On Securities Markets Regulations and Investor's Trading Behavior: First Approach to the Crafting of the Theoretical Model

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Abstract

This research study analyzes how the cultural background of a portfolio manager has the potential to influence choice, and how securities regulation can help correct the resulting biases in trading decisions. Building upon the concept of delta parameter (Crawford & Ostrom, 2005) and prospect theory (Kahneman & Tversky, 1979) we attempt to capture the potential effect of social constructs and other normative influences on individual choice, and claim that country-specific cultural factors exert a decisive influence in investors' perceptions about risk and return, which in turn affects trading decisions. The paper argues that this type of analysis is a necessary prerequisite when trying to predict the effectiveness of international securities regulatory reforms.

Keywords: Behavioral Public Finance; securities regulation; decision theory, regulatory design

1 Motivation

This paper seeks to contribute to what we see as a much-needed discussion: a behavior-informed approach to the regulation of international securities markets, and the expected effects of a progressive harmonization of such regulations across countries.

The debate on regulatory harmonization has been particularly relevant in the European Union context, where members have made efforts to further the integration of their stock markets (references). Asian countries grouped in the ASEAN+1 community have also addressed the issue, as efforts to create a diversified, robust, and efficient regional bond market continue taking place (Asian Development Bank, 2008; Daekeun & Yung Chul, 2004; Eichengreen, 2006; Kim, 2001).

There is an appealing and evolving literature, which argues that public policy analysis design would benefit from the incorporation of behavior-informed theories and methods (Alemanno & Sibony, 2015; Shafir, 2013; Thaler & Sunstein, 2009). Some scholars have been trying to incorporate these ideas to the specific case of securities market regulation (Huang, 2005; La Blanc & Rachlinski, 2005). Advocates of the use of such approaches in finance focus their attention on individual-level variables that are thought to be relevant in decision-making, but that are often eclipsed by simplifying assumptions that facilitate theory building and modeling, but ignore the complexity embedded in human decision-making processes (references). Reality, we sustain, is on the eye of the beholder. And the eye of the beholder is in turn shaped by attitudes and perceptions reflecting, among other factors, reflecting the particularities of the institutional and cultural setting where an individual is raised.

The literature linking the origins of a nation's legal system and economic outcomes offers an illustrative example of the relevance of the subject matter under scrutiny in this paper (La Porta & López-de-Silanes, 1998; La Porta, Lopez-de-Silanes, & Shleifer, 2006; La Porta, Lopez-de-Silanes, & Shleifer, 2008). La Porta, López-de-Silanes and Schleifer (2008) document that countries whose legal traditions built under the premises of common law tend to be more protective of investors than countries whose legal system is inspired on civil law, and that the resulting protection is a strong predictor of financial development. This follows from the fact that conceptions originating in Roman and English laws were

incorporated into specific codes and legal institutions, shaped the beliefs of individuals in the nations were changes were first introduced, but later in countries that were conquered or colonized.

We posit that history has the power to shape ideas and ideals, as individuals start internalizing the embedded features of such laws. It is not a rule law by itself what shapes our actions. Individuals make decisions in one way or another, based on perceptions and attitudes towards such rules and laws that are in turn shaped by the cultural setting. As Elinor Ostrom once suggested, "…individual behavior is strongly affected by the context in which interactions take place rather than being simply a result of individual differences" (Ostrom, 2009).

"[C]ulture has increasingly been understood as a non-fixed, dynamic, and context-dependent phenomenon" (Yates & Oliveira, 2016), a factor that is embedded in our daily activities and defines how individuals perceive their world, and may even influence the way in which we process information. Culture is a powerful force driving decision-making, a force that does not change in the short-term but influences our cognitions, attitudes and perceptions. Modeling the potential effects of this important factor, and deriving testable hypotheses on the inter-connection between culture and trading behavior is a necessary precedent to analyze the effectiveness of securities regulations reform in an international context.

With this in mind, our aim is to supplement the extensive empirical literature with an invitation to readers to explore the issue from a theoretical perspective. Hence, the research questions guiding the discussion that follows are:

- What theoretical approach is adequate to capture the impact of culture on trading decisions?
- How does "culture" enter into the trading decision equation?
- What hypotheses about the impact of rules on trading behavior can be derived from the chosen theoretical model?
- What policy implications can be derived in terms of the effectiveness of regulatory harmonization in securities markets?

