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100 research ideas: extending the frontiers of research in corporate finance

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ABSTRACT

Where can one systematically find research ideas? I propose a scheme to classify and broadly generalize the sources of inspiration for research topics, with emphasis on corporate finance. In the process, I propose 100 new research topics awaiting the brave and persistent.

1. Introduction

This paper attempts to address a dilemma that has long vexed many researchers: The question of where to systematically find research ideas.

To push beyond the current frontier of research, it would be helpful if one could visualize the shape and size of the frontier. In the following, I propose a systematic taxonomy of the sources of ideas for social science research, which includes economics and finance.

I organize research frontiers into six sources of origin, plus the current state. I call it “The Cube”.

In Section 2, I present a brief discussion of the distinguishing characteristics of these six facets plus one dimensions. Section 3 gives specific research topics suggestions©. Section 4 concludes.

2. Facets of research ideas: an approach to frontiers of corporate finance

The Cube. Imagine standing inside the cube.

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2.1. Center

In the center of the cube is the present. This dimension includes the: current state of knowledge, contemporaneous issues, recent crises and events, testing of known hypotheses with more refined techniques, and extensions of extant research findings; it also includes 'looking under the lamppost because there is light', 'have hammer (new techniques) looking for a place to bang', and chasing fads or hot topics,… These topics are what researchers can find by looking at current trends, and will not be discussed here.

2.2. Front and back: the time dimensions

Inspired by the euphemism that 'what is in front of us is the future, and what is behind us is the past', these two dimensions represent topics taken from the past or from anticipation of the future.

2.2.1. Back (past)

The historical past is probably one of the richest and yet most neglected area to find original research topics for several reasons:

A. Because of the very long past history compared to the recent few decades over which most finance research is concentrated, one should expect more 'happenings' in the past. Hence, it is a very fertile ground to look for inspirations.
B. Most problems that command interest in the recent literature are nothing new. They are the recurring themes in transactions arising between parties in businesses dealings of old. These issues include: a. real (e.g., transaction costs), or behavioral frictions; b. unequal power (e.g., wealth, knowledge, or experience) between two parties in a transaction; c. dealing with dishonest or deceptive behaviors or, abuse of power; d. enforcement of formal and informal contract. e. development of business norms, f. use of both legal and social sanctions; and, g. relationship based transactions as they pertain to trust building and reputational concerns.
C. Because many of these issues probably arose during the first business transactions, the ancients and near ancients developed solutions, perhaps from the wisdom of sages, or perhaps simply based on trial and error. Although some history books may cover 500 years in a few pages, 500 years is a long time to search for and eventually find a solution. In other words, there is nothing new under the sun, solutions to the current finance related issues may be discovered if one bothered to look closely at the past.
D. Those who resist a serious look at the past may claim that one could not perform rigorous statistical analysis due to lack of clean large sample data, and therefore the past is not worthwhile for study. However, the need for empirically testing an original theory with large sample is much overrated. An empirically 'testable' model using recent past data of firms attempts, at best, describe what firms do based on what the researcher's limited ability to infer others' motives and behaviors. It is certainly not an original model that prescribes the optimal behavior or response of firms. This last class of model, in principle, is not testable, for firms to behave as though following the postulated empirical relationship, the empirical researcher must necessarily commit the contradiction that most firms must have been well aware of the solution years *before* the researcher could conceived the so called 'original idea', or else, there be no data available for testing. On the other hand, many of the historical narratives are supported by observations, some transcending generations. The prerequisite for a large sample is also not a necessary condition for scientific inquiry; witness the many worthy research topics in physics and natural science that involve providing an explanation or theory

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based on a single or few careful observations or outliers.

E. Business practices evolve over time out of necessity brought on by such things as changing external stimuli; including for example: response to natural disasters; expansion of a nation's territories through conquest and religious conversions; the shrinking of once great empire; inventions that enable faster transportation over longer distance; and large scale production from manufacturing to mining, resulting in trades of greater volume, over a greater distance, necessitating shared risks. Last but not least, larger and more protracted wars generate the necessity to develop means with which a sovereign could finance war. This last item was the origin of large scale financing including bond issues. There is no better place than the past thousand years to find such incidents. Longer history is even more valuable if the responses to stimuli evolved over a long period.

F. Many researchers may simply recycle older ideas under a new guise, without giving proper acknowledgement. Some examples will be discussed in the next section.

2.2.2. Front (future)

The front of the cube reminds us to think seriously about the institutions and strategies needed in order to deal with various potential paths of business opportunities and risks. Studies on the future of finance have not been able to earn a place among current research topics. The culprit is the usual demand that a suitable research topic must have reliable data that is empirically testable. Obviously, one could not collect data and test on what is yet to happen. Nevertheless, this direction of research is a necessary for the adaptation and survival of firms in the future. Musing about future innovations and technologies under various contingent future scenarios is not a futile exercise. Even though future could not be precisely predicted, it is the imagining of future scenarios, and the formulating of various contingency plans for dealing with them that provide businesses with the lead time to gain profits and cut losses.

2.3. To the sides: left and right

Combining the topics on the ‘left’ and those on the ‘right’ gives the so-called cultural dimension to business finance practices. Consider the following:

2.3.1. Left

Topics here refer to all other disciplines (out in *left* field) that have a two-way intellectual exchange with finance. Finance may be influenced by borrowing ideas and solutions from these fields, and may help solve their issues of interest, as well. Finance, in theory and practice, cannot exist in isolation from other related fields. These fields may include all of social sciences – psychology, sociology, anthropology, ethics, and history. They may also include disciplines in business such as marketing, management, accounting and strategic management. Physical sciences such as neurology, chemistry, gene and DNA research, may also influence and be influenced by finance.

2.3.2. Right

Topics here refer to the multinational dimensions, including the peculiar practices within a single country.[1] There are many reasons to study the financial practices in other countries:

1. Businesses and investors in different countries may develop different responses to deal with both long and short term issues in finance.
2. Some countries may have more experience with extreme financial crises, with greater severity and frequency.
3. Since it is unreasonable to expect uniform economic, regulations, fiscal and tax policies among countries, firms exploit their differences, i.e., cross country arbitrage.
4. Combining the topics on the ‘left’ and those on the ‘right’ gives the so called cultural dimensions in business finance practices.

2.4. Above and below: giants above and original data below

2.4.1. Top (above)

Above the cube are the forerunners of finance - finance's intellectual ancestry. The most direct lineage from which finance derived is certainly economics. Economics provides many of the theoretical foundations and research methodologies in finance research.[2] There are potential research topics tracing the economic origin of finance theories as well as finding and adapting new ideas in economics that have yet to be adapted into the finance literature.

In addition, researchers should look up not only to the well-known giants but also to the unsung sages, upon whose shoulders many of the later contributors stand. There are also early researchers whose work has been not fully appreciated, and worse, for which later researchers may have taken credit. There are papers to be written about their contributions as well.

[1] The use the term ‘Right’ because many countries these days have right leaning governments including those of the former communist countries that no longer practice Marxist economics and now are simply totalitarian.

[2] Unfortunately, there are many papers these days that are devoid of any economics content reflecting the author's lack of understanding of the subject.

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2.4.2. Bottom (below)

Below is the ground level. I am referring to putting in the work to 'dig' out new and original data. New data comes not only from being the first to collect the information, but also from finding data already in existence but not generally available to other researchers. Researchers may also design a procedure to collect original data. Examples are carefully conducted surveys, interviews, laboratory experiments, and simulations. In comparison to empirical data compiled from the company, market, and other secondary sources, data from a well-designed experiment can insulate the study from other complicating factors to include only factors of interest. Laboratory experiments and simulations allows the researchers to ask hypothetical questions, try novel solutions, model alternate futures, and test the sensitivity of solutions to different scenarios. Empirical data, on the other hand, can be contaminated by both known and unknown complicating factors, requiring the researchers to attempt ex post remedies such as sample selection, sorting, and various econometric techniques.

3. 100 research ideas

Research topics as inspired by the Cube (These are original topics I generated, they are copyrighted ©, in case you decide to pursue one of the topics here, please refer to this paper as the original source.)

3.1. Past

Idea #1: The earliest finance problem was the choice between tenancy and sharecropping. When landowners around the world, they may be wealthy families or feudal lords, could not personally farm the land, they were observed to use one of these two arrangements: tenancy or sharecropping. The former, involves a fixed rent akin to a debt contract, while the latter is equity participation, albeit without the residual right to transfer. This is essentially a capital structure problem –the earliest arrangement between people all around the world is basically a corporate finance issue.[3] Here, the researcher could approach the topic in the same manner as in a capital structure issue. There are agency concerns, for instance, the tenant may not truthfully report the size of harvest, and in many cases the landlord could not verify (asymmetric information) due to distance, indolent, untrustworthy agent/monitor, or fraud, etc. From there, one could formulate hypotheses based on these familiar themes. For instance, could the distance of the land from where the landlord lived be a measure of the potential for agency and asymmetric information concerns? Could repeated dealings (dealing with the same family over several generations) alleviate these problems? Do landlords exchange parcels of land among themselves to minimize these concerns? There are archives of land contracts in many countries, from ancient to near history. This is the realm of archeological finance.

Idea #2: How did the traders of old embark on risky and large ventures? Risk sharing is also a very ancient problem – from the caravans traversing the Silk Road together, to the Phoenician and Venetian merchants sending large ships on long voyages. Researchers should be able to find archives of written contracts on risk sharing, sources of loss and mechanisms to limit it, and early forms of limited liability.

