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## The performativity of the Capital Asset Pricing Model (CAPM) and its reproduction through schools

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The paper examines the performativity of the CAPM, according to the three categories of performativity outlined by Mackenzie. It finds that while the CAPM is unambiguously performative at the generic and effective level, it fails to reach Barnesian performativity. Next, it explores, by means of a survey, the manner in which the performativity of the CAPM is shaped and reproduced through the education of future financial professionals in finance programmes, and the attitudes these individuals hold towards the extent of performativity of the CAPM. The survey results indicate that the generic and effective performativity of the CAPM is reproduced and entrenched through the vocationally oriented education of future financial professionals. Further, survey respondents were generally unperturbed by the lack of Barnesian performativity of the CAPM. This, the paper argues, reflects a pragmatism on the part of respondents, whereby application is privileged over theory, and whereby a theory is important to the extent that it is widely applied by others in the real world.

Keywords: CAPM; finance; performativity, theory

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*“Practical men who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back”*

John Maynard Keynes, 1936, *The General Theory of Employment, Interest and Money*

## Introduction

The very act of observation, physicists have found, changes the phenomenon being observed. This statement may be generally applied to a range of fields, not least in finance, in which theory appears to have not so much represented reality as constituted it. In particular, the Capital Asset Pricing Model (CAPM), in formalizing a relationship between risk and return of financial assets, has come to be the bedrock of finance, used by actors in portfolio management, equity trading, and corporate finance.

This paper focuses on the performativity of CAPM, that is, the way in which it has, to use Callon’s phrase, “performs, shapes and formats” finance (Callon ed., 1998). Specifically, it considers 3 things. Firstly, it examines the extent to which the CAPM is performative. Next, it explores, through a survey, how the performativity of the CAPM is shaped by the way it is taught to future finance professionals in schools. Finally, it considers the attitude these future financial professionals hold towards the extent of performativity of the CAPM, and what this implies regarding the attitude of financial professionals towards theory in their field.

The paper unfolds in the following manner. The first section presents a summary of performativity as a concept, particularly in the context of economics. The second section explores the performativity of the CAPM – according to the three categories of performativity outlined by Mackenzie. We find here that while the CAPM is unambiguously performative at the generic and effective level, it fails to reach Barnesian performativity. The third and fourth sections explore, through a survey, how the performativity of the CAPM is shaped and reproduced through the education of future financial professionals in finance curricula. It also considers the attitudes of survey respondents towards the lack of Barnesian performativity of the CAPM. The third section lays out the methodology of the paper’s survey, while the fourth section discusses the results of the survey, its implications, and the limitations of the survey. The final section is a conclusion to the paper.

## I. The idea of performativity

An attempt at summarizing the concept of performativity – as it exists in economics and, more generally, the social sciences - naturally encourages circumspection. The notion is broad, a proliferation of ideas liberally drawn from a diversity of fields, from linguistic philosophy (whence it sprung) to anthropology, sociology, semiotics, and science studies<sup>1</sup> – something of its free-ranging spirit is captured in its jargon, with its blithe coining and recasting of words<sup>2</sup> and references to “cyborgs” and “cognitive prostheses”. It is strongly contested, its provocative propositions prompting criticism from various directions, from linguistic purists who argue that the expansive use of the term “performativity” in social scientific theories contributes to conceptual clutter<sup>3</sup>, to virtualists (Miller, 2002) who contend that performativity is misconceived for the way it mistakes representation for reality, to those who consider its epistemological orientation dangerous in its apparent disregard for the objectivity of truth<sup>4</sup>. It is a field still in the midst of evolution, its boundaries still in flux, and its sprawl of ideas yet to be governed under a systematic framework.

Yet, for all of its complexity, at the heart of performativity lies an idea that is striking in its clarity and import. At its core, performativity is a proposition about the relationship between theory and the world which it seeks to describe. As Aspens (2007) explains, it “refers to the interplay between theories of the [world] and the [world itself]”.

Here we depart from the conventional notion that the two are completely separate, and that while the world is what it is, theory seeks simply to represent the observed phenomena in an abstracted form. In this interpretation of the relationship between theory and reality, the function of theory, as Huntington (1996) would note in another context, is to describe a phenomenon, to explain its underlying mechanisms, and to predict how it would act.

This is true of some theories, and less true for others. It is certainly the case for the vast majority of scientific theories. For instance, in thinking about gravity, we may describe it, explain it and predict how it would

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1. Callon and Muniesia (2008) think that the concept of performativity “suffers from its overly rich polysemy” [my translation] as a result of this cross-pollination across disciplines.

2. Callon (2006) for instance proposes to use the term “economist” to “denote all agents who participate in the analysis and transformation of economic markets”.

3. See for example Maki (2013), who argues that the “vague” usage of performativity in the social sciences to broadly describe how the use of theories have consequences on the social world occludes the distinction between constituting/enacting something and causing something.

