Shadow Finance[*]

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Abstract

Shadow finance refers to all financial transactions that take place outside regulated and transparent financial markets. We emphasize one important reason why a shadow financial sector exists: preventing dissemination of valuable information about asset values and 'cream skimming' of the most valuable assets away from public, transparent, exchanges. We highlight one important negative externality on organized markets from the migration of financial transactions to the shadow finance sector, reduced access of retail investors to the most lucrative investments. We argue that existing exemptions from securities regulations for "qualified investors" in the shadow finance sector facilitate cream-skimming and thereby undermine public markets.

"Is finance a game, or is it much more important than that? It should be something else entirely. Finance ought to provide an economy with an efficient means of allocating capital. It should provide a means of price discovery of assets, whether real or financial. It should provide a safe and reliable payments system. Financial innovations are worthwhile if, and only if, they help in those areas. All too often, players see financial innovations as providing ways to manipulate the system and make money off less savvy traders." Floyd Norris, New York Times, *In Korea, The Game of Trading Has Rules*, 26 August 2011.

1 Introduction

One of the most important functions of financial markets is indeed to provide "a means of price discovery of assets". This is an essential step in the process of capital allocation, risk-sharing, and the provision of liquidity. But price discovery, or in other words, the determination of an asset's value, requires skill, talent and information, which are all in scarce supply. Implicit in Floyd Norris' analysis is the view that price discovery ought to be a public good provided by financial markets. This is consistent with a long tradition in finance scholarship, which holds that financial markets are on average 'informationally efficient'. That is, equilibrium asset prices on average reflect assets' true (risk-adjusted) fundamental value and thus allow investors to discover assets' true prices (see e.g. Fama, 1970). More precisely, the 'efficient markets hypothesis' holds that competitive financial markets produce *publicly quoted equilibrium asset prices* that on average accurately convey information about fundamental asset values to all. Thus, in essence, according to this hypothesis financial markets are somehow able to overcome a private provision of public goods problem and provide a valuable public service of price discovery.

As Grossman and Stiglitz (1980) pointed out in their classic article, this hypothesis is just too good to be true and violates the basic economic tenet that '*there is no such thing as a free lunch*'. When information about fundamental asset values is costly to produce, they argued, it cannot all be accurately reflected in equilibrium prices. For then no-one would have an incentive to produce this costly information and every investor would simply *free-ride* by obtaining the valuable information from quoted prices. The producer of costly information has to be adequately rewarded for this valuable economic activity. In competitive financial markets with publicly quoted prices they suggest that this can only come in the form of '*insider trading*', whereby the informed investor gets to trade and thus make a capital gain before (or without)

her information being entirely revealed to other investors. What they have in mind here is not the illegal and socially wasteful practice of trading on the inside information of others, but the perfectly legal and socially valuable practice of generating costly information to be able to make better investment decisions.

To the extent that the costly privately produced information can easily leak out in the process of trading they, and other scholars, have pointed out that there may be too little information produced by 'insiders'. The amount of information that will be produced is directly related to insiders' ability to profit from insider trading, which itself is related to how easily 'insiders' can "make money off less savvy traders". Paradoxically, the better financial markets are at publicly disseminating information, the fairer the trading system is, and the better protected the less savvy traders are, the less reliable are the valuations produced by financial markets as they rest on less information.

Insider trading is one mechanism for eliciting the production of costly information. Another equally important mechanism, which we focus on in our companion paper, Bolton, Santos, and Scheinkman (2011), is to avoid the public disclosure of prices, or to trade bespoke securities at negotiated prices, which are difficult to compare to other securities. This is accomplished by trading in non organized, less regulated, opaque markets: what we refer to here as the *'shadow finance'* sector. In this sector, costly private information can be produced and its value can be largely appropriated by limiting its dissemination to the wider investing public. While transactions in this sector often serve an efficiency-enhancing purpose by eliciting better information, more accurate valuations, and value-improving financial innovation, they also impose a negative externality on organized markets by diverting the influx of certain investments from organized markets, which is the only place where the investing public at large can invest. The types of assets and deals that are likely to take place in the shadow finance sector involve investments that are most sensitive to information that can only be acquired by skilled investors. These are the investments that are most likely to be undervalued by retail investors in organized markets, and that require the most input from financiers with special valuation skills and information. This is why we refer to the diversion of these transactions to the shadow finance sector as a form of *'cream skimming'*.

Interestingly, transactions in the shadow finance sector between highly sophisticated parties satisfy Floyd Norris' basic test for socially valuable financial innovations: they benefit all parties to the deal, rest on better price discovery, and maximize the surplus from trade through customization of the deal to the parties' needs. In particular, the value of these deals

does not rest on any exploitation of less savvy investors. At least not directly. This is in contrast to the 'insider trading' in organized markets, which can only come at the expense of uninformed investors. It would thus seem that the growth of the shadow finance sector in the past three decades is a welcome development, reflecting mainly the greater efficiency of modern finance. This is, indeed, the perspective underlying much of the regulatory approach to the shadow finance sector, hedge funds, private equity funds, private placement and 'over-the-counter' (OTC) markets. As we explain below, this sector remains largely unregulated on the theory that the main actors in this sector are sophisticated players who do not need any regulatory protection. Indeed, players in this sector mainly view regulatory intervention as counterproductive as it limits freedom of contracting. However, as we shall argue, the fact that all parties to a transaction (in the shadow finance sector) gain from a deal does not imply that society at large gains nor that overall welfare is increased. To the extent that the shadow finance sector enhances cream skimming it may undermine both resource allocation and the welfare of retail investors who only have access to less valuable investments in organized markets.