Idea #3: The single most important financial innovation is the notion of 'limited liability' without which there could be no 'diversification' since a single currency unit of exposure could cause personal ruin. There would be no venture capital or angel investors as rich persons would be especially vulnerable under unlimited liability. In other words, without the means to limit exposure to loss, there could be no financial securities, or even the practical possibility of corporate or personal diversification, i.e., portfolio theory. The evolution of the notion and eventually the practice of limited liability are worth a serious study.[4]

Idea #4: The most successful financial innovation is the debt contract, which we find in nearly all civilization. The debt contract has been well accepted, because it solves a big part of the information and agency problem. With a debt contract, the lender needs not spend resources to know precisely the borrower's profit or harvest, borrowers pay if they earn above the contractual debt payment, and forfeit the asset if they do not. The borrowers have a self-motivated incentive to tell the truth. It is of interest to investigate related issues, such as: what arrangements the ancient people had prior to the advent of the debt contract, how they verified borrower's output or profit, how do they dealt with default, and at what stage of economic development the debt contract first appeared in various ancient cultures?

Idea #5: Today's standard optimal capital structure theory derives from a tradeoff between the benefits and the costs of debt. However, the defect of this theory becomes obvious when it has no role in explaining why businesses borrow, except perhaps for the last 100 years. This is because the principal benefit of debt relies on the tax deductibility of interest expense, in which there was no corporate income tax in the U.S until 1909. There is a need to develop a general enough explanation(s) why firms benefited from borrowing in earlier as well as modern times.

Idea #6: A related concept is what lead to the discharge of debt under bankruptcy. Prior to the advent of bankruptcy, defaulted debt cause hardships on both lenders and borrowers (e.g., indentured and debtor's prison). How did the change in the attitude toward debt forgiveness evolve in the course of history? There are other angles of this issue are of interest, as the decision to default could be motivated by agency problems made more likely under asymmetric information.

Idea #7: Many of the current practices were developed over a long period in the past. Tracing the evolution of such practices may

[3] This idea is due to Joseph Stiglitz. I list it as the first research idea to pay homage to those who came before us.

[4] Limited liability in its modern form is due to Alexander Hamilton, in which he incorporated in the charter of the Second Bank of the United States.

give a better appreciation how solutions to finance problems evolve. This applies to the prevalent use of collateral, early form of governance involving hired managers, and means of preserving and dividing family wealth.

Idea #8: The principles behind some of the oldest problems may explain the workings of the most recent financial topics. For instance, the second oldest medium of exchange, after bartering, was through self-manufactured currencies such as shells, bones, and rocks. How could these have value for which another ancient person was willing to exchange say, a wild animal after two hours of hunt? Taking a closer look, we realize that this is the same as asking why people are willing to pay for cryptocurrencies such as Bitcoin. These currencies are similar, because while neither has intrinsic value such by satisfying hunger, they both involve work – spending long hours to polish the shells or rocks or mining Bitcoin. Unfortunately, investing time and money on producing currency may only be a necessary but not sufficient condition for a medium of exchange to gain acceptance. If in fact various cryptocurrencies have no intrinsic value, the natural next question is whether the source of their value must then be behavioral. If so, what are those behavioral rationales? And could they be sustained over a longer period?

Idea #9: Lessons from the past. Much has been written about famous bubbles from the South Sea Bubble to the Tulip bubble, but why do investors still fail to learn from these examples, witness the recurrence in dot.com bubble of recent past? Is it a behavioral trait that causes humans to 'repeat the mistakes of the past'?

Idea #10: A very current topic in which we could learned from the lessons of the past is the financial market consequences of trade wars. There were several trade wars from the Smoot Hawley Act of 1930 to bouts of tariff increases on steel, aluminum, banana, sugar, and rubber, etc.

Idea #11: To get a better appreciation for the evolution of financial institutions, one should study the development of early arrangements, both formal and informal, that preceded today's institutions. Evolving from hiding one's entire wealth under the mattress or burying it in the backyard all the way to giving it to third party for safe keeping, which was a forerunner of today's bank, involved making a giant step toward the trust of strangers. How was this change in attitude developed?

Idea #12: Trust was vital in the transactions between those in the same village, this is understandable as people spent their entire lives in the same place. Lack of mobility constrained bad behavior and encouraged trust. What is worth noting is how some earlier people managed to make 'trust' mobile; trust gained could be transferred from one village to another. For instance, traders in those days would form professional associations or guilds. In effect, the guild substituted the collective reputation of all its members to vouch for their individual member who may be engaging in transactions in the town for the first time. The guild's value to the individual members, and ability to sanction bad apples made the arrangement sustainable. Of course, we still see remnants of guilds in today's professional associations, trade groups, and cartels. There are research topics where one can find trust being priced in the market, e.g., difference in the borrowing rates when trust does or does not exist.

Idea #13: One of the most important governance event in history is the hearing conducted by the Armstrong Commission in 1905. The commission investigated corporate abuses by the insurance companies and put the blame squarely on the corporate organization form. The commission recommend the State of New York to compel stock insurance corporations to convert to the mutual organizational form. There are many unanswered questions that are still relevant today. In particular, were the alleged abuses the result of the insurance companies having the corporate organizational form and thus raise legitimate questions about this form? How was governance under the mutual organizational form? When these mutual insurance were demutualize to return to stock form, were there improvement or deterioration in corporate governance? The sample and the period provide an opportunity to study governance and agency abuses and control under different organizational forms.

Idea #14: This involves a treasure hunt. Mutual organizations, from insurance companies to mutual saving banks, are owned by their policyholders or members. In theory, like shareholders, they own a share of the firm's profit. However, since these members do not have the right to trade their share of profit, they would forfeit the surplus once their insurance policy expired or payoff, or money withdrawn from the savings bank. As a consequence, these organization would build up a very sizable surplus over the years in which there is no owner. However, mutual organizations these days are mostly demutualized, i.e., converting to stock corporations. Who claimed the large unclaimed surplus in the mutual companies[5] during the demutualization, which could be a major agency issue? The circumstance presents a very peculiar agency problem. Whoever takes possession of the surplus is committing an act of agency, but against who? Most policy holders and depositors had left and gone and seemingly gave up their share of the surplus. It is a very sizable amount (imagine the size of cumulated retained earnings in a large corporation). What had happened to the money? Is it the incumbent managers at the time of demutualization, the investors at IPO, or agency leakage over the year?

Idea #15: With today's technology on graphic presentation, data search and analysis, mining archaic data, digitizing ancient texts, and machine translation of archaic languages, it is possible to map a genealogy of early financial innovations (e.g., exchanges, future contracts, traveler's check, money centers, paper currency, contracts and the evolution of contractual terms, means to transfer funds over long distance, evolution of interest and regulation of usury, pooling of funds); where, when originated, how, where and how long did it take the innovation to spread; why was it started in certain place and not in other places, the last item leads to the conditions for financial innovations.

3.2. Front (future)

Innovations in the practice of finance are mostly driven by technological progress. The rest are from adaptations to new demands

[5] Profits earned by mutual insurance companies are owned by the policy holders in theory. However, since departing policy holders did not receive their 'share' of the surplus, the surplus remained as unclaimed property without owner.

from transactions, fund raising, quantification of risks, dealing with and modifying constraints, and supply or demand shocks for financial securities.

Idea (#16) Research topics may derive either from: a) developing scenario in future states as a result of anticipated advancement in certain technologies, b) or from forecasting or anticipating the necessary technological advancements to facilitate general or specific financial transactions or policies. Research methods may involve collecting opinions of technology experts, and futurists, or may involve the Delphi technique in which a panel of experts is assembled for multi round information sharing and feedback, gradually building a consensus on future scenarios.

Idea #17: There are also topics, although complete in hypotheses, theory development, and research design that are still awaiting data from the future. As an example, consider the topic of comparing the performance of female versus male top executives. Using the available sample of current and past female executives is subject to several valid criticisms. First, there are too few female CEOs in major corporations; currently less than 5% of CEOs in the largest U.S. firms are female. Second, there could be selection biases in the current population of female executives. One source of such biases arises if these female CEOs have experienced discrimination in advancing through the corporate ranks. Consequently, they must be far better than their male competitors to advance, the outgrowth will be a study in which only superior females get chosen, and the empirical results will be superficially in favor of females over males. A second potential bias has a neutral effect is that perhaps only females with the same qualities as male executives got chosen, e.g., characteristics such as toughness, vanity, self-importance, or just simply machismo. In this case, the study will bias in the direction of finding no difference. A third source of bias has the opposite effect. This may occur where, such as in some Scandinavian countries, that have laws or mandate to have a certain percentage of female board members or executives. Here, demand may temporarily exceed supply as the prior corporate policies and practices may have been biased against females resulting in too few females in the upper management. If compelled to appoint females who were not groomed for the top jobs, like their male counterparts, the effect is to cause a downward bias in the performance comparison.

