

Labor Unions, Long-Run Growth Risk, and Asset Prices

Juan Marcelo Ochoa

Duke University

LACEA Annual Meeting
November 2011

Motivation

- Strong labor unions have a negative impact on firms' operating flexibility
 - Reducing firms ability to adjust wages in face of fluctuations in productivity
 - Layard (1991) and Nickel and Layard (1999) → wages are far more responsive to the state of the labor market in countries where wage bargaining is less coordinated between unions
- Question: How does the strength of labor unions impact asset prices?

What do I do?

- Using data on 19 OECD countries I explore the impact of labor unions on asset markets
 - How does the strength of labor unions shape the exposure of firms' cash-flows to GDP growth?
 - Can the differences in cash-flows exposure due to labor unions strength explain cross-country differences in expected equity returns?
- Two measures of unions strength,
 - Union density
 - Bargaining coordination
- I present a production economy model in which
 - Households have recursive preferences (Epstein-Zin)
 - Workers and firms meet through a matching function (Pissarides (2000), Shimer (2009))
 - Firm negotiates wages with non-unionized and unionized workers

Previous Literature

- Bansal, Dittmar and Lundblad (2002, 2005) show that differences in exposure of cash-flows to aggregate economic fluctuations contain very valuable information about the cross-section of expected returns in U.S.
 - Portfolios sorted by book-to-market and market capitalization
- Jerman (1998), Boldrin, Christiano, and Fischer (2001), Gomes, Kogan, and Zhang (2003) focus on the asset pricing implications of flexibility in adjusting capital inputs
- Kuehn, Petrosky-Nadeau and Zhang (2011) consider a standard Diamond-Mortensen-Pissarides model with recursive preferences
 - Calibration implies that unemployment is a rare disaster
 - Model generates times when unemployment is equal to 100%, generating crashes in the economy

Empirical Findings

- Strength of labor unions shape the exposure of dividends to GDP growth
 - Exposure of dividends to GDP growth increases with the levels of union density, and coordination of bargaining
- Cross-sectional differences in cash-flow exposure's account for more than 50% of the cross-country variation in expected returns across 19 OECD countries
 - Stronger labor market unions increase the amount of growth risks
- Results robust to inclusion of additional control variables; growth in employment, and growth in hourly wage

Model Implications

- Exposure of dividends to growth is larger in an environment with strong labor unions
 - Labor unions prevent the adjustment of wages \rightarrow wages increase (decrease) at a slower pace than labor productivity
- Expected returns on a claim to a firm's payout increases with the strength of labor unions
- The model matches several features of the data
 - Higher strength of labor unions generate a higher volatility of the unemployment rate and higher expected returns
 - Low and smooth risk-free rate
- Long-run growth risks and rigidities introduced by labor unions are both important to explain labor market fluctuations along with asset prices

Outline

- 1 Empirical Evidence
- 2 Model
- 3 Model Implications
- 4 Conclusions

Outline

- 1 Empirical Evidence
- 2 Model
- 3 Model Implications
- 4 Conclusions

Data

- Data for 19 OECD countries for the period 1970Q1–2010Q4
 - Australia, Austria, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Sweden, U.K., and U.S.
- Two measures of unions strength,
 - 1 Union density from OECD statistics
 - 2 Bargaining coordination from the OECD Institutions Data Set (Centre for Economic Performance at LSE)
- Asset markets data on real value-weighted returns Morgan Stanley (MSCI index)
- Data on real GDP growth from OECD statistics

Cash-flow Growth Beta and Expected Returns I

- Compute a panel-VAR where coefficients depends on measure of unions strength

$$\mathbf{x}_{i,t} = \Phi_0 + (\Phi_1 + \Phi_2 L_{i,t})\mathbf{x}_{i,t} + \Phi_i + \Theta_t + \mathbf{C}\epsilon_{i,t} \quad (1)$$

where

- i country, t year
 - $\mathbf{x}_{i,t} = [\Delta d_{i,t}, \Delta y_{i,t}]$
 - $\Delta d_{i,t}$ dividends' growth rate
 - $\Delta y_{i,t}$ real GDP growth rate
 - $L_{i,t}$ strength of labor unions (Bargaining coordination, union density)
- As in Bansal Dittmar and Lundblad (2002), I estimate the long-run cash-flow growth beta
 - Long-run response of dividend growth to a shock to real GDP growth
 - The coefficients in Φ_2 capture how the strength of unions shape the exposure of firms' cash-flows to growth