In in our companion paper, Bolton, Santos, and Scheinkman (2011), we analyze a model with the following basic three period structure. In the first period agents face an occupational choice between entrepreneurship in the real sector and a career in finance. Those who choose to become entrepreneurs then proceed to set up a business, and those who choose to become financiers invest in human capital and information to be able to value assets for sale by entrepreneurs in the second period. When an entrepreneur needs to raise funding in the second period by selling assets (or a stake in her business) she can turn to either organized and transparent exchanges or to private placement markets. In organized exchanges, entrepreneurs sell primarily to retail investors, who do not have any special valuation skills or information. Assets therefore tend to sell at their average estimated value, which means that high value assets tend to sell at a discount in these markets. This is why entrepreneurs attempt to sell to informed financiers (or "qualified investors") in private placement markets in the hope that their asset will be found to be of high value. Should entrepreneurs indeed have above average value assets to sell, these assets will likely be identified by informed investors and therefore sell for a higher than average price. This is why in equilibrium a shadow finance sector generally exists alongside organized, transparent and regulated exchanges. While entrepreneurs with above average value assets benefit from trading in the shadow finance sector, they are, however, not able to appropriate the full value of the asset because of a lack of competition

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in the shadow finance sector. The informational rent that financiers are able to extract in the shadow finance sector is due to both the *opacity* of the shadow finance sector and the *scarcity* of valuation skills in the economy.[1]

In sum, financiers with high valuation skills operating in the shadow finance sector, offer a valuation service at a premium to entrepreneurs with high value assets, thereby *cream-skimming* the most valuable assets away from organized, regulated, and transparent markets. This cream-skimming imposes a negative externality on these markets and ultimately allows for excessive informational rent extraction by financiers in the shadow finance sector. The reason is that prices in organized markets, which offer a lower bound to entrepreneurs seeking to raise funding, are lowered by cream-skimming, as they reflect the average value of assets placed in organized markets, which is lower the more high value assets get placed privately in the shadow finance sector. The rent informed financiers can extract in the shadow finance sector is increased in proportion to the reduction in the 'reserve price' entrepreneurs can get in organized markets. In Bolton, Santos, and Scheinkman (2011) we focus on an occupational choice inefficiency resulting from the informational rent extraction in the shadow finance sector: as more rents can be extracted in this sector too much talent is attracted by a more lucrative career in the shadow finance sector over entrepreneurship.[2]

In this paper we focus on a different aspect, namely that investment returns in organized, regulated, markets–the main source of returns available to retail investors–are eroded as a result of the cream-skimming of assets to the shadow finance sector. To highlight this effect we provide a simplified treatment of the analytical framework in Bolton, Santos, and Scheinkman (2011) in this paper, by suppressing the occupational choice problem in the first period. In this simple analytical framework we show that when the shadow finance sector grows relative to the organized, transparent sector, the equilibrium investment returns of retail investors are reduced and those of professional or "qualified investors" increase. Thus the cream-skimming by the shadow finance sector in this adaptation of our model is at the expense of retail investors, while in Bolton, Santos, and Scheinkman (2011) it is at the expense of entrepreneurs.

The observation that the growth of the shadow finance sector results in simultaneously lower returns for retail investors in organized, regulated, markets and higher returns for pro-

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[1]See Glode, Green and Lowery (2010) for a related theory of informational rent extraction in bargaining.

[2]Baumol (1990) and Murphy, Shleifer and Vishny (1991) also consider the question whether the financial sector attracts too much talent. Their theories, however, do not distinguish between an organized, regulated, and transparent sector, and a shadow finance sector.

fessional investors in the shadow finance sector is broadly consistent with observed realized returns over the past decade. As one of the most successful professional investors, David Swensen (2005), forcefully argues in his book on personal investing, the high return investments that professional investment teams have access to are just out of reach for ordinary investors. And while a typical 401-K investment portfolio in U.S. stocks and bonds has languished over the past decade, hedge fund returns (to the extent they can be measured) have generally outperformed the S&P 500 index on a risk-adjusted basis (see, e.g. Agarwal and Naik, 2004, and Kosowski, Naik and Teo, 2007).[3] In any case one is more likely to find sophisticated investors *running* hedge funds that simply investing in them so that the returns of hedge funds underestimate the returns to their managers.

In the aftermath of the financial crisis of 2008, many commentators have raised concerns about the opaqueness of the shadow finance sector as a hidden source of systemic risk. The main worry is that risky positions could build up in the shadow finance sector in the hands of a few institutions unbeknownst to regulators and thus pose a systemic risk. This is largely the reason why the Dodd-Frank Act of 2010 (DFA) opens the way to regulations requiring greater reporting of positions in OTC swaps markets, a major segment of the shadow finance sector. Under DFA, the CFTC and SEC have a broad mandate to require registration of swaps dealers, capital requirements for certain swaps dealers, and trading of standardized swaps on organized exchanges with a central clearing platform (CCP). As we discuss in section 3, there has been considerable resistance by the financial industry to the introduction of these regulations. While some concessions have been obtained relatively easily–such as the creation of CCPs–others are being fought over bitterly–such as the implementation of greater transparency for swaps prices and quotes.

The DFA also considers tighter regulation of hedge funds, calling for more transparency in the form of registration and greater disclosure requirements for advisors. Moreover, the DFA requires further criteria that "qualified investors" must meet, essentially raising the bar on retail investors for access to the shadow finance sector. All in all, while the new regulations may help reduce the likelihood of systemic risk build-up in the shadow finance sector they also make access to this sector by retail investors harder. As we elaborate in section 3, an unintended consequence of these regulations may thus be to further increase inequality between retail and qualified investors.

