Bureau of Economic Analysis to measure the state of aggregate employment. The first is the growth rate of payroll (seasonally adjusted total non-farm payrolls of all employees), and the second is the change in unemployment rate (seasonally adjusted civilian unemployment rate). The payroll growth is procyclical, and the change in unemployment rate is countercyclical (e.g., Stock and Watson (1999)). We also use the growth rate of average weekly hours (seasonally adjusted average weekly hours of total private industries from the Bureau of Economic Analysis). We briefly discuss the results using the (procyclical) growth rate of average weekly hours in the main text but delegate the detailed tables to the Internet Appendix to save space.

The empirical finance literature has documented a list of financial variables that forecast market excess returns. Campbell and Shiller (1988), Fama and French (1988), and Hodrick (1992) show that the dividend-to-price ratio predicts future excess returns. We measure the S&P dividend yield, denoted DP, as the natural logarithm of the sum of the past four quarters of dividends per share minus the natural logarithm of the S&P 500 index level. The source for the S&P index and its dividends is CRSP. Fama and Schwert (1977) and Fama (1981) find that the relative Treasury bill rate predicts returns. We measure the relative bill rate, denoted TB, as the three-month Treasury bill rate from the Federal Reserve Board minus its four-quarter moving average.

Keim and Stambaugh (1986) and Fama and French (1989) document the forecasting power of the term premium and the default premium. We measure the term premium, TRM, as the difference between the ten-year Treasury bond yield and three-month Treasury bill yield from the Federal Reserve Board. The default premium, denoted DEF, is the difference between the BAA-rated corporate bond yield and the AAA-rated corporate bond yield from the Federal Reserve Board. Lettau and Ludvigson (2001) show that the log consumption-to-wealth ratio, CAY, predicts excess market returns. We obtain the data of CAY from Sydney Ludvigson's Web site.

To quantify the incremental predictive content of these risk premium proxies for future aggregate employment, we use a group of macro control variables used in prior studies to forecast future macroeconomic performance (e.g., Barro (1990) and Lettau and Ludvigson (2002)). These macro controls are: lagged payroll growth, De; lagged change in unemployment rate, Du; lagged growth of average weekly hours, Dw; lagged corporate profit growth, Dprofit, measured as the growth of the after-tax corporate profit with inventory valuation and capital consumption adjustments, seasonally adjusted in current dollars, from the Bureau of Economic Analysis; lagged growth of gross domestic product, Dgdp, measured as the growth of gross domestic product (GDP), seasonally adjusted in chain-weighted 2000 dollars, from Bureau of Economic Analysis; and the growth of average Q, Dq.

We define a firm's average Q as the ratio of the market value of the firm's assets to its book value of total assets (Compustat annual item 6). The market value of the firm equals the market value of common equity (share price at the end of the fiscal year [item 199] times common shares outstanding [item 25]) plus the book value of preferred stock (in sequence of availability, items 10, 56, 130) plus the book value of total debt (the sum of total short-term debt [item 9] and total long-term debt [item 34]). We calculate the aggregate average Q as the aggregate market value of assets divided by the aggregate value of book assets (excluding financial firms). Because the average Q series is annual, we assign last year's Q to each quarter in the current year in predictive regressions with quarterly data.

Our empirical specifications are the standard long-horizon predictive regressions (e.g., Fama and French (1989) and Lettau and Ludvigson (2002)). To forecast market excess returns, the dependent variable is the H-quarter log excess return on the S&P 500 composite index, $\sum_{h=1}^{H} r_{t+h} - r_{ft+h}$, in which H is the forecast horizon ranging from one quarter to 16 quarters. To forecast labor market performance, the dependent variables are: the H-quarter growth of total non-farm payroll, $e_{t+H} - e_t$, in which e_t is the natural logarithm of total non-farm payroll in quarter t; the H-quarter change in civilian unemployment rate, $u_{t+H} - u_t$, in which u_t is the unemployment rate in quarter t; and the H-quarter growth of average weekly hours, $w_{t+H} - w_t$, in which w_t is the average weekly hours in private industries in quarter t.

For each regression, we report the slopes, the adjusted R^2, and two sets of t-statistics: t-statistics calculated from standard errors corrected for autocorrelations per Newey and West (1987) and t-statistics calculated from standard errors adjusted for the use of overlapping observations in long-horizon regressions per Hodrick (1992). Both sets of t-statistics test the null hypothesis that a given slope coefficient equals zero. Presenting both sets of t-statistics is important: Ang and Bekaert (2007) show that Newey-West t-statistics can overreject the null hypothesis of no predictability at long horizons, but that Hodrick t-statistics retain the correct size in small samples.

4 Empirical Results

Section 4.1 provides background on time-varying aggregate risk premiums by presenting up-to-date long-horizon forecasts of market excess returns with standard predictive variables from empirical finance. Sections 4.2 and 4.3 report our key empirical results that risk premium proxies provide substantial predictive power for long-horizon labor market performance. Finally, Section 4.4 shows that payroll growth and change in unemployment rate also forecast market excess returns.

4.1 Forecasting Market Excess Returns

Using an updated sample through 2007, Table 1 reports the long-horizon forecasts of S&P 500 index excess returns. Panel A shows that the dividend yield shows some ability to forecast excess returns. The adjusted R^2 increases monotonically from 1% in the one-quarter horizon to 5% in the four-quarter horizon and further to 12% in the 12-quarter horizons. The slopes are all positive with the Newey-West t-statistics above 1.6 in short horizons and above two in horizons longer than eight quarters. But these long-horizon t-statistics are likely clouded by overlapping observations: the Hodrick t-statistics decrease below 1.6 as the horizon goes beyond four quarters. Using the same empirical specifications but in a shorter sample that ends in 1999, Lettau and Ludvigson (2002) document weak evidence of predictability with the dividend yield: the maximal adjusted R^2 is only 3% and the Newey-West and Hodrick t-statistics are all below 1.5. The evidence suggests that the dividend yield's predictive power has substantially increased over the past ten years probably because market valuation ratios have mean-reverted from their exceedingly high levels in the late 1990s.

Consistent with Lettau and Ludvigson (2001, 2002), Panel B of Table 1 shows that the log consumption-to-wealth ratio, CAY, reliably predicts market excess returns. The adjusted R^2 starts at 6% at the quarterly horizon, rises to 16% at the four-quarter horizon, and increases further to 38% at the 16-quarter horizon. The slopes are universally positive and the Newey-West t-statistics are above four across all horizons. The Hodrick t-statistics start at 4.3 at the quarterly horizon, decreases to 3.6 at the four-quarter horizon, but still remains at 2.7 at the 16-quarter horizon.

From Panel C, the relative bill rate forecasts excess returns with a negative slope, but the explanatory power concentrates in short horizons within four quarters. The term spread forecasts excess returns with a positive slope, and the explanatory power seems to increase with horizon (Panel D). Newey-West t-statistics for the slopes are significant beyond the eight-quarter horizon, but the Hodrick t-statistics are only marginally significant. As in the sample through 1999 used by Lettau and Ludvigson (2002), the default spread does not show any univariate forecasting power for excess returns in our sample (Panel E). Panel F forecasts excess returns using all five regressors. CAY is the only predictor that shows consistent and reliable forecasting power across all horizons. The dividend yield and the term spread show marginal forecasting power at long horizons, but the two sets of t-statistics give inconsistent inferences. The relative bill rate loses its forecasting power at short horizons, and the default spread remains ineffective. In all, the evidence suggests that long-horizon excess returns are predictable and that CAY is the most robust risk premium proxy.

4.2 Do Risk Premium Proxies Forecast Aggregate Employment?

To preview the results, we find that time-varying aggregate risk premiums are negatively correlated with short-horizon employment growth but positively correlated with long-horizon employment growth, as predicted by the search model in Section 2.

Payroll Growth

Table 2 reports the long-horizon regressions of the quarterly growth rate of total non-farm payrolls on the predictive variables for excess returns from Table 1. Panel A shows that the dividend yield forecasts short-horizon payroll growth with a negative slope and long-horizon payroll growth with a positive slope. Although the sign pattern of the predictive relation is consistent with theory, the predictability evidence is weak: the slopes across different horizons are all within 1.6 standard errors from zero. Panel B shows that the results using CAY as a risk premium proxy are stronger than those using the dividend yield. High values of CAY predict low payroll growth at short horizons but high payroll growth at long horizons. The Hodrick t-statistics start at 1.7 at the eight-quarter horizon and increase to 2.1 and 2.3 at the 12- and 16-quarter horizons, respectively. The adjusted R^2 increases from 2% at the eight-quarter horizon to 5% at the 16-quarter horizon. CAY also shows marginally significant predictive power of payroll growth in the one-quarter horizon: the negative slope has a Newey-West t-statistic of -1.6 and a Hodrick t-statistic of -1.9.

From Panel C, the results from the relative bill rate also conform to the search model's predictions. High values of the relative bill rate predict low risk premiums (see Table 1), and therefore high payroll growth at short horizons and low payroll growth at long horizons. The significance of the sign pattern is even stronger than that from using CAY: the Hodrick t-statistics of the relative rate's slope start at 3.4 at the one-quarter horizon, decrease to 2.6 at the two-quarter horizon and further to 0.5 at the four-quarter horizon, before turning significantly negative with magnitude all above three from the eight-quarter horizon and onwards.