There exists a natural experiment that could provide a clean set of data but require waiting. China implemented a one child policy for 35 years that was recently repealed.[6] Over this period, many of the CEOs in the private sector begot only one child, and soon the single child, daughter or son, will be groomed to take over the CEO position. Because these founders/CEOs have only one child, there is no bias in the selection as to which child, son or daughter, may be the company's next CEO, or bias in the allocation of the family resources to the child, in development and in education. However, it may take another 5–15 years to have an ideal sample as since the parent must retire and then, the single child must have a reasonable length of time as CEO to yield a trail of performance record.[7]

Idea 18: Another direction is in the imagining of the more mundane finance practices and tasks. New developments, or innovations, often arise from new demand for the service, or from new technologies. Take the case of the latest medium of financial transactions, a relatively inexpensive innovation using a smart phone to make payments through a QR code, this has enabled some countries such as China to completely skip the development of the credit card, and cut out the middleman (credit card companies with seemingly endless solicitation mailings.) On the other hand, much of the promise of the cryptocurrency, as means of transaction, as a store of value, and as object of speculation have been found to be too expensive in practice. The transaction costs, e.g., electricity consumed, would make it impractical, to make small purchases, e.g., buy a soda rather than via a smart phone. Furthermore, the accounting approach, that is built with redundancy in mind (i.e., block chain) could backfire, as it makes transaction expensive and yet has not proven to be as secured as advertised, witness the number of cryptocurrency thefts by yet to be identified intruders.

It may have limited success as an instrument of speculation. By limited, I am referring to the one big spike in the price of Bitcoin which resembles a price bubble and its subsequent bursting. The historical path of the price of the cryptocurrency may be useful to study the formation and dissipation of financial securities whose existence is mainly to facilitate speculation. The existence of cryptocurrency may also be laboratory experiment to study why people would spend thousands on mining and trading objects that resemble ‘the emperor's new clothes’ where the value is in the eyes of the beholder.

Idea #19: Dare to imagine how firms in the future may conduct business, from obtaining funds to investing them. Financing problems in the future could be resolved if technology could solve the twin problems of verifying an entrepreneur's projected cash flows for a project and assurance of the entrepreneur's character over the life of the loan/equity invested.

Idea #20: Future visionaries and entrepreneurs are far too optimistic in projecting the benefits of new technologies and far too willing to avoid hard questions from the consequences of these technologies. The research is to quantify these hidden costs, and verify if they are incorporated as part of the managers' decision making process (via case study and survey) and perform empirical analysis to verify if the investors could anticipate and would incorporate the consequences and externalities from new technologies. For instance, if technologies would make life easier and give individuals more leisure time, how could individuals find enough work to earn money in order to pay for the luxuries when there will be a decrease in the demand for human labor? Although the driverless car is realizable in the near future, who will employ the displaced Uber drivers? Is it not Uber's greatest contribution to the economy is that it gives those who have random, small blocks of time the ability to earn income, thus, raising the total employment hours?

Idea 21: One of the most challenging topics in finance research, in which few or none have looked, is the very much ingrained idea, among investors and in textbooks, that stock price is an unbiased estimate of all future capitalized cash flows (dividends). Specifically, suppose the stock price of say, Company X is at $60 per share today, how can we say it is not the unbiased sum of the present value of its future dividends, which are yet to be realized and therefore could take on any value? Thus, this statement is taken

[6] It was repealed on January 1, 2016.

[7] The study would exclude those families that were exempted (minority groups), or could avoid the one child policy (willing to pay a monetary penalty and perhaps, relinquish some rights).

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on faith, as a truism. The proof seems hopeless, the future is not yet realized, and therefore could admit any set of plausible estimates for all future dividends. It is a dubious but not impossible situation, nevertheless, I shall suggest a technique I call as 'Back to the Future to resolve it[8]'. Consider, if we are in 1960, we still cannot tell whether the prevailing share price of Company X in 1960 is or is not an unbiased estimate of all its future cash flows. However, moving forward to the present, we do have the entire 60 years of actual dividend record of the company. That data is long enough to form present value calculations, discounted at the prevailing discount rate in 1960 for Company X.[9] We can then compare the actual realized value of the stock against its market estimated value some 60 years ago for a large sample in order to verify whether or not the market value in 1960 was an unbiased estimate of the capitalized value of the actual realized cash flows in the form of dividends.[10]

3.3. Left (related fields)

There is two-way traffic between research topics in finance and other related fields such as sociology, anthropology, history, religion, psychology, ethics, literature, political science, and law.

3.3.1. Sociology and anthropology

Many civilizations practice primogeniture, in which the family's wealth is only passed on to one heir, who is usually but not necessary the eldest. The practice was and still is practiced in many quarters and is important in many situations, e.g., in explaining the survival of the feudal system (or today, in the survival of the family firms through several generations). The other lesser heirs (second or third sons) were breed to provide reserves as insurance against the loss of the first born due to disease, accidents, and the like. They would eventually inherit little if anything, and they would have to find other means to acquire wealth and fame. In Europe and Japan, these lesser heirs would enroll in military schools or the like, in which they could earn their own titles and wealth.[11] The practice not only preserved tradition (feudal and family names' survival) but also produce high quality military officers.

On the other hand, countries without the practice of primogeniture, principally the United States and China, would divide the family's wealth among the heirs. Wealth was less likely to be concentrated, and in many cases, dissipated over successive generations due to a more equitable division. Consequently, there is less real and perceived social inequality. In contrast, under primogeniture, the rich family can hold on to their wealth longer; under the feudal system, poor people knew their children and grandchildren would remain poor, and children and grandchildren of the feudal load would remain powerful. Even in today's world where the practice of primogeniture is considerably weaken but not eliminated, there are still many unanswered research questions for family firms:

Idea #22: Focus on family dynamics. How does the family resolve the conflicts between the managing branch and the other members, now also owning shares? What are the family specific agency issues and what are the potential solutions? Will the agency concerns create a need for minimum dividend distribution to satisfy the consumption needs of the non-working family members, thus providing a rationale why wealthy people in high income tax bracket demand dividends in spite of high personal tax on such income?

Idea #23: Will the family firms' internal conflicts result in a need to limit the risk of asset investment, including new and innovative activities? Or, there will a constraint on use of debt or in issuance of new equity?

Idea #24: Focus on the successor. How does the family choose the person to manage in case of multiple potential candidates? Is the person pre-chosen, i.e., heir apparent, and did she or he receive different training and education opportunities? What cause a family to choose an outsider when there is at least a family member in waiting? For family firms that run by a feudal lord, the research questions are: how does the head of the family groom the designated heir for the job in today's world. Does this grooming include prep school or boarding schools, top universities via legacy admissions, a stint in a prestigious Wall Street bank due to connections, semi arranged marriage for business alliances?

Idea # 25: For families without qualified or interested heirs, or not under primogenitures, how do they choose outsiders as top managers? How do these non-managing but share owning family members maintain control through the board and other avenues?

Idea #26: For wealthy individuals or families with diverse holdings in many companies, how do they compete to hire, monitor, motivate and compensate their hired outsiders as executives where they are without two major incentives for top management talents: the promise of promotion to CEO, and owning stocks?

3.3.2. Religion and history

Here, we encounter several finance related topics that may provide thoughts for future research. This should not be surprising as agency problems among individuals are as old as time. The rise of the power and wealth of organized religion also give rise to the need to control clergy's power to use the church's property and influence for personal gains. Thus, we find the creation of the board (or deacon) to control the English abbot, or head of the local church. The board overseeing an organization became the forerunner of today's board of directors in a corporation. Less known is the fact that celibacy among the Catholic priests actually arose out of the Vatican's frustration with controlling the very widespread corruptions in the regional churches, with practices such as the selling of

[8] My apology to use movie title.

[9] It would be safe to say, dividends beyond 60 years may be ignored as their present values would be miniscule.

[10] I had done such calculations and found that the market consistently overestimated the present value of most stocks. In other words, investors in the stock market were basking in 'Eternal Sunshine' (from another movie).

[11] The coward among them would court rich widow, which explained why rich widows were such great demand in the old novels.

forgiveness for sins committed (absolution).[12] Throughout history, there are numerous case studies of religions in various countries created and solved agency/governance issues.

Idea #27: An in depth study of various agency problems in churches, in both older and modern period, and their solutions can add insights into different approaches to control agency problems.

Idea #28: Religious organizations (versus religiousness of managers, shareholders.) is under- research in the finance literature. Nevertheless, they are interesting and challenging in their own right: their market value (assets owned and present value of members' offerings) rivals the largest corporations of the world; they are opaque; they are tax free yet occasionally borrow providing another challenge to explain why borrow in the absence of taxes; some local branches may even declare bankruptcy to limit liability to the headquarter, exhibiting corporate practice of isolating risk exposure by organizing subsidiary as separate legal entity; members as stakeholders may have varying degree of involvement in governance, and no residual right; management (top echelon in the church headquarter) has extra-legal control over stakeholders (members) e.g., expulsion, excommunication, shaming, etc., to limit the exercise of governance from below. The availability of data varies from required disclosure by their tax free fund raising arm, to voluntary disclosure of inflow and expenses by the local churches, and to almost no tabulation of the church's assets at the headquarter level.

3.3.3. Sociology, geography and ethics

Here, we find the role of trust in financial transactions. Even today, trust is still important for transactions. Throughout the history of most countries, the notion of trust is the cornerstone of all transactions. People deal with those they can trust, as they learn the qualities of what makes trust sustainable is also essential in repeated financial transactions. The lack of geographic mobility makes trust gained more valuable and trust lost particularly long lasting. The topic has relevance today in many ways: venture capital and angel investors still partly make their funding decision on the extent they can trust the other person. Local bank officers do the same. Potential research topics may include:

Idea #29: Focus on intangible measures of trust. How is trust created in today's transactions; what is the role of affinity bias, e.g., those with similar ethnic, religious, education background, in fostering and abusing trust; modeling the value of trust as a parameter in increased probability in obtaining financing, or in reducing borrowing costs;

Idea #30: How does reputation affect financing provided by strangers? Can trust be inherited or transferred? If so, when and how? These issues relate to the entrepreneurs and their funding sources, from angel to venture capital to private equity funds.