4. A discussion of this may be found in Vosselman (2013).

operate under a variety of circumstances. And while a theory of gravity may provide a full understanding of its laws, and furnish a theoretical basis for making use of it (e.g. in constructing a roller coaster, in planning space flight missions), it exercises – and it would be fatuous to expect otherwise - no effect on it. The phenomena observed by science operate by laws that are more often than not immutable and, more importantly, external to us. We are limited only to discovering them and observing them in action.

This is not so of social science theories, which have as their subject of study human beings, whose actions are guided, whether consciously or unconsciously, by thoughts and beliefs, which are mutable, and subject to influence by the theories individuals imbibe. Thus, as Callon (1998) points out, economic actors, when interacting with the world, use economic theories to orient their actions. In so doing, they shape the world according to these theories<sup>5</sup>. We see then how theory is performative, but not simply observing the functioning of the phenomena under study, but rather, in influencing its very action, “performing” it, moulding it to its own likeness. It is important to note here that theory here exists and exercises its influence not just at the level of pure thought, but also in the material world. For a theory is not simply a belief and a worldview to be apprehended intellectually – it is also embedded in the real world, “incorporated”, as MacKenzie (2006) observes, into real-world objects - “algorithms, procedures, routines, and material devices” – which constitutes an environment in which individuals operate, thereby shaping the way in which they think or may think, act or may act. The notion of performativity therefore comprises an inescapable element of materiality: a theory enacts itself into reality – becomes a true description of the world - by going beyond discourse and creating what Callon (2006) calls the “material and textual assemblages” that enable it to be true<sup>6</sup>.

Presently, several typologies exist that serve to parse the theory of performativity. We use in this paper the framework delineated by MacKenzie (2006)<sup>7</sup> for the clarity with which it distinguishes, as testable propositions, the different ways by which theory may shape reality. Accordingly, three levels of performativity

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5. It is perhaps worth mentioning that virtualism, despite its critique of performativity, agrees with the premise that economic models may “transform the world into closer approximations” of themselves.

6. Callon uses MacKenzie’s empirical work on the Black-Scholes model to demonstrate precisely what this means: “MacKenzie rightly talks of “an equation and its worlds”...One world implied by the equation – without which the equation would not function and that which would not function without the equation – is a world in which prices can be observed [to] follow a random walk. It is a world in which “skewnesses” ...will later be calculated and re-injected into pricing formulae, a world in which software (Autoquote) will allow the production of continuous quotation even for options with low liquidity. It is a world which has its vocabulary, its evaluation criteria, a world in which the notion of implied volatility, a simple mathematical variable, becomes observable and calculable..What MacKenzie describes with surgical precision is the gradual actualisation of the world of the formula...[a] formula that previously functioned in a paper world, subsequently functions, after many investments, in a world of computers and silicon, algorithms, professional skills, and cleverly adjusted institutions.”

7. Callon and Muniesa (2008), for instance, discuss the concept of performativity in terms of its “constitutive tensions”.

may be perceived. At the first level is what may be termed “generic” performativity, whereby an aspect of economic theory is used, not simply by academics, but also by actors in the real world. The second is “effective performativity”, whereby an aspect of economic theory is not only used, but that its very usage “makes a difference”, perhaps by enabling a process which would not have existed without the theory, or by changing it from how it would have operated in the absence of the theory. The third is “Barnesian performativity”, defined as the use of theory by economic actors which “[alters] economic processes or outcomes ....so that they better correspond to the model.” Here then, reality conforms to theory by dint of “self-validating feedback loops”<sup>8</sup>.

Crucially, a difference should be noted between performativity and a self-fulfilling prophecy, which has a precise technical meaning. The latter refers only to a mistaken prediction which, in shaping the responses of actors, “generates its spurious confirmation” (Calhoun, 2010). Performativity is a larger conceptual category that includes both valid and invalid theories, though it should be said that if the latter may exist in the short run, its invalidity would soon be clear to economic actors, ensuring its obsolescence. Further, performativity differs from a self-fulfilling prophecy in its emphasis on the “embeddedness” of a theory.

And certainly, in the field of finance, models are performative, functioning, to use Mackenzie’s metaphor, not simply as a camera, “passively recording” what occurs in markets, but an engine, altering markets and, in certain cases, actively enabling their action. Indeed, it was only with the development of financial theory from the 1950s that modern finance was born. The classic example is that of the Black-Scholes-Merton options pricing model. In providing for a way for options and their risks to be priced, the model made it possible for a vast array of option markets to be created, in the fields of equities, interest rates, currencies, and commodities. And thus, the number of call option contracts changing hands at the Chicago Board Options exchange daily jumped from 911 in 1973 to 100000 in 1977 (MIT Sloan Management, 2013). By 2007, the international system would be trading, according to Stewart (2012), 1 quadrillion dollars’ worth of derivatives per day – “10 times the total worth, adjusted for inflation, of all products made by the world’s manufacturing industries over the last century”.

