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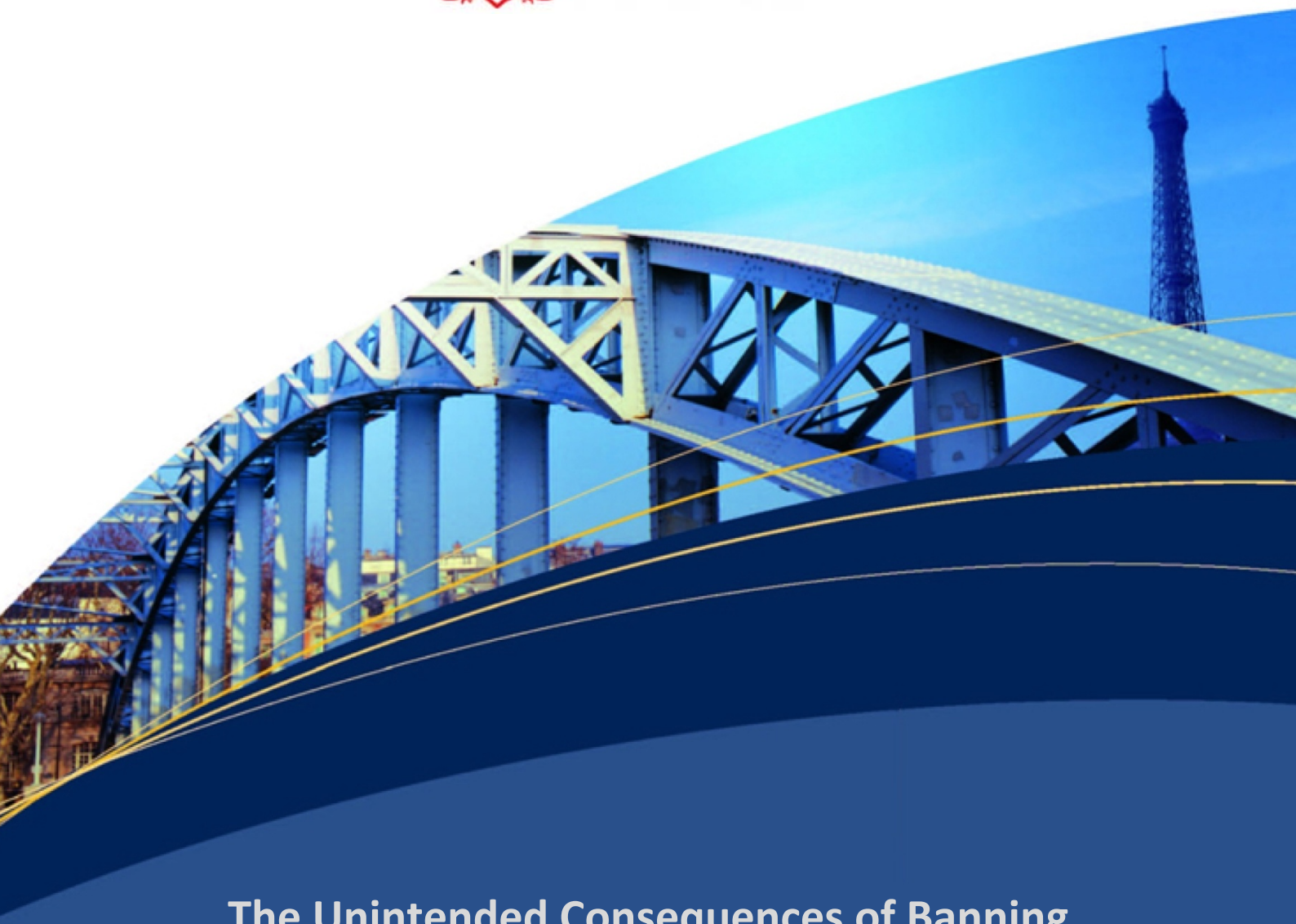

The Unintended Consequences of Banning Derivatives in Asset Management

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Executive Summary

Our objective. What would be the consequences of banning derivatives from the asset management industry? In this study, we present a what-if analysis of the potential consequences for asset managers and their customers of the enforcement of such a ban. Specifically, we describe how an economy *without* derivatives would look like, with a special emphasis on the asset management industry as it makes intensive use of derivatives instruments for hedging and investment purposes.

Why banning derivatives? The idea that derivatives markets have a destabilizing effect on the financial system has been pointed out for years. The arguments of the derivatives' opponents are based on the belief that derivatives are excessively complex, opaque, unregulated, and used by investors who lack financial competence. Furthermore, derivatives are deemed to lead to excess volatility, bubbles, and extreme losses, which in certain cases can be lethal. As a result, many have called for banning derivatives from certain activities, including asset management.

The recent evolution of the derivatives markets. Derivatives have been traded for centuries. While early trading only concerned agricultural products, the increasing need of hedging a number of other risks has spurred the growth of derivatives on a vast range of underlying assets, such as foreign-exchange rates, interest rates, equity, credit, commodities, energy, weather, etc. Derivatives instruments can be either traded on an exchange or over-the-counter (OTC), with the latter accounting for around 90% of derivatives trading. Recent regulations in Europe and in the U.S. require systematic OTC trade reporting and mandatory central clearing for all standardized and liquid derivatives.

Why using derivatives in the first place? Investors and firms use derivatives to manage the risks they are exposed to. Firms hedge away any financial risks for which they have no comparative advantage (e.g., interest rate or foreign-exchange risk for an industrial firm). As a result, they can focus on their core business activity and become more efficient. Academic research has shown that derivative-based hedging strategies increase firm value, improve risk allocation, and make markets more efficient.

Derivatives are widely used in the asset management industry. According to a recent Morningstar survey, 27% of U.S. mutual funds reported at least one derivative holding. Mutual funds in Europe make even larger use of derivatives. In a survey of French mutual fund companies, we find that 52% of the surveyed funds use derivatives and these funds represent 65% of the total assets under management.