Consistent with Lettau and Ludvigson's (2002) results that the term spread has strong forecasting power for investment growth (replicated with the updated sample through 2007 in the Internet Appendix), the term spread also has strong forecasting power for payroll growth. However, the slopes are positive and mostly significant across all horizons: the sign pattern does not conform to the search model. Following Lettau and Ludvigson, we interpret the evidence as indicating the term spread's strong forecasting power for output growth (e.g., Stock and Watson (1989) and Chen (1991)). It is likely that the effect of the term spread works primarily through the cash flow channel, as opposed to the risk premium channel that we focus on. Consistent with this interpretation, the term spread is indeed a weaker risk premium proxy than CAY across all horizons (see Table 1).

From Panel E of Table 2, the default spread predicts payroll growth with significantly negative slopes at short horizons but with insignificantly positive slopes at long horizons. Although the sign pattern is consistent with the search model, the strength of the predictability at long horizons is negligible. However, this evidence might suggest that the default spread is a weak risk premium proxy at long horizons, as shown in Table 1. Panel F reports long-horizon multiple regressions of payroll growth with all the risk premium proxies. All the proxies show marginal predictive power for payroll growth at some horizons. With all five proxies included, the empirical specification has reliable predictive power for payroll growth at every horizon, with the adjusted R^2 varying from 13% to 23%.

In all, we document that risk premiums are negatively correlated with payroll growth at short horizons but positively correlated with payroll growth at long horizons. As such, risk premium proxies such as CAY and the relative bill rate also forecast long-horizon payroll growth. The sign patterns of the predictive relations using the dividend yield and the default spread go in the right direction, but their long-horizon predictive power is insignificant. The term spread has strong forecasting power for payroll growth, but this ability likely derives from its forecasting power for output growth, as opposed to time-varying risk premiums.

We also have documented long-horizon regressions of the growth rate of average weekly hours on risk premium proxies (see the Internet Appendix). This variable has been used in the literature to as an indicator of labor market performance (e.g., Stock and Watson (1999)). Without showing the details, we can report that CAY, the term spread, and to a lesser extent, the default spread all predict the weekly hours growth with significantly positive slopes, especially at long horizons. The relative bill rate predicts the weekly hours growth with significantly negative slopes across all horizons. More important, there is no dynamic sign pattern as in the case of predicting payroll growth. The evidence suggests that adjusting average weekly hours is a smooth process without any lags, whereas adjusting total non-farm payrolls is a more sluggish process. Adjusting payrolls means hiring and firing workers, a process involving search and matching that are time-consuming and costly (e.g., Mortensen (1982) and Pissarides (1985)). In contrast, adjusting weekly hours means changing the utilization rate of existing workers, a process that is likely to be relatively smooth.

Change in Unemployment Rate

Table 3 reports the long-horizon regressions of change in unemployment rate on risk premium proxies. Because the dependent variable is countercyclical, the null hypothesis from the search and matching model is that time-varying risk premiums should predict change in unemployment rate with a positive sign at short horizons but a negative sign at long horizons. From Panel A, although the dividend yield produces the right sign pattern, the predictability evidence is weak: all the slopes are within 1.5 standard errors from zero. Indeed, the negative slopes at long horizons have magnitudes close to zero. And the adjusted R^2 is tiny across all horizons.

Panel B shows that CAY produces a sign pattern of slopes consistent with theory: high values of CAY predict positive changes in unemployment rate at the one-quarter horizon, but negative changes in unemployment rate thereafter. In particular, the slope's Hodrick t-statistics rise (in magnitude) from -1.3 at the four-quarter horizon to -2.2 in the eight-quarter horizon and further to around -2.5 at the 12- and 16-quarter horizons. The pattern of the Newey-West t-statistics is largely similar. CAY's predictive power concentrates mostly at long horizons: the adjusted R^2 increases monotonically from zero at the four-quarter horizon to 6% at the eight-quarter horizon, to 12% at the 12-quarter horizon, and further to 17% at the 16-quarter horizon.

Panel C of Table 3 shows that the sign pattern of the relative bill rate is again consistent with the search model. Because the relative bill rate is procyclical, high values of the relative rate should predict negative changes in the unemployment rate at short horizons but positive changes at long horizons. The predictive power of this risk premium proxy again concentrates at long horizons: the adjusted R^2 is close to zero at the horizons up to four quarters but varies from 15% to 18% at horizons longer than eight quarters. The Hodrick t-statistics for the slope increase from 1.8 at the four-quarter horizon to 3.9 at the eight-quarter horizon and further to 4.1 at the 16-quarter horizon. However, the slope at the one-quarter horizon, although negative, is close to zero.

Consistent with the results of forecasting payroll growth (see Table 2), Panel D of Table 3 shows that the term spread has strong predictive power for long-horizon changes in unemployment rate. The adjusted R^2 starts at 8% at the one-quarter horizon, increases to 27% at the four-quarter horizon, peaks at 44% at the eight-quarter horizon, before dropping to 38% at the 12-quarter horizon and 29% at the 16-quarter horizon. The slopes are negative and significant across all horizons: the Newey-West t-statistics vary from -3.14 to -7.48 and the Hodrick t-statistics vary from -2.99 to -4.71. As such, high values of the term spread strongly signal declines in the unemployment rate, and low values of the term spread strongly signal increases in the unemployment rate across all horizons. However, the sign pattern does not conform to the search model.

Our evidence on forecasting payroll growth and change in unemployment rate with the term spread adds to the large body of evidence on the predictive power of the term spread for real economic activity. Harvey (1988) documents the predictive relation of the term spread with consumption growth. Laurent (1988), Stock and Watson (1989), and Chen (1991) show that the term spread forecasts output growth. Estrella and Hardouvelis (1991) report that the term spread predicts the growth of gross national product, consumption (nondurables plus services), consumption durables, investment, and recession probabilities. As noted, Lettau and Ludvigson (2002) show that the term spread has strong forecasting power for investment growth. Our evidence lends support to the view that the term spread is strongly affected by inflationary expectations and monetary policy and that the predictive power of the term spread for economic growth depends on the degree to which the Federal Reserve reacts to deviations in output from its long-term trend (e.g., Estrella (2005)). The term spread tends to rise when the Federal Reserve cuts the short-term interest rate to stimulate the economy, and a boom in economic activity and inflation typically follows such a policy move with a lag. And the term spread tends to fall when the Federal Reserve raises the short-term interest rate to curb the inflation, and a slowdown in economic activity and inflation typically follows with a lag.

From Panel E of Table 3, the sign pattern of the predictive relation between the default premium and change in unemployment rate is consistent with the search model. The default spread has positive slopes at short horizons within four quarters and negative slopes at long horizons above eight quarters. The slopes are mostly insignificant, however. The adjusted R^2 pattern shows that the forecasting power again concentrates at long horizons: the adjusted R^2 is 2% at the one-quarter horizon, but is 6% at the 12-quarter horizon and 11% at the 16-quarter horizon. Panel F reports the long-horizon forecasts of changes in unemployment rate using all five predictive variables. The sign pattern of the dividend yield reverses, but the slopes are mostly within one standard error from zero. CAY, the relative bill rate, and the default spread continue to produce the right sign pattern. In particular, high values of CAY forecast significant increases in unemployment rate at short horizons within two quarters but significant declines in unemployment rate at the 16-quarter horizon. Finally, high values of the term spread continue to forecast strong declines in unemployment rate across all horizons. With all the predictive variables included, the regression specification shows strong forecasting power: the adjusted R^2 increases monotonically from 19% in the one-quarter horizon to 30% in the four-quarter horizon and further to 43% at horizons longer than eight quarters.

4.3 Do Risk Premium Proxies Forecast Aggregate Employment Relative to Macro Controls?

We have shown so far that long-horizon payroll growth and change in unemployment rate are predictable by a standard set of risk premium proxies. Because the labor market is an important component of the macroeconomy, future payroll growth and change in unemployment rate also are likely to be connected with past macroeconomic performance. We ask whether the risk premium proxies contain any information about future labor market performance beyond that contained in a set of macro control variables. As noted, we follow Lettau and Ludvigson (2002) and include as macro controls lagged payroll growth, lagged change in unemployment rate, lagged corporate profit growth, lagged growth rate of average Q, and lagged GDP growth.

Table 4 reports the forecasts of payroll growth with macro controls. In univariate regressions, the lagged values of payroll growth, corporate profit growth, and GDP growth all predict future payroll growth with a positive sign. Unlike risk premium proxies, their predictive power mostly concentrates at short horizons with the adjusted R^2 all peaking at the one-quarter horizon. The adjusted R^2 starts at 47% at the one-quarter horizon for lagged payroll growth, declines to 16% at the four-quarter horizon, and further to 2% at the eight-quarter horizon. The adjusted R^2 of lagged corporate profit growth starts at 24% at the one-quarter horizon, declines to 17% at the four-quarter horizon, and further to 5% and 2% at the 12- and 16-quarter horizons, respectively. The slope of the lagged corporate profit growth remains significant at long horizons, however. In contrast, lagged growth of average Q does not appear to predict future payroll growth. The adjusted R^2 is below 3% across all horizons, and the slopes are all within 1.6 standard errors from zero. Moreover, the slope is positive at the one-quarter horizon before turning negative at subsequent horizons. The dynamic sign pattern suggests that the growth of average Q is likely a (weak) risk premium proxy. This interpretation seems reasonable because the aggregate book-to-market ratio predicts market excess returns (e.g., Kothari and Shanken (1997)).

When all four controls are included into the specification, lagged payroll growth retains its predictive content within four quarters. Lagged GDP growth remains significant across all horizons up to and including the 12-quarter horizon. Lagged corporate profit growth loses its predictive power: most of the slopes are insignificantly negative. Lagged average Q growth has significantly negative slopes at most horizons. The adjusted R^2 pattern again suggests that the predictive power of the macro controls concentrates mostly at short horizons.

