

Innovation Awards, Product Segmentation, and Stock Returns

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Abstract

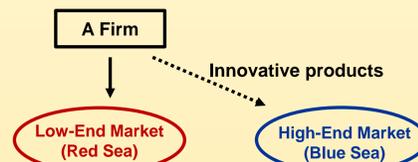
Award-return relation: this paper connects technological innovation to product market segmentation using a prestigious award for technology breakthroughs in product inventions: the R&D 100 Award. We argue that award-winning outcomes have asset pricing implications because awarded firms have the growth opportunities to promote their products to high-end markets, which increases revenue procyclical to aggregate consumption and results in higher systematic risks. We find that, compared with their matched industry counterparts, awarded firms are associated with lower product similarity, lower product fluidity, and higher profitability over the future five years. Moreover, these firms outperform their comparable peers by 3% in annual returns and have both significantly higher procyclicality of sales growth and market betas. Moreover, the award-return relation is more pronounced in periods of higher aggregate consumption growth and among firms with higher R&D investments.

Motivation

- **Innovation is under the spotlight.**
 - Innovation is the only way for firms to distinguish themselves from product competitors.
 - Award reception following firms' product inventions may affect their product segmentation strategies.
 - *Intel's Core® CPU* wins R&D100 award in 2011, and it targets Core to the high-end markets to meet new demands from computation-efficient work station and advanced game players.
 - *Toyota Land Cruiser Prado* wins R&D100 award in 2016, and in the next year, its sales top the SUV market and analysts also upgrade their recommendations.
- **Research question: why do firms do product invention?**
 - Any real effects of technologies converted to products on product market performance?
 - What are the asset pricing implications?

Economic Story

- **Innovation, product segmentation, and stock returns.**
 - Innovative products open growth opportunities in high-end markets.
 - High-end markets are associated with higher procyclicality and higher profitability to aggregate consumption.
 - Firms with innovative products have higher systematic risks and higher expected stock returns.



Conclusions

- **Takeaway: market segmentation due to product inventions may affect asset prices.**
- **Product inventions changes segmentation landscape.**
 - We first document a positive relation between innovative product awards and future product market performance.
- **A two-product model to motivate award-return relation.**
 - **Higher stock returns:** awardees outperform by 2-4% annually.
 - **Higher systematic risks:** awardees exhibit higher market betas by 10% and higher procyclicality of sales growth by 23%.
 - **Consumption risks related:** consumption growth increases one stdev., return spread increases 0.26% monthly (3.12% annually).
 - **Amplified by growth opportunities:** award-return spread is higher by 0.85%-1.30% monthly in high R&D subgroups.
- **Punchline: award premium comes from consumption risks.**

R&D 100 Award

- We use **R&D 100 Award**, known as "Oscar of Innovation", to measure some firms' commercialized technologies that help them stand out in product markets.



Empirical Verification

- **Awardees receive growth opportunities in high-end market.**

- **Stronger monopolistic power:** product similarity ↓
- **Lower product threats:** product fluidity ↓
- **Higher profitability:** returns on equity ↑

- **Hypothesis 1.** $r_{t+1}^{AMU} = r_{t+1}^A - r_{t+1}^U > 0$

- Awardees have **higher expected stock returns** than unawardees.
- **Empirical test to H1.**

- **One-Way Portfolio Sorting.** Awarded firms provide significant alpha of 12% and outperform unawarded benchmarks by 2-4% annually.

One-Way Portfolio Sorting with Unawarded Benchmarks

Model	Excess return	CAPM	FF3	FF3+XRDF	FF4	FF4+XRDF	FF5	FF5+XRDF	FF6	FF6+XRDF
Excess return	0.28**	0.25**	0.32**	0.30**	0.23*	0.21*	0.32**	0.31**	0.26**	0.23*
/Alpha	(2.30)	(2.03)	(2.57)	(2.48)	(1.84)	(1.66)	(2.56)	(2.43)	(2.01)	(1.80)

- **Hypothesis 2.** $\beta_{t+1}^A > \beta_{t+1}^U$

- Awardees have **higher systematic risk exposures** than unawardees.

□ **Intuition.** Awarded firms are more exposed to growth opportunities in high-end market and their sales are more procyclical.

- **Empirical test to H2.**

- Awardees have **higher future five-year market betas** than unawardees by 10%.
- Awardees have **higher future procyclicality of sales growth** than unawardees by 20%.

- **Hypothesis 3.** $\partial r_{t+1}^{AMU} / \partial C_{t+1} > 0$

- The award-return relation is **procyclical** to aggregate consumption growth.

□ **Intuition.** The risk premium of awarded firms originates from consumption risks.

- **Empirical test to H3.**

- The annual award premium almost doubles if aggregate consumption growth increases by one stdev.

- **Hypothesis 4.** $\partial r_{t+1}^{AMU} / \partial I^* > 0$

- The award-return relation increases with **R&D investment**.

□ **Intuition.** The intensity of R&D investment is a proxy for the number of growth opportunities (our model; Berk et al. (1999)).

- **Empirical test to H4.**

- The return spread of awarded minus unawarded increases with R&D investment.

Two-Way Portfolio Sorting on R&D Intensity

Xrd \ Award	Unawarded	Awarded	Awarded-Unawarded					
			Excess return	CAPM	FF3	FF4	FF5	FF6
Low	0.49	0.58*	0.09	0.09	0.02	-0.10	-0.01	-0.11
	(1.63)	(1.95)	(0.45)	(0.43)	(0.11)	(-0.46)	(-0.03)	(-0.48)
High	0.51	1.53***	1.01**	0.90**	1.06**	0.75*	1.30***	1.02**
	(1.19)	(2.84)	(2.34)	(2.07)	(2.45)	(1.70)	(2.93)	(2.30)
High-Low	0.03	0.95*	0.92*	0.81*	1.04**	0.85*	1.30***	1.13**
	(0.07)	(1.87)	(1.91)	(1.67)	(2.16)	(1.73)	(2.67)	(2.28)

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