Derivatives are vital tools for the asset management industry. Derivatives instruments allow mutual funds to implement risk management activities efficiently and with relatively low transaction costs. They also allow asset managers to take specific views on specific markets or asset classes, often for diversification purposes. If derivative use were not allowed, mutual funds could generally still perform these activities, but they would have to sustain much larger transaction and operational costs. Such costs could in many cases provide an incentive for investment funds not to perform these risk-management activities, leading to suboptimal risk/return profiles that would cost dearly to final investors. Furthermore, if derivatives were not allowed, the investable choice set for the final investor would be dramatically reduced. A ban of derivatives in asset management would be particularly harmful for smaller size asset managers, as they cannot rely on large economies of scale when implementing alternative risk management strategies.

Fund managers should remain free to select derivatives instruments (exotic or not) that best suit the interests of their investors. Whether a fund manager uses a simple plain-vanilla or a more exotic derivative instrument does not really make a difference for two reasons. First, fund managers have indeed developed sufficient risk management capabilities to deal adequately with any of these instruments. Second, derivatives with complex payoffs can be priced using straightforward replication methods. If anything, exotic derivative instruments allow fund managers to further reduce transaction costs.

The alleged opacity and lack of regulation for derivatives trading is largely overstated in asset management either, because the regulator imposes transparency on final payoffs and strict risk measurement requirements on the full spectrum of potential risks, from market, to counterparty, and to liquidity risk. Finally, the fund manager is a professional investor and necessarily not a naive derivative user. As a result of all these factors, there is no evidence that derivatives are used to implement unwarranted risky bets in asset management. All the common fears that are potentially worrying for main street have no grounding in asset management.

In conclusion, banning derivative use in asset management would entail increases in transaction costs and suboptimal risk management strategies, which would both penalize the performance for the final investor. Such a derivative ban would not be justifiable with the usual arguments against derivatives, because these arguments do not appear to be valid in asset management.

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1. Introduction

Every year, **millions of companies and investors use derivatives instruments**. Most of the derivatives are used to hedge away some risks, whereas other derivatives strategies are used to increase risk exposures. Thus, the derivatives market is a global market for risks, allowing for risk transfers and leading to a better allocation of risks among economic agents.

A derivative is a financial instrument that has its value based upon another financial or economic variable. Popular types of derivatives include **forwards, futures, options, warrants, swaps, credit derivatives, and structured products**. These different types of derivatives are written on, respectively, interest rates, exchange rates, equity prices, defaults of debt issuers, etc. A growing number of derivatives are traded on exchanges, whereas those that are not standardized or those with long maturities are typically traded over-the-counter.

The role of derivatives is nowhere more vital than in the **asset management industry**. Indeed, derivatives are key risk-management tools for asset managers, as well as attractive investment vehicles. They are widely used because they allow asset managers to tailor a required risk/return profile efficiently and with low transaction costs for their customers.

The idea that derivatives markets have a **destabilizing effect on the financial system** has been pointed out for years. The arguments of the derivatives' opponents are based on the belief that derivatives are complex, opaque, unregulated, and used by investors who lack financial sophistication. Furthermore, derivatives instruments are deemed responsible for leading to excess volatility, bubbles, and extreme losses, which at times can be lethal. As a result, many have called to ban derivatives from certain activities, including some parts of the asset management industries.

In this study, we investigate what would be the **consequences for the asset management industry if such a ban would be enforced**. Our analysis proceeds in two steps. The first part of this report (Sections 2-4) is a general presentation of the derivatives markets and of their economic usefulness. In the second part of this study (Sections 5-7), we specifically focus on the asset management industry and show that derivatives are a vital tool for this industry.

The main takeaways from this study are the following. We show that banning derivatives from the asset management industry would have dramatic implications for the members of the industry and, most importantly, for their customers. Indeed, we show that *without* derivatives:

- risks would be harder to manage, as derivatives allow fund managers to lower their risk exposures;

- fund performance would be lower, as derivatives reduce transaction costs and allow access to new asset classes;
- the investable choice set for final investors would be dramatically reduced;
- the cost would be particularly high for smaller asset managers, who cannot benefit of economies of scale when implementing alternative risk management strategies.

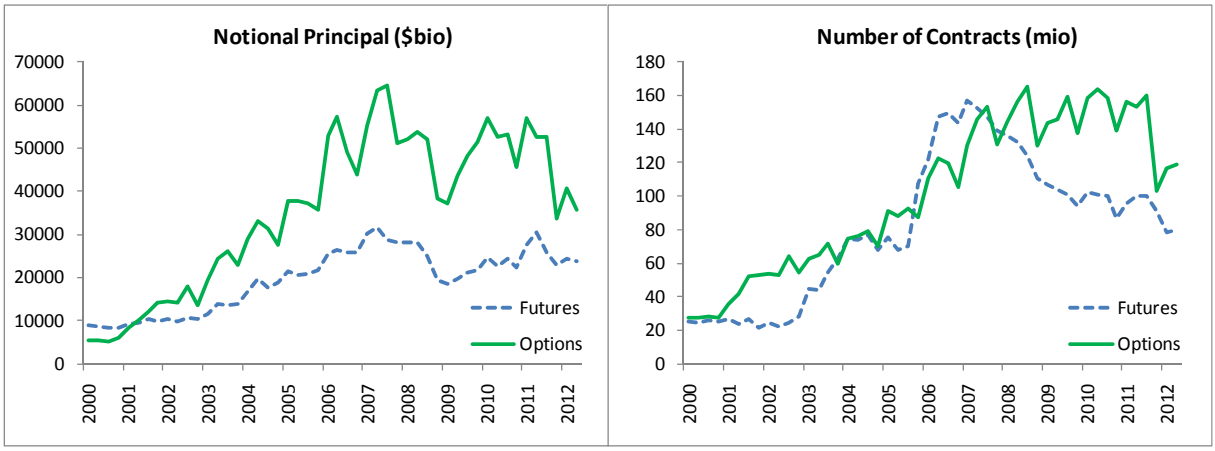
We also conclude that all the common fears about derivatives use are misplaced for the asset management industry, as the asset-manager derivative user is competent and derivative usage is carefully controlled and disclosed.

2. Evolution of Derivatives Markets

Derivatives have been traded for centuries. While early trading only concerned agricultural products, an increasing number of products have been introduced over the years on commodities, energy, foreign-exchange rates, interest rates, equity, credit, weather, etc.