Table 5 reports the forecasts of changes in unemployment rate with macro controls. The dependent variable seems persistent at short horizons: the lagged value has significantly positive slopes and the adjusted R^2 varies from 9% to 21% at horizons within four quarters. In univariate regressions, high values of lagged corporate profit growth and lagged GDP growth forecast declines in unemployment rate. The slopes of the lagged corporate profit growth remain significant across all horizons up to 16 quarters, and the slopes of the lagged GDP growth remain significant up to eight quarters. The forecasting power of both predictors again concentrates at short horizons within four quarters: the adjusted R^2 declines rapidly beyond the four-quarter horizon. High values of lagged average Q growth predict increases in unemployment rate at long horizons, although the slopes are only marginally significant. The adjusted R^2 rises from -1% to 9% as the horizon extends from one quarter to 16 quarters. When we include all four macro controls in the specification, high values of lagged change in unemployment rate forecast significant declines of unemployment rate at long horizons. Lagged corporate profit growth loses its forecasting power. High values of lagged GDP growth and low values of average Q growth predict significant declines in unemployment rate across all horizons. The shape of the adjusted R^2 pattern is more uniform: it starts at 28% at the one-quarter horizon, peaks at 35% at the four-quarter horizon, and declines only to 27% at the 12-quarter horizon and further to 18% at the 16-quarter horizon.

With this background, we can examine to what extent the risk premium proxies contain information about future payroll growth and change in unemployment rate, information that is not already captured by macro controls. Table 6 assesses the marginal predictive power for payroll growth, and Table 7 assesses that for change in unemployment rate, of each risk premium proxy relative to the four macro controls. The first five panels in each of the tables report the forecasts over various horizons, adding the dividend yield, CAY, the relative bill rate, the term spread, and the default spread, one at a time, to the set of four macro controls.

The last panel in each table reports the forecasts using all nine regressors including the five risk premium proxies and the four macro controls.

Table 6 shows that when added one at a time into the payroll growth regression with the macro controls, the dividend yield and CAY both reproduce their dynamic sign pattern consistent with the search and matching model. However, the slopes of the dividend yield are within 1.3 standard errors from zero at long horizons, albeit still positive, and CAY's slopes are only marginally significant (about 1.9 standard errors from zero) at the 16-quarter horizon. The slopes of the default spread are all within 0.7 standard errors from zero, although demonstrating the right sign pattern. The relative bill rate retains its strong forecasting power at long horizons with t-statistics above three from eight quarters and onwards. However, in the presence of strong macro predictors at short horizons, the slopes of the relative bill rate do not turn positive at short horizons. The term spread remains a strong predictor at most horizons even with the macro controls included.

From the last panel of Table 6, when we include all five risk premium proxies into the empirical specification with four macro controls, the regression explains a much larger fraction of the variation in future payroll growth at long horizons than what can be explained by macro controls only. Using the macro controls alone, Table 4 shows that the regression explains only 15% and 6% of the payroll growth variation at the eight-quarter and the 16-quarter horizons, respectively. Adding risk premium proxies increases the respective fractions explained to 32% and 21%. In particular, adding risk premium proxies increases the predictive power of the specification at long horizons. Turning to the slopes, we observe that the dividend yield and CAY have marginal predictive power, and the relative bill rate has significant predictive power at long horizons. Lagged payroll growth has reliable predictive power at short horizons, and the GDP growth has significant predictive power across horizons from two to 12 quarters.

Table 7 performs similar analysis as in Table 6 but using change in unemployment rate as the dependent variable. When we add one at a time into the specification with only the macro controls, CAY and the default spread reproduce the dynamic sign pattern that is consistent with the search model. However, only CAY retains marginally significant slopes at the 12-quarter horizon and beyond. And the long-horizon slopes of the default spread are all within 1.6 standard errors from zero. The dividend yield has significantly positive slopes at long horizons, inconsistent with the search model. But this evidence is probably due to multicollearity: the long-horizon slopes of the lagged change in unemployment rate are significantly negative (these slopes are insignificant and tiny in univariate regressions, see Table 5). The relative bill rate has strong predictive power at the four-quarter horizon and onwards, but in the presence of strong macro controls at short horizons, especially the lagged growth of GDP, the slopes of the relative bill rate do not turn negative at short horizons. The term spread again retains strong predictive power even with the macro controls included.

More important, as in payroll growth regressions, the last panel of Table 7 shows that including the risk premium proxies into the macro-control specification substantially increases the fraction of the variation in future change in unemployment rate at long horizons. The macro-control specification explains 29%, 27%, and 18% of the variation of change in unemployment rate at the eight-, 12-, and 16-quarter horizons (see Table 5), and adding risk premium proxies increases the adjusted R^2s to 54%, 54%, and 53%, respectively. High values of CAY forecast significant increases in unemployment rate within the first two quarters and significant decreases in unemployment rate beyond 12 quarters. The slopes of the default spread also show the right sign pattern, but the slopes are less significant than those of CAY. The term spread retains strong predictive power across most horizons, whereas the dividend yield and the relative bill rate are largely insignificant.

In all, we document that risk premium proxies add forecasting ability of labor market performance primarily at long horizons, whereas standard macro controls have predictive power mostly as short horizons. Even with the presence of strong macro controls, CAY shows the dynamic sign pattern as predicted by the search model. We also observe the right sign pattern in some specifications with other risk premium proxies, but CAY is the most consistent proxy.

4.4 Do Labor Market Variables Forecast Stock Market Excess Returns?

The time series predictability literature has largely overlooked labor market variables as predictors of stock market returns. We fill this gap. The empirical specifications are similar to those in Table 1. The dependent variables are future log excess returns on the S&P 500 index across various horizons. However, the regressors are one-quarter lagged payroll growth or one-quarter lagged change in unemployment rate in univariate regressions, along with the lagged values of the dividend yield, CAY, the relative bill rate, the term spread, and the default spread in multiple regressions.

From Panel A of Table 8, payroll growth is a strong negative predictor of market excess returns across all horizons. The adjusted R^2 is hump-shaped: it starts at 2% at the one-quarter horizon, peaks at 9% at the four-quarter horizon, and declines to 3% at the 16-quarter horizon. The slopes are all negative, significant for horizons up to eight quarters, and marginally significant at longer horizons. High payroll growth forecasts low market excess returns on average and low payroll growth forecasts high market excess returns on average from one to 16 quarters ahead, consistent with the view that the aggregate risk premium is countercyclical.

It is informative to compare the univariate regressions with payroll growth to those with standard predictors from empirical finance in Table 1. Judged on the t-statistics and adjusted R^2 across various horizons, the predictive power of payroll growth clearly dominates that of the default spread. The adjusted R^2 of the default spread is zero across all horizons, and its slopes are all within 0.7 standard errors from zero. Payroll growth also seems to dominate the relative bill rate in forecasting excess returns. The adjusted R^2 of the relative bill rate also peaks at the four-quarter horizon, but at 5%, which is lower than the maximum of 9% for the payroll growth. The slopes of the relative bill rate are mostly significant within four quarters, but are all within 1.5 standard errors from zero thereafter. In contrast, most t-statistics for the payroll growth slopes are above two from the eight-quarter horizon and onwards.

The return predictive power of payroll growth is distinct from those of the dividend yield and the term spread. Whereas the forecasting power of payroll growth concentrates in relatively short business cycle frequencies within four quarters, the dividend yield and the term spread achieve their predictive power at long horizons, as evidenced by their respective maximum adjusted R^2 of 14% and 11% at the 16-quarter horizon. Whereas the slopes of payroll growth are all significant at the 5% level within four quarters, none of the slopes of the dividend yield and the term spread are significant at these short horizons. Only CAY dominates payroll growth in predicting market excess returns.

Panel B of Table 8 includes the standard predictors along with payroll growth in forecasting long-horizon excess returns. Payroll growth retains significant predictive power from four to 12 quarters ahead and marginal predictive power at the 16-quarter horizon. In particular, judged from the t-statistics, payroll growth seems to dominate the dividend yield, the relative bill rate, and the term spread in predicting returns. The default spread even has all negative slopes in the multiple regressions. Again, only CAY dominates payroll growth.

Panel C shows that change in unemployment rate forecasts excess returns with a positive sign. The slopes are positive across all horizons, significant at the two- and four-quarter horizons, and marginally significant at the eight-quarter horizon. The adjusted R^2 peaks at 5% at the four-quarter horizon. The forecasting power of change in unemployment rate is similar in nature with, but is quantitatively weaker than, that of payroll growth. Indeed, as shown by Panel D, once we include the standard risk premium proxies into the specification, the slopes of the change in unemployment rate become universally negative, albeit insignificant.

The last two panels of Table 8 report long-horizon forecasts of market excess returns using investment growth (the growth of fixed, nonresidential investment from the Bureau of Economic Analysis). As noted, investment as a predictor of returns has received much attention in the asset pricing literature (e.g., Cochrane (1991) and Chen and Zhang (2009)). In contrast, payroll growth has been largely ignored. It is interesting to compare the predictive power of payroll growth with that of investment growth. The evidence clearly is in favor of payroll growth. Panel E shows that investment growth forecasts market excess returns with a negative sign at short horizons. The t-statistics are slightly above two within two quarters and are slightly below 1.8 at four quarters ahead. From the eighth quarter and onwards, the slopes are all within 1.5 standard errors from zero, albeit still negative. The adjusted R^2 is low, only 2% even at short horizons. Panel F shows further that once we include the standard return predictors in the specifications, the slopes are within 1.5 standard errors from zero across all horizons. Relative to the long-horizon forecasts reported in Panels A and B, investment growth is clearly dominated by payroll growth in forecasting excess returns. The predictive power of investment growth is largely comparable to that of change in unemployment rate: the adjusted R^2 is slightly higher for change in unemployment rate, but investment growth retains its negative sign in slopes going from univariate to multiple regressions.

