A Labor Capital Asset Pricing Model

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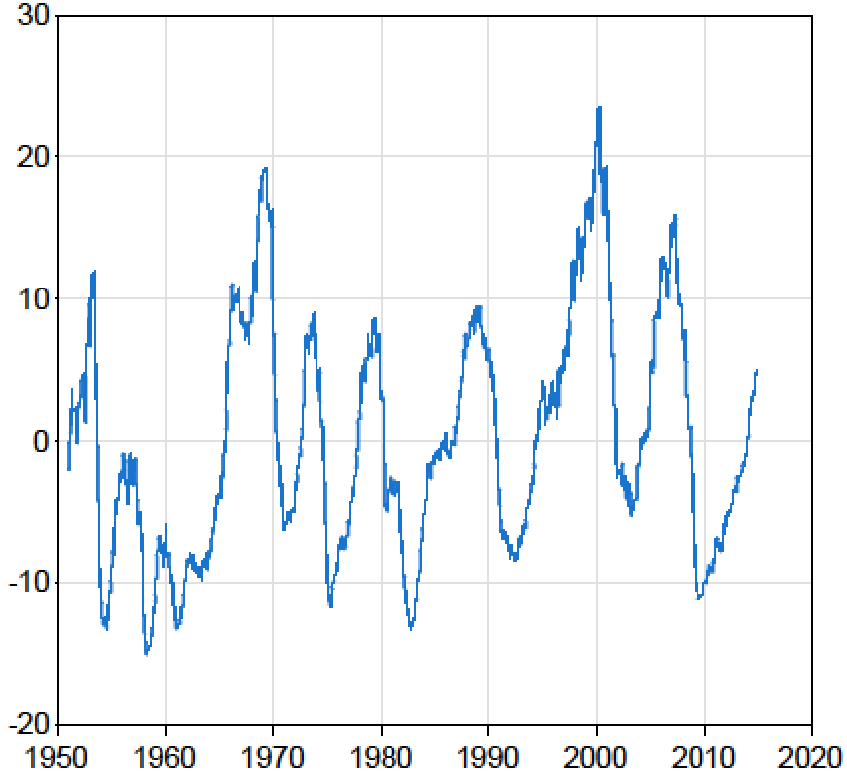
Main Idea

- Exposure to labor market risks are an important determinant of the cross-section of equity returns.
- Long-short portfolio (long low labor market risk loadings and short high risk loadings) yields a 6% annualized average return.
- Authors build a labor asset pricing model – loadings on labor market "tightness" proxy for priced variation in the efficiency of the labor market matching mechanism
- Low (high) loadings are more (less) exposed to (systematic) labor market matching efficiency shocks

Labor Market Tightness

$$\theta_t = \frac{\text{Vacancy Index}_t}{\text{Unemployment Rate}_t \times \text{LFPR}_t}$$



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Risk Exposure to Labor Market Tightness

The authors first define the "shock" to labor market tightness as follows:

$$\vartheta_t = \log(\theta_t) - \log(\theta_{t-1})$$

Then, risk exposures are calculated via a two-factor time-series regression, *by firm for a fixed interval:*

$$R^e_{i,t} = \alpha_{i,\tau} + \beta^M_{i,\tau} R^M_t + \beta^\theta_{i,\tau} \vartheta_t + \varepsilon_{i,t}$$
$$t \in \{\tau - 35, \tau\}$$

So, for each firm, we have a time-series of labor market tightness risk exposures, $\beta_{i,\tau}^{\theta}$, that are then used for sorting firms into portfolios.

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Key Findings:

Labor Market Tightness and Firm Level Risk Exposure

Decile	β^{θ}
Low	-0.80
2	-0.38
3	-0.23
4	-0.12
5	-0.02
6	0.06
7	0.16
8	0.28
9	0.46
High	0.92

	Raw	Unconditional Alphas		
Decile	Return	CAPM	3-Factor	4-Factor
Low	1.14	0.02	0.04	0.03
2	1.10	0.11	0.11	0.11
3	1.07	0.12	0.09	0.12
4	1.02	0.10	0.07	0.07
5	1.01	0.09	0.03	0.02
6	0.98	0.06	0.02	0.00
7	0.99	0.05	0.03	0.05
8	0.97	-0.02	-0.02	0.01
9	0.89	-0.18	-0.16	-0.11
High	0.66	-0.52	-0.51	-0.41
Low-High	0.48	0.54	0.55	0.44
t-statistic	[3.66]	[4.12]	[4.20]	[3.31]

Robust to alternative measurement windows, the exclusions of micro cap firms, F-M cross-sectional regressions, and alternative proxies for labor market tightness. Authors argue this is ***not*** an anomaly, but rather reflects priced *labor market risk*.