Many financial derivatives are standardized and traded on dedicated exchanges. For instance, Chicago Mercantile Exchange started trading futures contracts on currencies in 1972, and one year later, Chicago Board Options Exchange listed the first call option on a stock (put options got introduced in 1977). The first energy derivatives covered petroleum products emerged right after the fundamental restructuring of the world petroleum market in the 1970s. Today, the most actively traded listed derivatives remain the futures and options contracts. We show in Figure 1 that the worldwide trading activity of exchange-traded derivatives experienced a rapid expansion until 2007 and then stabilized, and even declined for futures in terms of number of contracts traded. A unique feature of these products is the fact that they are not heavily exposed to counterparty risk as they go through clearing.

Figure 1: Exchange Traded Derivatives – Worldwide Statistics

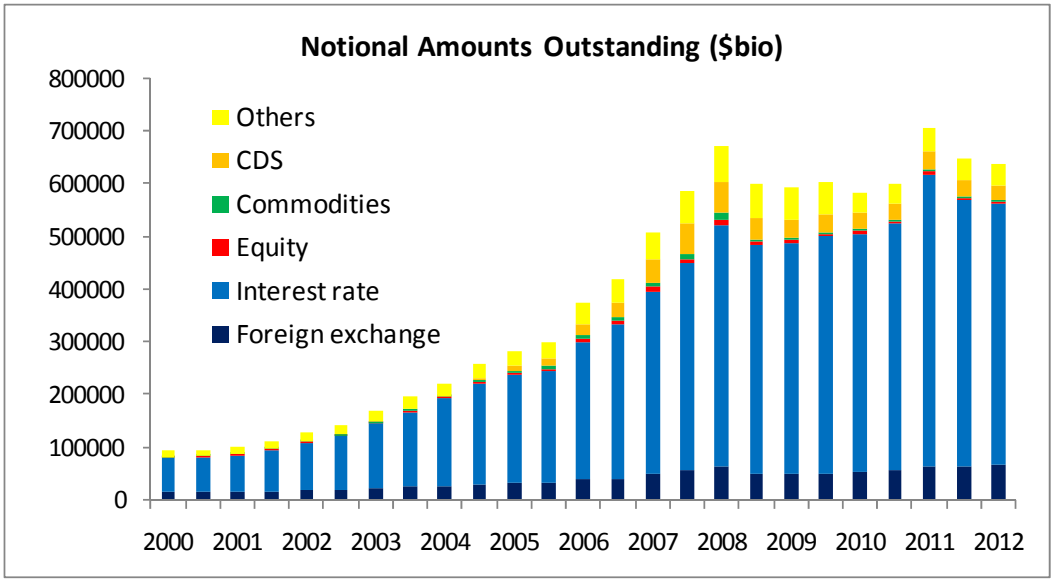


Source: Bank for International Settlement (BIS)

Parallel to the trading of standardized derivatives products on derivatives exchanges, many derivative instruments are **traded over-the-counter (OTC)**. The terms of an OTC derivative contract are privately-negotiated and booked directly between two counterparties. Typical examples include swap agreements and exotic derivatives. As shown in Figure 2, OTC derivatives are primarily written on interest rates and foreign exchange rates.

More recently credit derivatives have been introduced to allow market participants to hedge away, or get a pure exposure to, credit risk. The **Credit Default Swap (CDS)** was introduced in the mid-1990's and accounts for the vast majority of credit derivatives activity (see Figure 2). A CDS is *de facto* an insurance against the default of a given issuer (corporate or sovereign entity). Globally, the CDS market grew from US$6.4 trillion in notional outstanding in 2004 to a peak of US$58 trillion in June 2007 (BIS data).

Figure 2: OTC Derivatives – Worldwide Statistics



Source: Bank for International Settlement (BIS)

The OTC market dwarfs exchange trading. Total notional amounts outstanding of OTC derivatives amounted to $639 trillion at the end of June 2012, which is ten times higher than the total notional for listed futures and options ($59.5 trillion). However, there is a recent evolution in favor of derivatives exchanges as, following the 2009 G20 meeting, regulators have called for more **transparency and a better control of counterparty risk for OTC products**. Recent regulations, such as the MIFID2, European Market Infrastructure Regulation (EMIR), and the US Dodd-Frank Act, require systematic OTC trade reporting, migration of all standardized OTC products on exchanges or electronic trading platforms, mandatory central clearing of standardized and liquid derivatives and collateralization of remaining OTC non centrally cleared products. A direct consequence of this new regulatory framework is a migration of previously OTC-traded products, such as swaps and CDS, to derivatives exchanges with clearing facilities (InterContinental Exchange, CME, Eurex, and LCH.Clearnet).

Another important trend on derivatives markets is the emergence of new **derivatives in emerging economies**. In China, for instance, the progressive openings of its markets and the high economic growth have created new hedging needs for companies (Bank for International Settlements, 2012). As a consequence, Chinese derivative exchanges, such as the newly launched China Financial Futures Exchange, now offer a complete set of derivatives instruments: commodity futures, RMB forwards, RMB foreign exchange swaps, bond futures, interest rate swaps, and stock index futures contracts. Well functioning and liquid derivatives markets appear to be an important contributing factor to economic growth.

3. Why Are Derivatives Used?

As we have just illustrated in the previous section, the amount of derivatives notional amount outstanding and traded every day is very substantial. Why are derivatives used? In this section, we show that derivatives allow individuals and firms to **achieve payoffs that they would not be able to achieve or could only achieve at much greater cost**. More specifically, derivatives can be used to hedge risks and to obtain exposure to an asset class. In both cases, these activities could not be implemented efficiently without the use of derivatives. Furthermore, we show that derivatives are also used to extract information about future market volatility and other key economic variables.

3.1. Hedge risks

Investors must take risks. If they do not, they are unable to generate any return in excess of the risk-free rate. But they need to **bear the right amount of risk given their own appetite for risk**. Firms must take risks as well. But they should only take risks to exploit valuable opportunities for which they have a comparative advantage and be able to shun the risks that they do not want to take because they are not about their core business. For example, an industrial firm would want to take all the risks related to the core business sector where it produces and has unique knowledge and skills, but would want to avoid, for instance, all the risks related to the dynamics of interest rates.

Derivatives allow investors and firms to choose the **type of financial risk, as well as the level of risk exposure**. More specifically, derivatives allow the enactment of a financial hedge, that is, a financial security that would pay-off precisely in the negative state of nature, and as such would minimize the loss of the firm in this situation.