5 Conclusion

We document intriguing evidence that the stock market and the labor market are interconnected. High values of aggregate risk premiums forecast low short-horizon payroll growth but high long-horizon payroll growth. High value of risk premiums also forecast increases in short-horizon unemployment rate but decreases in long-horizon unemployment rate. Lagged payroll growth is a strong negative predictor for market excess returns at business cycle frequencies. This predictive power is even stronger than that of several standard conditioning variables such as the default spread and the relative Treasury bill rate. Change in unemployment rate positively predicts market excess returns, but its forecasting power is somewhat weaker than that of payroll growth.

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Table 1 : Forecasting Stock Market Excess Returns

This table reports results from long-horizon regressions of log excess returns on the S&P 500 index, $\sum_{h=1}^{H} r_{t+h} - r_{ft+h}$, in which H is the return forecast horizon in quarters. The regressors are one-period lagged values of the consumption-wealth ratio, CAY, log dividend yield, DP, the detrended short-term Treasury bill rate, TB, the term premium, TRM, the default premium, DEF, and their combination. For each regressor in a given regression model, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	DP	slope	0.02	0.05	0.09	0.17	0.23	0.27
		t_{NW}	1.61	1.75	1.88	2.06	2.22	2.48
		t_{HD}	1.59	1.61	1.60	1.53	1.38	1.21
		adj-R^2	0.01	0.02	0.05	0.10	0.12	0.14
B	CAY	slope	1.48	2.77	5.09	8.91	11.82	13.60
		t_{NW}	4.42	4.28	4.13	5.07	5.11	5.72
		t_{HD}	4.26	3.97	3.60	3.15	2.87	2.67
		adj-R^2	0.06	0.10	0.16	0.27	0.35	0.38
C	TB	slope	−0.02	−0.03	−0.04	−0.03	−0.03	−0.03
		t_{NW}	−2.47	−2.44	−1.94	−1.50	−1.24	−0.98
		t_{HD}	−2.30	−2.50	−2.37	−1.20	−0.80	−0.85
		adj-R^2	0.02	0.04	0.05	0.01	0.00	0.00
D	TRM	slope	0.01	0.02	0.03	0.04	0.05	0.08
		t_{NW}	1.81	1.72	1.90	2.29	3.22	3.53
		t_{HD}	1.83	1.72	1.65	1.28	1.44	1.77
		adj-R^2	0.02	0.02	0.04	0.04	0.06	0.11
E	DEF	slope	0.01	0.02	0.01	−0.02	−0.03	−0.01
		t_{NW}	0.63	0.61	0.34	−0.45	−0.50	−0.12
		t_{HD}	0.70	0.64	0.30	−0.27	−0.29	−0.07
		adj-R^2	0.00	0.00	0.00	0.00	0.00	0.00
F	DP	slope	0.01	0.04	0.08	0.15	0.17	0.19
		t_{NW}	0.91	1.15	1.42	1.60	1.79	2.02
		t_{HD}	0.90	1.09	1.26	1.15	0.87	0.76
	CAY	slope	1.23	2.23	3.98	7.29	9.91	11.08
		t_{NW}	3.00	3.19	3.27	3.72	3.84	4.02
		t_{HD}	2.87	2.86	2.78	2.61	2.46	2.24
	TB	slope	−0.01	−0.02	−0.03	−0.02	0.00	0.02
		t_{NW}	−1.65	−1.84	−1.69	−0.74	0.12	0.73
		t_{HD}	−1.50	−1.61	−1.64	−0.67	0.09	0.55
	TRM	slope	0.00	0.00	0.01	0.02	0.03	0.06
		t_{NW}	0.04	0.07	0.43	0.65	1.34	2.10
		t_{HD}	0.04	0.06	0.32	0.49	0.78	1.12
	DEF	slope	−0.00	−0.01	−0.04	−0.09	−0.08	−0.06
		t_{NW}	−0.19	−0.39	−0.85	−1.50	−1.31	−0.76
		t_{HD}	−0.19	−0.36	−0.71	−0.85	−0.62	−0.38
		adj-R^2	0.06	0.11	0.21	0.32	0.43	0.49

Table 2 : Forecasting Payroll Growth with Risk Premium Proxies

This table reports long-horizon regressions of payroll growth. The dependent variable is the H-quarter growth of seasonally adjusted total non-farm payrolls of all employees, $e_{t+H} - e_t$, in which e_t is the logarithm of total payrolls in period t. The regressors are one-period lagged values of the consumption-wealth ratio, CAY, log dividend yield, DP, the detrended short-term Treasury bill rate, TB, the term premium, TRM, the default premium, DEF, and their combination. For each regressor in a given regression model, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	DP	slope	−0.00	−0.00	−0.00	0.01	0.02	0.02
		t_{NW}	−0.91	−0.68	−0.10	0.90	1.22	1.32
		t_{HD}	−1.24	−1.05	−0.16	1.26	1.60	1.60
		adj-R^2	0.00	0.00	0.00	0.01	0.03	0.05
B	CAY	slope	−0.05	−0.07	0.03	0.33	0.56	0.73
		t_{NW}	−1.58	−0.95	0.22	1.11	1.63	1.91
		t_{HD}	−1.94	−1.37	0.37	1.70	2.05	2.31
		adj-R^2	0.01	0.00	0.00	0.02	0.04	0.05
C	TB	slope	0.00	0.00	0.00	−0.01	−0.01	−0.01
		t_{NW}	2.52	1.69	0.35	−2.19	−2.51	−1.97
		t_{HD}	3.40	2.57	0.51	−3.19	−3.72	−3.26
		adj-R^2	0.07	0.02	0.00	0.03	0.04	0.02
D	TRM	slope	0.00	0.00	0.00	0.01	0.01	0.01
		t_{NW}	1.22	1.98	2.87	3.62	3.08	2.14
		t_{HD}	1.39	2.54	3.70	4.38	3.99	3.04
		adj-R^2	0.00	0.03	0.08	0.15	0.12	0.06
E	DEF	slope	−0.00	−0.01	−0.01	−0.00	0.00	0.01
		t_{NW}	−3.02	−2.13	−1.12	−0.26	0.23	0.47
		t_{HD}	−3.10	−2.61	−1.58	−0.37	0.31	0.58
		adj-R^2	0.06	0.04	0.01	0.00	0.00	0.00
F	DP	slope	0.00	0.00	0.01	0.02	0.03	0.03
		t_{NW}	0.43	0.45	0.83	1.82	1.91	1.53
		t_{HD}	0.55	0.67	1.39	2.34	2.09	1.60
	CAY	slope	−0.11	−0.20	−0.25	−0.20	0.01	0.30
		t_{NW}	−3.17	−2.73	−1.56	−0.65	0.04	0.82
		t_{HD}	−3.07	−3.06	−2.29	−0.95	0.04	0.89
	TB	slope	0.00	0.00	0.01	−0.00	−0.00	−0.00
		t_{NW}	3.89	3.32	2.55	−0.11	−0.66	−0.64
		t_{HD}	4.42	4.12	3.02	−0.18	−1.28	−1.17
	TRM	slope	0.00	0.01	0.01	0.01	0.01	0.01
		t_{NW}	5.24	5.23	5.10	4.39	2.72	1.68
		t_{HD}	5.01	5.39	5.34	5.09	3.97	2.62
	DEF	slope	−0.00	−0.01	−0.01	−0.02	−0.02	−0.01
		t_{NW}	−2.58	−2.13	−1.83	−1.84	−1.13	−0.53
		t_{HD}	−2.74	−2.69	−2.56	−2.07	−1.19	−0.56
		adj-R^2	0.23	0.20	0.17	0.21	0.18	0.13