Cash-flow Growth Beta and Expected Returns II

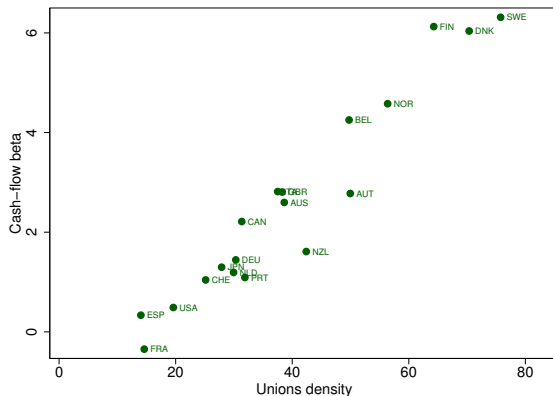
- Dividends growth long-run response to GDP growth of a country with unions strength L_i can be written as,

$$\iota_{2,1} [\mathbf{I} - \kappa(\Phi_1 - \Phi_2 L_i)]^{-1} \mathbf{C} \epsilon_{i,t} = \beta_{U_i} \epsilon_{i,t}^y \quad (2)$$

- Cross-country differences in the exposure of dividends growth to real GDP arise due to strength of unions
- Then I ask if β_{L_i} contains information about the cross-sectional differences in expected returns,

$$E(R_i) = \lambda_0 + \beta_{L_i} \lambda \quad (3)$$

Cash-flow Growth Beta and Unions Density



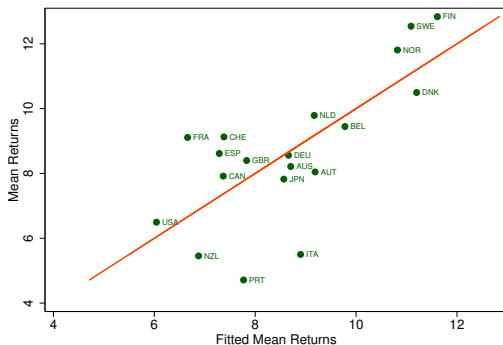
- Union density increases the exposure of dividends to GDP growth
- Similarly, a higher level of bargaining coordination increases the exposure of dividends to GDP growth

Expected Returns and Strength of Unions

- Compute the exposure of dividends to GDP growth for both of the unions strength variables
 - β_{U_i} the exposure of dividends due to unions density
 - β_{B_i} the exposure of dividends due to bargaining coordination
- Regress average returns on exposure to growth

$$\bar{R}_i = \lambda_0 + \lambda_U \beta_{U_i} + \lambda_C \beta_{B_i} + v_i$$

Observed and Fitted Mean Returns



	λ_0	λ_U	λ_B	R^2
Coefficients	1.35 (3.20)	0.64 (0.20)	0.37 (0.20)	0.53

- Exposure to growth due to higher union density and bargaining coordination are both positively correlated with expected returns

Summary of Empirical Findings

- Strength of labor unions shape the exposure of dividends to GDP growth
 - Exposure of dividends to GDP growth increases with the levels of union density, and coordination of bargaining
- Cross-sectional differences in cash-flow exposure 's account for more than 50% of the cross-country variation in expected returns across 19 OECD countries
 - Stronger labor market unions increase the amount of growth risks
- Results robust to inclusion of additional control variables; growth in employment, and growth in hourly wage

Outline

- 1 Empirical Evidence
- 2 Model**
- 3 Model Implications
- 4 Conclusions

Model I

- Economy has two economic actors: households and firms
- Households
 - Consume
 - Provide labor
- Firms access to two technologies
 - Production technology
 - Recruiting technology
- Search frictions are present in the process in which individuals and firms trade labor
- Firm negotiates wages with non-unionized and unionized workers

Labor Market I

- Employment evolution

$$n_{t+1}(s^t) = (1 - q)n_t(s^{t-1}) + M_t(s^t)$$

- Matching function

$$M_t(s^t) = mu_t(s^{t-1})^\zeta v_t(s^t)^{1-\zeta}$$

where,

- $u_t(s^{t-1}) = 1 - n_t(s^{t-1})$ unemployed
- $v_t(s^t)$ recruiters

- The probability that a firm meets a worker is,

$$\frac{M_t(s^t)}{v_t(s^t)} = m\theta_t(s^t)^{-\zeta} = \mu(\theta_t(s^t))$$

where,

- $\theta_t(s^t)$ recruiters to unemployed workers ratio

Household I

- Household has a measure one of individuals of which a fraction n is employed and $1 - n$ is unemployed
- A worker finds a job with probability $f(\theta_t(s^t))$, and loses her job with probability q ,

$$n_{t+1}(s^t) = (1 - q)n_t(s^{t-1}) + f(\theta_t(s^t))(1 - n_t(s^{t-1}))$$

- The household budget constraint is,

$$c_t(s^t) \leq a_t(s^t) + w_t(s^t)n_t(s^{t-1}) - \sum_{s_{t+1}|s^t} Q_t(s_{t+1}|s^t)a_{t+1}(s_{t+1}, s^t)$$