2 Theoretical model

Prospect Theory Modeling with/ without Culture

According to the Prospect Theory, the value of an investment can be appraised with the following equations:

$$V = \pi(p)u(x) + \pi(1-p)u(y) \quad \textbf{Eq. (1)}$$

where π is a probability weighting function with the following structure with regards to p.

$$\pi(p) = \frac{p^{\beta}}{p^{\beta}+(1-p)^{\beta}}, \quad \textbf{Eq. (2)}$$

Where $\beta \in (0,1)$. Considering the same simulation made by Kahneman (1979), with $\beta = 0.8$, we can get:

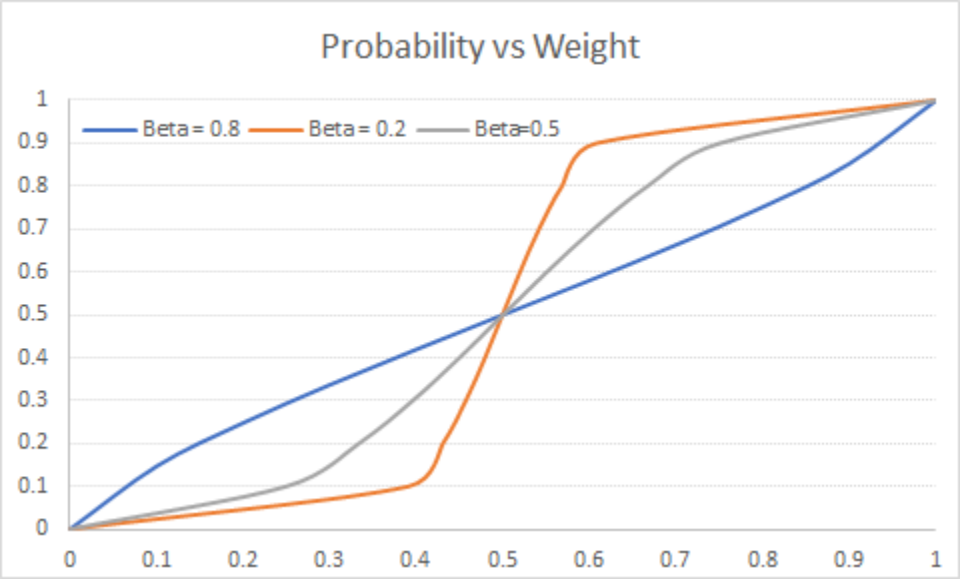

Figure 1

Given that x with probability p and y with probabilyt $1-p$, where $x \geq 0 \geq y$ and $y = u(x)$, we can parametize as below:

$$u(x) = |x|^{\beta} \; for \; x \geq 0 \qquad \textbf{Eq. (3)}$$

$$u(x) = -\lambda|x|^{\beta} \; for \; x \leq 0 \qquad \textbf{Eq. (4)}$$

Assuming that $u(x)$ is increasing in x , concave for gains and convex for losses and first order condition at point 0 is that:

$$\lim_{x \to 0+} \frac{-u(-x)}{u(x)} = \lambda > 1 \qquad \textbf{Eq. (5)}$$

This will result in the following simulation:

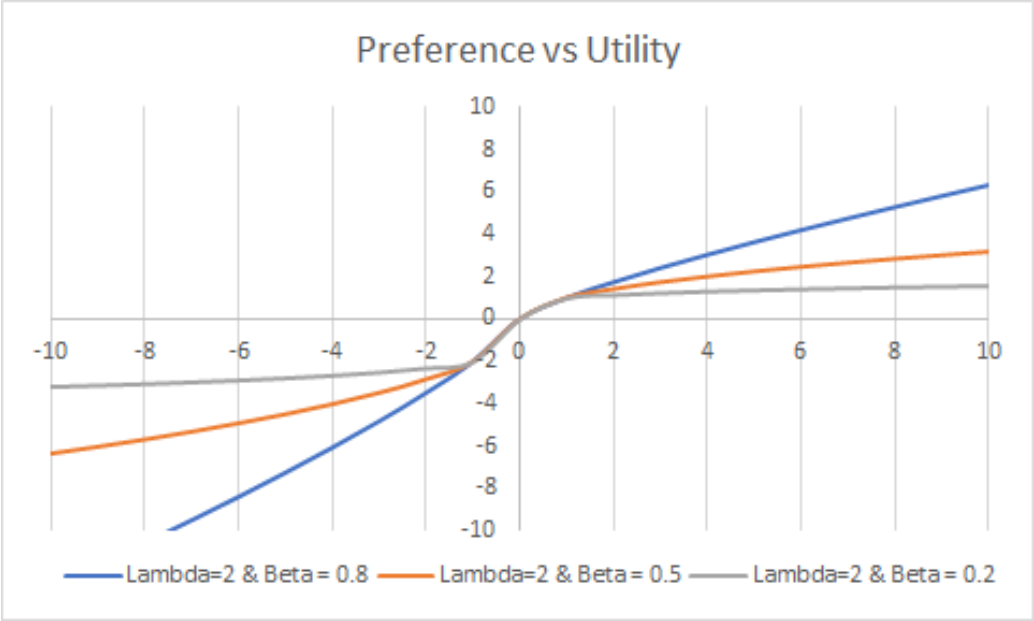

Figure 2

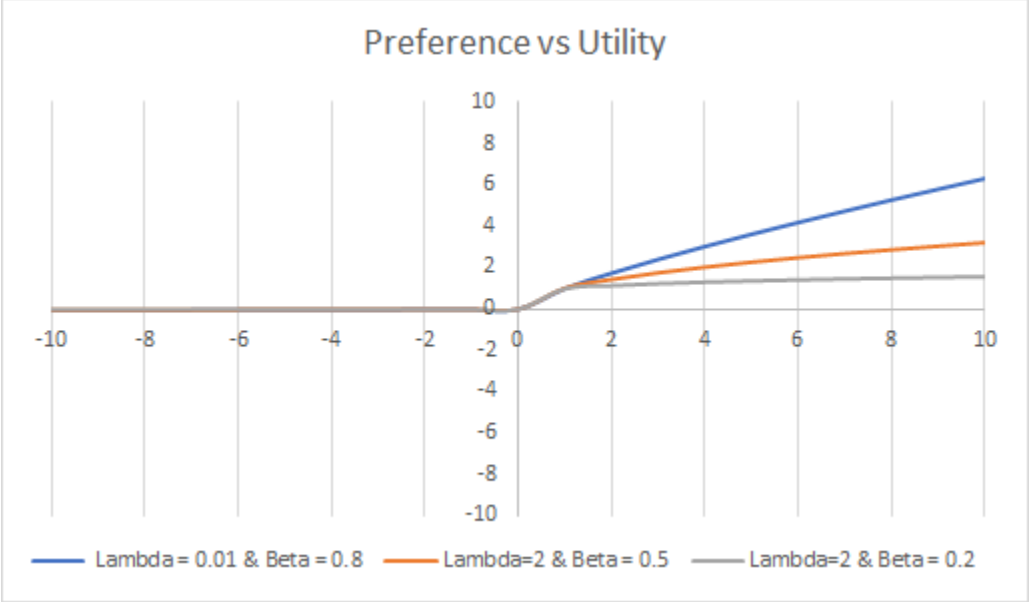

Figure 3

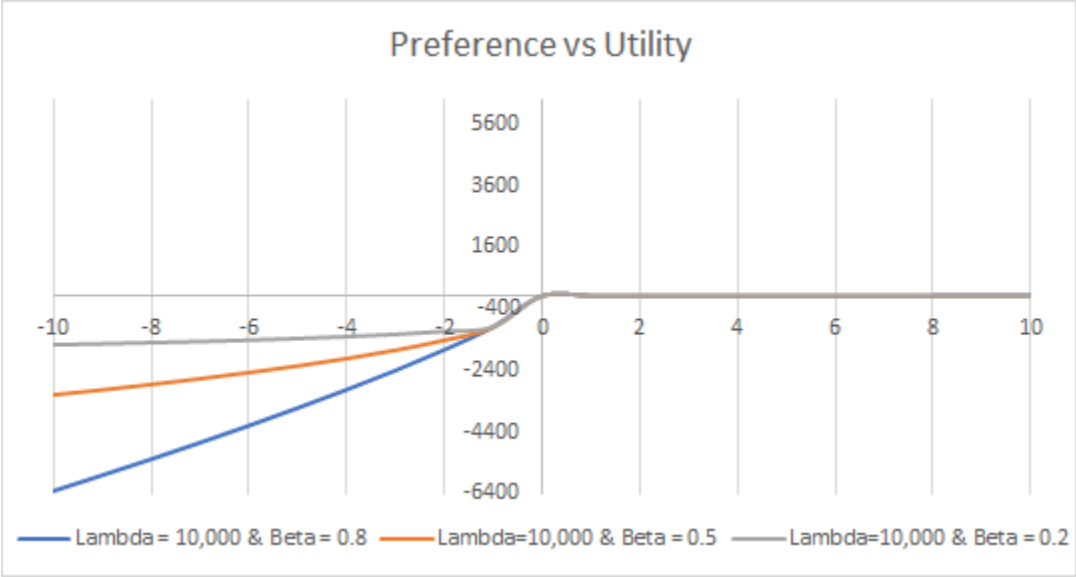

Figure 4

When culture (δ) is considered, it is important to stress that it might magnify or not the result according to the investors' background. Also, it changes very sluggishly during time. Therefore it can be seen as a constant time-invariant for a simpler model.

Given that $\delta > 0$ and also:

$$g(x,y) = \begin{cases} x & with\ probability\ p \\ y & with\ probability\ 1-p \end{cases} \quad \textbf{Eq. (6)}$$

Being the total utility equals to:

$$V = \pi(p)u(x) + \pi(1-p)u(y) \quad \textbf{Eq. (7)}$$

$$V = \pi(p)(|x|^{\beta}) + \pi(1-p)(-\lambda|y|^{\beta}) \quad \textbf{Eq. (8)}$$

If we scaled up the above function in k , it will give us:

$$\delta g(x,y) = g(\delta x, \delta y) = \begin{cases} \delta x & with\ probability\ p \\ \delta y & with\ probability\ 1-p \end{cases} \quad \textbf{Eq. (9)}$$

Since it is monotonic and symmetric. Then,

$$V(kg(x,y)) = \pi(p)(|\delta x|^{\beta}) + \pi(1-p)(-\lambda|\delta y|^{\beta}) \quad \textbf{Eq. (10)}$$

$$V(kg(x,y)) = (\delta)^{\beta}\left[\pi(p)(|x|^{\beta}) + \pi(1-p)(-\lambda|y|^{\beta})\right] \quad \textbf{Eq. (11)}$$

$$V(kg(x,y)) = (\delta)^{\beta}V(g(x,y)) \quad \textbf{Eq. (12)}$$