Table 3 : Forecasting Change in Unemployment Rate with Risk Premium Proxies

This table reports results from long-horizon regressions of change in unemployment rate on lagged variables. The dependent variable is the H-quarter change in seasonally adjusted civilian unemployment rate, $u_{t+H} - u_t$, in which u_t is the unemployment rate in quarter t. The regressors are one-period lagged values of the consumption-wealth ratio, CAY, log dividend yield, DP, the detrended short-term Treasury bill rate, TB, the term premium, TRM, the default premium, DEF, and their combination. For each regressor in a given regression model, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	DP	slope	0.11	0.19	0.21	0.01	−0.12	−0.21
		t_{NW}	1.20	0.99	0.60	0.03	−0.16	−0.26
		t_{HD}	1.46	1.28	0.75	0.03	−0.16	−0.21
		adj-R^2	0.01	0.01	0.00	−0.01	−0.01	0.00
B	CAY	slope	0.96	−0.20	−7.01	−27.78	−45.91	−55.87
		t_{NW}	0.50	−0.05	−0.87	−1.77	−3.01	−4.30
		t_{HD}	0.60	−0.07	−1.29	−2.19	−2.46	−2.42
		adj-R^2	0.00	−0.01	0.00	0.06	0.13	0.17
C	TB	slope	−0.00	0.03	0.20	0.71	0.83	0.81
		t_{NW}	−0.07	0.47	2.03	3.83	3.40	3.07
		t_{HD}	−0.08	0.46	1.82	3.91	4.19	4.13
		adj-R^2	−0.01	0.00	0.03	0.17	0.18	0.15
D	TRM	slope	−0.08	−0.18	−0.41	−0.78	−0.85	−0.78
		t_{NW}	−3.14	−4.02	−5.09	−7.48	−6.38	−5.16
		t_{HD}	−2.99	−3.55	−4.18	−4.71	−4.66	−3.92
		adj-R^2	0.08	0.15	0.27	0.44	0.38	0.29
E	DEF	slope	0.12	0.15	0.02	−0.49	−1.07	−1.42
		t_{NW}	1.60	0.89	0.05	−0.77	−1.70	−2.35
		t_{HD}	1.60	1.02	0.07	−0.88	−1.42	−1.63
		adj-R^2	0.02	0.01	−0.01	0.01	0.06	0.11
F	DP	slope	−0.05	−0.05	−0.11	−0.20	0.36	0.85
		t_{NW}	−0.60	−0.29	−0.32	−0.42	0.63	1.24
		t_{HD}	−0.62	−0.34	−0.37	−0.38	0.46	0.83
	CAY	slope	5.91	9.07	10.54	−1.70	−28.81	−49.89
		t_{NW}	2.89	2.69	1.60	−0.12	−1.77	−3.25
		t_{HD}	2.57	2.38	1.66	−0.13	−1.45	−2.00
	TB	slope	−0.09	−0.14	−0.17	0.16	0.19	0.18
		t_{NW}	−1.63	−1.77	−1.43	0.76	0.70	0.70
		t_{HD}	−1.69	−1.82	−1.37	1.24	1.33	1.06
	TRM	slope	−0.15	−0.30	−0.55	−0.73	−0.60	−0.39
		t_{NW}	−4.80	−5.19	−5.96	−5.76	−3.15	−2.16
		t_{HD}	−4.54	−4.73	−4.70	−4.63	−3.37	−1.93
	DEF	slope	0.21	0.31	0.38	0.24	−0.69	−1.45
		t_{NW}	2.38	1.78	1.08	0.49	−1.06	−1.92
		t_{HD}	2.16	1.80	1.13	0.40	−0.79	−1.45
		adj-R^2	0.19	0.24	0.30	0.43	0.43	0.43

Table 4 : Forecasting Payroll Growth with Macro Controls

This table reports results from long-horizon predictive regressions of payroll growth. The dependent variable is the H-quarter growth of seasonally adjusted total non-farm payrolls of all employees, $e_{t+H} - e_t$, in which e_t is the logarithm of total payrolls in period t. The regressors are one-period lagged values of payroll growth, De, profit growth, Dprofit, growth of average Q, Dq, and growth of GDP, Dgdp. For each regressor in a given regression, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	De	slope	0.68	1.09	1.30	0.80	0.54	0.59
		t_{NW}	9.45	7.12	4.10	1.62	0.92	0.88
		t_{HD}	6.20	6.24	5.08	2.44	1.55	1.69
		adj-R^2	0.47	0.35	0.16	0.02	0.00	0.00
B	Dprofit	slope	0.04	0.07	0.11	0.12	0.13	0.12
		t_{NW}	4.11	4.65	4.51	3.29	2.95	2.44
		t_{HD}	3.73	4.69	5.20	5.37	5.63	5.35
		adj-R^2	0.12	0.12	0.08	0.05	0.04	0.02
C	Dq	slope	0.00	−0.00	−0.01	−0.02	−0.03	−0.02
		t_{NW}	0.43	−0.08	−0.57	−1.08	−1.01	−0.73
		t_{HD}	0.56	−0.11	−0.86	−1.53	−1.46	−1.07
		adj-R^2	0.00	0.00	0.00	0.02	0.03	0.02
D	Dgdp	slope	0.24	0.44	0.65	0.69	0.65	0.50
		t_{NW}	6.06	6.41	5.29	3.52	2.06	1.33
		t_{HD}	5.18	5.49	4.71	3.59	2.65	1.70
		adj-R^2	0.24	0.24	0.17	0.08	0.05	0.02
E	De	slope	0.58	0.83	0.75	−0.11	−0.46	−0.15
		t_{NW}	7.48	4.78	2.06	−0.21	−0.71	−0.18
		t_{HD}	5.13	4.73	2.59	−0.26	−0.94	−0.28
	Dprofit	slope	−0.00	−0.00	−0.01	−0.01	−0.00	0.02
		t_{NW}	−0.39	−0.25	−0.42	−0.29	−0.04	0.26
		t_{HD}	−0.29	−0.25	−0.54	−0.55	−0.07	0.47
	Dq	slope	−0.00	−0.01	−0.02	−0.04	−0.04	−0.04
		t_{NW}	−2.04	−2.31	−2.25	−2.46	−2.08	−1.23
		t_{HD}	−1.50	−2.21	−2.64	−2.88	−2.57	−1.79
	Dgdp	slope	0.11	0.28	0.60	1.01	1.08	0.75
		t_{NW}	2.47	3.05	3.24	3.62	2.67	1.49
		t_{HD}	2.07	3.08	3.19	3.57	3.21	1.90
		adj-R^2	0.49	0.41	0.25	0.15	0.13	0.06

Table 5 : Forecasting Change in Unemployment Rate with Macro Controls

This table reports results from long-horizon predictive regressions of change in unemployment rate. The dependent variable is the H-quarter change in seasonally adjusted civilian unemployment rate, $u_{t+H} - u_t$, in which u_t is the unemployment rate in quarter t. The regressors are one-period lagged values of employment growth, De, profit growth, Dprofit, growth of average Q, Dq, and growth of GDP, Dgdp. For each regressor in a given regression, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	Du	slope	0.47	0.78	0.91	0.54	−0.02	−0.46
		t_{NW}	4.76	4.50	3.42	1.43	−0.04	−0.79
		t_{HD}	3.61	3.82	3.15	1.52	−0.06	−1.02
		adj-R^2	0.21	0.20	0.09	0.01	−0.01	0.00
B	Dprofit	slope	−2.09	−3.70	−6.09	−6.70	−6.95	−5.11
		t_{NW}	−3.35	−3.06	−3.00	−2.61	−2.42	−1.66
		t_{HD}	−3.39	−3.72	−4.02	−4.20	−4.14	−2.80
		adj-R^2	0.09	0.10	0.09	0.05	0.04	0.01
C	Dq	slope	0.01	0.10	0.42	1.38	1.89	2.11
		t_{NW}	0.06	0.38	0.86	1.63	1.73	1.78
		t_{HD}	0.08	0.48	1.04	1.68	1.59	1.37
		adj-R^2	−0.01	0.00	0.01	0.05	0.08	0.09
D	Dgdp	slope	−13.77	−25.38	−43.65	−45.13	−36.61	−14.40
		t_{NW}	−4.49	−4.43	−4.52	−4.09	−1.80	−0.84
		t_{HD}	−3.96	−3.84	−3.42	−2.65	−1.82	−0.58
		adj-R^2	0.22	0.25	0.26	0.12	0.05	0.00
E	Du	slope	0.26	0.36	−0.08	−0.84	−1.55	−1.57
		t_{NW}	2.50	2.23	−0.30	−2.77	−4.16	−2.85
		t_{HD}	1.77	1.81	−0.30	−2.17	−3.54	−3.57
	Dprofit	slope	−0.14	0.04	0.33	1.22	−0.20	−1.13
		t_{NW}	−0.24	0.04	0.21	0.50	−0.08	−0.37
		t_{HD}	−0.22	0.04	0.26	0.68	−0.09	−0.42
	Dq	slope	0.19	0.50	1.32	2.66	3.16	2.98
		t_{NW}	2.21	2.69	3.51	4.43	4.18	2.83
		t_{HD}	1.75	2.44	3.10	3.01	2.67	2.03
	Dgdp	slope	−10.68	−23.51	−55.98	−82.12	−86.47	−61.34
		t_{NW}	−3.39	−4.09	−5.41	−6.67	−4.00	−3.28
		t_{HD}	−2.49	−3.13	−3.49	−3.60	−3.57	−2.34
		adj-R^2	0.28	0.33	0.35	0.29	0.27	0.18