- $a_t(s^t)$ Arrow-Debreu asset
- $Q_t(s_{t+1}|s^t)$ price of a unit of consumption at $t + 1$

Household II

- Representative household has Epstein-Zin (1989) and Weil (1990) recursive preferences over consumption (c) and work (n),

$$V_t(s_t) = \left[(1 - \beta)c_t(s_t) (1 - \chi n_t(s_t))^\psi + \beta \left(E_t V_{t+1}(s_{t+1})^{1-\gamma} \right)^{\frac{1-\frac{1}{\psi}}{1-\gamma}} \right]^{\frac{1}{1-\frac{1}{\psi}}}$$

donde

- β is the discount factor
- ψ is the intertemporal elasticity of substitution (IES)
- γ the coefficient of relative risk aversion

Household III

- Household problem: chooses how much to consume $c_t(s^t)$ and save $a_{t+1}(s_{t+1}, s^t)$ in order to maximize lifetime utility
- The stochastic discount factor is given by,

$$Q_t(s_{t+1}|s^t) = \beta \pi(s^{t+1}|s^t) \left(\frac{c_{t+1}(s^{t+1})}{c_t(s^t)} \right)^{-1/\psi} \left(\frac{1 - \chi n_{t+1}(s^t)}{1 - \chi n_t(s^{t-1})} \right)^{\vartheta(1-1/\psi)} \\ \times \left(\frac{V_{t+1}(s^{t+1})}{\left(E_t V_{t+1}(s^{t+1})^{1-\gamma} \right)^{\frac{1}{1-\gamma}}} \right)^{1/\psi - \gamma}$$

- $\varphi \neq 0$ employment has an impact on the discount factor
- $1/\psi < \gamma$ news about consumption and employment have an impact on the stochastic discount factor

Wage Determination I

- Unionized workers ask a wage rise equal to average productivity growth,

$$w_t^*(s^t)^U = w_{t-1}(s^{t-1})e^\mu \quad (4)$$

where

- μ long-run growth rate

- Non-unionized workers wage pedido is determined through Nash-bargaining,

$$w_t^*(s^t)^{NU} = \arg \max_w \tilde{V}_{n,t}^\phi \tilde{J}_{n,t}^{1-\phi}$$

- $\tilde{V}_{n,t}$ ($\tilde{J}_{n,t}$) is the marginal value to a household (firm) of having one additional employed worker
- $\phi \in (0, 1)$ is the non-union workers' bargaining power
- The wage paid depends on the “strength” of unionized workers ω ,

$$w_t(s^t) = \omega w_t^*(s^t)^U + (1 - \omega)w_t^*(s^t)^{NU}$$

Asset Pricing

- The return on a claim to a firm's payout is,

$$R_{t+1}(s^{t+1}) = \frac{d_{t+1}(s^{t+1}) + p_{t+1}(s^{t+1})}{p_t(s^t)}$$

- $p_t(s^t)$ is the value of the firm

- The risk-free interest rate equals,

$$R_t^f(s^t) = \sum_{s^{t+1}|s^t} Q_t(s_{t+1}|s^t)$$

Exogenous shock

- Technology growth is exogenous,

$$\Delta \ln g_{t+1}(s^{t+1}) = x_{t+1}$$

- The productivity growth follows a first-order autoregressive process,

$$x_{t+1}(s^{t+1}) = \mu(1 - \rho) + \rho x_t(s^t) + \sigma s_{t+1}$$

where s_{t+1} is iid.