In order to better understand why firms make extensive use of derivatives, we present three real-life examples of derivative-based hedging strategies:

Example 1: Hedging commodity price risk with a futures contract

→ Consider the case of a car manufacturer and a steel producer. The car manufacturer is considering building a new plant two years from now and hiring 1,000 new employees. Once the new plan is ready, the company will also need to purchase 100,000 tons of steel to build the new cars. One of the most serious business concerns for the company is that it will not be able to cover its production costs if the price of steel exceeds $500. The steel producer is also concerned with potential fluctuations in the price of the steel but it would only be negatively affected by depressed prices. In particular, any price below $300 would not allow it to cover its production costs. In this example, both the car manufacturer and the steel producer would gain in locking in the price of steel at 400$ per ton using a 2-year futures contract. This would clearly be a "win-win" situation for both of them.

Example 2: Hedging foreign-exchange risk with a forward contract

→ A leasing aircraft manufacturer is facing a currency mismatch between its incomes, which are predominantly expressed in US dollars (billing currency) and its costs, which are mainly expressed in euros (employees, material, and suppliers). Without hedging, a drop in value for the dollar would have dramatic implications for this firm. However, a forward contract would allow the firm to fix the exchange rate at which it will be able to sell its dollars for. Alternatively, a foreign exchange option would allow the firm to sell its dollars at a pre-specified rate when the spot exchange rate is low, but to sell them on the spot market when the spot rate is high. Note that long-term foreign-exchange derivatives, like those required in this example, are traded over-the-counter and not on an exchange.

Example 3: Hedging interest rate risk with a swap contract

→ Suppose that a firm has an adjustable-rate loan (e.g., Euribor + a spread) with principal of 10 million euros and current payments of 400,000 euros per year. If interest rates double, the firm payments would increase dramatically. The firm could eliminate this risk by refinancing the loan and getting a fixed-rate loan, but the transactions costs could be high. A swap contract would be an alternative solution that would not entail renegotiating the loan contract. The firm would agree to make payments to a counterparty, say a bank, equal to a fixed interest rate applied to 10 million euros. In exchange, the bank would pay the firm a floating rate also applied to 10 million euros. With this interest rate swap, the firm would use the floating-rate payments received from the bank to make the loan payments. The only payments the firm would make out of its own pocket would be the fixed interest payments to the bank, as if the firm had a fixed-rate loan. Therefore, a doubling of interest rates would no longer affect the firm loan payments.

An international survey of financial derivatives usage has been recently conducted by Bartram, Brown and Fehle (2009). They analyze the financial statements of 7,319 non-financial firms from 50 countries and find that **60% of the firms report using some kind of derivatives**. They show that foreign-exchange derivatives are used by 45% of the firms in their sample whereas interest rate derivatives and commodity derivatives are used by 35% and respectively 10% of the firms.

The Bartram, Brown and Fehle's study also provides evidence on **why firms use derivatives**. Firms using foreign currency derivatives engage in more foreign currency transactions, and firms that use interest rate derivatives have higher leverage, suggesting the prominent role of hedging for derivatives. Consistent with this evidence, Guay (1999) shows that when firms start using derivatives, their stock return volatility falls by 5 percent, their interest rate exposure falls by 22 percent, and their foreign-exchange exposure falls by 11 percent.

3.2. Get exposure

Derivatives allow investors to get exposure efficiently and cheaply to a specific asset class, to a particular security, or to a specific payoff within an asset class. These features allow investors considerable flexibility in implementing and exploiting views about the future evolution of an economic or a financial variable.

For example, it is significantly easier and cheaper to buy an option or a futures contract rather than buying directly shares in a large number of companies and rebalancing the portfolio for every corporate event (dividends, splits, mergers, etc). Furthermore, derivatives provide embedded leverage and allow getting exposure with less capital than through a direct investment on the underlying spot market. These arguments are particularly relevant for smaller investors that face much higher transaction costs and cannot efficiently and cheaply replicate the payoff of a derivative security.

Though derivatives can make underlying markets more efficient as they allow to efficiently manage and allocate risk and offer tailored ways to achieve specific payoffs, observers have long been concerned that they can also disrupt markets because they make it easier to build speculative positions. Overall, there does not seem to be convincing evidence that the introduction of derivatives trading on an underlying security increases permanently the volatility of the return of that underlying. For example, Conrad (1989) finds that the introduction of option trading on a stock reduces (rather than increases) the volatility of the underlying stock. Along similar lines, Bollen (1998) finds no effect.

In order to better understand how derivatives can be used to obtain exposure to an asset class, we present two real-life examples. They show how investors can take a view with derivatives on a single stock and how investors can participate to the potential upside of a financial security return profile while protecting their capital.

Example 4: Investing in stocks or in call options?

→ Consider the case of an investor who is extremely positive about a new technology developed by a high-tech company. The investor is considering two investment strategies: (1) directly buying some shares of the company on the stock market at 100 euros per share or (2) buying some call options on the stock of this company. The call option will allow the investor to buy some shares of the company in two years for 200 euros. If the view of the investor materializes, he will make much more money using call options than trading the stock.