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8. It may be noted here that the notion of Barnesian performativity accommodates the possibility of assessing truth, though it makes the point that truth, as Paul Veyne famously observed, “has a history”. The epistemological concern held by some that the concept of performativity in economics may diminish the possibility of appraising theoretical truth may thus be overblown. As Maki acutely points out “...it is not the case that if a theory “performs its target, it therefore is not or cannot be (more or less true)”. Indeed, performativity has it that an economic theory becomes a true description of observable reality to the extent that it has been successfully adopted and implemented in reality – to the exclusion of other theories. Thus, truth, far from being unalterable, is often provisional, the contingent outcome of “struggles”, as Callon characterises it, between competing theories and programmes.

## II. The CAPM and its performativity

We turn now to the CAPM, developed by Sharpe and Markowitz, and variously described as the “canonical model” (Mackenzie, 2006), the “revolutionary idea” (Dempsey, 2012) that underpins much of modern finance theory<sup>9</sup>. Before exploring the performativity of CAPM in the field of finance however, it is worth considering first the central ideas of the model.

At its heart, the CAPM describes the relationship between risk and return, premised upon a set of particular assumptions<sup>10</sup> about the market and the investors acting within it. Notably, it conceives of a perfectly efficient market, in which: i) there is an absence of transaction costs, through taxes or commissions; ii) a single risk-free interest rate exists, at which all investors may borrow and lend; iii) all investors hold equal access to all securities; and iv) perfect information is freely available to all actors. Within this frictionless market, investors operate, who: i) are so numerous as to be price-takers; ii) consider the same one-period investment horizon; iii) being identically rational and risk-averse, choose to own “mean-variance-efficient” portfolios, in that they seek to minimise the variance – volatility - of portfolio return, given expected return, and maximize expected return, given variance; and vi) hold homogenous beliefs about the market, i.e. that they are in complete agreement about the investment opportunities for the assets existing in the market.

Under these particular conditions, the CAPM demonstrates that the relationship between the expected return of an asset and risk may be expressed as

$$R_i = R_f + \beta_i (R_m - R_f)$$

Whereby, the expected return – i.e. the average return - of an asset,  $R_i$ , is equivalent to the risk-free interest rate,  $R_f$ , plus a risk premium, which is the asset’s beta  $\beta_i$  multiplied by the market risk premium ( $R_m - R_f$ ).

A few things may be noted about the formula. Firstly, the expected return of an asset, measured as a percentage, refers to the cash dividends received plus the net capital gain – a positive or negative figure - during the holding period divided by the purchase price of the security. Secondly, the market risk premium is the excess return of the market,  $R_m$ , over the risk-free rate. It is essentially the compensation required by

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9. Notably, the Black-Scholes-Merton model was built upon the CAPM

10. The assumptions listed in the paragraph are drawn principally from Shapiro (2003) and Fama and French (2004).

investors for bearing the additional risk of a market portfolio relative to a risk-free asset<sup>11</sup>. Crucially, the market portfolio referred to here is one that is properly diversified so that its risk is, as David Mullins (1982) points out, exclusively systematic, which is to say, “inherent in the overall performance of the stock market”, which tends towards volatility. Finally, the beta of an asset is a measure of an asset’s sensitivity to market volatility, expressed formally as the co-variance of its return with the market return divided by the variance of the market return. While a financial asset with a beta of 1 would be as volatile as the market, rising and falling at the same percentage as it, an asset with a beta of 1.55 – the average value of a Metals & Mining company stock<sup>12</sup> – would be more volatile than the market, with its return fluctuating by 1.55 times that of the market.

The CAPM thus tells us that the average return of an asset is driven by just three things: the risk-free rate of interest in the market, the risk premium of the overall market, and the asset’s volatility relative to the market volatility. Risk and return are positively related: the higher the risk of an asset, the higher its average return. Importantly, as a formal expression of the relationship between risk and return, it tells us that the only risk for which investors are compensated for is systematic risk. Unsystematic risk – the risk specific to a company – is not compensated by the market since the investor could eliminate it simply by portfolio diversification<sup>13</sup>.

Today, the CAPM is such an institution within finance theory, its insights so familiar to us, that it is perhaps easy to forget its significance and fixate upon what appears to be its obvious absurdities: the highly unrealistic assumptions creating the rarefied world that the CAPM inhabits. However, in so doing, we fail to apprehend the paradigm shift introduced by the CAPM in our understanding of asset pricing. As Perold (2004) notes in his delightful study on the model, before the CAPM, “risk did not enter directly into the computation of the cost of capital”, and attempts to incorporate the former into the latter relied invariably on “rules-of-thumb [that] were ad hoc at best”. Indeed, as Modigliani and Miller summed up in a review of finance theory in 1958, “no satisfactory explanation has yet been provided...as to what determines the size of the risk [adjustment] and how it varies in response to changes in other variables.”<sup>14</sup> The CAPM would furnish just that, with its formula providing, as Fama and French (2004) remark, “powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk.”

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11. Conceptually, the market risk premium is the compensation that investors require to make them, as Duarte and Rosa (2015) put it, “indifferent at the margin between holding the risky market portfolio and a risk-free bond.”