Idea #31: Focus on tangible measure of trust, including to all stakeholders. Does the financial market reward firms that exhibit costly but ethical behavior and punish unethical but profit maximizing behavior? The question seems to be incongruent with the unadulterated profit maximizing goal of the firm. However, until such time that investors, via the financial market pricing, started to reward good behaviors for their own sake and not for some soft rationalization, e.g., good public relations, image building, win award and praise for the CEO, etc., ethics in a corporation is only superficially dealt with.

3.3.4. Psychology

There are boundless possibilities here that could be applied to finance since the rise of behavioral finance as a serious research area.[13] Examples of behavioral corporate finance research topics include: seemingly irrational behaviors:

Idea 32: Why are investors willing to pay tax on dividends received? There are many cases where such tax is avoidable, and yet an examination of tax returns will show many high tax brackets individual receiving dividends and pay tax on them.

Idea 33: They are also willing to pay tax on cash dividends not received, as in the case of dividend reinvestment plan (DRIP) where they receive no cash but have to pay tax on reinvested dividends as if received. Note that they would be better off (i.e., not pay tax) if they do not sign up for the DRIP program. The mystery is further deepened as the reinvestment portion of the plan is essentially a stock dividend, which is not taxable. And thus, DRIP appears to be inferior to a simple stock dividend if increasing the number of shares but not portfolio value make some investors happy. Instead, what we observe in recent years is the opposite: the dominated DRIP program gains in number while stock dividend paying firms have been diminishing to almost extinction today.

Idea #34: Why fluff matters? Investors also seem to prefer shares designated as A shares over those designated as B shares, even though the former has lesser value due to inferior voting rights, liquidation rights, etc., They also seem to like “Preferred” stocks over “Common” stocks when they were originally created, ‘and to prefer high yield bonds over junk bonds’. The intriguing question is why investors are willing to act on these behavior induced irrational biases again and again.

Idea 35: There are also areas where the behavioral response by firms or investors differs from outcome, and yet, they will repeat the pattern of initial high enthusiasm and subsequent disappointment again and again. Finding these behaviors in corporate finance and explaining them will make challenging research topics. A case in point is the ‘new girl in town syndrome’ where managers and investors overestimate what is new. For instance, when a company announces that it is venturing into new technology or increase R&D, share price rises. However, the market valuation of the R&D would later fall to only a fraction of its original investment. This

[12] The church first tried to make the accumulation of wealth less attractive to the priests, as they already face limitations as to how much they could consume and display wealth in public, by issuing a rule in the 11th century (by then Pope Benedict VIII) prohibiting the children of priest from inheriting property. The edict was probably difficult to enforce. The church then in Second Lateran Council in the twelve century (1139), approved a rule by forbidding priest to marry. Pope Gregory VII issued a decree against clerical marriage. In 1563, the Council of Trent reaffirmed the tradition of celibacy, Heid (1997).

[13] For a review of behavioral versus traditional corporate finance, see Ang (2019).

phenomenon needs to be documented and explained.

Idea 36: Another behavioral corporate finance topic is the 'cheap money illusion'. In the presence of asymmetric information in which managers are aware that their stocks are overvalued, would they consider the inflated stocks as cheap money in which they can squander, as in paying too much for acquisitions, or in increasing physical and intangible assets such as R&D?

Idea 37: Sunk cost is another behavioral topic that warrants more serious study. Managers may commit sunk cost fallacy in many of their decisions – the time, money invested in fees to investment banks, court expenses and manager's personal time in merger negotiations, in financing negotiations, i.e., in venture capital funding and in underwriting of IPO, bond issues, etc., may cause them to stay longer in negotiating a deal that they should have walked away or abandoned.

3.3.5. Physics and psychology

Idea 38: There is an observation in physics known as hysteresis in which when a certain force or energy moves an object from point A to point B, which could be as simple as stretching or bending, but when an opposite force is applied at B, the object would not return to the original state A. I can see several parallel situations in finance that could present empirically testable topics. One example is when a company cut dividend at one time and restore the same amount later, will the stock price return to the level prior to dividend cut? Other examples include: announcement of earnings increase and an equal decrease later; a merger announcement that is withdrawn subsequently where both acquirer and the target may both experience 'hysteresis'.

3.3.6. Political science and law

These areas have attracted finance researchers in topics such as CEOs' political affiliations and campaign contributions in lobbying politicians for or against legislations. Although these may be headline grabbing issues, the more relevant financial research topics are more mundane, for example: the unintended consequences of legislations that is to affect finance in ways that was not originally intended.

Idea #39: There are many examples of the unintended consequences of legislations that is to affect finance in ways that was not originally intended. They need a closer analysis with large sample. The tax on dividends paid to another company was originally intended to penalize/discourage transfer of funds between related companies under the 'trust' structure. Yet, it morphed into a tax advantage for corporations to hold preferred stocks since these intercompany cash dividends are taxed at a lower tax rate than the regular corporate income tax rate. Another example is the Trust Indenture Act of 1939, which requires 100% approval from bondholders to modify covenants. Although it was intended to protect bondholders, it turned out to be an impediment for riskier companies trying to issue bonds. There are undoubtedly numerous other examples researchers can unearthed.

Idea #40: Title III of the JOBS Act established crowdfunding provisions that allow early-stage businesses to offer and sell securities, including to small investors.[14] Since small investors are able to participate, even with a only a few thousand (or hundred) dollars, the scheme reminds us of small investors and penny stocks in which securities law, from the Securities Act of 1933 to Penny Stock Reform Act of 1990, are trying to protect. Is there a conflict between these two sets of laws? In other words, crowdfunding may provide not only a means for small businesses to seek funds from strangers but also to test whether the small investors are smarter these days or not. Is it 'this time is different' or still 'there is a sucker born every minute'.

Idea #41: A topic in law and finance that has not received enough attention in serious large scale empirical research (vs. case study) is financial fraud. Take earnings manipulation, which is more common than most people thought. Does it pay or what is the probability that these firms face SEC scrutiny, restatement, or exposure by analysts and other professional investors? Even for the unfortunate few that got caught, what are the longer term consequences if any?

Idea #42: For companies that have had violated securities laws, do investors have memory of the misdeed? If so, for how long? How much of the fault do investors attribute to the managers versus the firm? How much difference does it make to remove the managers? Could the offending manager get away with a fall guy?

Idea #43: An overlooked agency situation involves voluntary delisting of companies. If the managers of perfectly healthy companies decided to delist,[15] the company may sharply reduce flow of information to the investors, and may even cut or skip dividends. All of these agency actions may cause the now hard to trade shares to decline in value, while the company, under the complete control of the management, may still be worth the same or perhaps more than its pre delisting value, having the same customers and products, etc.

3.3.7. Literature

One can also find finance topics in literature. For instance, have you ever wondered why in the old English novels, everyone seems to know everyone's income (e.g., Mr. Westcott has an annual income of £12,000, and Mr. Plumb's is £8000.) How could people at the time know about another's income while we could not today? The answer is inside the novel. These men spent their entire day on leisure activities – riding horses, hunting with dogs, sipping tea, playing parlor games, chatting and sing songs with the ladies. They

[14] • The requirements to invest are: If *either* your annual income *or* your net worth is less than $107, 000, then during any 12-month period, you can invest up to the greater of either $2200 or 5% of the lesser of your annual income or net worth.

• If *both* your annual income *and* your net worth are equal to or more than $107,000 then, during any 12-month period, you can invest up to 10% of your annual income or net worth, whichever is less, but not to exceed $107,000.

[15] A company may voluntarily delist or cause delisting by its failure to satisfy one of the exchange's listing requirements. There were many firms chose to delist after the Sarbanes Oxley Act, citing its onerous reporting requirements.

did not work. Since the source of wealth in those days was land, not working the land themselves meant they rented out the land to other people who would. Hence, their income was simply the prevailing rental rate for land times the number of acre of land they owned.

Idea #44: From the land record, one could obtain fairly good estimates of income and thus, distribution of incomes. Thus it provides the data to study topics such as wealth distribution and leisure to work tradeoff. The treasury of world literature, from the Greek classics, to tales from Asia, and Shakespearean plays, are full of agency problems and their solutions or non-solutions, lessons for the family firms, formal and informal contracts, relationship transactions, and even financial innovations.

3.4. Right: the international dimension

1. In the same way that international travel opens one to firsthand experience that people and places are different, studying the practice of finance in different countries serves the same purpose. Research ideas can come from:

Idea #45: One could do a comparative analysis of financial institutions and their developments between countries, or among several countries. The first step is to identify the unfulfilled needs of individuals during early pre-financial institutions period that created the demand for innovative solutions. Take for example, in the absence of lending institutions such as banks, when a single individual may not have enough resources to make a large purchase, such as a car, a group of similarly eager car buyers would pool their money to take turn buying one car at a time. They developed interesting and equitable rules to decide who would receive the first purchase, second and so on. The allocation decision may take the form of a competitive bidding based on the interest cost the winning bidder was willing to pay to the rest who do not get the use of a car in this round. The interest bid is a function of the bidder's impatience for delayed gratification. These arrangements could be found throughout the world, such as the early financieras in the Latin Americas, and Hue in China. These and other pre financial institutions and markets are worth a serious study.

Idea #46: There is a potential for a comparative analysis of how financial managers in different countries respond to similar external shocks and crises. The different ability to respond to major catastrophic financial events involves differences in sociology, psychology, anthropology and religion, due to for example, cohesiveness with one's identity group, attitude toward charity and altruism, notion of paying forward, and after life rewards for good deeds.