To calculate the Arrow-Pratt risk aversion, it follows:

$$\rho = -\frac{V''}{V'} = -\frac{V''^{(kg(x,y))}}{V'^{(kg(x,y))}} \quad \textbf{Eq. (13)}$$

$$= -\frac{(\delta)^{\beta}\beta(\beta-1)\left[\pi(p)\left(|x|^{\beta-2}\right) + \pi(1-p)\left(-\lambda|y|^{\beta-2}\right)\right]}{(\delta)^{\beta}\beta[\pi(p)(|x|^{\beta-1}) + \pi(1-p)(-\lambda|y|^{\beta-1})]}$$

$$\rho = \frac{-(\beta-1)}{|x|} \quad \textbf{Eq. (14)}$$

For the same risk aversion, different cultures have different value appraisals.

If we, however, consider the culture as an additive variable in x, then our utility will be deemed like this:

$$V(g(\delta + x, y)) = \pi(p)(|\delta + x|^{\beta}) + \pi(1-p)(-\lambda|\delta + y|^{\beta}) \quad \textbf{Eq. (15)}$$

Then, by analogy, the risk aversion coefficient will be:

$$\rho = \frac{-(\beta - 1)}{|x + \delta|} \quad \textbf{Eq. (16)}$$

It grows smoothly with the cultural change.

3 Discussion:

Drs. Espinosa and Ivo will present the rational of this study to colleagues attending the panel, explain the expected implications in terms of securities regulation design, and, upon receiving feedback from the audience, discuss how the theoretical model depicted above can be related to the other papers presented in the panel.

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