12. Figure taken from Damodaran’s database on worldwide industry betas as of January 2016, which is available here: <http://www.stern.nyu.edu/~adamodar/pc/datasets/betas.xls>

13. An easy enough task given the CAPM assumptions of perfect information and equal access of all investors to all assets in the market. In practice, as Mullins (1982) observes, empirical studies suggest that “unsystematic risk can be virtually eliminated in portfolios of 30 to 40 randomly selected stocks.”

14. Quote found in Perold (2004).

The theoretical importance of the CAPM is thus indisputable; yet, to return to the question, has this translated into a measure of influence on the practice of finance? At the level of generic performativity - the extent to which the CAPM is used by actors in the financial world - the record of the CAPM appears indisputable.

Indeed, since its introduction more than 50 years ago, the CAPM has become, as Damodaran (2002) notes, “the standard model for measuring market risk in finance”. In a survey conducted by Bancel and Mittoo (2014), of 356 financial professionals<sup>15</sup> across 10 European countries with CFA or equivalent qualifications, nearly 80% of respondents used the CAPM model to estimate the cost of equity. The 2013 Valuation Survey carried out by KPMG in Australia found that “the CAPM is the most popular model being used to derive a cost of equity estimate, with all participants always or sometimes using this model” (KPMG, 2013). Notably, 82% of the surveyed participants “always used the method”, with the remaining 18% using the method “sometimes”. The 2014/2015 PWC Corporate Finance Survey in South Africa affirmed as well the primacy of the CAPM as a valuation tool (PWC, 2015), with 86% of respondents stating that they “always use it”, 11% stating that they “frequently use it”, and 3% stating that they “sometimes use it”. As for Asia, while no such business valuation survey appears to have been undertaken as yet, an investment banking analyst working in Singapore who was surveyed for this paper stated categorically that “the CAPM has become an industry practice” in business valuation, and that, to her knowledge, “no one in the [investment banking] industry [in Singapore used anything other than the CAPM]”. We see then that the generic performativity of the CAPM in finance is unambiguous.

Given the ubiquity of the CAPM as a tool of valuation, the same may be said perhaps for its effective performativity – defined by “the difference it makes”, an admittedly woolly definition which may be measured, as mentioned earlier, by the way it enables a process to be undertaken which would not have existed without the theory, or changes it from how it would have originally operated. We consider first the latter. Here, the academic literature shows evidence that the CAPM has changed processes in the financial world. As Perold (2004) notes, prior to the development of the CAPM, a popular method of estimating the cost of equity was the Gordon-Shapiro dividend model, in which the cost of equity was “[inferred] from future dividend growth rates”. A survey conducted by Istvan (1961) found that in the late 1950s, “financial decision makers [in the US] widely used payback period and simple internal rate of return methods” in their cost of capital calculations. Yet, by 2001, 73.5% of 392 CFOs surveyed by Graham and Harvey (2001) stated that they used the CAPM method in their capital budgeting planning. The surveys cited earlier suggest that this change in the cost of capital calculation shows no sign of being reversed.

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15. Portfolio managers constituted the single largest group in the sample at 23%, followed by financial analysts (22%), investment bankers (19%), and valuation experts (16%).

As for the criteria of creating a process that did not previously exist, we may note that the CAPM has provided the intellectual underpinning for the presently widespread practice of indexing, that is, passively investing in a market portfolio. Indeed, the central insights of the CAPM, that only systematic risk matters for the return of an asset and that the most efficient risky-asset portfolio is the market portfolio, provoked, as it were, the rise from the 1960s of mutual funds that sought exclusively to replicate broad-based indices. Indeed, passive investing has grown dramatically, particularly over the recent years, to the extent that, according to a Vanguard report (Philips, Kinniry Jr, Schlanger & Hirt, 2014), “US-domiciled index mutual funds and exchange-traded funds (ETFs) accounted for 35% of equity, and 17% of fixed income funds” in 2013. The 2015 Investment Company Factbook corroborates the trend, stating that whereas from 2007-2014, index funds received \$1 trillion in net new cash in the US, actively managed domestic equity mutual funds experienced a net outflow of \$659 billion in the same period (ICI, 2015), a testament to the phenomenon fuelled by the CAPM.

It is clear then that the CAPM is performative at a generic and effective level. Yet, its Barnesian performativity – the extent to which theory alters processes or outcomes to conform to itself - is rather more qualified. While the early empirical tests carried out on the CAPM did show that the relationship between the average asset return and beta was linear, a result consistent with the model, they also indicated that the model tended to overstate the risk-free rate and understate the market risk premium<sup>16</sup> - a fact that has been borne out by subsequent studies.