Idea #47: Another viable option could be a comparative study of how differences in cultural traits, recent historical experience, and differences in regional or national attitude toward risk taking and tolerance for failure produce differences in financial policies. This could include policies on topics from acquisition and divestment to capital structure and financing choices as, well as in innovative endeavors, including the migration patterns of individuals.

Idea #48: Is there evidence of convergence among countries with respect to the items above that have been suggested for study? Do innovations and practices developed in different countries and over a span of time converge to a single (or few) dominant practice (s) or institution(s)? For instance, there used to be many different approaches to set IPO offer price: formula to preset price weeks before issue date, allow the price be set by auction, engage underwriters in book building, or use hybrid (e.g., price half of the issue via auction among large institutional investors and use this as the price for individual investors on a prorated basis.

Idea #49: What is intriguing in the study of the development of financial institutions is that the best practice (one which maximizes social welfare) may not emerge as the eventual survivor. Why? In the above example, auction, which maximizes the welfare of the issuer and all willing investors failed in the U.S and elsewhere in favor of the book building system via the underwriters. The underlying reasons, which are as yet to be verified, could be partly behavioral or irrational. The irrational story goes like this: investors like the excitement of seeing a price jump in the offer date as they vicariously enjoy experiencing the large price movement as if they own shares when in fact they do not receive any allocation of shares from their brokers.

The financial interrelationships among countries, including financial arbitrage between countries existed only because different countries could not have had the same tax systems, regulations, tangible, and intangible costs of doing business. There are several research topics that would worth take a closer look with the potential to find existence of financial arbitrage between countries.

Idea 50: A useful lesson and case study is United States' failed attempt to collect U.S corporate income taxes on income earned by U.S corporations in foreign countries that have a lower corporate tax rate. Evidence shows that firms would not taxes that they could avoid including giving up U.S corporate citizenship. They would develop tax arbitrage strategies such as inversion, e.g. in which a U.S corporation be ‘acquired’ by a foreign corporation with low corporate income tax. The recent tax law change finally acknowledged the futility of the previous policy and now adopts the territorial tax system used by every other country with a substantial multinational presence. Countries no longer bother to collect these taxes and instead accept whatever taxes are paid in foreign countries. Multinational firms win and governments lose. International tax arbitrage strategies and their effects in affecting international financial flows and relative valuations should be a topic of current interest.

Idea #51: Test well-known equilibrium relationships between countries, e.g., interest rate parity and purchasing power parity, in the corporate finance context. For instance, is there an arbitrage opportunity to acquire companies in a country with a recently depreciated currency when the acquisition is made using the depreciated local currency? Or, will the local currency values of these potential targets quickly revalue upward to maintain parity with the pricing relationship prior to the devaluation? If there is such an adjustment in parity, will it be limited only to firms in the currency devalued country where arbitrage is feasible; e.g. firms that are potential merger targets, have foreign listing, are investible by foreigners, or are included in the country ETFs.

Policy Adoption. The fact that countries acted at different points of time, even adopting the same policy, provide the laboratory experiments that empirical researchers look for. Specifically:

Idea #52: Countries imposed various taxes (personal income tax, and corporate income tax) at different points in history, which

makes them ideal to investigate the before versus after effect while randomizing international common factors in a difference in difference laboratory setup.

Idea #53: Similarly, various regulations regarding securities, insider trading, share repurchase, etc., were enacted at different times in different countries, which may also present similar research opportunities.

Idea #54: Finally, mechanics for good governance as well as various merger defenses were implemented or introduced at different times in different countries as well, presenting another yet similar research opportunity.

Firm level decisions: There are also various international finance topics at the firm level that maybe worth a closer look. For instance:

Idea #55: given that currency movements are hard to forecast, could the treasury departments of firms gain from active management of its international currency portfolio?

Idea #56: When it comes to corporate governance, do multinational firms aim high or low? That is, when it comes to investing, acquiring, and issuing securities, do multinational firms favor investing in countries with good or poor governance, in countries with high or low costs of regulations, or in high or low political costs including corruption[16]? Are there differences in the way multinationals respond to these issues depending on the attributes of their home country of headquarters?

Idea #57: Are the differences among countries overrated? Could researchers chronicle and document convergence among most major trading countries? The underlying principle is that greater uniformity reduce cost of doing business everywhere, and for multinational firms to enter new markets.

Idea #58: Due to the availability of data and where most researchers are located, governance studies are concentrated in recent decades and on firms in the U.S and other developed countries. A hidden bias in the study of established capital markets is that their investors, having long experience with the capital market, would make governance studies taken from the more recent period cleaner and thus less interesting. To use data on U.S and U.K firms after investors have had cumulated a couple of hundred years of investing experience means it would be difficult to find the sophisticated investors not aware of the importance of governance, and for some firms to be cavalier enough to ignore the interests of the investors. Fortunately, there are still many countries in the world, from the developing to former communist countries that have nascent capital market started in the last 20–30 years. It is in these countries we can understand how the notion of good governance is developed, demanded, and priced, etc. In other words, we can witness how awareness for the relevance of governance is evolved.

3.5. Top (above)

Idea 59: Because economics is the most important intellectual ancestor of finance, we need a concerted effort, via research papers, to trace where important concepts and theories of finance came from. Examples are:

a. Irving Fisher's idea of two-period consumption smoothing via lending/investing and borrowing gave rise to both the multiperiod consumption model in investment theory, and the security market line/capital market theory. Neither would have been possible without the mechanics of intertemporal transfer via lending and borrowing.
b. The diminishing marginal efficiency of the investment curve gave rise to the finance textbook prescription of positive NPV criterion in capital budgeting. More importantly, the parsimonious representation of a firm's investment opportunity by James Tobin, in the form of the marginal Q, has been popularized and corrupted in the finance literature. It is corrupted insofar as empirical finance researchers find marginal Q too cumbersome to calculate and opt for the average Q instead. Particularly bothersome is that this big leap of faith has seldom been acknowledged. Average Q grossly overestimates marginal Q as average Q includes many previously made investments with positive NPV. Marginal Q is much lower as the low hanging fruits have already been picked. In many cases marginal Q should be near one for firms not under financing constraint and few investment opportunity in future periods.[17] This suggests that many previously published studies using average Q may need replications with marginal Q to confirm their reported results. The bias from this inflated Q is more serious for firms with a steeper marginal efficiency of investment curve.
c. The economic analysis of externality exposes how narrowly focused are the financial decisions made in firms. This gap, between the society's total gain (or loss) versus that of individual firms shows that a firm's investment decision cannot capture all the benefits and causes the society to underinvest; however, the firm's underestimation of an investment's benefits is partly or wholly offset by the project's negative externalities, such as, pollution, health hazard, and addiction.

Idea #60: This extended view of firm investment begets new research topics including an expanded definition of NPV to

[16] Corruption, although generally a cost of doing business, is not always a bad thing that multinationals would want to avoid. Some astute multinationals could obtain favorable concessions, win bids, or speed up the process of securing approvals when public officials in a country are more corrupt.

[17] The fact that marginal Q for all firms not under financial constraint should be at or near 1.0 means that marginal Q should not be applied in most empirical studies used as measure of firm's investment opportunity. The use of Q as a measure of the manager's ability is particularly vexing. Firms with high Q, which is used to indicate high ability managers, actually measure the opposite; high ability managers will not leave money on the table with an unexploited investment opportunity. Some readers may claim Q also incorporate excess returns from expected future investments, the more appropriate measure in cases when the when the excess values of the future investments are incorporated in the market price of shares is closer to the average Q.

incorporate both positive and negative externalities. Other questions in this realm include the following: Do investors incorporate the hidden costs of negative externalities into the stock valuation? Could real or artificial corporate actions such as social responsibility initiatives make a difference? A study of the positive and negative externalities in the recent past fifty years could be enlightening to show how narrowly defined corporate finance decisions have been.

Idea #61: Give credit where credit is due. Research progress tends to build pieces by pieces, step by step, where few breakthroughs are without precursors. To truly appreciate what the more celebrated researchers have accomplished, we need to remember those who came before them and on whose silent shoulders they stand on. Here are some examples of these forgotten intellectual forerunners whose contributions may interest some researchers to give them proper credits in a publication. Many old hands in finance are familiar with the list below, but the new generation needs to be reminded.

a. It was John Burr Williams who invented the mechanics of homemade leverage and dividend. In Williams (1938), he articulated the capital structure and dividends irrelevance propositions. His Harvard dissertation was published in 1935, and reissued in 1956, two years before M&M published theirs.
b. Jack Treynor (1962) proposed the security market line/capital market model, before a more formal presentation by W. Sharpe.[18]
c. Benjamin King (1965) discovered the common market factor for all stocks and separate factors for subgroups of stocks, which provided the inspiration for the market portfolio, the single factor market model, and the multifactor asset pricing model.
d. Give credit to James Boness (1964) for the first appearance of the present version of the option pricing formula which he published in his University of Chicago dissertation. His model was identical to what we know as the Black and Scholes model except for one term. His omission was that he did not insert the risk free rate as the discount rate. The intellectual leap to see the hedged portfolio is risk free and thus, should be properly discounted at the risk free rate is due to Edward Thorpe, MIT mathematics professor and gambler extraordinaire.
e. In turn, Fisher Black (1973), in his two page note, should be credited for realizing the interest rate on corporate debt are grossed up such that bondholders are indifferent between holding tax free versus taxable bonds, and the benefit to corporate debt is net of the grossed up rate. This notion is usually credited to a later Merton Miller (1977) paper on ‘Debt and Taxes’.