→ **Labor-CAPM**

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β^{θ}: A case study using industries

Many of the β^{θ} risk loading are not statistically significant. Over 1954-2014, only three of the FF48 industry portfolios have a significant β^{θ}.

Industry	Average cond β^{θ}	Standard dev of β^{θ}	Fraction of months in low β^{θ} quintile	Fraction of months in high β^{θ} quintile
Tobacco Products	-0.090	0.207	0.391	0.137
Beer & Liquor	-0.060	0.153	0.321	0.081
Utilities	-0.046	0.109	0.296	0.086
Communication	-0.028	0.102	0.196	0.089
Precious Metals	-0.027	0.618	0.451	0.341
Banking	-0.026	0.147	0.334	0.112
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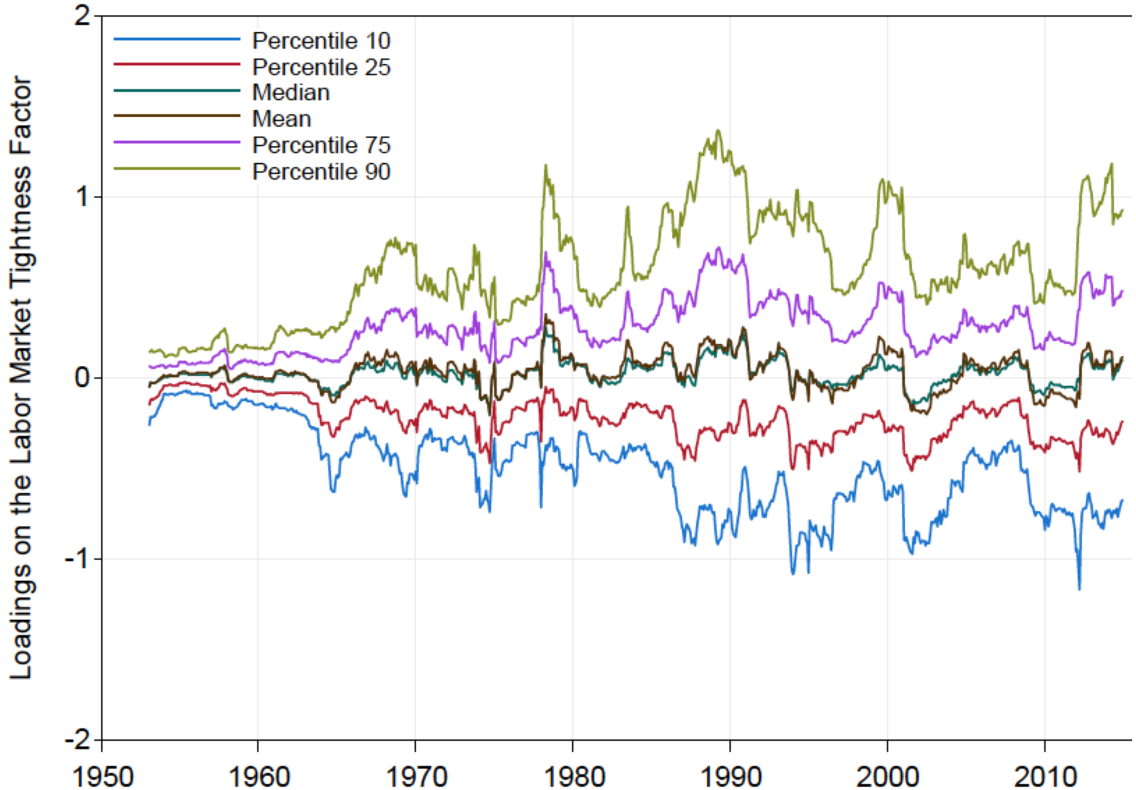
Shipbuilding, Railroad Equipment	0.046	0.207	0.172	0.301
Automobiles and Trucks	0.047	0.119	0.114	0.276
Textiles	0.062	0.135	0.069	0.293
Non-Metallic and Industrial Metal Mining	0.067	0.209	0.177	0.350
Real Estate	0.074	0.187	0.149	0.333

Yet, the portfolio returns **are** significant (unconditional return spread is much smaller).