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[3]See Malkiel and Saha (2005) for a dissenting view on hedge fund performance.

2 A Simple Analytical Framework

We begin our discussion by describing the simplified analytical framework of Bolton, Santos, and Scheinkman (2011) without occupational choice and with *cash-in-the-market pricing*. In the Appendix we give a detailed exposition of the formal model underpinning our analytical framework and provide a statement of our main proposition on cream-skimming in the shadow finance sector and the welfare consequences for retail investors. By cash-in-the-market pricing, a term first coined by Allen and Gale (1998), we mean that average equilibrium asset prices in the organized exchange are given by the ratio of total cash in the hands of market investors divided by total assets for sale. When cash-in-the-market prevails asset prices can be below the present value of its cash-flows; this reflects frictions that prevent investors from borrowing to finance all their investment opportunities.[4]

We divide time into three critical phases. In an initial phase entrepreneurs make their investments. In an interim phase, the assets that are created through these investments may be sold so as to allow the entrepreneurs who wish to do so to exit their investments. The assets originated by entrepreneurs may be of high or low value. The true value of originated assets is difficult to ascertain and both entrepreneurs and retail investors can only determine the likely average value of an asset for sale. There are, however, financiers specialized in valuing assets, who are able to distinguish the valuable assets from the other ones. These financiers operate mainly in the shadow finance sector, an opaque dealer-based market where they can single out the best assets and acquire them at some price, which we denote by p_d.[5] The reason why skilled financiers operate mainly in this sector is that they are better able to protect their informational rent in this market, as other investors are not able to infer their information from their quoted prices, which remain hidden. In contrast, in the organized, regulated, and centralized market, where buyers are required to disclose their bids, it is much harder for informed financiers to protect their informational rent. Accordingly, in this market there are mainly retail and uninformed institutional investors, who are ready to buy any asset up for sale at some price p. We refer to this centralized market in what follows as an exchange and to the dealer-based market as a private market.

Another key distinction between the private market and the exchange is the customiza-

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[4]This is a simple way of modeling a downward sloping demand curve for financial assets. Cross sectional dispersion in risk aversion among potential buyers of the is another.

[5]The subscript d refers to the price of assets in the dealer market (the shadow finance sector).

tion and complexity of financial transactions. On the private market assets can be customized for the special needs of a particular entrepreneur. This tends to enhance the value of the transaction. In contrast, on the exchange only standardized financial assets, such as stocks, bonds or futures, are traded, which makes relative comparisons between two assets easier and enhances competition. The dark side or customization in the private market is complexity and opacity. Customized financial assets are unique and therefore harder to value by referring to the value of comparable assets. Thus, customization, while creating higher added value, also facilitates extraction of this value by informed financiers. It also produces greater complexity and a greater risk of unintended consequences with respect to the build-up of systemic risk.

Three classes of agents operate in our stylized economy: entrepreneurs who originate assets, financiers or financial intermediaries who are able to value assets, and uninformed retail investors who invest in assets sold on the exchange. As compensation for holding risky assets is not essential to our analysis we shall assume that all agents are risk-neutral. The assets originated by entrepreneurs yield a return or payoff in the third and last phase of our model, but to capture trading in assets after they have been originated and before they have matured, we shall take it that all entrepreneurs are eager to realize their investments and start consuming their accumulated wealth in the interim phase.[6]

Financiers stand ready to value and purchase assets for sale in the interim period, but they have limited wealth and cannot absorb all assets that are up for sale at a reasonable price. For simplicity we shall take it that each financier can purchase at most one asset and, as is empirically plausible, that there are fewer financiers in the economy than entrepreneurs. The remainder of the assets that cannot be purchased by financiers is absorbed by retail investors in the exchange. An important assumption in our analytical framework is that there is no overall excess savings, or *savings' glut*, in our economy. In other words, there is a relative abundance of assets originated by entrepreneurs that can serve as savings vehicles for retail investors. This ensures that in equilibrium the return on investment for retail investors will be strictly positive.

What deterimes whether an asset is traded on the private market or on the exchange? A first factor, of course, is whether the asset is identified as valuable by financiers. If in their assessment the asset is only average or below average then they will not seek to purchase it. Accordingly, all average or below average assets will end up being traded on the exchange. If

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[6]We could have allowed entrepreneurs in need of liquidity to borrow against their projects instead of selling, but as we argued in our earlier paper, they would weakly prefer to sell them outright.

the asset value in their estimate is above average then financiers will seek to purchase it at a competitive price, which would be the price the asset is expected to fetch on the exchange. This is how informed and skilled financiers are able to extract an informational rent in the private market: they are able to acquire an asset with above average value at a price that is close to the average value of assets that are traded on the exchange. What fraction of above average value assets will thus be traded on the private exchange? Essentially, as many as financiers can afford to buy. To the extent that their financial capacity is limited they will have to turn down some attractive deals, which will then take place on the exchange.