Idea #62: There are many more such examples for the readers to discover from the earlier writers. For example, agency problems, or taking advantage of another when the opportunity should arise, is known throughout history. The antecedents to agency costs are probably too many and too far back to trace. Nevertheless, a serious study on how solutions to agency issues developed in different places and different time is of interest for both historical and pedagogical reasons.

Be bold, let yours be the shoulder others can stand on. In other words, researchers should not be slaves to testing other people's ideas. They should aim at coming up with their own original ideas, which is a lot more exciting. I shall give you a few examples:

3.5.1. Other governance mechanisms after Jensen and Meckling (1976)

They proposed three mechanisms to deal with potential agency concerns: monitoring, incentives, and bonding. These solutions give rise to several well-known governance mechanisms: boards of directors as internal monitors versus activists, investors, and potential acquirers as external monitors; and executive compensation as an internal incentive mechanism versus opportunities for higher pay in the managerial labor market as an external incentive mechanism, etc., Since humans' tendency is to take advantage of other people (take or steal when payoff is high and when the opportunity arises; avoid and let other people do the work but to take credit or material benefits.) is as old as time, one would expect there exist other mechanisms to deal with agency and thus serve as means to good governance. Thus, in addition to the three mechanisms mentioned above, I have come up with additional mechanisms below that may warrant further research in documenting and testing their efficacy in dealing with agency concerns:

a. Sunlight.

Idea #63: If the process and the performance of the contracted task between the principal and the agent are for all to see, the eyes of the public take the place of private monitoring and the agent will find extracurricular activities extremely difficult. Public knowledge of the agent's action may include advanced warnings of related transactions, or knowing in real time when the executives are ‘at play’ in such activities as playing golf, combining business trips with family vacations, or using the company plane for reasons in a ‘grey area.’ We also need to make it more difficult for laggard executives to hide their shortcomings by making it easy to compare their achievements versus resources consumed. Public disclosures may also include a report card on the company's performance and efficiency in the utilization of the company's resources, from tangible assets to its human capital, compared to other executives under similar operating conditions or handicaps.

Idea #64: This approach applies equally well to reduce corruption by public officials, which can be viewed as an agency issue against the citizens. Imagine if the public could have knowledge (e.g., through required disclosure, investigative work and surveillance by the citizens in a society that allows citizens to freely express their views without fear of recrimination, or allow a bounty for uncovering official's hidden bank accounts and properties) of officials' and their relatives' sources of incomes, both above and

[18] Treynor was known to be working on the idea since late 1950s. Modigliani suggested breaking the paper into two: “Toward a Theory of the Market Value of Risky Assets”, and “Implications for the Theory of Finance”, presented in 1962 and 1963 respectively. Later, it is known that Modigliani called to tell him about William F. Sharpe's CAPM paper, and suggested that Treynor and Sharpe exchange drafts.

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under the table, assets under various names, consumption goods and other means to display wealth, and money transferred to other related persons. The eyes of the millions of free citizens provide the best monitors of public officials and their family members as means to reduce public corruption.

Idea #65: Social media these days allows individuals to reach a large audience at almost zero marginal cost. This is the power of the crowd. In addition, there are company specific social media outlets in the form of single company sites (stock boards) for all investors. Sooner or later, small activist investors may find a way to reach likeminded investors and amplify their grievances against company's management policies. That is, social media may empower small investors. Upon reaching a critical number of small investors through social media, it would become necessary for management to pay attention. They cannot help but notice the posts as the number of people around them who notice grows. In particular, for executives in high places, social media comments by small investors may initially be simply annoying, to be swatted away like flies. However, when the criticisms reach frenemies in their social circle, the criticisms may be torturous. For those who are in or try to break into the elite social circle, the concern to avoid public shaming may breed good behavior. That is, this mechanism raises the private costs to the agent from engaging in agency behavior.

Idea #66: Sunshine should also be applied to the monitors (e.g., members of the board) and their actions, with disclosure of their voting records, attendance, willingness to dissent on behalf of shareholders, and related transactions. It would be useful to produce a score card for the entire pool of current individual directors that is based on the qualities that are important for monitors on behalf of the shareholders to possess, as opposed to qualities that favor the executives; i.e. not one to rock the boat, quiet, just give advice based on their expertise, and subservient to the CEO or owners.[19] This way, public shaming of directors would come in the form of a low public score that could lead to a boycott or blackball by shareholder interest groups.

b. Legal and professional sanctions.

Idea #67: Investigate the efficacy of branding and shunning. A person tends to exhibit better behavior when society has a longer memory, and when the same person's professional opportunity for wealth and fame decline away from one's home base or financial and business center. Fear of being branded in the business community should cause potential offenders to hesitate before committing agency acts. There is a need for research to prove whether shunning works to constrain bad behavior among executives, and whether its effectiveness depends on the country, history, culture, and legal environment.

Idea #68: Investigate the impact of reputation. The flip side of a penalty imposed by others (sanctions, shaming, shunning, etc.) is the effort by current and potential managers to give assurance of their integrity and character. Managers value reputation for various reasons. They may see the monetary value of reputation, through greater opportunity for a better job; the utility value, through improved standing among peers or in the community; an intergenerational transfer value, by passing one's good name to children; or simply as a consumption good. To earn such a reputation would take time to develop through repeated transactions. A very desirable property of reputation is that the more a person works to enhance one's reputation, the harsher is the penalty for losing it, which further encourages good behavior.

Idea #69: Egregious acts by managers be made punishable under new laws. Stealing from shareholders for own benefit is nevertheless stealing, in fact, for the amount taken, is a felony. However, for legal sanctions to work, there need to be a sea change among the minds of the legislators, executives, and shareholders that diverting, wasting, and taking of company's funds and resources are punishable by law.[20] Professional sanctions include adverse impact on the managerial labor job market, given a criminal record. The recent change in the public attitude toward corporate executives who committed sexual abuse toward employees and the career ending consequence makes a powerful reminder to future managers. There is a need to combine legal research on the theoretical legal basis and precedence to make corporate agency by top management punishable as a felony with the directors as co-conspirators. There should also be triple penalty similar to the case of insider trading.

c. Competition.

Idea #70: If a task to be performed could be equally divided into smaller parts, each part can then be assigned to two or more competing persons or teams. Competition, in the absence of collusion, can elicit maximum effort and mutual monitoring from the competitors. Thus, reducing the resources the principal needs to expend on monitoring, and verification. However, competition is not without shortcomings. Collusion, sabotage, attempts to corrupt judges of the competition, lobby to influence rules of the contest, false reporting of results and feigned competition designed to benefit one competitor and handicap the rest could all reduce the positive benefits of competition. Nevertheless, there are certain tasks involving agents in which competition is a solution to elicit maximum effort. There are topics in both the design of the competition with minimizing agency cost in mind, as well as documenting and

[19] These days, many researchers have lost their way in governance research. In particular, they rationalize a CEO serving as chairman of the board; i. e., so-called duality, under the misguided notion that the arrangement minimizes conflict, speeds up decisions, and achieves overall better coordination. What garbage! They forget the first principle: the primary function of the board members is to monitor the CEO and other top managers on behalf of the shareholders. Shareholders are too diffused and cannot monitor for themselves due to costs and free riding by other shareholders. The board is therefore created on behalf of the shareholders, hired, and paid for by the shareholders, and for the shareholders. If the CEOs need outside expertise, they can hire consultants.

[20] It is high time to address the social inequity that when poor people steal a few dollars (or a loaf of bread, as in *Les Miserables*), they can get jail sentence, while top executives using company's funds and assets for private benefit escape punishment.

comparing agency costs under various forms of competition.

However, I should point out two concerns in dealing with agency problems: the first is a fatal flaw in all remedies to agency concerns and the second is a non-solution that is often mistakenly accepted as a viable solution.

Idea #71: The flaw is the risk of the 'last period transaction' problem. Individuals are calculating and opportunistic; if the one time agency related gain outweighs all future gains from the existing relationship, the temptation to take the maximum possible ill-gotten gain and terminate the relationship is great. From another angle, an agent may use all previous efforts in building a good record for a large payoff in the final transaction. Unfortunately, 'last period transactions' occur regularly between friends, relatives, and longtime business associates. It is worth taking a closer look at instances of 'last period transaction,' despite having in place all the mechanisms to alleviate agency. It may show that there is no foolproof solution to agency concerns. Additionally, researching business owners and individuals who have suffered from agency action inflicted by others may reveal that the offenders are those they trusted most.[21] An investigation into the circumstances in which agency issues actually occur may shed new light into the topic, where current research is mostly positive prescriptions.

Idea #72: The none solution is attempting to solve an agency problem through market pricing. The theory suggests that the market could price and deduct expected agency costs from the value of the transaction. For instance, it has been suggested that the investors could discount the expected agency costs of a firm from its managers in their pricing of the shares. Firms with higher expected agency costs to be extracted from shareholders would be priced lower.

However, there is a logical flaw with this solution: it requires the investors to predict the size of agency costs *before* the managers act opportunistically, e.g., to steal, or to turn in subpar effort. To illustrate, imagine a manager or entrepreneur selling shares to outside investors in which the investors expect the manager to take 20% for personal consumption or waste like amount with reduced effort. Because this is a penalty assessed ***before*** the manager actually consumes the agency benefits, the manager can decide how much to consume after observing the assessed penalty by the market. A rational and calculating manager will surely consume more than the assessed discount on the shares, whatever it may be. Thus, the assessed discount for agency costs, no matter the estimated value, will always be too low. Specifically, "if you paid me only $80 for a $100 job because you expected me to steal or waste $20, would you expect me to be honest and give you a $100 worth, steal just $20, or steal more than $20?" The efficacy of solving agency through market pricing needs be examined.

