Essay:

Asset prices and real activity are disconnected

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For decades, researchers have developed numerous models to explain asset prices (returns) regarding the human behavior reacting to information. The information referred to as determinants of asset pricing, including dividends, firm characteristics, market return, consumption and so on. The most intuitive models where developed based on consumption theory regarding agents that try to maximize their expected discounted utility in their life time and using the fundamental economic determinants. Despite the intuition, the models (CCAPM and extensions) usually fail to fit the actual return, creating Equity Premium Puzzle. Though the problem is extended to Volatility Puzzle as well, to be brief, this essay focus only on Equity Premium Puzzle and some improvements.

The main question in this essay is whether recent improvement in literature have solved the puzzles or not? Which betterments had better performances and what critiques they face? Should we change the model and create extensions or we need a new brand model? Does the problem lay in the theory or it's a matter of determinants estimations? All these improvements in the models are trying to show that asset prices are connected to the real economy. The more general question that cannot easily be answered is whether the asset prices are connected to the real economy at all? To solve the Equity Primum Puzzle, three approaches where made. The first one accounts for better estimation of determinants in the model. The second approach used developed new models and extensions to solve the puzzle. The third approach considers the irrational human behavior. This essay addresses some improvements in the first approach and one particular explanation using natural field experiment classified as the third approach.

For decades, researchers tried to develop models to explain the determinants of asset returns (prices). The early dividend discount model tried to use expected discounted future cashflows to price assets regarding the law of one price (Gordon 1962) facing the question on how to determine the discount rate and expected future dividends. The following widespread adopted model, CAPM, used market return and risk-free rate as the determinants of asset returns (Taylor 1961, 1962; Sharpe 1964; Lintner 1965; Mossin 1966) lacking the economic intuition and any explanation for abnormal in portfolios with different size factors and value factors. Thus, Fama and French (1992) created a model adding to size and value factors to market factor to explain the abnormal return. However, the intuitions accounting for economic behavior was still missing. Long before, Consumption-based capital asset pricing model (CCAPM) was introduced regarding the expected return of investment and consumption (Lucas 1978; Breeden 1979). Notwithstanding the economic intuition of CCAPM, fitting 100 years of data to the model showed a big divergence in the returns predicted for risky assets (1% on average) and the actual returns (6% on average) referred to as Equity Premium Puzzle by (Mahra and Prescott 1985).

Jordà, Schularick and Taylor (2019) used data from 1870 to 2015 for 17 different developed countries showing that equity premium is 5.86% for full sample and 6.81% for post-World-War II which is still far from 1.2% predicted by CCAPM (See Table 1). They also calculated the Implied risk aversion corresponding to these risk premiums derived from the following formula, showing a huge divergence in risk aversion and occasionally, very high values:

$$\gamma = \frac{\ln E(R) - \ln E\left(R_f\right)}{Cov(\ln R, \ln g)}$$

Where g is the growth in dividends (see Table 2). Golez and Koudijs (2018) using Netherlands, Us and US data went even further back to 1630 and showed a similar result (See Figure 1).