Example 5: Buying a capital guaranteed structured fund

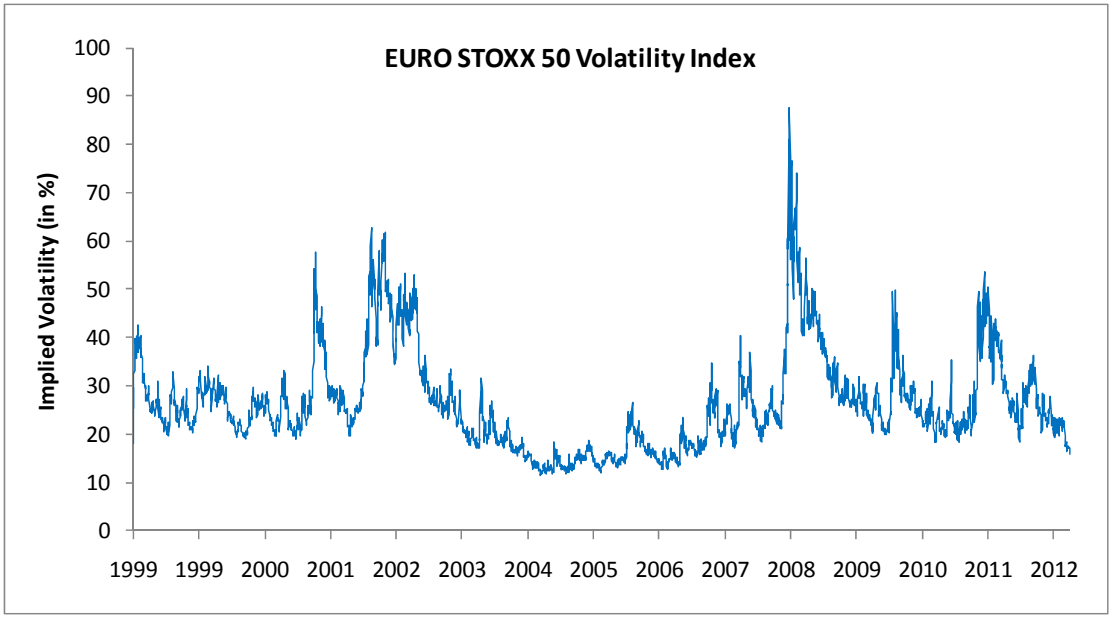
→ A capital guaranteed fund is a financial product that allows investors to benefit from an increase in a given financial index (e.g., a stock market index, a basket of commodities), without being exposed to downside risk. Technically speaking, the product combines a bond position, hence the guarantee, and a call option on the index, hence the upside. Such a product is particularly popular among retail investors as it allows them to be long in the stock market without putting their invested capital at risk.

Note that a Constant Proportion Portfolio Insurance (CPPI) strategy would also allow an investor to maintain an exposure to the upside potential of an index while protecting against downside risk. CPPI does not make use of option contracts but instead maintains a position in a treasury bond or liquid monetary instruments, together with a leveraged position in a market index. CCPI requires the positions to be rebalanced when the proportion of the equity part compared to the cushion deviates too much from its pre-agreed level. The drawback of this strategy is that a sudden drop in the market index could reduce the net asset value below the value of the bond floor needed to guarantee the capital at maturity – a phenomenon known as gap risk.

3.3. Extract information

Option contracts are derivative instruments whose value depends mainly on the volatility of the underlying asset. It is then possible to use the current market price of these derivatives and extract the expected or ***implied* volatility** using an option pricing model. This implied volatility gives an estimate of the level of volatility that market participants expect over the residual life of this derivative security. The implied volatility can be used by markets participants to get a sense of the level of uncertainty on the market. As an illustration, we plot in the Figure 3 the evolution of the implied volatility extracted for the Euro Stoxx 50 index (European Blue Chips).

Figure 3: Implied Volatility Index



Source: www.stoxx.com

There is ample empirical evidence suggesting that in practice the informational content of implied volatility is very valuable. For instance, Jorion (1995) shows that the implied volatility outperforms alternative volatility forecasts, such as historical volatility or estimates from a GARCH econometric model, for forecasting the volatility of the foreign exchange rates. Christensen and Prabhala (1998) report consistent findings for the U.S. stock markets.

Similar information can be extracted about the level of **expected correlation** among the constituents of a stock index by comparing the implied volatility extracted from an option on this stock index with implied volatilities from individual stock options (see, for example, Driessen, Maehnout and Vilkov, 2009).

Derivatives can also be used to **forecast dividends** that will be paid by a company or the constituents of a stock index by looking at price of futures contracts on dividends (e.g., van Binsbergen, Brandt, and Koijen, 2012).

Derivative prices are also a useful source of **information in fixed-income markets**. For instance, a sharp increase in the CDS spread of a firm, while both its bond yield and ratings remain stable, is often seen as an early warning signal by market participants. Indeed, as CDS markets are much more liquid than the bond market, they are likely to react to new information in a timelier manner. Consistent with this evidence, Hull, Predescu, and White (2004) show that there is anticipation of ratings changes announcements in the CDS market.

4. The Impact of Derivatives on the Real Economy

4.1. Increase firm value

In many situations, corporations only undertake long-term investment projects if they can hedge some of the inherent risks. Without proper hedging tools, many attractive projects would not be undertaken. By getting rid of all the risks for which they have no comparative advantage, firms can focus on their core business, become more efficient, and increase in value. And derivatives are the perfect tools to actively manage risk exposures.

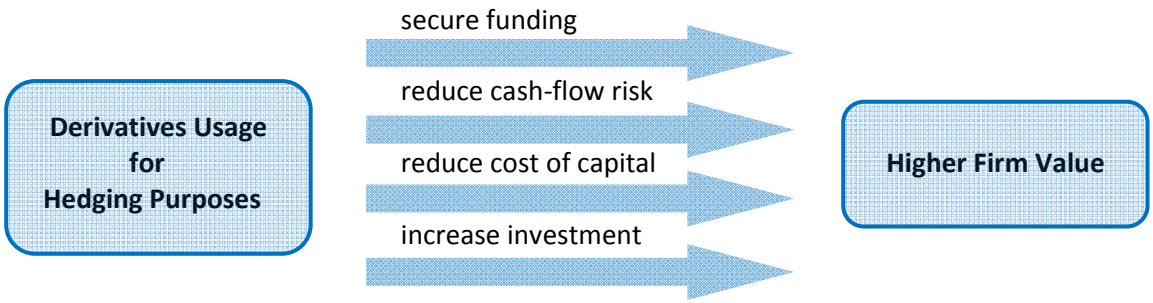
A first argument put forward in the academic literature is that active risk management allows firms to **secure funding**. Froot, Scharfstein and Stein (1993) show that risk management generates internal funding, which is a cheaper source of capital than external financing. Using a detailed dataset from the US agricultural industry, Cornaggia (2012) shows that risk management generates internal funding that producers use to finance productivity-enhancing investments. Furthermore, this study empirically shows that bankers influence producers to engage in risk management to reduce the risk of default on loans. It is shown that producers who actively manage risks are more likely to receive bank financing.

Another key channel between derivatives usage and firm value is the **reduction of cash-flow risk**. In their survey of two decades of empirical academic literature, Smithson and Simkins (2005) conclude that (1) the use of risk management tools are associated with more stable cash flows and (2) firms with more stable cash flows tend to be worth more. We summarize these fundamental results in Figure 4. Consistent with this evidence, in a survey by Bodnar, Hayt, Marston and Smithson (1995, p. 108), 28 percent of the firms state that minimizing accounting earnings volatility is their primary motivation for using derivatives. Although theoretical research has paid little attention to the role of derivatives in smoothing earnings, there is empirical evidence that firms with a smoother flow of income are valued more (Barth, Elliott and Finn, 1999).