2.1 Cream Skimming and the Welfare of Retail Investors

What is the effect of an increase in the number of financiers or in the capacity of financiers to absorb valuable assets for sale in the interim period? Basically, as the number of financiers increases the fraction of valuable assets that is *cream-skimmed* by the private market increases. This means, first, that retail investors have access to fewer valuable investments on the exchange. Thus, other things equal, the expected return of assets open to retail investors decreases as fewer assets are available to them as savings vehicles and the average quality of assets sold on the exchange decreases. Second, the expected return obtained by financiers in the private market increases as the proportion of high quality assets traded in the private market increases. The reason is that financiers get to purchase the valuable asset at the competitive price, which is the price quoted on the exchange. But, to the extent that this price declines to reflect a worsening of the average quality of assets sold on the exchange, financiers get to purchase assets at more favorable terms. This is the fundamental cream-skimming externality we emphasize in our analysis that the shadow finance sector imposes on the exchange and on retail investors. Commentators on the financial crisis have focused on the externality in the shadow finance sector in the form of accumulation of hidden systemic risks. We add to that a cream-skimming externality, which would remain even if adequate reporting of positions in the shadow finance sector reduces or eliminates the systemic risk.

2.2 The Credit Boom through the lens of the model

One way in which the shadow finance sector can grow is if the number of financiers operating in that sector grows. But an equally plausible way in which this sector can grow is if existing financiers are able to borrow more, or (more generally) obtain more financing from retail

investors to acquire more assets. This channel of growth of the private market induces the same negative externality in terms of cream-skimming on the exchange, and on top of that is the source of a major systemic risk through a lending boom-and-bust cycle, where initially greater leverage enables financiers to boost their returns, but eventually excessive expansion of the private market results in too much money chasing too few valuable assets, over-leverage, and a crash.

To see this, consider the following dynamic extension of our analytical framework, where we simply paste a sequence of economies like the one described above one after the other. In every period t there is then the same population of entrepreneurs originating assets as described above. In the *interim phase* $t + \Delta$ these entrepreneurs then sell their assets, which mature in the *final phase* $t + T$, where $\Delta \geq 1$ and $T > \Delta$.

Moreover, in every period t a population of long lived retail investors enters the exchange and provides liquidity in this market. After they acquire the assets sold by entrepreneurs in period $t + \Delta$ they simply hold them until maturity in period $t + T$. There is also a date specific group of financiers, μ_t, that enters the $(t + \Delta)$-period private market. As with the retail investors just described, financiers can only participate in the private market open in their period. Once they have acquired their assets they also hold them until maturity at date $t + T$. In sum, financiers and retail investors are, as a simplifying assumption, buy-and-hold investors.

Before we discuss the effects of a gradual increase in the size of the private market through leverage, we first consider the simpler scenario in which the private market grows as a result of an increase the group of financiers over time, that is, $\mu_{t+1} > \mu_t$. Then it is easy to see what this dynamic version of our framework can deliver. First, notice that because the group of financiers is increasing over time, so is the amount of cream skimming. As a result, the quality of the *vintage* of assets in the hands of retail investors deteriorates progressively, as reflected in the expected payoff for each of the vintages.

At the same time, consider what happens with equilibrium prices in the exchange. As long as cash-in-the-market prevails, the price of the average asset traded in the exchange goes up on account of the lower volume of assets flowing into it: $p_{t+1} > p_t$. It follows that for any retail investor, the *realized* return between two periods (other than the maturity date) is always strictly positive and given by

$$R_{t,t+1} = \frac{p_{t+1} - p_t}{p_t}.^7 \tag{1}$$

Figure 1: **Prices for the different vintages: Cash-in-the-market pricing versus discounted cash-flow region**
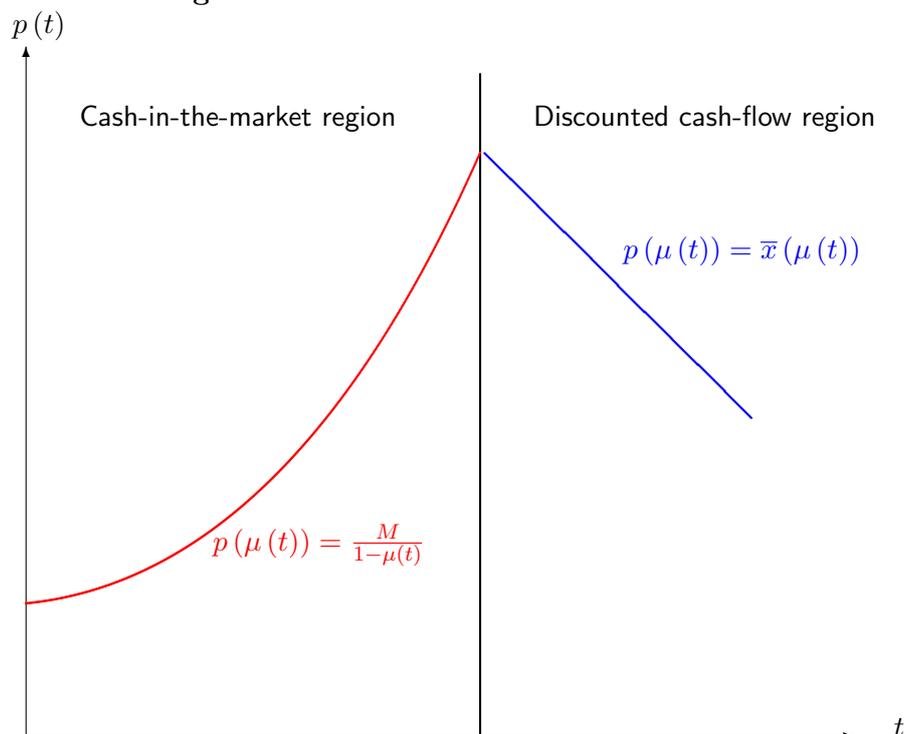
Notice that this is the case even though every period the expected rate of return of an asset acquired in the exchange is lower than in the previous period.