Unfortunately, in spite of its inherent defect, the market has no choice but to incorporate expected agency costs in some degree in the pricing of shares. This relation between share price and ex ante agency costs is verified by empirical data Bebchuk, Cohen, and Yang (2013).

Idea #73: It is one thing to show market price agency costs, i.e., ex ante pricing, it is another to show that managers indeed behave, i.e. limit ex post agency costs no greater than ex ante pricing.

Idea #74: In developing or former communist countries when they have had to start a stock market from scratch, are the inexperienced investors aware of agency costs? If not, what is the price of this ignorance, i.e., loss suffered in their shares of high agency concerns companies? How long (in years) does it take for investors in these nascent stock markets to learn?

Idea #75: Are agency costs priced differently in different markets? What can explain the international difference? How much of the difference in pricing is due to difference in: culture, religion, history, psychology, life experience, and time period studied.

Idea #76: Last period transaction. Develop a model of agency theory that incorporates the last period transaction problem. Document how individuals and firms deal with this problem. Are there differences in the severity of, and solutions to this issue across the world? What account for the difference?

3.5.2. Entrepreneurial finance

The time has come to point out that finance theory for the entrepreneurial firm is not the same as the traditional finance theory for the steady state firm. They differ in all important areas – investments, financing or capital structure, distribution or dividends, and management of liquidity, for example. Thus, we need new research in all these important areas.

Irrational behaviors are not necessarily all bad. Sometimes, they are necessary for the survival of the individual or group. A case in point is the investment made by entrepreneurs and their financial backers (angel investors, and venture capital). True breakthrough entrepreneurial investments are long shot; on the average, they have a low probability of success, and average return of all entrepreneurial investments is in negative NPV territory. This is necessarily so, for every new technology or way of doing business, there be only a handful of winners and the rest are bound to be losers. Thus, the average return has to be low. If these entrepreneurs, and their backers, were truly rational, they would invest in neither individual projects, nor a portfolio of projects. On the other hand, truly breakthrough projects, which are few, yield society far, far greater benefits. In other words, there are positive externalities that the entrepreneurs and their financial backers cannot capture but nevertheless benefit all. Consequently, the economy is better off with entrepreneurs and their backers exhibiting irrational behavior, including overconfidence, over optimism and miscalculations. This is what I coined as the 'Second Law of the Invisible Hand' Ang (2018), where low probability but high extreme payoff investments made by risk taking entrepreneurs and their backers yield positive social good; the higher the number of individual behaving thusly, the greater is the benefit to the economy.

Idea #77: A theory of corporate investment could not be complete without making allowance for entrepreneurial investments. More specifically, I am referring to deriving a rigorous model of entrepreneurial investment incorporating both the value and low

[21] This is the result of a self-selection problem. Most people would not lend money to—or hire as agents—strangers or those they do not trust. As a consequence, if they are cheated, it must come from the pool of those they trusted.

probability of very large payoff as well as a penalty function for failure. For practical purpose, it would be a generalized NPV rule.

Idea #78: In recent years, the high valuations given to the 'Unicorns' or not listed firms with over a billion in valuation is a challenging topic. Do the entrepreneurs and their financial backers know their odds (rational) or not (irrational)? What can we take away from earlier high valuation startups where we now have some history of their financial results on which to perform relatively rigorous analysis? Modeling the investment choice of the entrepreneurs and their backers, with and without considering externalities, is a worthwhile challenge.

Idea #79: Entrepreneurial financing may also provide answers to questions that sociologists, anthropologists, and ethicists like to know. For example, family members and friends' willingness to provide financing at unfavorable odds and payout may enable researchers to estimate the value of family ties and the value of friendship. These are quantified by the amount of discount they are willing to accept in comparison to what they could have earned at the financial market from unrelated third parties.

Idea #80: The financing capital structure nexus for the entrepreneurial firms could also be reformulated. Instead of the standard debt versus equity choice and mix, the entrepreneurs are more concerned with the choice between inside (their own) versus outside (from other fund suppliers such as, angel investors, venture capital and employees) equity.

To model this version of the reformulated capital structure problem, one would need to operationalize the entrepreneur's utility function. In particular, to specify what the entrepreneurs mean by retaining control and preserving the founder's vision. Is it retaining the right to choose policies for the firm, such as in what asset to invest, when and how? Or, is it securing the founder's say and stake in the company. Many of these concerns ultimately lead to a model wherein the firm is choosing between outside debt, outside equity, and inside equity. The further division of equity into founder's (entrepreneur's) equity versus equity issued to financial backers is a distinguishing characteristic of the entrepreneurial capital structure theory.

Idea #81: The nature of dividend also takes on a different view for the entrepreneurial firm. However, the general principle is still the same – how much and when to distribute to the investors or founder as return on capital. The scope is expanded, however, the forms of distribution include: pre IPO sale of partial stake, sale of entire venture before IPO, IPO, sale of partial stake at IPO via secondary offer, post IPO sale, post IPO dividends, post IPO sell of remaining stake to an outside acquirer. The distribution problem is expanded from timing, amount and choice between dividends and repurchase to the question of choosing the amount and timing among these various means of distribution to exit.

There are rooms to formally formulate the ideas discussed above as theoretical research papers.

3.5.3. Expanding the capital structure theory

For the traditional firms, versions of the standard capital structure theory range from a trading off between benefits (tax deductibility of interest expense) and costs (agency, asymmetric information, transaction costs, …) to produce an interior optimum to one that is driven by timing considerations (pecking order, and behavioral timing). There are several new directions capital structure may be expanded by researchers.

Relaxing the assumption that investment and capital structure choices are separable.

M&M analyzed capital structure for a given level and risk of investment, i.e. assets in the same risk class. In the real world of business, the expected profitability of the asset determines whether financing provided by others would be forthcoming, and the availability of financing determines whether the investments be made. In the following, I shall consider corporate finance policy topics under two of the cases where financing and investment interact. These are the two circumstances:

Idea #82: The firm has not only positive NPV on the average, but its return in every state is high enough to cover the initial investment outlay plus risk free interest. This situation is not rare, witness the number of firms whose profit could easily satisfy this condition year in and year out. However, corporate finance could be quite different. Here, the entire project could be financed by 100% debt, and thus, we have a corner solution. In fact, this is an arbitrage situation, as many positive NPV projects are or could be transformed into one. Yet, we have several issues to explore: why are these firms not 99.9% debt financed[22]? Why do they hold so much cash? Do investors understand the source of stock price fluctuations here is due to fluctuations in the excess profit and not risk (with probability of distress) in the usual sense?

Idea #83: The firm has positive NPV but not domineering then there are returns in states that are less than the cost of investment. This is also not unusual as most firms operate as if they only invest in positive NPV projects. The pre financial engineering approach is to choose debt no greater than the lowest return among all states. The difference would be covered by equity. Alternatively, these firms may issue risky debt (i.e., subject to default), and compensate lenders with a higher interest rate. These days, however, with the advent of hedging products such as credit default swap (CDS), the firm can still issue risk free debt while buying CDS at the same time. Because of the cost of insurance charged by the issuer of the CDS (at $cds), in this case, only firms with positive (NPV - $cds) can finance their projects with 100% debt. Otherwise, the positive NPV firm could be financed with all inside equity, or with some outside equity for risk averse founders looking for risk sharing outside investors. Researchers can work out the full model. These circumstances could lead to rewriting the theory of capital structure in a non-trivial way.

Idea #84: A puzzle in corporate finance involving capital structure is the question of why firms do not avail themselves of the existing financial products that could create the synthetic arbitrage above (Idea #82). I am referring to preferred stocks, which is probably as old as common stocks, income bonds which has disappeared, zero coupon long maturity bond, as well as financial securities that allow costless reorganization, i.e., automatic debt equity swap as in CoCo bond, etc. Even during period when they were available or popular, firms still did not utilize them to the maximum extent, i.e., near 100% debt.

[22] The 0.1% equity allows the owners residual claim to the surplus.

Idea #85: Researchers do not like to deal with messy data, and thus, they would often get rid of nonconforming firms under the guise of outliers, recording error, and value outside plausible range, etc. Researchers using capital structure data would almost always discard the 'inconvenient' firms with negative equity. To the casual readers, this seems like a small price to pay for improved estimation. However, these 'zombies' firms are not negligible in number. They could range up to 10% or above in the Compustat universe of firms in some years. There is a research industry to revise extant empirical studies on capital structure as well as topics with leverage ratio as a variable by including these omitted firms.

3.6. Below

1. Before generating new data, one needs to dig deeper below ground to make use of data that is already available but seldom used. The federal government releases a great deal of data every year by various agencies, such as the vast storehouse of data from the Bureau of Labor Statistics and the Bureau of Economic Analysis, plus data from the Survey of Current Business, Survey of Consumer Finance, the Census, and surveys and reports on business conditions on foreign countries by the State Department and the Commerce Department, not to mention the regular reports and occasional studies by the Federal Reserve Banks, etc. There is data collected by business groups, such as the Conference Board, or by foundations such as Kaufman on panels of small businesses. There are also similar reports generated by foreign governments and their agencies, as well as from private sources. For instance, one can obtain data on private businesses more easily in other countries, e.g., Europe via Amadeus, and Canada, than in the U.S.