More recently, Bartram, Brown and Conrad (2011) investigate the impact of the use of exchange rate, interest rate, and commodity price derivatives on the risk profile of 6,888 non-financial firms headquartered in 47 different countries. They conclude that firms reduce cash flow risk, total risk and systematic risk significantly through financial risk management with derivatives. Allayannis and Weston (2001) study 720 large firms and find that those using currency derivatives have higher market values than those not using currency derivatives. Similarly, Carter, Rogers and Simkins (2006) show that jet fuel hedging is positively related to airline firm value. Finally, Perez-Gonzalez and Yun (2011) exploit the introduction of weather derivatives in the late 1990's as an exogenous shock to

firms' ability to hedge weather risks. They show that weather derivatives lead to an economically large and statistically robust 6% increase in firm value.

Figure 4: Hedging Increases Firm Value



Another channel linking active risk management and firm value is through a **reduction in cost of capital**. Smith and Stulz (1985) argue that risk management can reduce the expected costs of firm distress and in turn the cost of capital of firms. In practice, there are a variety of derivatives instruments that firms can use to ease fund raising and reduce their cost of capital. Two examples are right issues (the firm grants call options to existing shareholders to raise capital, while preventing dilution effects) and convertible bonds (the firm sells both a plain-vanilla bond plus a call warrant on the firm's equity).

Furthermore, Froot, Scharfstein, and Stein (1993) argue that risk management adds value to the firm by **increasing investment**. In particular, they argue that when external capital is costly, risk management can help ensure that a firm has sufficient internal capital to finance attractive investment opportunities. Consistent with this theory, Pérez-González and Yun (2011) find empirically that hedging leads to higher investment levels, which are consistent with the idea that left-tail cash flow realizations can limit debt capacity due to distress costs.

4.2. Improve risk allocation

One of the most important characteristics of derivatives markets is their ability to **unbundle financial risks**. For instance, a corporation that is exposed to various sources of risk, such as interest rate risk, commodity price risk, funding risk, can decide to hedge away some risk exposures using derivatives. Similarly, a bond-holder may find that a given bond is attractive for his portfolio in terms of risk/return, and in turn diversification, but may want to hedge the associated default risk. This can be done by buying credit protection through a Credit Default Swap contract.

The idea that derivatives helps attain a **better social allocation of risks** can be traced back to the origin of financial economics theory. Ross (1976), Hakansson (1978), and Breeden and Litzenberger (1978) demonstrate the welfare effects of options. They show that options complete financial markets in the sense that they provide payoff functions that would not otherwise be available without derivatives or could only be achieved at much greater cost. Stulz (2004) claims that the better risk allocation provided by derivatives allow the **whole economy to be more productive and welfare to be higher**.

4.3. Make financial markets more efficient

When trading, investors reveal information to the market. There are several reasons to believe that informed traders trade predominantly on derivatives markets. First, when they have some positive information about a firm or an industry, they will trade on the derivative markets to benefit from the high leverage offered by derivatives. Second, it is easier to exploit a negative view on the derivatives market – by buying a put option for instance – than on the spot market. As a consequence, **new information gets incorporated into prices in a timely fashion** in derivatives markets. Third, derivatives are the easiest and cheapest investment vehicle to trade on volatility. For all these reasons, derivatives markets are very likely to be the best source of information for market participants.

Example 6: Trading on negative news

→ After conducting a detailed analysis of a given biotech company, a portfolio manager concludes the firm is currently overpriced on the stock market. In order to exploit his view, the portfolio manager can buy a put option that would allow him to make money if the stock price goes down.

There is an extensive academic literature on the **informational role of derivatives**. The early literature mainly focused on the lead-lag relationship between spot and derivatives markets. In an influential study, Stoll and Whaley (1990) conclude that the S&P 500 futures contract leads the S&P 500 index by five minutes on average. Chakravarty, Gulen and Mayhew (2004) provide unambiguous evidence that stock option trading contributes to price discovery in the underlying stock market. They estimate the option market's contribution to price discovery to be about 17 percent on average. Pan and Poteshman (2006) find that trading volume in the option market can help forecast stock returns.

5. Derivatives are Vital Tools for the Asset Management Industry

Derivatives are widely used in the asset management industry. According to a recent Morningstar survey of November 2011, **27% of the 6,809 distinct U.S. mutual funds reported at least one derivative holding**.[1] The average fund that owned derivatives held approximately 12 derivatives positions, 40 funds held at least 100, and one held more than 500. The categories of funds with derivative holdings ranged widely. As of the last-reported portfolio, funds in 83 categories held derivatives, including stock funds, bonds funds, allocation funds, target-date funds, and alternative funds. Funds in the intermediate-term bond category were the largest users of derivative holdings, with 5,154 total derivative positions among 128 funds. Funds in world-bond, conservative-allocation, nontraditional bond (a new category of bond funds that hedge credit and/or interest-rate risk), foreign large-blend (stock), and multisector bond categories were the next largest users, with each category holding more than 1,000 derivative positions in aggregate.

Mutual funds in Europe make even higher use of derivatives. Marin and Rangel (2006) report that the **60% of the Spanish mutual funds** had some derivatives position in their portfolios. Furthermore, Garcia-Appendini and Rangel (2009) find that **63% of the Italian mutual funds** were derivatives users. Adam and Guettler (2011) find that that among the largest 100 corporate bond funds the use of CDS has increased from 20% in 2004 to 60% in 2008.

Table 1: The Use of Derivatives by French Asset Managers

	Number of Funds	% Funds	AUM (in M€)	% AUM
All Surveyed Mutual Funds	8,024		1,387,781	
Of which use derivatives	4,233	52.75%	898,771	64.76%
All Funds except Money Market Funds	7,623		1,076,286	
Of which use derivatives	4,144	54.36%	687,279	63.86%
Money Market Funds	401		311,495	
Of which use derivatives	89	22.19%	211,492	67.90%

Source: Association Française de la Gestion Financière (AFG) – December 2012

In collaboration with the French Asset Management Association (Association Française de la Gestion Financière), we have conducted a survey of the use of derivatives instruments by mutual funds managed in France. Our sample contains 8,024 funds managing more than 1,387 billion euros (as of December 31, 2012), which corresponds to about 50% of the overall French asset management industry in terms of assets under management. These funds are managed by 15 different

[1] The results of the Morningstar survey were disclosed in response to the request for comments from the U.S. Security and Exchange Commission on the use of derivatives by mutual funds (http://www.sec.gov/comments/s7-33-11/s73311-23.pdf).

management companies. **We find that 52.75% of the funds managed in France use derivatives.** The funds that use derivatives represent 64.76% of the total asset under management in our sample. The proportion of funds using derivatives is lower among money market funds, but we find that large money market funds often use derivatives.