Table 6 : Payroll Growth Regressions

This table reports results from long-horizon predictive regressions of payroll growth. The dependent variable is the H-quarter growth of seasonally adjusted total non-farm payrolls of all employees, $e_{t+H} - e_t$, in which e_t is the logarithm of total payrolls in period t. The regressors are one-period lagged values of employment growth, De, profit growth, Dprofit, growth of average Q, Dq, growth of GDP, Dgdp, and one-period lagged values of the consumption-wealth ratio, CAY, log dividend yield, DP, the detrended short-term Treasury bill rate, TB, the term premium, TRM, the default premium, DEF, and their combination. For each regressor in a given regression, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	De	slope	0.59	0.86	0.79	−0.10	−0.53	−0.32
		t_{NW}	7.16	4.64	2.08	−0.20	−0.91	−0.38
		t_{HD}	5.09	4.61	2.60	−0.22	−1.04	−0.52
	Dprofit	slope	−0.00	−0.01	−0.02	−0.01	0.02	0.04
		t_{NW}	−0.14	−0.51	−0.67	−0.18	0.30	0.58
		t_{HD}	−0.10	−0.49	−0.88	−0.29	0.54	0.98
	Dq	slope	−0.00	−0.01	−0.02	−0.04	−0.03	−0.01
		t_{NW}	−2.24	−2.57	−2.31	−2.07	−1.20	−0.28
		t_{HD}	−1.53	−2.24	−2.43	−2.06	−1.24	−0.33
	Dgdp	slope	0.09	0.27	0.58	0.98	1.07	0.80
		t_{NW}	2.29	3.02	3.23	3.53	2.56	1.50
		t_{HD}	1.87	2.98	3.25	3.44	3.13	1.95
	DP	slope	−0.00	−0.00	−0.00	−0.00	0.01	0.03
		t_{NW}	−0.97	−0.89	−0.61	−0.09	0.87	1.19
		t_{HD}	−0.74	−0.85	−0.70	−0.09	0.82	1.23
		adj-R^2	0.48	0.41	0.25	0.15	0.13	0.09
B	De	slope	0.58	0.83	0.77	−0.04	−0.30	0.10
		t_{NW}	7.45	4.66	2.11	−0.07	−0.46	0.12
		t_{HD}	5.12	4.63	2.64	−0.08	−0.63	0.18
	Dprofit	slope	0.00	−0.00	−0.01	−0.01	0.01	0.02
		t_{NW}	0.01	−0.31	−0.47	−0.11	0.16	0.34
		t_{HD}	0.01	−0.30	−0.62	−0.18	0.29	0.64
	Dq	slope	−0.00	−0.01	−0.02	−0.03	−0.04	−0.02
		t_{NW}	−1.78	−2.20	−2.01	−2.06	−1.66	−0.83
		t_{HD}	−1.27	−2.09	−2.39	−2.40	−2.03	−1.12
	Dgdp	slope	0.10	0.28	0.59	0.95	0.98	0.63
		t_{NW}	2.40	3.11	3.23	3.57	2.53	1.30
		t_{HD}	1.90	3.02	3.28	3.49	3.11	1.71
	CAY	slope	−0.01	−0.03	0.03	0.19	0.38	0.63
		t_{NW}	−0.49	−0.56	0.23	0.75	1.36	1.91
		t_{HD}	−0.34	−0.51	0.28	0.93	1.42	1.89
		adj-R^2	0.48	0.41	0.25	0.15	0.14	0.09

Panel	Regressors		Forecast horizon in quarters 1	2	4	8	12	16
C	De	slope	0.64	0.98	1.10	0.77	0.60	0.87
		t_{NW}	6.33	4.53	2.63	1.23	0.91	1.14
		t_{HD}	4.62	4.71	3.35	1.63	1.16	1.38
	Dprofit	slope	0.00	−0.00	−0.00	0.01	0.02	0.04
		t_{NW}	0.18	−0.07	−0.19	0.27	0.48	0.60
		t_{HD}	0.13	−0.06	−0.24	0.38	0.78	1.02
	Dq	slope	−0.00	−0.01	−0.02	−0.03	−0.04	−0.03
		t_{NW}	−1.63	−2.07	−2.08	−2.15	−1.83	−1.07
		t_{HD}	−1.15	−1.94	−2.45	−2.43	−2.20	−1.51
	Dgdp	slope	0.08	0.24	0.51	0.78	0.81	0.51
		t_{NW}	1.97	2.49	2.73	3.06	2.21	1.09
		t_{HD}	1.63	2.65	2.86	2.85	2.52	1.30
	TB	slope	−0.00	−0.00	−0.00	−0.01	−0.01	−0.01
		t_{NW}	−1.01	−1.52	−2.29	−3.63	−3.89	−3.21
		t_{HD}	−0.87	−1.63	−2.61	−4.40	−4.43	−3.71
		adj-R^2	0.48	0.42	0.27	0.21	0.19	0.10
D	De	slope	0.66	1.02	1.13	0.52	0.10	0.37
		t_{NW}	8.26	5.47	2.81	0.90	0.16	0.47
		t_{HD}	5.49	5.13	3.58	1.14	0.20	0.61
	Dprofit	slope	0.00	−0.00	−0.02	−0.04	−0.03	0.01
		t_{NW}	0.08	−0.08	−0.76	−1.12	−0.46	0.08
		t_{HD}	0.05	−0.08	−0.99	−1.90	−0.83	0.14
	Dq	slope	−0.00	−0.00	−0.01	−0.03	−0.04	−0.03
		t_{NW}	−0.92	−1.45	−1.83	−2.14	−1.63	−0.86
		t_{HD}	−0.56	−1.23	−2.02	−2.36	−2.01	−1.22
	Dgdp	slope	0.06	0.19	0.47	0.85	0.87	0.52
		t_{NW}	1.69	2.21	2.99	3.75	2.38	1.02
		t_{HD}	1.21	2.18	2.88	3.48	3.08	1.32
	TRM	slope	0.00	0.00	0.00	0.01	0.01	0.01
		t_{NW}	2.40	2.50	2.62	2.32	1.86	1.47
		t_{HD}	1.57	2.14	2.84	2.94	2.37	1.85
		adj-R^2	0.54	0.47	0.35	0.26	0.18	0.09

Panel	Regressors		Forecast horizon in quarters					
			1	2	4	8	12	16
E	De	slope	0.57	0.81	0.72	−0.17	−0.46	−0.05
		t_{NW}	6.81	4.28	1.93	−0.34	−0.77	−0.06
		t_{HD}	4.83	4.33	2.43	−0.39	−0.90	−0.08
	Dprofit	slope	0.00	−0.00	−0.01	−0.00	0.01	0.01
		t_{NW}	0.19	−0.15	−0.42	−0.05	0.12	0.16
		t_{HD}	0.12	−0.13	−0.51	−0.08	0.22	0.28
	Dq	slope	−0.00	−0.01	−0.02	−0.04	−0.04	−0.03
		t_{NW}	−1.79	−2.10	−2.02	−2.26	−1.84	−0.91
		t_{HD}	−1.37	−2.11	−2.55	−2.66	−2.34	−1.47
	Dgdp	slope	0.09	0.26	0.58	0.96	1.04	0.78
		t_{NW}	2.36	3.18	3.40	3.87	2.71	1.57
		t_{HD}	1.83	2.96	3.21	3.45	3.29	2.11
	DEF	slope	−0.00	−0.00	−0.00	−0.00	−0.00	0.01
		t_{NW}	−0.65	−0.56	−0.32	−0.33	−0.06	0.37
		t_{HD}	−0.47	−0.56	−0.39	−0.38	−0.06	0.45
		adj-R^2	0.48	0.41	0.25	0.15	0.12	0.06
F	De	slope	0.66	1.03	1.16	0.79	0.72	1.43
		t_{NW}	6.53	4.42	2.56	1.44	1.18	1.89
		t_{HD}	4.61	4.35	3.29	1.58	1.41	1.89
	Dprofit	slope	0.00	0.00	−0.00	−0.00	0.02	0.04
		t_{NW}	0.36	0.37	−0.11	−0.05	0.45	0.54
		t_{HD}	0.24	0.35	−0.13	−0.07	0.82	0.98
	Dq	slope	−0.00	−0.01	−0.02	−0.03	−0.01	0.04
		t_{NW}	−2.05	−2.50	−2.00	−1.97	−0.32	1.06
		t_{HD}	−1.30	−1.96	−1.93	−1.64	−0.32	1.32
	Dgdp	slope	0.05	0.17	0.42	0.71	0.75	0.52
		t_{NW}	1.54	2.02	2.62	3.55	2.21	1.04
		t_{HD}	1.05	1.97	2.50	2.96	2.84	1.45
	DP	slope	−0.00	−0.00	0.00	0.01	0.03	0.04
		t_{NW}	−0.67	−0.64	0.10	1.15	1.89	2.20
		t_{HD}	−0.46	−0.55	0.11	1.09	1.67	1.95
	CAY	slope	−0.04	−0.09	−0.12	−0.10	0.21	0.72
		t_{NW}	−1.68	−1.59	−0.85	−0.39	0.66	1.83
		t_{HD}	−1.09	−1.32	−1.05	−0.48	0.73	1.93
	TB	slope	−0.00	−0.00	−0.00	−0.01	−0.01	−0.01
		t_{NW}	−0.73	−1.30	−1.37	−2.26	−2.08	−1.89
		t_{HD}	−0.68	−1.41	−1.68	−3.86	−4.41	−4.17
	TRM	slope	0.00	0.00	0.00	0.01	0.00	0.00
		t_{NW}	1.92	1.73	1.93	1.65	1.13	0.51
		t_{HD}	1.31	1.49	2.13	2.20	1.69	0.83
	DEF	slope	−0.00	−0.00	−0.01	−0.02	−0.01	0.01
		t_{NW}	−1.61	−1.47	−1.27	−1.86	−0.58	0.95
		t_{HD}	−0.98	−1.24	−1.39	−1.59	−0.48	0.89
		adj-R^2	0.55	0.49	0.36	0.32	0.25	0.21