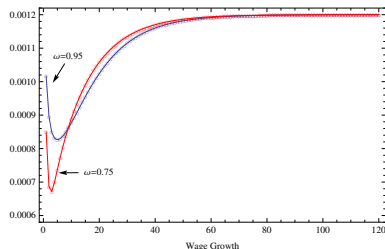
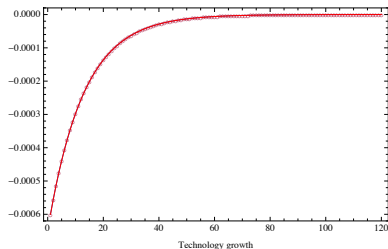
Outline

- 1 Empirical Evidence
- 2 Model
- 3 Model Implications**
- 4 Conclusions

Comparative Statics I

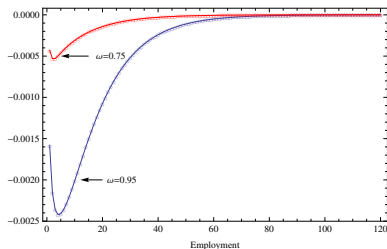
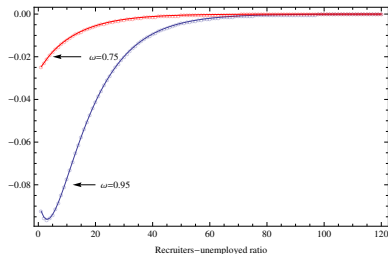
- I calibrate the model and compare two economies with different strength of unions
 - All parameters equal except for the strength of labor unions
- Representative agent has a monthly decision horizon
- **Preferences:**
 - Intertemporal Elasticity of Substitution $\psi = 1.5$,
 - Relative risk-aversion parameter $\gamma = 10$
- **Labor market:** Shimer (2005) and Shimer (2009)
 - Matching function is equal to $f(\theta) = s_n \theta^v$
- **Wages:**
 - Non-unionized workers' bargaining power: $\phi = 0.2$
 - Labor unions with low strength power $\omega = 0.75$
 - Labor unions with high strength power $\omega = 0.95$

Dividends Exposure to Growth I



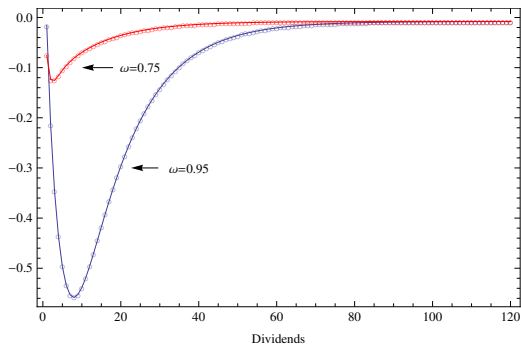
- Response to a negative shock to the growth rate of productivity x_t
 - Plot: deviations from the balanced growth path; every period is a month
 - Blue line high strength of labor unions $\omega = 0.95$; red line low strength of labor unions $\omega = 0.75$
- As growth decelerates, wages growth also decelerate
 - Strong labor unions mitigate the drop in the wages
 - Periods with wages higher than productivity

Dividends Exposure to Growth II



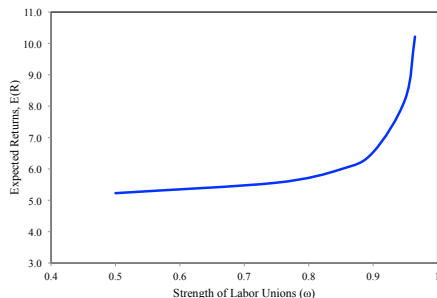
- Firms have no incentive to hire and dedicate less workers to recruiting activities
 - The recruiting effort decreases more in an environment with strong labor unions
- Lower recruiting efforts translates into an increase in unemployment
 - Important drop in employment in environment with strong labor unions

Dividends Exposure to Growth III



- The dividends long-run response is larger in an environment where unions prevent the adjustment of wages
- Phase of low productivity period is characterized by high wages relative to labor productivity

Asset Pricing Implications



- Expected returns on a claim to a firm's payout increases with the strength of labor unions
- With stronger labor unions, the inability of firms to adjust wages increases the exposure of their dividend payouts to growth

Outline

- 1 Empirical Evidence
- 2 Model
- 3 Model Implications
- 4 Conclusions**

Conclusions

- Strength of labor unions shape the exposure of dividends to GDP growth
 - Exposure of dividends to GDP growth increases with the levels of union density, and coordination of bargaining
- Cross-sectional differences in cash-flow exposure 's account for more than 50% of the cross-country variation in expected returns across 19 OECD countries
 - Stronger labor market unions increase the amount of growth risks
- Model implications
 - Stronger labor unions diminish in the inability of firms to adjust wages increasing the exposure of their dividend payouts to growth
 - Stronger labor unions increase expected returns on a claim to a firm's payout
- The data and the model suggest that stronger labor unions increase the cost of equity