Later empirical studies would provide more fundamental criticism of the CAPM. The central prediction of the model is that the expected return of an asset is explained exclusively by three things: the risk-free rate, the market risk premium, and the sensitivity of the asset to market volatility (beta). The corollary of this is that any difference in the expected return across assets would be due solely to differences in the beta, since the risk-free rate and market risk premium are constants. Yet, beginning from the late 1970s, there emerged a myriad of empirical studies that found that the CAPM consistently failed to account for anomalies in stock returns, which could be reliably explained by variables, as Bhatnagar and Ramlogan (2009) note understatedly, “[with] no special standing in asset price theory.” Basu (1977) documented a positive relationship between expected returns and earnings-price ratio; Bhandari (1988) demonstrated a similar link between asset return and the level of leverage. Perhaps the most prominent critique came from Fama and French in 1992. Studying the stock returns in the NYSE, AMEX, and NASDAQ markets from 1962-1989, they found that

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16. Phrased differently, the linear relationship between the average return and beta derived by these early tests was too flat. The time series regressions run in these studies, as Fama and French (2004) point out, “consistently find that the intercept is greater than the average risk-free rate..., and the coefficient on beta is less than the average excess market return.”

whereas the factors size and book-to-market equity “combine to capture the ... variation in average stock returns”, the “relation between beta and average return for 1941-1990 is weak, perhaps nonexistent, even when beta is the only explanatory variable [in the regression].”

Fama and French’s conclusion is that the empirical record of the CAPM is “poor - poor enough to invalidate the way it is used in applications.” And indeed, academics have called for the use of alternative models to price assets, such as the Arbitrage Pricing Theory or the Fama and French Three Factor Model. Aswath Damodaran, a professor of finance at NYU, has been particularly vocal in his criticism of the CAPM, stating that “removing the CAPM from my toolbox will in no way paralyse me in my estimation of value” (Damodaran, 2011).

Though the CAPM achieves generic and effective performativity, it has consistently failed to reach Barnesian performativity. It is an intriguing point of observation that the usage of the CAPM remains ubiquitous even though its predictions have not quite been borne out in reality. How can we explain the success of the model, its entrenchment in the practice of finance despite the relative scarcity of evidence affirming its truth?

This study seeks to explore this situation through two lines of inquiry. Firstly, how is the generic and effective performativity of CAPM reproduced through the education of future financial professionals? Secondly, what are their attitudes towards the lack of Barnesian performativity of the CAPM?

### **III. Methodology of study**

A survey of 32 individuals was conducted, all of whom had studied finance at university, either at undergraduate or graduate level. 27 of these individuals had experience - prior and ongoing - in finance, and, of the 27, 21 were, at the time of writing, working at the investment banking division of BNP Paribas in Paris<sup>17</sup>.

The respondents came from 11 universities, 2 Singaporean, 8 French, and 1 Italian (see Appendix). They are: from Singapore, the National Technological University of Singapore (NTU) and the Singapore Management University (SMU); from Italy, Bocconi University; and from France, Dauphine, EDHEC, ESCP Europe, EM Lyon, ESSEC, HEC, NEOMA Business School, and Sciences Po. These institutions are highly ranked and prestigious, on account of the strength of their finance programmes and, perhaps more significantly, the

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17. One of them was a first-year analyst in the department, while the rest were interns with whom I worked while interning in the same department.

access that they provide to selective jobs in the corporate sector<sup>18</sup>. This status allows us to say our sample, though small, is nevertheless relevant.

The respondents were asked to fill in a series of survey questions (see Appendix) through a questionnaire, available in both online and written versions. The questionnaire comprised 3 sections. The first section consisted of basic background questions aimed at understanding the academic formation as well as occupation of the respondent.

The second section considered how the performativity of the CAPM is reproduced through schools. To that end, 4 main questions were posed to respondents: i) whether the CAPM was indeed taught in their curricula; ii) whether students were taught the limitations of the CAPM, iii) whether alternatives to the CAPM model were taught to them, and iv) the extent to which they perceived the CAPM to be important in finance. In addition, respondents who possessed professional experience (through internships or full-time jobs) were asked 2 further questions: i) whether they had used the CAPM in their line of work, and ii) whether they used alternatives or modifications to the CAPM in their work

In the final section, 5 questions were posed, designed to elicit their attitudes towards the lack of Barnesian performativity of CAPM i.e. that the model failed to provide predictions conforming to real-world results. The questions were: i) were they aware that there is considerable empirical evidence against the CAPM; ii) whether they found it problematic that the CAPM was not empirically strong; iii) whether they would be comfortable using a tool of finance without understanding it; iv) the extent to which they agreed with the statement that “in finance, knowing how to use a tool is more important than understanding the theory behind it”; and iv) the extent to which they agreed with the statement “in finance, the importance of a tool is determined by its extent of usage by others”.

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18. For elite firms tend to hire largely from a closed set of “target schools”, while, as Rivera (2012) notes, competition is “largely closed to students who do not attend prestigious schools”. This is recognised to be particularly true of firms in the financial sector. Banks identify selected universities, for which they run recruitment programmes that span from case study sessions to introductory cocktails and campus-specific interviews. It is a point of interest to note the extent to which the relationship between these firms and schools may be a self-replicating loop. Firms often despatch, for these events, alumni employees to recruit students who would become in turn alumni employees; the career services department in schools encourage and facilitate networking – through events or the simple provision of an email - between students and alumni, the latter often happy enough to oblige, whether through a sense of simple kindness (helping a desperately job-seeking student out) or attachment to their alma mater. It is difficult to overstate the importance of networking in securing access to an industry where competition for limited places remains, despite the relative industry decline in the past years, ferociously keen - surveys conducted by the Association of Graduate Recruiters suggest that there are about 125 applicants for each full-time investment banking position.