Table 7 : Change in Unemployment Rate Regressions

This table reports results from long-horizon predictive regressions of change in unemployment rate. The dependent variable is the H-quarter change in seasonally adjusted civilian unemployment rate, $u_{t+H} - u_t$, in which u_t is the unemployment rate in quarter t. The regressors are one-period lagged values of employment growth, De, profit growth, Dprofit, growth of average Q, Dq, growth of GDP, Dgdp, and one-period lagged values of the consumption-wealth ratio, CAY, log dividend yield, DP, the detrended short-term Treasury bill rate, TB, the term premium, TRM, the default premium, DEF, and their combination. For each regressor in a given regression, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	Du	slope	0.27	0.37	−0.05	−0.78	−1.47	−1.48
		t_{NW}	2.62	2.45	−0.20	−2.30	−3.60	−2.78
		t_{HD}	1.81	1.88	−0.19	−2.02	−3.40	−3.36
	Dprofit	slope	−0.08	0.16	0.54	1.68	0.39	−0.43
		t_{NW}	−0.15	0.17	0.36	0.73	0.17	−0.15
		t_{HD}	−0.13	0.18	0.42	0.92	0.18	−0.15
	Dq	slope	0.41	0.99	2.16	4.48	5.54	5.79
		t_{NW}	2.92	3.37	4.51	4.70	4.35	4.87
		t_{HD}	2.31	3.04	3.61	3.63	3.34	2.71
	Dgdp	slope	−9.71	−21.26	−52.15	−73.72	−75.54	−48.39
		t_{NW}	−3.23	−4.04	−5.22	−5.97	−3.33	−2.40
		t_{HD}	−2.33	−2.94	−3.33	−3.40	−3.32	−1.98
	DP	slope	0.18	0.42	0.71	1.55	2.02	2.39
		t_{NW}	1.99	2.27	2.44	2.74	2.59	3.07
		t_{HD}	1.63	1.98	2.03	2.23	2.04	1.84
		adj-R^2	0.29	0.35	0.38	0.35	0.34	0.27
B	Du	slope	0.26	0.35	−0.08	−0.78	−1.43	−1.41
		t_{NW}	2.39	2.09	−0.28	−2.44	−3.64	−2.54
		t_{HD}	1.72	1.77	−0.29	−2.03	−3.34	−3.22
	Dprofit	slope	−0.09	0.09	0.32	0.90	−0.89	−2.11
		t_{NW}	−0.17	0.09	0.21	0.38	−0.33	−0.68
		t_{HD}	−0.15	0.10	0.26	0.53	−0.45	−0.85
	Dq	slope	0.24	0.56	1.31	2.28	2.35	1.84
		t_{NW}	2.20	2.39	2.91	3.15	2.55	1.45
		t_{HD}	1.78	2.24	2.67	2.38	1.82	1.14
	Dgdp	slope	−11.12	−24.04	−55.89	−78.70	−79.13	−51.01
		t_{NW}	−3.46	−4.02	−5.47	−6.79	−3.74	−2.63
		t_{HD}	−2.52	−3.14	−3.53	−3.73	−3.72	−2.31
	CAY	slope	1.87	2.25	−0.39	−14.64	−31.48	−44.31
		t_{NW}	1.10	0.67	−0.06	−1.00	−2.03	−2.79
		t_{HD}	0.94	0.62	−0.06	−1.01	−1.49	−1.68
		adj-R^2	0.28	0.32	0.35	0.30	0.32	0.27

Panel	Regressors		Forecast horizon in quarters 1	2	4	8	12	16
C	Du	slope	0.38	0.60	0.41	0.49	−0.20	−0.30
		t_{NW}	3.37	4.06	1.35	1.58	−0.60	−0.63
		t_{HD}	2.08	2.71	1.50	1.46	−0.54	−0.74
	Dprofit	slope	−0.26	−0.23	−0.19	−0.19	−1.64	−2.48
		t_{NW}	−0.48	−0.26	−0.13	−0.10	−0.72	−0.81
		t_{HD}	−0.42	−0.25	−0.15	−0.11	−0.78	−0.93
	Dq	slope	0.16	0.42	1.16	2.22	2.71	2.55
		t_{NW}	1.70	2.16	3.13	4.73	4.45	2.73
		t_{HD}	1.33	2.00	2.74	2.53	2.25	1.70
	Dgdp	slope	−8.67	−19.20	−47.44	−58.84	−62.79	−39.04
		t_{NW}	−2.87	−3.32	−4.36	−4.91	−3.11	−2.33
		t_{HD}	−2.15	−2.88	−3.17	−3.05	−3.19	−1.79
	TB	slope	0.07	0.15	0.30	0.83	0.84	0.79
		t_{NW}	1.53	2.57	2.98	4.86	3.98	2.91
		t_{HD}	1.27	1.84	2.49	4.15	3.81	3.43
		adj-R^2	0.31	0.36	0.41	0.48	0.41	0.29
D	Du	slope	0.30	0.45	0.14	−0.33	−1.01	−1.03
		t_{NW}	3.01	3.03	0.52	−1.25	−3.66	−2.33
		t_{HD}	1.96	2.32	0.57	−0.95	−2.53	−2.49
	Dprofit	slope	−0.10	0.13	0.54	1.70	0.31	−0.62
		t_{NW}	−0.18	0.14	0.40	0.88	0.13	−0.22
		t_{HD}	−0.16	0.14	0.42	0.93	0.14	−0.22
	Dq	slope	0.09	0.25	0.73	1.32	1.73	1.54
		t_{NW}	0.86	1.20	1.84	2.44	2.40	1.49
		t_{HD}	0.67	1.08	1.61	1.41	1.32	0.95
	Dgdp	slope	−7.65	−16.25	−38.99	−43.95	−45.58	−20.27
		t_{NW}	−2.42	−2.84	−3.93	−3.86	−2.47	−1.17
		t_{HD}	−1.82	−2.54	−2.85	−2.51	−2.64	−1.09
	TRM	slope	−0.05	−0.12	−0.29	−0.65	−0.70	−0.70
		t_{NW}	−2.09	−3.40	−4.84	−6.23	−4.79	−3.87
		t_{HD}	−1.76	−2.48	−3.24	−4.10	−3.69	−3.28
		adj-R^2	0.31	0.38	0.46	0.53	0.47	0.37

Panel	Regressors		1	2	4	8	12	16
			Forecast horizon in quarters					
E	Du	slope	0.26	0.38	0.01	−0.62	−1.13	−0.98
		t_{NW}	2.44	2.43	0.04	−1.78	−3.19	−1.88
		t_{HD}	1.67	1.83	0.04	−1.97	−2.84	−2.18
	Dprofit	slope	−0.15	0.09	0.55	1.75	0.83	0.31
		t_{NW}	−0.26	0.09	0.36	0.77	0.36	0.11
		t_{HD}	−0.23	0.10	0.41	0.90	0.37	0.11
	Dq	slope	0.21	0.46	1.14	2.21	2.29	1.76
		t_{NW}	2.34	2.82	3.39	3.23	2.40	1.26
		t_{HD}	1.83	2.29	2.88	2.45	1.80	1.13
	Dgdp	slope	−10.67	−23.58	−56.23	−82.72	−87.64	−62.97
		t_{NW}	−3.35	−4.09	−5.60	−6.60	−3.90	−3.12
		t_{HD}	−2.47	−3.10	−3.45	−3.59	−3.60	−2.41
	DEF	slope	0.01	−0.06	−0.22	−0.52	−1.01	−1.40
		t_{NW}	0.19	−0.35	−0.56	−0.76	−1.52	−1.51
		t_{HD}	0.14	−0.30	−0.54	−0.71	−1.07	−1.41
		adj-R^2	0.28	0.32	0.35	0.30	0.30	0.24
F	Du	slope	0.27	0.43	0.11	0.17	−0.08	0.19
		t_{NW}	2.56	2.77	0.35	0.49	−0.24	0.43
		t_{HD}	1.52	1.85	0.38	0.50	−0.20	0.37
	Dprofit	slope	−0.18	0.08	0.62	1.08	0.27	−0.03
		t_{NW}	−0.32	0.09	0.45	0.60	0.12	−0.01
		t_{HD}	−0.27	0.09	0.45	0.61	0.13	−0.01
	Dq	slope	0.51	0.93	1.34	1.84	1.10	0.02
		t_{NW}	2.78	2.83	2.24	1.76	0.75	0.01
		t_{HD}	2.05	2.21	1.78	1.25	0.60	0.01
	Dgdp	slope	−7.27	−15.80	−38.85	−43.30	−46.62	−22.82
		t_{NW}	−2.40	−2.65	−3.57	−3.65	−2.21	−0.98
		t_{HD}	−1.73	−2.40	−2.68	−2.38	−2.61	−1.22
	DP	slope	0.13	0.26	0.26	0.43	0.72	1.03
		t_{NW}	1.31	1.39	0.81	0.70	0.91	1.56
		t_{HD}	1.01	1.15	0.70	0.62	0.77	0.82
	CAY	slope	5.29	7.81	8.01	−4.64	−35.81	−60.93
		t_{NW}	2.73	2.27	1.10	−0.33	−2.21	−3.36
		t_{HD}	2.23	1.82	0.97	−0.28	−1.51	−2.09
	TB	slope	0.04	0.05	0.03	0.36	0.31	0.22
		t_{NW}	0.69	0.71	0.19	1.65	1.37	0.89
		t_{HD}	0.58	0.60	0.21	2.49	2.11	1.39
	TRM	slope	−0.05	−0.11	−0.29	−0.43	−0.35	−0.26
		t_{NW}	−1.97	−2.40	−2.93	−2.62	−1.63	−1.27
		t_{HD}	−1.74	−2.10	−2.62	−2.86	−1.79	−1.20
	DEF	slope	0.16	0.19	0.12	−0.14	−1.28	−2.25
		t_{NW}	2.00	1.18	0.29	−0.29	−2.67	−2.94
		t_{HD}	1.50	0.89	0.25	−0.16	−1.12	−1.82
		adj-R^2	0.33	0.39	0.45	0.54	0.54	0.53

Table 8 : Forecasting Stock Market Excess Returns

This table reports long-horizon regressions of log excess returns on the S&P 500 index, $\sum_{h=1}^{H} r_{t+h} - r_{ft+h}$, in which H is the return forecast horizon in quarters. The regressors are one-period lagged employment growth, De, one-period lagged unemployment rate, Du, one-period lagged investment growth, Di, with and without one-period lagged values of the consumption-wealth ratio, CAY, log dividend yield, DP, the detrended short-term Treasury bill rate, TB, the term premium, TRM, and the default premium, DEF. Employment is the seasonally adjusted total non-farm payrolls of all employees and De is $e_t - e_{t-1}$, in which e_t is the logarithm of employment in quarter t. Du is $u_t - u_{t-1}$, in which u_t is the seasonally adjusted civilian unemployment rate in quarter t, and Di is $i_t - i_{t-1}$, in which i_t is the logarithm of fixed, private nonresidential investment in quarter t. For each regressor in a given regression model, we report the OLS estimate of the slope coefficient, slope, the Newey-West corrected t-statistic, t_{NW}, the Hodrick (1992) corrected t-statistic, t_{HD}, and the adjusted R^2, adj-R^2. The sample is quarterly from 1952 to 2007.