In this section, we explain more specifically the reasons why the use of derivatives is vital for the asset management industry. In particular, we examine the issues that asset managers and their investors would have to face if the use of derivatives were not allowed. This is an interesting perspective to gain a better understanding of the benefits of derivatives use in the asset management industry.

Mutual funds use derivatives for many different purposes. We can categorize them into two general categories. First, and foremost, **derivatives are used to reduce risk** along many different dimensions, from portfolio insurance to the management of the relation between flows and performance. Second, **mutual funds may use derivatives to exploit views about future financial market dynamics**. This can be achieved by tracking an index, or any other financial variable, or by getting an exposure to a certain asset class.

In all these cases, the same objectives can also be reached without the use of derivatives. In all these cases though, this determines much larger transaction and operational costs, such that either the fund avoids some of these activities, or, the fund performance (and the result for the final investor) is seriously penalized. **The costs of not using derivatives are potentially larger for smaller mutual fund families**, as we discuss at the end of this subsection. The cost of not allowing derivatives use in the asset management industry for the final investor is also that the choice set of available investment products is substantially limited.

5.1. Reducing risk *without* derivatives

At some points in time, mutual fund managers might think that it would be wise to reduce risk, either because the volatility of the assets in the portfolio has increased or because they think that the outlook in the near future is not supporting the returns of the assets in the portfolio. For example, an equity mutual fund manager might want to reduce its stock market exposure in certain periods of time. Similarly, a bond fund manager could think that the interest rate risk in the fund portfolio needs to be reduced.

This can clearly be achieved without the use of derivatives. The equity fund manager would reduce each of the stock portfolio holdings in proportion of the targeted risk reduction. If the view on the market improves, the equity mutual fund manager would then buy back the shares that were

previously sold. Similarly, the bond fund manager is likely to sell some of the longer maturity bonds to reduce the interest rate risk, or some larger quantities of medium-maturity bonds, just to buy them back when the reduction of interest rate risk is not deemed necessary any longer.

The transaction and operational costs of these activities are potentially large, especially for big portfolios of many stocks and bonds, or less liquid assets. The use of derivatives would have allowed the equity mutual fund manager and the bond fund manager to achieve the same objective, the change in the equity market and interest rate exposure, without incurring in the same transaction costs. In the equity example, trading appropriate quantities of a single typically very liquid stock index futures contract would have delivered the desired outcome. Similarly, in the bond fund example, trading an appropriate quantity of the most liquid derivatives in the world, an interest rate swap, would have **easily achieved the objective of risk reduction in one single step** that can easily be reversed once risk views have changed. Obviously, the advantage of using derivatives for the risk rebalancing of the fund portfolio is more pronounced if these activities are carried out more frequently.

Another example along the same lines is that of a mutual fund manager who might think that in a certain period of time the likelihood of a market crash is higher than usual. An equity mutual fund manager could be afraid of a Lehman-Brothers' type of crash or a bond fund manager might think that monetary policy could suddenly change. At the same time, both managers need to keep an exposure to their respective funds asset class, as per their mandates. The only way for these managers to obtain the desired outcome *without* using derivative is to dynamically reduce (increase) their exposure when the underlying asset price decreases (increases). This activity is clearly costly to execute, difficult to explain to investors, and requires a careful design of the dynamic trading strategy. **The same objective can be achieved instead very easily using derivatives**. Fund managers can buy put options with a relatively low strike price, effectively putting a floor to the value of their portfolios, implementing the so-called *Portfolio insurance strategies*.

The story of recent financial market crisis events clearly demonstrate that fund companies, and therefore their investors, sorely need more tools to manage risk. According to Morningstar, between October 2007 and March 2009, every risky, non-government-bond asset class lost money. Funds that performed relatively better were those that were able to move more assets to cash or government bonds. **Increased usage of derivatives could have helped the funds temporarily reduce risk exposure without necessarily selling positions**. For instance, in the context of overlay mandates for institutional investors, derivatives allow to flexibly manage the different risks of existing assets without changing the physical asset allocation.

Consistent with the examples in this section, Deli and Varma (2002) show that U.S. mutual funds tend to use derivatives precisely to reduce transaction costs when they are implementing the risk management activities described above. In their research, they find that the trading-cost benefits of using derivatives for mutual funds are positively related to the illiquidity of the underlying fund portfolio. The more illiquid the portfolio, the greater the potential economies offered by derivatives.

A more technical matter: Managing the impact of performance on fund risk

There is empirical evidence in academic studies that investors increase allocations to funds that are performing well and withdraw funds from fund performing poorly (e.g., Sirri and Tufano, 1998).

Fund managers may be reluctant to invest in or divest their funds of securities immediately in response to cash flows if the timing of cash flows does not correspond to managers' information about optimal trading, including motivations related to transaction costs of managing a position too frequently.

If managers are unable or unwilling to invest new cash immediately, the fund's cash position will tend to increase after periods of good performance, which leads to a decrease in fund risk (and in fund expected returns). Likewise, after poor performance investors will redeem shares, and would want cash back. If managers are unable or unwilling to sell immediately proportions of the fund holdings, the risk of the fund will increase as a result of managers borrowing to meet redemptions.

Without the use of derivatives, there is no way to manage the impact of performance on fund flows and fund risk, unless fund managers decide to trade sub-optimally. Managers who use derivatives are instead able to dampen the impact of performance on risk relative to those who do not. Indeed, one of the first and most important academic studies on this topic, Koski and Pontiff (1999), finds that fund managers use derivatives precisely to reduce the impact of performance on risk.