## IV. Survey results and discussion

### IV.A. The reproduction of the performativity of CAPM through schools

We turn first to the way in which the generic and effective performativity of the CAPM is enacted through the education of future financial professionals.

When asked if they had learnt the CAPM in school, all 33 survey respondents replied in the affirmative. Additionally, 16 of them mentioned that the CAPM was the only asset pricing model that they had been taught. The other 17 indicated that they had learnt alternative models in class, with the most commonly cited alternative models being the Arbitrage Pricing Model (mentioned by 6 out of 17 respondents), followed by the Fama-French Tri-Factor model (2 of 16). Strikingly, among the respondents who had learnt alternative asset pricing models in school, a majority (10 out of 17) stated that it was the CAPM that was given the most weight in the curriculum. 3 stated that alternative models were given more emphasis, 1 stated that there was no marked focus on any one model, while 3 did not respond to the question. 26 of the 33 respondents stated that they had been taught the limitations of the CAPM.

The survey results demonstrate the striking preponderance of the CAPM in finance curriculum. 26 out of 33 respondents indicated that the CAPM was, if not the only asset pricing model taught in school, certainly the model accorded the greatest curricular weight. This finding bears out Fama and French's observation that the CAPM is "the centrepiece of MBA investment courses...[and] often the only asset pricing model in these courses" (Fama & French, 2004). It is perhaps unsurprising that the respondents were almost unanimous in their view of the importance of the CAPM. 24 of them stated that the CAPM was "quite important" in the field of finance, while 8 thought that the model was "very important". 1 contrarian took the opposite view, indicating that the model was "quite unimportant".

What explains the emphasis of the CAPM in finance programmes taught at university? Perhaps the answer resides in the fact that many finance courses are vocational in orientation<sup>19</sup>, often taught by professionals in the field, with a marked accent placed on learning what is actually used in the field rather than abstract theory. Certainly, this seems to be the case for respondents who studied at Sciences Po, a few of whom, when asked follow-up questions outside the survey, mentioned that their professors – all of whom are practitioners rather than academics - had taught only CAPM since it was the predominant tool used by financial practitioners.

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19. A fact perhaps underlined by the requirement, in most business schools in France, to do a six-month internship (a quarter of the total length of the programme) in order to graduate.

Other respondents who had learnt other asset pricing models expressed a similar view; those who cited the CAPM as the model given the most weight in class, when asked the reason for the curricular emphasis, explained in terms of its real-world applicability: it is “the most used” model; “it is a practical model...not just theory.” Tellingly, a respondent, who had studied at both Bocconi and HEC, stated that while the arbitrage pricing model had been taught in class, “[it] was always presented as rather impractical.”

And the perception held by future finance professionals of the primary importance of the CAPM as an asset pricing model, if shaped during school, is lent confirmation upon their exposure to the working world, whether on internship or on a full-time position. One respondent, an investment banking intern in Paris, noted that at the firm at which he was working, “[for the] calculation of the cost of capital...there are no other models used by the bank”. Another respondent, an investment banking analyst in Singapore with 3 years of experience, corroborated his observation, stating that “it has become standard industry practice for everyone to use the CAPM”, and that “no one in the industry” worked with alternatives to the CAPM.

It may thus be seen how the generic and effective performativity of the CAPM is replicated through schools in an often self-reinforcing cycle. Students in finance and business courses are often taught the CAPM as the dominant or sole paradigm for asset pricing, generally by financial practitioners. The vast majority of whom use, as mentioned previously, the model almost all the time. Well-drilled in the one method that they know to be ubiquitous, the students enter the field to be exposed to the CAPM, to the exclusion of other alternatives. Some eventually become professors in finance courses. In this way, schools and the field of finance combine to perpetuate the performativity of the CAPM in a constant cycle.

#### **IV.B. Attitudes towards the lack of Barnesian performativity of the CAPM**

Yet, it should be noted that the continuation of the generic and effective performativity of the CAPM through schools is not mindless – the uncritical transmission and acceptance of a widely circulated concept. We recall that 26 of the 33 respondents stated that they had been taught the limitations of the CAPM. Presumably then, most respondents were aware that the CAPM could not be said to be performative at the Barnesian level – that it does not provide accurate estimations of asset returns. The second section of the survey aimed at exploring their attitudes towards the contradiction of being taught to use a dominant model which consistently provides flawed results.

We may begin the discussion with a seeming contradiction: when asked whether they were aware that there was considerable empirical evidence against the CAPM, just 20 of the 33 respondents replied in the affirmative, a lower number than those who had indicated having learnt the limitations of the CAPM in

school. Surely the lack of empirical evidence constitutes the primary limitation of the CAPM? Or perhaps, an explanation may be that while some of the respondents were aware that the CAPM made simplifying assumptions, and might thus derive results different from the real world, they did not know the magnitude of evidence against it. The apparent incoherence might have been lessened had the question been differently phrased, by dropping the word “considerable” from the question.