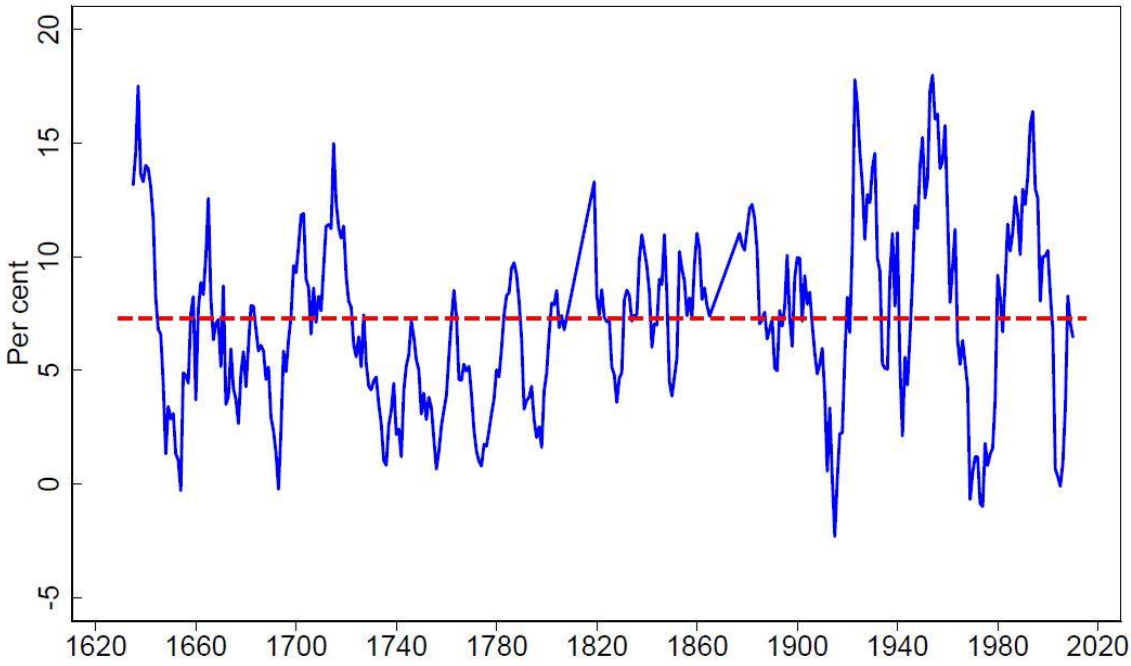
Regarding the estimations of determinants in CCAPM, Savov (2011) introduces garbage data to proxy for consumption. Despite the neglecting fact that garbage does not account for services consumption, which in the recent Covid pandemic seemed to be more volatile than other sectors, the consumption volatility increases leading to lower risk aversion estimation. However, the new 18-26 level for risk aversion is still high. Kroencke (2017) used the same approach along with reversing the filtering process in NIPA and ended up with even lower risk aversion. In Figure 2, Kroencke shows the estimation distribution using the filtered method and unfiltered methods. Moreover, McGrattan and Prescott (2003) used transaction costs to show lower actual returns that fits better with CCAPM predictions. (See Figure 3 and 4)

In 2011, Larson, List and Metcalfe ran a field experiment using a new phenomenon in risk aversion called myopic loss aversion to explain the Equity Premium Puzzle. Myopic loss aversion explains that investors are focused on the short term, causing very negative reactions to recent losses, which can reduce the long-term benefits enormously (Thaler et al., 1997). Larson, List and Metcalfe pooled high frequency minute-by-minute price realization. Dividing the professional FX traders into two groups, the first group received frequent price information and the second group received infrequent price information. Considering the risky assets were allocated to traders randomly, the second group invested more in risky assets (See Table 3). Thus, if investors get frequent information on prices, they under-invest in risky assets which leads to higher returns for risky assets and explaining the Equity Risk Premium Puzzle. However, the underinvestment will cost them lower gains in the long-run.

To conclude, there are various ways to approach Equity Risk Premium Puzzle. The recent developments suggested better estimated determinants and better extensions of CCAPM. A new unorthodox approach thrived in behavioral economics suggests myopic loss aversion as a behavioral pattern occurring among investors which answers the Equity Risk Premium Puzzle under the assumption that the average investors in the market follow that pattern.