3.6.1. Social networks

Today, researchers enjoy an abundance of data from social networking sites such as Facebook, Twitter, Instagram, and Yelp, as well as data compiled by Google and other search engines. There are also communications between shareholders in such places as company specific message boards. One should expect the low hanging fruit to be soon picked. The next step is to use this data in more creative ways. For example, the low marginal cost and wide availability of social media data makes one wonder whether it could be put to good use in the business world.

Ideal #86: For instance, could one or a few small investors, owning only a few shares, take to social media to voice their concerns over companies that commit particularly egregious actions, and get results by receiving support from other shareholders also on social media? If so, how, or what is the sequence of events that are necessary for a tweet or comment by a small investor to become an avalanche? This topic is not trivia or a novelty - it may provide some answers to the vexing question: if the board of directors does not perform its function as monitor of top management, who could?

Idea #87: Related is the role of stock influencers, how does one acquire status? How do they influence other investors/followers? Are they unbiased or for hire? Could they compete with the highly paid analysts of the big investment banks? If so, do they diminish the role of the latter?

Idea #88: At the other end of the spectrum, can social media be used for manipulation? Firms can do this by hiring third party professionals to promote the company or make carefully crafted misleading statements.

Idea #89: I envision that, very soon, researchers with expertise in artificial intelligence techniques will use it to discern subtle changes in sentiments and hidden reasons behind objections to manager's financial decisions. Firms will use it, in combination with social media, for nefarious means, such as manipulating investors' perceptions, or persuading shareholders to agree to managers' self-serving objectives, etc.

Idea #90: We are beginning to realize the double edged sword nature of social media. While one can distill trends, sentiments, and even deeper feelings from random but honest posted comments; but it is also subject to manipulation. There is probably an industry in existence serving clients to manipulate the public in general, and investors in particular, with machine generated social media identities. The research topics here are to identify and clean up the manipulated raw social media data, and then replicate previous studies with cleaned data.

2. Survey is one of the easiest ways to obtain original data but is also one of the most difficult ways to get reliable results. Most of us at one time or another are annoyed by requests to respond to surveys. This feeling is probably ten times worse among busy executives. At best, they may get an intern or assistant to the executive secretary to answer the survey. The ideal survey would have to be one administered to captured audience, i.e., CEO of firms attending a special class or conference for top executives. Even more ideal is to maintain the same panel of executives over many years. This is obviously very demanding of respondents, as many would drop out due to lack of commitment, losing interest, job change, and retirement. The scope of such longitudinal study is also much curtailed, as respondent are more likely to stay if the periodic survey is limited to a very short list of questions.
3. Idea #91: Questions in such longitudinal surveys may include asking dealmakers (e.g., active top managers as investors and speculator of other firms, investment bankers in corporate finance (M&A, IPO, etc.,) about deal making opportunities, the best time to sell or buy, … Why they choose to issue debt or equity, retire or refund. Or, perhaps track the same group of investors (small, large, etc.,) asking why they made their decisions to buy, sell or hold, etc., and then ask them afterwards, how they view the same transactions, now with hindsight – what influenced them to rush and possibly make a mindless decision. Do they commit self-attribution or other behavioral bias, even for experienced traders? Most relevant to corporate finance is how they respond to announced change in financial policies announced by the management, not just their impact on share prices, but their rationalization of the manager's motives and rationales.

Idea #92: Survey may also be used in creative way to elicit hidden answers on questions that are inherently difficult to get truthful

answers. For instance, on the issues of whether ethical concerns play a part in financial decision, it would be fruitless to simply ask:

"I consider ethical concerns very important in my investment decision: from strongly agree to not agree, on a scale of 1 to 10. etc.".

However, the researchers can also use framing to design the questionnaire. Consider the first iteration:

"Your company's scientists come up with a revolutionary new product that could bring $50,000,000,000 in sales that is equivalent to $250,000,000,000 in market value creation. There is an estimated legal liability of $10,000,000,000 for payout to survivors and hospitalization costs due to accidents and side effects".

Same question, now the legal liability is lowered to $2,000,000,000 or raised to $50,000,000,000.

Observe that although the question of ethics is often regarded as an absolute standard (the answer should be the same in all three cases, as ethics should not have a price), a survey may reveal to many people that ethics has a price and is relative in a cost benefit calculation.

Idea #93: Interviewing executives, who are generally self-serving, may yield little useful information, interviewing common investors requires large samples and costs to distill the hidden common lines of thoughts. However, more than for reporting or information gathering, a more meaningful purpose of interviews is to generate ideas and build models to aid research. Insights may be gained from the interviews to fill gaps in our knowledge of a topic.

Idea #94: Recall that empirical models are intended to verify how closely the assumed model can describe choices made by individuals and firms. The specification of these empirical models is not produced in a vacuum, but rather, they require astute observations from the experienced. A classic example of how executives' decision models inspire testable empirical model is the partial adjustment corporate dividend model proposed by Lintner. He asks executives how they make dividend decisions, and why they do not distribute as much as they can afford. The answer is that they are afraid they may have to cut dividend later, which is to be avoided, and hence, they make smaller increases to reduce the chance of having to decrease later. Interestingly, this behavior also anticipates the Tversky and Kahneman's Prospect Theory, in which the gain from an increase is considered to be less than a decrease of equal size. Another example involves the puzzle of why some firms (the Unicorns) are able to obtain high valuation and financing. I am certain that a careful read of interviews given by their founders would reveal certain common characteristics: confidence, bravado, can do, dream big, spin tales, etc. They may be the great visionary or the great con artist. It would be up to the researchers to analyze what is said.

Idea #95: Large scale simulations are very rare today. However, their role as an invaluable tool for research is even greater now for several reasons. Firstly, simulations are capable of handling very large, undefined, and complex problems, with many variables and relationships where the standard research tools of postulated simple relationships with symbols, disguised as mathematical model, or ad hoc empirical models would be woefully inadequate. Secondly, advances in machine learning and artificial intelligence can breathe new life into simulations that previously relied on older tools such as Monte Carlo simulations. Lastly, the changing landscape in business and advances in technology create new challenges where simulations can contribute. For instance, just as simulations may be used to study the spread of virus (computer or natural), they may also be used to study how information about the firm spreads, or how to counteract misinformation.

Idea #96: From a financial decision viewpoint, simulation may provide insights into financing and investment problems that are too complicated to model or be solved analytically, e.g., a multiperiod investment decision may involve a sequence of financing, refinancing, asset sales or redeployment, etc., Valuation of stocks need not be confined to simple assumptions such as fixed or constant change in earnings concerning firm decisions and external shocks; simulations with learning allow greater flexibility to incorporate a firm's choices and external shocks.

Idea #97: Laboratory experimentation is possibly the most underutilized research method in finance. In some ways, this is understandable as most finance researchers do not receive training in this approach. There is also the planning and cost involved, as well as the fact that experimental results are not journal reviewer friendly, e.g., a seemingly harmless, simple suggestion from a reviewer could require an experiment to be repeated or even cause it to be abandoned, and raising the resulting cost and time involved in response to the reviewer's whim. However, there are certain research topics where laboratory experiments may be the only means to tackle a research question. For instance, negotiations between the managers and their lenders, venture capital suppliers, potential acquisition targets, suppliers, or customers, or between managers and labor in collective bargaining, and with board members in setting own pay, usually take more of the executives' time than the standard corporate finance issues of capital structure, dividends, or working capital, etc. Yet, there is no data available on negotiation – formal and informal offers and counteroffers, signals and tactics, etc. Fortunately, the basic structure of most bargaining situations can be replicated in a laboratory experiment. Here, one can perform laboratory experiments not only in finance applications previously explored just using game theory but also on hypotheses derived from behavioral finance. Experiments may set reference points for participants and examine their role in affecting final outcomes. Negotiation game may be designed to observe how one party can cause the opponent to reveal their reference point, or even move it toward the position that the first party desire, or how one party can create sunk costs for the opponent, real or behavioral.

Idea #98: Laboratory studies may also be designed to examine various elements of negotiations such as, different types of opening merger bids, from low ball to preemptive bids. To simulate negotiations with fund suppliers (lenders, bankers, and venture capital), players may be endowed with various qualities, e.g., those who have had previous record of fair dealing versus not; experienced players vs. inexperienced, or those who prone to misrepresent, etc.

Idea #99: Laboratory experiments may also be applied in a market trading setting to evaluate proposed firm financial policy change versus alternatives.

Idea #100: Laboratory experiments could also have a meaningful role in the study of social media in manipulating the

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expectations of investors or of perception of a CEO's talents.

Idea #101: More practical for firms is experiments to explore whether social media could influence the outcomes of proxy voting, which would be useful for the incumbent managers or the challengers to nominate or retain board members or to revise corporate charters.

Idea #102: Laboratory experiments may also be designed to test whether companies could use stealth social media to influence share prices.

4. Conclusion

When I set out to write a paper on expanding the frontier of finance research, I faced the problem of defining the frontier. It would be more convenient to define the frontier as a line consisting of the latest research. However, it would be a movable line and would bulge in places where a research topic is currently hot. Instead, I establish the cube wherein the six dimensions are broad enough to cover almost all possibilities and with the desirable property of being stable, and is not influenced by fads. The cube can also be viewed as a taxonomy to organize research topics and directions by their sources of origin. The list of research topics I suggested in this paper is just a first iteration. I look forward to additions by readers and future researchers.

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