Next, the respondents were directly asked about their view on the CAPM’s lack of Barnesian performativity: was it problematic for them that the empirical evidence for the CAPM is not strong? Here, only a minority of respondents (12 out of 33) responded in the affirmative. 19 responded in negatively, while 2 abstained from responding. It is a curious finding, that the respondents appeared on the whole comfortable with the notion that a widely used theory in their field does not quite bear out in reality.

Could such a response be due to a certain pragmatism related to the vocational nature of most finance courses? Students enter the field with the overriding aim of obtaining work in finance. The priority would thus be to learn how to use the tools needed for work in the industry, rather than understanding the theory behind the application, a viewpoint reinforced by the curricular emphasis on what is applicable in the field. Moreover, it is true that the varied backgrounds of individuals who enter finance mean that not everyone is equipped to understand the highly technical nature of finance theory (applying the results of the theory is, in comparison, considerably easier) One may be an excellent car driver without having any knowledge of mechanical engineering.

The survey results do suggest that the explanation has a degree of truth – though it is in need of some reworking. Addressing first the latter, a clear majority of the survey participants - 27 out of 33 - responded in the negative when asked whether they would be comfortable using a tool of finance without understanding it. The analogy of the car driver then runs slightly false. It may be that in finance, it is not possible to draw a clear distinction between knowing how to use a tool and understanding why it works. The oft-quoted statement that finance is as much an art as a science<sup>20</sup> means that practitioners must know how to adapt the tools according to different circumstances. To take the CAPM as an example, the formula is unambiguous in theory as to the variables required to derive the rate of return of an asset. Yet things immediately appear less straightforward when one attempts to apply it. What, to take just a single example, beta should we use when calculating the cost of equity of a company? Its average daily beta for the past one year? Or should the time

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20. Gitman (2012), professor of finance at San Diego State University, for instance defines finance as the “art and science of managing money” in his *Principles of Managerial Finance* textbook; Damodaran considers the valuation process – of which asset pricing is a part – as “somewhere in the middle” between art and science. Damodaran, A. *What is Valuation*. Accessed from: [http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/background/valintro.htm](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/background/valintro.htm).

horizon be five years, and the beta calculated on a weekly rather than daily basis? In the case of a company that has recently changed its business, would it make more sense instead to use a forecasted beta since its historical beta captures its relative market volatility as a result of its past business activity?<sup>21</sup>

Clearly, there is a need for judgement on the part of financial actors when using financial tools, which in turn requires an understanding of how they actually function. This may explain why such a firm majority of survey respondents expressed their discomfort with using a tool without understanding it. Yet it must be noted that while many might be uneasy about using a tool without comprehension, a slight majority of respondents – 18 out of 33 – actually agreed overall with the statement that it is more important to know how to use a tool of finance than to understand the theory behind it. In effect, 5 strongly disagreed with the statement, 10 disagreed, 15 agreed with the statement, while 3 strongly agreed. If a distance from unanimity on the question, the respondents nevertheless displayed a perceptible inclination towards prioritising application over theory.

The responses of the survey participants to the two questions appear contradictory. But they may perhaps be reconciled by refining the initial explanation about pragmatism prompting the respondents' relative unconcern about the CAPM's weak empirical evidence. Perhaps it may be that though the respondents are interested in theory, such an interest is instrumental. They are interested in theory insofar as it enables them to use the tool. Thus, while one would need to understand precisely what the beta is in order to know what proxies should be used in different contexts, a debate about whether it is really true that only systematic risk is compensated by the market – the point on which the CAPM turns, and from which other asset pricing models diverge - may seem needlessly academic.

We turn finally to the last question, where respondents were asked to state their extent of agreement with the statement “in finance, the importance of a tool is determined by its extent of usage by others”. A strong consensual agreement was seen, with 27 out of 33 respondents at least agreeing with the statement, and, of the 27, 13 expressing strong agreement. Of the 6 who disagreed with the statement, none strongly agreed. The unequivocal response to the last question provides yet another clue to understanding the mind set of

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21. The examples can be multiplied. What constitutes the market risk premium? In the case of a European asset, the broad consensus would be that the excess return of a broad-based European index – often the Stoxx 600 - would be a good proxy. Would that, however, be the most appropriate measure to use when calculating the cost of equity of a Swedish telecoms company largely focused on the Scandinavian market? Upon reflection, a Scandinavian index might appear to be the most appropriate recourse, but one must contend then with the relative lack of liquidity of Scandinavian markets, which would elevate the risk premium. The fact that picking these variables admits of a degree of subjectivity means that the cost of equity calculation quite often is an issue of negotiation in M&A transactions. Whereas the buyer would have an interest in a higher cost of equity, since it would increase the total discount rate and lower the company valuation, the seller would seek the opposite in looking for as high a selling price as possible.

respondents with regard to the CAPM and its lack of Barnesian performativity. The respondents may have learnt the limitations of the CAPM in school, and been made aware of its lack of empirical proof; yet a majority of the respondents are fine with it because it is, to quote a respondent, “standard industry practice”. A theory is important if everyone thinks it important. This may reflect the close attention paid by actors in finance to the actions of others, which in turn reflects an understanding that in finance, actions tend to be self-fulfilling. Consequently, in finance, actors often have to “get up and dance”, as the former Citigroup CEO Chuck Prince famously remarked, “as long as the music is playing” (The New York Times Dealbook, 2007). Here, it may perhaps be said that the survey respondents demonstrate another facet of their inclination toward application rather than theory, by privileging theory that is widely applied by others.