In this economy thus the quality of vintages in the hands of retail investors deteriorates over time but the quality of vintages in the hands of financiers remains constant, as they only acquire the best assets. Also, every cohort of retail investor enjoys positive capital gains, while cash-in-the-market prevails, even though the difference between the expected rate of returns (7) and the return on the safe technology, which is normalized here to 1, goes down. This simple model thus can explain the stylized patterns observed in the mortgage market throughout the real estate bubble.

The evolution of prices in this dynamic model is also revealing (see Figure 1). Recall that we are assuming that all investors are buy-and-hold investors, so that we eliminate, again, by assumption, the possibility of reselling the asset at some later date. Figure 1 shows how prices evolve in this model over time. As long as cash-in-the-market pricing holds, the increase in the group of financiers is reducing the volume of assets flowing into the exchange and thus

increasing the prices paid by retail investors. Moreover prices are *convex* in the amount of cream skimming so that the realized returns are increasing every period. At some point, however, cream-skimming catches up with the economy and the quality of vintages is so low that retail investors are not willing to pay more than the expected payoff for the asset. After that further cream skimming only lowers this expected payoff and thus the prices of the assets flowing into the exchange. Notice also that the incentives to purchase assets do not disappear. Early retail investors enjoy large expected returns in their hold-to-maturity portfolios whereas late retail investors, those arriving to the market in the discounted cash-flow region, only capture the risk-free rate when holding their assets to maturity.

Needless to say, many elements are missing from this simple story. For one, the supply of assets has been kept constant every period, although in practice there has been a notable increase in the issuance of mortgage bonds during the credit boom. Another pre-crisis phenomenon that this simple story does not capture is the increase in the amount of uninformed funds available waiting to buy (dollars assets), which were in shorter supply after the bust of the dot.com bubble and the corporate governance scandals following the collapse of Enron depressed the IPO market for a decade and spurred a wave of delistings through leveraged buyouts.

Consider now the scenario where the private sector grows through leverage. When financiers (or, now financial intermediaries) can borrow, an increase in the size of the private sector has two distinct effects when cash-in-the-market-pricing prevails. First, financial intermediaries' returns may go down because, as intermediaries buy more projects they increase the cash-in-the-market-price of assets in the exchange and therefore the price at which they themselves can acquire assets. Second, financial intermediaries' returns increases because some of the cash owned by retail investors is loaned to intermediaries, depressing the cash-in-the-market price in the exchange. It is intuitive that as long as leverage requires that some capital of intermediaries be used in each purchase, this latter effect will be dominated by the first - less money is withdrawn from the exchange than the value of assets bought by the uniformed. In this case, our general conclusion still holds: an increase in the size of the private market decreases the welfare of retail investors. In addition, to the extent that leverage potentially makes it possible for the private market to grow to the point where all valuable assets are cream-skimmed by the private market, it is possible for this market to grow too large, and consequently that some over-levered financial intermediaries will be unable to repay all their debts and will go bust.

3 Implications

3.1 The Regulation of Hedge Funds

The DFA mostly reinforces the existing regulatory approach to hedge funds, which is built around several exemptions from the much tighter regulations under the Securities Act of 1933 and the Investment Company Act of 1940 that apply to mutual funds. The justification for these exemptions is that as long as hedge funds only target "accredited investors" and "qualified purchasers" there is no need to provide regulatory protection to these investors, as they are sophisticated enough to be able to fend for themselves. The DFA calls for a strengthening of the criteria for eligibility as an "accredited investor", thus raising the barrier to entry to these investments. A possible unintended consequence of the new proposed rules is that it makes it even harder for retail investors to benefit from the superior returns offered by these funds. Some commentators have argued that this approach to the regulation of hedge funds may therefore be counterproductive and that access should be made easier not harder (see Edwards, 2004).

In terms of our analysis, one difficulty with relaxing the criteria for eligibility as "accredited investors", however, is that investors who lack the necessary valuation skills may be left unprotected and may not be able to generate higher returns for their investments. They may simply be easy targets for charlatan investment advisors. The challenge is not so much giving greater access to the hedge funds than to allow greater dissemination of the price discovery service these hedge funds provide. Thus, greater disclosure would not only bring benefits in terms of better monitoring of risk concentration, but also in terms of making hedge funds' price discovery service available to a wider investment public.

3.2 The Regulation of Private Placements

Private placement markets have grown substantially following the adoption by the SEC of rule 144A in 1990.[11] Under this new rule so called "qualified institutional investors" are exempt from registration requirements under the Securities Act of 1933 for transactions exceeding $500,000. As Lambe (2007) and Tang (2007) have documented, the relaxation of registration requirements under rule 144A has substantially increased the secondary market liquidity of this segment of the shadow finance sector, making this a much more attractive source of capital

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[11]Sjostrom (2008) and Testy (1990) provide a detailed analysis of Rule 144A and its ramifications.