			Forecast horizon in quarters					
Panel	Regressors		1	2	4	8	12	16
A	De	slope	−2.06	−4.08	−7.99	−8.28	−7.46	−8.92
		t_{NW}	−2.35	−2.82	−3.37	−2.21	−2.10	−2.30
		t_{HD}	−2.27	−2.47	−2.82	−2.03	−1.60	−1.88
		adj-R^2	0.02	0.04	0.09	0.05	0.03	0.03
B	DP	slope	0.02	0.04	0.09	0.16	0.18	0.20
		t_{NW}	1.04	1.29	1.65	1.86	2.13	2.58
		t_{HD}	1.02	1.20	1.41	1.26	0.94	0.80
	CAY	slope	1.09	1.97	3.29	6.33	8.93	9.71
		t_{NW}	2.58	2.73	2.69	3.24	3.40	3.46
		t_{HD}	2.46	2.45	2.22	2.23	2.21	1.93
	TB	slope	−0.01	−0.01	−0.00	0.03	0.05	0.08
		t_{NW}	−0.63	−0.70	−0.05	1.07	1.90	2.83
		t_{HD}	−0.60	−0.66	−0.05	0.91	1.36	2.02
	TRM	slope	0.00	0.01	0.02	0.04	0.05	0.08
		t_{NW}	0.42	0.51	1.31	1.40	2.13	3.43
		t_{HD}	0.42	0.48	0.95	1.08	1.31	1.74
	DEF	slope	−0.01	−0.02	−0.07	−0.13	−0.13	−0.12
		t_{NW}	−0.60	−0.85	−1.68	−2.36	−2.09	−1.64
		t_{HD}	−0.58	−0.75	−1.26	−1.27	−0.92	−0.68
	De	slope	−0.01	−0.02	−0.07	−0.13	−0.13	−0.12
		t_{NW}	−0.60	−0.85	−1.68	−2.36	−2.09	−1.64
		t_{HD}	−1.46	−1.52	−2.33	−2.22	−1.71	−1.73
		adj-R^2	0.06	0.11	0.21	0.32	0.43	0.49

Panel	Regressors		Forecast horizon in quarters 1	2	4	8	12	16
C	Du	slope	0.02	0.06	0.10	0.09	0.07	0.04
		t_{NW}	1.54	2.68	3.23	1.94	1.38	0.74
		t_{HD}	1.48	2.15	2.34	1.89	1.21	0.69
		adj-R^2	0.01	0.04	0.05	0.02	0.01	0.00
D	DP	slope	0.01	0.03	0.08	0.14	0.16	0.19
		t_{NW}	0.88	1.07	1.35	1.61	1.82	2.05
		t_{HD}	0.87	1.01	1.18	1.11	0.85	0.74
	CAY	slope	1.19	2.06	3.63	6.88	9.57	10.77
		t_{NW}	2.89	2.95	2.97	3.40	3.60	3.82
		t_{HD}	2.75	2.62	2.48	2.41	2.32	2.11
	TB	slope	−0.01	−0.01	−0.01	0.01	0.03	0.04
		t_{NW}	−1.16	−0.78	−0.48	0.31	0.93	1.31
		t_{HD}	−1.10	−0.75	−0.49	0.29	0.71	1.02
	TRM	slope	0.00	0.01	0.02	0.03	0.05	0.07
		t_{NW}	0.22	0.59	1.17	1.14	1.63	2.34
		t_{HD}	0.22	0.56	0.91	0.98	1.15	1.43
	DEF	slope	−0.00	−0.02	−0.05	−0.10	−0.10	−0.07
		t_{NW}	−0.28	−0.65	−1.22	−1.77	−1.50	−0.89
		t_{HD}	−0.27	−0.58	−0.95	−1.01	−0.71	−0.44
	Du	slope	−0.00	−0.02	−0.05	−0.10	−0.10	−0.07
		t_{NW}	−0.28	−0.65	−1.22	−1.77	−1.50	−0.89
		t_{HD}	−0.48	−1.34	−1.79	−1.78	−1.09	−0.65
		adj-R^2	0.06	0.11	0.21	0.32	0.43	0.49
E	Di	slope	−0.44	−0.76	−1.05	−0.73	−1.00	−1.15
		t_{NW}	−2.17	−2.04	−1.79	−1.04	−1.36	−1.34
		t_{HD}	−2.09	−2.00	−1.78	−0.82	−1.03	−1.18
		adj-R^2	0.02	0.02	0.02	0.00	0.00	0.01
F	DP	slope	0.01	0.04	0.09	0.15	0.17	0.20
		t_{NW}	0.96	1.21	1.47	1.58	1.81	2.10
		t_{HD}	0.94	1.16	1.34	1.17	0.91	0.78
	CAY	slope	1.20	2.12	3.72	7.16	9.61	10.72
		t_{NW}	2.85	2.71	2.81	3.45	3.48	3.65
		t_{HD}	2.71	2.57	2.45	2.46	2.28	2.06
	TB	slope	−0.01	−0.02	−0.03	−0.01	0.01	0.03
		t_{NW}	−1.34	−1.35	−1.21	−0.56	0.53	1.13
		t_{HD}	−1.28	−1.33	−1.24	−0.52	0.37	0.86
	TRM	slope	0.00	0.00	0.01	0.02	0.04	0.06
		t_{NW}	0.08	0.20	0.64	0.70	1.45	2.25
		t_{HD}	0.09	0.19	0.48	0.54	0.86	1.19
	DEF	slope	−0.00	−0.02	−0.05	−0.09	−0.10	−0.08
		t_{NW}	−0.24	−0.54	−1.10	−1.41	−1.40	−0.93
		t_{HD}	−0.24	−0.50	−0.88	−0.88	−0.69	−0.45
	Di	slope	−0.00	−0.02	−0.05	−0.09	−0.10	−0.08
		t_{NW}	−0.24	−0.54	−1.10	−1.41	−1.40	−0.93
		t_{HD}	−0.21	−0.55	−0.79	−0.27	−0.53	−0.50
		adj-R^2	0.06	0.11	0.21	0.32	0.43	0.49

Figure 1: Dynamic Relations between the Expected Return Shock, Labor Hiring, and Employment Growth

The time-lines depict the hypothesized responses of hiring, employment growth, stock prices, and realized returns to a one-time shock to the expected return (the discount rate). $E_t[r_{t+1}]$ is the expected return from the beginning to the end of period t conditional on information at the beginning of t. p_t is the ex dividend stock price at the beginning of t. $\mu_t\nu_t$ is the number of new hires (a flow variable) over period t. n_{t+1}/n_t is employment growth from the beginning to the end of period t. r_{t+1} is the realized return from the beginning to the end of t. We depict the time-lines for three models: standard one-period time-to-fill (no time-to-plan, Panel A), two-period time-to-fill (no time-to-plan, Panel B), and one-period time-to-fill (and one-period time-to-plan, Panel C).

Panel A: One-Period Time-to-Fill (no Time-to-Plan)

	t	$t+1$	$t+2$
$E_t[r_{t+1}]\downarrow\ \Rightarrow$	$p_t\uparrow,\ \mu_t\nu_t\uparrow$ $r_t\uparrow,\ n_{t+1}/n_t\uparrow$	$p_{t+1}\downarrow,\ \mu_{t+1}\nu_{t+1}\downarrow$ $r_{t+1}\downarrow,\ n_{t+2}/n_{t+1}\downarrow$	

Panel B: Two-Period Time-to-Fill (no Time-to-Plan)

	t	$t+1$	$t+2$
$E_t[r_{t+1}]\downarrow\ \Rightarrow$	$p_t\uparrow,\ \mu_t\nu_t\uparrow$ $r_t\uparrow,\ n_{t+1}/n_t\leftrightarrow$	$p_{t+1}\downarrow,\ \mu_{t+1}\nu_{t+1}\downarrow$ $r_{t+1}\downarrow,\ n_{t+2}/n_{t+1}\uparrow$	$p_{t+2}\leftrightarrow,\ \mu_{t+2}\nu_{t+2}\leftrightarrow$ $r_{t+2}\leftrightarrow,\ n_{t+3}/n_{t+2}\downarrow$

Panel C: One-Period Time-to-Fill (and One-Period Time-to-Plan)

	t	$t+1$	$t+2$
$E_t[r_{t+1}]\downarrow\ \Rightarrow$	$p_t\uparrow,\ \mu_t\nu_t\leftrightarrow$ $r_t\uparrow,\ n_{t+1}/n_t\leftrightarrow$	$p_{t+1}\downarrow,\ \mu_{t+1}\nu_{t+1}\uparrow$ $r_{t+1}\downarrow,\ n_{t+2}/n_{t+1}\uparrow$	$p_{t+2}\leftrightarrow,\ \mu_{t+2}\nu_{t+2}\downarrow$ $r_{t+2}\leftrightarrow,\ n_{t+3}/n_{t+2}\downarrow$