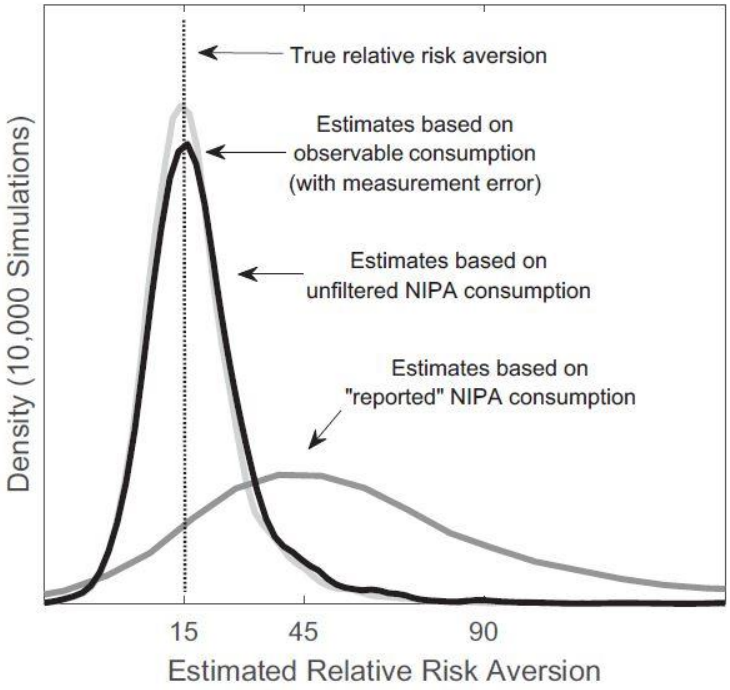
Appendix

Figure 1



Golez, Benjamin, and Peter Koudijs. "Four centuries of return predictability." *Journal of Financial Economics* 127, no. 2 (2018): 248-263.

Figure 2: Relative risk aversion estimates in a simulated asset pricing economy.



Kroencke, Tim A. "Asset pricing without garbage." *The Journal of Finance* 72, no. 1 (2017): 47-98. Figure 1.

Figure 3 and 4:

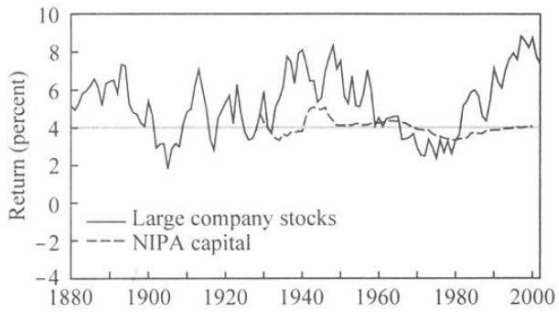


FIGURE 3. EQUITY AND NIPA CAPITAL RETURNS, 1880–2002

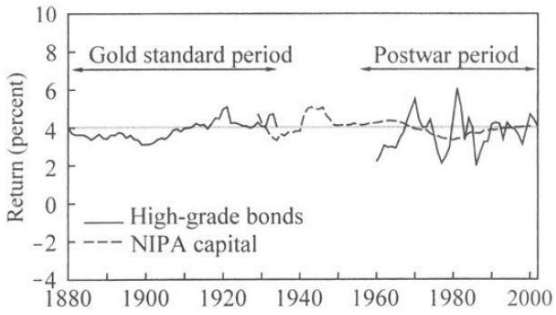


FIGURE 4. DEBT AND NIPA CAPITAL RETURNS, 1880–2002

McGrattan, Ellen R., and Edward C. Prescott. "Average debt and equity returns: Puzzling?." *American Economic Review* 93, no. 2 (2003): 392-397. Figure 3 and 4.