Q1: What should one think about this limited time-series significance?

Q2: Are the portfolio differences driven by the time-series (of risk exposures) or the cross-section (of firm/industry portfolio composition)?

β^{θ} loadings in the cross section of firms



Q3: Considerably more on the portfolio composition (firm/ industry characteristics)

Suggestion: Before moving to the model, this should be sorted out so we understand *exactly* what features of the data the economics are designed to explain.

[Belo, Lin, and Bazdresch (2014)]

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β^θ Loadings and Typical Anomalies

The labor market risk loadings do not seem to play a large role in (a few) typical anomaly portfolios (at least unconditionally from 1954-2014).

	β^θ	Average Return		β^θ	Average Return
Size 1	0.038	9.392	Investment 1	-0.022	9.326
Size 2	0.004	9.560	Investment 2	-0.005	7.163
Size 3	-0.006	9.268	Investment 3	0.001	6.536
Size 4	-0.019	8.772	Investment 4	0.025	6.544
Size 5	0.002	6.833	Investment 5	-0.004	5.257
B/M 1	-0.006	6.638	Profitability 1	-0.015	4.967
B/M 2	-0.013	7.468	Profitability 2	-0.006	5.220
B/M 3	0.004	8.371	Profitability 3	-0.007	5.943
B/M 4	0.014	8.962	Profitability 4	0.004	6.462
B/M 5	0.033	10.508	Profitability 5	0.007	7.577

Q4: This framework does not provide a role for labor market risk in explaining our usual anomalies? [at least unconditionally]

So, the model's role is instead to explain why β^θ–sorted L/S excess portfolio returns reflect priced labor market risk.

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The Labor-CAPM

Firms generate revenue:

$$Y_{i,t} = e^{x_t + z_{i,t}} N_{i,t}^{\alpha}$$

Where

$$\begin{aligned} x_t &= \rho_x x_{t-1} + \sigma_x \varepsilon_t^x, \\ z_{i,t} &= \rho_z z_{i,t-1} + \sigma_z \varepsilon_{i,t}^z, \end{aligned}$$

Firms hire/fire workers and the labor market is characterized by a endogenously determined degree of tightness, θ_t, and exogenous matching efficiency, p_t, where the latter follows:

$$p_t = \rho_p p_{t-1} + \sigma_p \varepsilon_t^p$$

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The Labor-CAPM

The authors employ an aggregate matching model for labor and determine equilibrium wages.

Firm's maximize value by posting vacancies and firing workers (with costs) in the face of an exogenously determined pricing kernel:

$$m_{t+1} = -r_f - \gamma_x \varepsilon_{t+1}^x - \frac{1}{2}\gamma_x^2 - \gamma_p \varepsilon_{t+1}^p - \frac{1}{2}\gamma_p^2$$

where aggregate productivity and matching efficiency shocks are priced. This yields a two-factor model that is "rotated" to reflect the empirical setup explored earlier

$$\mathbb{E}_t[R_{i,t+1}^e] = \beta_{i,t}^x \lambda^x + \beta_{i,t}^p \lambda^p = \beta_{i,t}^M \lambda^M + \beta_{i,t}^\theta \lambda^\theta$$

A few questions about what resides inside the model

A shock to aggregate matching efficiency alters firms' incentives to hire/fire.

However, firms face costly hiring/firing, so firm-specific productivity shocks may impede action. [Second, efficiency shocks carry a negative price of risk → discount rate effect for all firms]

Q5: Are these shocks really so separable? [The very nature of matching efficiency? Firm vs. Industry vs. Aggregate]

Suggestion: Would like to see a better match between an exercise that further decomposes what is happening within portfolios in the data with the mechanisms of the model.
<u>**Consider a Campbell–Shiller decomposition**</u>

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A few questions about what resides outside the model

Can we really separate out labor market tightness exposures from "level" characteristics

- capital/labor intensity
- global supply chain
- Patents (general purpose vs. industry specific technologies)

Creative Destruction

- Automation
- Globalization

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Conclusion

- An interesting paper sitting inside a rapidly growing literature.
- Document sizable return spreads related to labor market dynamics that deserve attention.
- A detailed labor market / asset pricing model designed to help explain the empirics.
- Have some lingering questions about both the empirical results and the model's critical mechanism
- **Definitely worth a read**

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