Thus, concerning the lack of Barnesian performativity of the CAPM, a majority of survey respondents were not perturbed by it. The CAPM remains fundamentally important to them since it is widely used in the financial world. This may be due to the understanding that in finance, the actions of others are important since collective action tends to be self-fulfilling. Thus, we may see how the respondents privilege the generic and effective performativity of the CAPM over Barnesian performativity. Moreover, it may be said that the sanguine attitude towards the empirical weakness of the CAPM reflects a pragmatic view that in finance, application is more important than theory, that what is important is to learn how to operate the tools currently used in the trade than to engage in a debate about them.

#### **IV.C. Limitations of the survey**

The sample size of the survey is small. Getting a larger and more diverse sample of future finance professionals would allow for a more representative survey of opinions to be obtained. Presently, only 33 individuals were interviewed, drawn from 11 schools, with 10 respondents coming from Sciences Po. Further, it is true that the findings of the survey would have been stronger if the survey had been combined with interviews. As it happened, since this was a survey available in a written or online format, the gaps in responses – for instance, the fact that some individuals claimed to be aware of the limitations of the CAPM but not to know that there was considerable empirical evidence against it – could have been clarified immediately, rather than subject to conjecture. Further, perhaps some questions could have been more trenchantly phrased to get better answers. For instance, asking “Is it a problem that most people continue to use the CAPM even when more accurate estimation methods are available?” would have presented more clearly to the respondents the problem of the CAPM’s lack of Barnesian performativity. The actual survey posed rather the question “Is it problematic for you that the empirical evidence of the CAPM is not strong?”. Finally, more in-depth questions could have been asked. It would have been interesting to understand, for instance, the extent to which the respondents’ acceptance of the CAPM’s lack of empirical grounding is

conditioned by the generally held view that finance is as much an art as a science – an attitude permissive to margins of error, even if they may be unnecessarily large. These are all directions for future research.

## **Conclusion**

In conclusion, the CAPM is generically and effectively performative, though it does not reach Barnesian performativity. And in the survey carried out in the paper, we find that the generic and effective performativity of the CAPM is reproduced and entrenched through the vocationally oriented education of future financial professionals, with the theory being, if not the only asset pricing model taught to them, certainly the one receiving the greatest curricular emphasis – a reflection and consequence of the model's preponderance in the real world. As for the attitudes of future financial professionals to the lack of Barnesian performativity of the CAPM, we note that the respondents were generally unperturbed by it, due largely to its strong generic and effective performativity. This in turn reflects a particular sort of attitude towards theory, whereby it is important to the extent that it is widely applied by others in the real world, and also, for many, a signal preference to apply a theory rather than to understand it.

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**Appendix: Survey Form**

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**The Performativity of CAPM**

**Full name**

**Academic formation (undergraduate and above)**

**Occupation**

**Age**

**Did you learn the Capital Asset Pricing Model (CAPM) in school?**

- Yes
- No

**Were you taught other methods of estimating the cost of equity? (eg. Arbitrage Pricing Model and Multi Beta Models)**

- Yes
- No

**[For those who answered "Yes" to the previous question] Which model was given the most weight in class? Why?**

**Were you taught about possible modifications to the CAPM? (eg. accounting for the size premium in the model)**

- Yes
- No

**Did you learn about the limitations about the CAPM in school?**

- Yes
- No

**Do you have any professional experience in finance? (including internship(s))**

- Yes
- No

**[If "Yes" to the previous question] Did/Do you use the CAPM in the course of your work? If so, in what context?**

**[For those with professional experience in finance] Did/Do you use any alternatives to the CAPM in the course of your internship? If so, what were they?**

**Did/Do you use the CAPM in a modified form? (accounting for size premium, country risk premium etc.)**

- Yes
- No

**To your mind, how important is the CAPM to finance?**

- Unimportant
- Quite unimportant
- Quite important
- Very important

**Are you aware that there is considerable empirical evidence against the CAPM?**

- Yes
- No

**Is it problematic for you that the empirical evidence for the CAPM is not strong?**

**Would you be comfortable using a tool of finance without understanding it?**

- Yes
- No

**In finance, knowing how to use a tool is more important than understanding the theory behind it**

- Strongly disagree
- Disagree
- Agree
- Strongly agree

**In finance, the importance of a tool is determined by its extent of usage by others**

- Strongly disagree
  - Disagree
  - Agree
  - Strongly agree
-