Table 1: excess return

	$E(R - R_f^{bills})$			$E(R - R_f^{bonds})$		
	Equities	Housing	Total	Equities	Housing	Total
(a) Full Sample						
AUS	6.44	5.25	5.84	5.66	4.23	4.95
BEL	6.19	7.88	7.04	4.77	6.52	5.64
CHE	4.60	5.32	4.96	4.45	5.18	4.82
DEU	9.89	9.50	9.70	7.79	7.44	7.62
DNK	4.49	7.61	6.05	3.02	6.16	4.59
ESP	4.46	5.17	4.81	3.42	4.13	3.78
FIN	5.95	3.39	4.67	4.70	2.15	3.42
FRA	5.70	6.15	5.93	4.69	5.14	4.92
GBR	6.31	6.50	6.41	5.21	5.40	5.30
ITA	4.65	7.13	5.89	3.42	5.90	4.66
JPN	4.85	6.80	5.82	3.39	5.33	4.36
NLD	5.95	5.07	5.51	5.18	4.52	4.85
NOR	6.42	6.74	6.58	5.63	5.95	5.79
PRT	5.99	4.90	5.44	5.06	3.98	4.52
SWE	5.75	4.30	5.02	4.87	3.41	4.14
USA	6.95	4.58	5.76	6.37	4.01	5.19
World (pooled)	5.86	6.03	5.94	4.82	5.00	4.91
(b) Post-WW2 Balanced						
AUS	5.79	5.17	5.48	5.05	4.44	4.75
BEL	7.74	5.90	6.82	6.57	4.72	5.65
CHE	7.90	3.59	5.74	6.70	2.38	4.54
DEU	11.77	8.69	10.23	10.39	7.31	8.85
DNK	3.60	5.84	4.72	2.55	4.79	3.67
ESP	5.82	3.59	4.71	4.28	2.05	3.17
FIN	2.82	4.43	3.63	1.63	3.23	2.43
FRA	4.99	4.56	4.77	4.45	4.02	4.24
GBR	7.44	6.34	6.89	6.20	5.10	5.65
ITA	8.12	9.28	8.70	6.34	7.50	6.92
JPN	5.69	6.67	6.18	4.26	5.24	4.75
NLD	6.32	5.02	5.67	5.95	4.65	5.30
NOR	10.71	8.04	9.38	9.11	6.45	7.78
PRT	7.59	5.71	6.65	6.26	4.38	5.32
SWE	7.16	5.47	6.32	6.19	4.50	5.34
USA	5.69	4.17	4.93	4.81	3.28	4.05
World (pooled)	6.81	5.78	6.29	5.66	4.63	5.14

Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. *The total risk premium puzzle*. No. w25653. National Bureau of Economic Research, 2019. Table A.2

Table 2: Implied risk aversion parameters

	(a) Full Sample			(b) Post-WW2 Balanced		
	γ			γ		
	Equities	Housing	Total	Equities	Housing	Total
AUS	33	215	53	69	243	111
BEL	147	26	48	99	185	137
CHE	42	71	56	45	55	50
DEU	28	52	37	28	66	38
DNK	−11	−1593	−33	712	146	210
ESP	21	88	35	63	236	94
FIN	24	52	29	16	−402	47
FRA	18	26	21	36	53	44
GBR	563	847	−1241	68	56	64
ITA	80	−591	290	51	−5084	124
JPN	11	86	23	10	53	18
NLD	−594	42	124	27	41	33
NOR	74	710	152	54	157	77
PRT	32	52	39	107	1868	191
SWE	35	93	49	41	93	60
USA	18	48	24	40	203	62
World (pooled)	46	80	60	41	109	60

Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. *The total risk premium puzzle*. No. w25653. National Bureau of Economic Research, 2019. Table A.6

Table 3: Tests of difference between the two groups over time – matched pairs only

Time	Infrequent (fraction risky asset)	Frequent (fraction risky asset)	Mann-Whitney Test z-statistic (p-value)
Last 20% of Periods	.466	.225	2.477(.007)
Day 1	.1	.115	.604 (.273)
Day 2	.215	.223	.431 (.333)
Day 3	.325	.304	1.182 (.119)
Day 4	.416	.285	1.415 (.079)
Day 5	.463	.247	2.336 (.01)
Day 6	.485	.234	2.506 (.006)
Day 7	.518	.268	2.329 (.01)
Day 8	.537	.282	2.667 (.004)
Day 9	.478	.252	2.213 (.013)
Day 10	.454	.198	2.641 (.004)

Larson, Francis, John A. List, and Robert D. Metcalfe. *Can myopic loss aversion explain the equity premium puzzle? Evidence from a natural field experiment with professional traders*. No. w22605. National Bureau of Economic Research, 2016. Table 2.