for corporations. In 2006, more equity capital was raised via Rule 144A private placements ($162bn) than in IPOs in Amex, NASDAQ and NYSE (which totaled $154bn).[12] Financial intermediaries rushed to design proprietary platforms where QIBs trade Rule 144A shares. Goldman Sachs created the Goldman Sachs Tradable Unregistered Equity (GSTrUE) platform, Citi, Lehman, Merrill Lynch, BoNY and Morgan Stanley created Opus-5 and NASDAQ followed suit with Portal. An important milestone in the development of this market occurred when Oaktree Capital Management LLC sold an equity stake for $800m.[13] There are many reasons for the success of private equity placements. Escaping the regulatory burdens associated with Sarbanes-Oxley must be an important factor, but in addition there is some evidence that higher quality issuers are flocking to Rule 144A rather than public offerings (Lambe, 2007).[14] The evidence on Private Investments in Public Equity (PIPEs), which are private equity offerings by public firms, also points in the same direction. PIPEs have increased from $4bn in 1996 to $56bn in 2007. To get a sense of the orders of magnitude, this compares with a total of capital raised through Seasoned Equity Offerings (SEOs) of $75bn in 2007. This trend in private placements has led some to argue that exchanges run the risk of being deprived of high quality issues. For instance, Roger Ehrenberg, former CEO of Deutsche Bank's hedge fund platform DB Advisors, has argued

> I think they (Rule 144A equity issuances) will quickly detract from the Nasdaq, NYSE and Amex. These private exchanges will effectively *skim the cream off the market*. The very highest quality issuers will forgo the public markets to issue on the private exchanges (as quoted by Lambe (2007), page 42.)

More recently, this tendency of shunning public equity offers has even reached highly successful new ventures, such as *Facebook*, *Twitter* and *Zynga*, which traditionally would have sought an IPO on NASDAQ, but now are instead seeking to first raise capital through private placements (see, Eaglesham, 2011). One of the regulatory hurdles these companies face,

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[12]See Lambe (2007, page 40) and Tang (2007, Figure 1) for a figure showing private equity capital issuance compared to IPO issuance for the period 2002 to 2006.

[13]See Sjostrom (2008) for a description of this deal as well as the discussion of Rule 144A in general. For a legal analysis that is contemporaneous with the 1990 adoption of Rule 144A see Testy (1990).

[14]A significant fraction of Rule 144A issues comes from reputable foreign issuers. In addition the probability of issuing under rule 144A is inversely related to the size of the issuing firm. Third, it is worth noting that a large number of Rule 144A equity issues comes from Real Estate Investment Trusts over the period covered by Tang (2007).

though, is that they are subject to much more stringent disclosure requirements once they pass the threshold of 500 shareholders.[15] However, in response to calls by some investors and representatives in Congress, the SEC has recently announced that it may consider raising this ceiling.[16] Interestingly, one of the main concerns about this limit voiced by U.S. investors is that the 500 shareholder ceiling can be evaded by "*raising money from investors overseas, denying U.S. citizens a chance to buy stakes*" [Eaglesham, 2011].

In terms of our analysis, an increase in the 500 shareholder ceiling, or more generally, any weakening of the disclosure requirements for private placements would likely result in more cream-skimming, thus *denying access of retail investors* to the privately placed stocks. Thus, a possible alternative response to concerns that some large U.S. investors may be denied access to these ventures, may be to apply the 500 shareholder limit to any shareholder, regardless of nationality and place of issue, and to tighten the application of the ceiling so that it applies to the number of ultimate shareholders and not just to the number of shell corporations investing directly in ownership blocks.

3.3 OTC Derivatives Markets

OTC derivatives markets emerged as a response to hedgers' and insurers' demands for customized insurance contracts, and over time they have grown into an enormous and highly lucrative shadow financial sector. To give a sense of the orders of magnitude consider the growth of the interest rate derivatives markets in exchanges versus OTC markets, which is reported in Figure 2. The growth in OTC markets dwarfs that of exchanges, by several orders of magnitude.

Clearly, these markets create value not just by cream-skimming the most valuable deals away from organized exchanges but also through contractual innovation and customization. Nowadays, however, many of the derivatives contracts that are traded in these markets are highly standardized and the initial justification for trading these contracts in unregulated OTC markets has largely disappeared. Under DFA, the CFTC has a broad mandate to extend prudential regulation to these markets and to induce migration of trading of standardized swaps onto organized exchanges.

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[15]This limit can, however, be circumvented through institutional investment pools that purchase a single block of shares.

[16]As Eaglesham (2011) notes, the *American Bankers Association* has called for an increase of the ceiling from 500 to 2,000.

Figure 2: **Interest rate derivatives; OTC vs. exchanges**

OTC: Notional values in billions of US dollars of interest rate swaps and forward rate agreements (FRAs); Exchanges: Notional value in billions of interest rate futures. Biannual: 1998-H1-2011-H1. Source: BIS
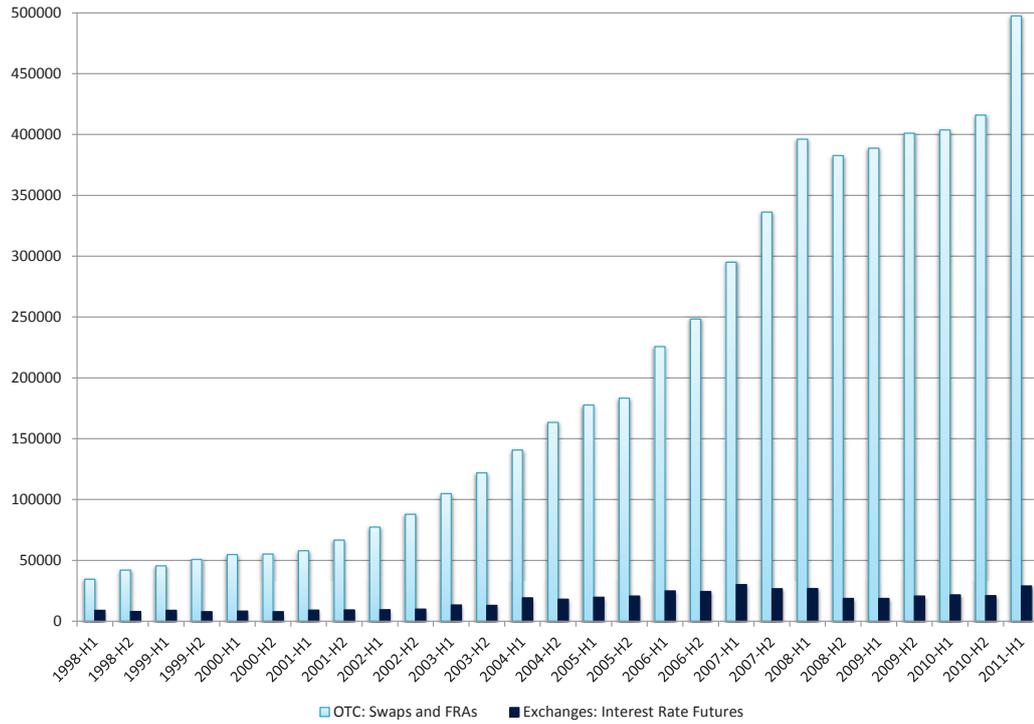
As the Chairman of the CFTC, Gary Gensler, recently emphasized, the purpose of moving trading of standardized derivatives and swaps onto organized exchanges is not just to forestall the buildup of systemically risky positions in these markets by requiring central clearing, but also to:

> "shift the information advantage from a small group of derivative dealers on Wall Street to the broader market. It is only Wall Street that benefits by keeping trades bilateral, where derivatives dealers internalize the transaction information. That means one corporation could get an entirely different price on a derivative than another. Wall Street profits from access to trading information while businesses,

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municipalities, consumers and others pay the costs. In the securities markets, this would be like putting 100 shares of a stock into your 401k with no knowledge of where the market prices the stocks. We should require that standardized derivatives be traded on regulated trading venues where all market participants get to see the pricing." [Gary Gensler, 2010]

The OTC markets' response to these regulatory moves has largely been to give in on the central clearing requirements, but to resist greater transparency for the new exchanges (see e.g. Leising, 2009, Morgenson, 2010, Scannell, 2009, and Tett, 2010). For example, when *Citadel*, the Chicago-based hedge fund, tried to set up an electronic trading system that would display prices for CDSs it met with stiff resistance from the leading Wall Street banks. Similarly, when the leading banks in OTC swaps and derivatives markets decided to set up clearinghouses like the InterContinentalExchange (ICE) under their control, they tried to keep out even well established potential entrants like the Bank of New York to protect their oligopoly rents. They also put in place rules giving exclusive access to market data to Markit (see Story, 2010).

4 Conclusion

The main goal of securities regulation is to protect less savvy investors from financial sharks. This is why public markets, where retail investors put most of their money, come with regulatory agencies charged with protecting investors as well as strict disclosure rules and other regulations limiting investors' risk exposure and promoters' ability to take advantage of unsuspecting investors. In private markets, where retail investors' access is restricted, on the other hand, there are virtually no regulatory agencies protecting investors and hardly any regulations. Only sophisticated investors are meant to be present in private markets, and the thinking is that these investors are not only able to fend for themselves, but also that regulation would mostly be harmful to the contracting parties as it would impede freedom of contracting in these markets.

We have argued that there is a fallacy in this simple distinction between public markets–open to small investors–and private markets–open to qualified investors, namely that it rests on the implicit assumption that the investments on offer in both markets provide more or less the same risk-adjusted return to investors. The reality, however, is that private markets offer

sophisticated investors unique access to more lucrative investment opportunities. Moreover, as these private markets grow, they tend to cream-skim the best investment opportunities away from public markets. The end result is thus that while retail investors may be adequately protected for the less juicy investments that are offered to them in public markets, they are being denied access to the more lucrative investment opportunities in private markets. When public and private markets co-exist, the problem of underprovision of price discovery does not just take the form of underinvestment in costly information acquisition in public markets, but also of underdiffusion of information acquired in private markets, which in turn may give rise to too much information production in private markets.

Although the new regulations of the shadow finance sector called for by the DFA may help redress some of the existing unbalanced approach to securities regulation, a more fundamental revision of the basic approach to securities regulation may be necessary, as the SEC's recent decision to consider relaxing the rules limiting private placements indicates. There has to be a more systematic recognition of the fact that any expansion of the shadow finance sector imposes negative externalities on retail investors by making it harder for them to have access to better investment opportunities.

5   Appendix: A Simple Model

5.1   Preliminaries

We consider three dates. At $t = 0$ entrepreneurs make an investment. The projects that are the product of these investment decisions are sold at $t = 1$ and at $t = 2$ projects' payoffs are realized. These payoffs can be high or low. At $t = 1$ there are two markets for projects. One is an opaque dealer-based market where financial intermediaries identify the best projects and acquire them at a price, p_d. The second market is a centralized market where a class of uninformed agents supply liquidity, obtaining projects for a price p. We assume that there is a storage technology by which all agents can transfer endowment from one period to the next costlessly.

5.2   Agents

There are three types of agents, all risk-neutral: Entrepreneurs, financial intermediaries and uninformed investors. We normalize the measure of entrepreneurs to 1. Each entrepreneur starts a project that will result in time $t = 2$ consumption goods, but only value consumption at time $t = 1$. For this reason entrepreneurs will sell their projects at time 1.[17] The project payoff is x_h with probability π and $x_l < x_h$ with probability $1 - \pi$.

Financial intermediaries are endowed with k units of period 1 consumption good and are indifferent between consuming at time $t = 1$ or $t = 2$. They are also endowed with a technology that allows them to identify good projects (those with payoff x_h). We make two simplifying assumptions for now: first, we assume that each financial intermediary can only find one good project, and that the measure μ of financial intermediaries satisfies $\mu < \pi$; second, we assume that $k \geq x_h$. These two assumptions guarantee that each financial intermediary has enough resources to acquire the one good project that it is able to identify, and that financial intermediaries collectively are not able to acquire all good projects available at $t = 1$. Both of these assumptions can be relaxed, and the model can be generalized to allow for leverage by financial intermediaries. We briefly discuss the implications of introducing leverage below, but a full analysis of leverage is beyond the scope of this paper.

Uninformed investors have a total capital of M and are indifferent between consumption

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[17]We could have allowed entrepreneurs to borrow against their projects instead of selling, but as we argued in our earlier paper, they would weakly prefer to sell them outright.

at date $t = 1$ or $t = 2$.

5.3 Markets

5.3.1 Private market

In the private market, financial intermediaries identify good projects and acquire them from entrepreneurs. Since we have assumed that each financial intermediaries can only identify a single project the volume ν of good projects transacted in the private market is at most μ, the measure of financial intermediaries.

5.3.2 Exchange

In the organized exchange, uninformed agents supply liquidity competitively to acquire the projects that are not placed in the private market. Because entrepreneurs need to sell their projects at $t = 1$, the total supply of projects in the uninformed exchange is given by

$$\pi - \nu + (1 - \pi) = 1 - \nu. \tag{2}$$

Thus, the expected value of the projects traded in the uninformed exchange is given by

$$\overline{x}(\nu) = \frac{(\pi - \nu) x_h + (1 - \pi) x_l}{1 - \nu}, \tag{3}$$

given that all agents are risk neutral. In the absence of capital constraints, the price of assets in the uninformed exchange would be given by (3); instead because the amount of capital in the hands of uninformed investors is limited to M, the price of the asset in the uninformed exchange is given by

$$p(\nu) = \min\left\{\overline{x}(\nu), \frac{M}{1 - \nu}\right\}. \tag{4}$$

Following the terminology introduced by Allen and Gale (1998), when

$$p = \frac{M}{1 - \nu}$$

we say that *cash-in-the-market pricing* obtains in the exchange.

5.3.3 Bargaining between intermediaries and entrepreneurs

Since there are $\pi > \mu$ good projects available, we assume that all the bargaining power rests with the short side of the market, financial intermediaries, who thus pay the minimum price

acceptable to entrepreneurs.[18] Since entrepreneurs want to consume at time $t = 1$ they would accept any price greater than or equal to the price they can obtain on the exchange, $p(\nu) < x_h \leq k$. Since intermediaries buy projects that yield x_h for sure, they obtain a rate of return that exceeds 1 by paying $p(\nu)$. Hence, at prices $p(\nu)$ all intermediaries would acquire a project and thus in equilibrium $\nu = \mu$ and intermediaries pay $p(\mu)$ for the (good) projects they acquire.

5.4   Cream Skimming

Given the equilibrium price $p(\mu)$ and volume of trade $\nu = \mu$ in the private market, it follows that each financial intermediary has in equilibrium utility of

$$U^{fi} = k + x_h - p(\mu),\tag{5}$$

and uninformed investors have an aggregate expected payoff of

$$V(\mu) = M + (\pi - \mu)\,x_h + (1 - \pi)\,x_l - (1 - \mu)\,p(\mu)\tag{6}$$

The following proposition immediately follows form these observations:

Proposition 1 *(a) There exists a measure of financial intermediaries $0 \leq \bar{\mu} \leq \pi$ such that cash-in-the-market holds if and only if $\mu \leq \bar{\mu}$.*

(b) If cash-in-the-market-pricing prevails in the exchange then an increase in the number of financial intermediaries (μ) decreases the aggregate utility of uninformed investors.

If cash-in-the market-pricing prevails, uninformed investors obtain a net surplus from their investments. When μ increases, this surplus diminishes for two reasons. First, the same cash is chasing fewer projects. Second, the quality of the average project bought by uninformed investors in the exchange declines. Notice as well the effect that an increase in the number of financial intermediaries has on the price and returns faced by uninformed investors. First, the returns faced by uninformed investors are given by

$$\overline{R}(\mu) = \frac{\overline{x}(\mu)}{p(\mu)} \geq 1.\tag{7}$$

They are strictly greater than 1 whenever cash-in-the-market prevails. In this domain, as the number of financial intermediaries increases the expected rate of return decreases, $R_\mu < 0$, both

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[18]As in our earlier paper, Bolton, Santos, and Scheinkman (2010) we could assume more generally that some of the bargaining power rests with the entrepreneur and thus that the price paid by intermediaries would be a weighted average of $p(\nu)$ and x_h.

on account of the lower expected payoff, as $\overline{x}_\mu < 0$, and on account of the price increase, $p_\mu > 0$, that results from the small supply of assets to the exchange. Notice thus that there are two effects associated with an increase in the number of financial intermediaries. First, an increase in the number of financial intermediaries translates into an increase in cream skimming taking place in the private market, which lowers the quality of the assets flowing into the uninformed exchange. Second, the overall quantity of assets flowing to the uninformed exchange also goes down, producing an upward pressure in prices.

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