5.2. Taking a view *without* derivatives

A mutual fund manager might want to exploit information, to take a view, about a specific financial asset or a whole financial market. This can be the result of information about expected returns (e.g., the mutual fund manager thinks that a certain stock market has strong upside potential), or alternatively, information on risk and correlations, in practice the need of getting an exposure to a certain market or to a certain asset class **for diversification purposes**.

These types of targets can clearly be achieved *without* the use of derivatives, simply buying the underlying assets that would be consistent with the fund manager's view. However, note that most funds are apt to get exposure to the equity market as a whole rather than they are to gain exposure

to a single stock. Furthermore, these are not necessarily the equity markets where funds have traditionally invested. For other asset classes, it might also be the case that the underlying asset is illiquid, or becomes illiquid and hard to trade precisely when the fund would like to change its exposure.

A few examples along the lines explained above highlight **the costs of implementing these views *without* using derivatives** in contrast to the ease of using them. Suppose a mutual fund would like to get exposure to the whole stock market of a certain country. This can be achieved by trading a relatively large number of stocks, in appropriate quantities to guarantee representativeness and sufficient diversification. Obviously, there are costs related to the design of the trading strategy and related to the transactions that need to be implemented. Alternatively, the fund manager can use a stock index futures contract, which is easy to trade, extremely liquid, and naturally offers exposure to the whole stock market.

Another example is a mutual fund manager wanting to get an exposure to the credit risk of the corporate sector, let us assume, for diversification purposes. Clearly, this can be achieved with the trading of corporate bonds, which needs necessarily to occur for a number of bonds for diversification purposes. Compared to stocks, the corporate bond market is relatively more illiquid, it is over-the-counter and not exchange-traded, and it tends to become very illiquid, if not completely frozen in periods of market stress. Alternatively, the fund manager can use derivatives contracts such as credit default swap indices, which are well-diversified portfolios of credit exposures that can be easily traded and have recently proved to be liquid in extreme market conditions.

5.3. Large and small mutual funds *without* derivatives

In the previous subsections, we explained **the costs and difficulties of implementing risk management policies and getting exposure to specific asset classes *without* the use of derivatives**. The common aspect of all these policies is that there are large costs in these activities, both in the design of the policy (e.g., figuring out the optimal number of shares that need to be dynamically traded to protect from the downside at a certain price level) and in the execution of these policies (e.g, the actual and potentially frequent transaction of a large number of securities that could be potentially illiquid).

It becomes clear that it is much more convenient to execute these policies *without* derivatives for large asset managers, for a simple ‘economies of scale’ argument. The fixed costs can be potentially shared across a large number of funds in the family and, more generally, a larger size of asset under management. For example, getting an exposure to a specific stock market not traditionally covered

by the fund can be designed such that other funds of the family can benefit from it or can be achieved through the expertise of other funds in the family.

The variable costs are also lower at big asset managers for a number of reasons. First, the large asset manager can negotiate better brokerage fees owing to the large amount of transactions. Second, very often large asset managers develop optimal trading strategies that tend to minimize transaction costs.

This discussion highlights that **the use of derivatives is crucial precisely for smaller size funds** that often cannot afford to implement the policies described above simply using the underlying assets. At the end, should mutual funds be banned from the use of derivatives, the funds that are likely to stop implementing risk reduction activities and taking view activities are the smaller size ones. Given that the smaller size managers are traditionally offering their products to the final retail investor more so than to other institutional final investors, a derivatives ban for mutual funds would at the end have the unintended consequence of hurting the performance of funds for the final retail investor that the regulator is trying to protect, leaving other institutional final investors largely unaffected.

A final point relates to the general industrial structure of the asset management industry. Any sort of regulation that is affecting relatively more the small players than the large players can potentially lead to larger concentration, either because small fund managers do not survive, because small funds have an incentive to merge, or just because large managers are more successful and attract more capital. It is not *a priori* clear whether the regulator would want to facilitate this phenomenon, let alone to understand whether this phenomenon would be beneficial at all for final investors.

5.4. The final investor in mutual funds *without* derivatives

As explained in the sections above, the final investor in mutual funds, especially smaller-size mutual funds, would be severely penalized if derivatives were banned from the asset management industry. Given the costs and complications of implementing risk management activities *without* derivatives, the average mutual fund will either manage risk sub-optimally (less frequently, less effectively, more costly) or not manage risk at all. Similarly, some asset classes will not be used to take views or exploit benefits of diversification, simply because it is too costly or too difficult operationally. In summary, all **these limitations will hurt the final retail investor** that will have access to riskier products or products offering lower returns.

There is another unintended consequence of banning derivatives use in the asset management industry. The choice set of investment vehicles for final investors wishing to invest in products with an asymmetric payoff would be severely limited. For example, after the recent crisis periods, investors are eager to invest in products offering some sort of capital protection. This would be the

case, for example, of an equity mutual fund that can use portfolio insurance sort of strategies, implemented with futures or options, to protect against the downside in periods of market stress. With mutual funds unable to have such risk management devices in place because of a potential derivatives ban, **the choice set of investors would be limited** to structured products with capital protection guarantees. While this is not the appropriate outlet to judge the merits or issues with structured products, the final investor is clearly at a disadvantage with a more limited choice set.

6. Do Common Fears about Derivative Use Have any Grounding in Asset Management?

The reasons why derivatives are typically criticized in the financial press and in the public opinion have been described previously in this report. In this section, we address the fears about derivatives use in turn and put them in relation to the asset management industry. We show that in all cases they are simply **common misconceptions when they are related to asset management activities**.

6.1. Are derivatives complex?

The level of complexity of a derivative instrument originates mainly from its payoff function. The most basic derivatives are called *plain vanilla,* whereas other instruments with more complicated payoff functions are labeled *exotic*. Examples of exotic derivatives include derivatives for which the payoff depends on the average, minimum, or maximum of the value of the underlying asset during the lifetime of the derivative. Other exotic derivatives are based on the performance of a subset of securities within a given basket. Another example is the presence of extra features such as *knock-in* or *knock-out* provisions.

The difference between a plain vanilla and exotic derivatives is not really meaningful in the asset management industry. Indeed, the complexity of derivative instruments would only be an issue if asset managers would fail to understand the risk and return implications of the derivative instruments they are including in their portfolio. The reason is intrinsic to the definition of a derivative as a financial instrument that *derives* its value from that of an underlying security. As such, pricing a derivative is obtained as relative to the value of an underlying price, using a payoff replication logic, which **dramatically simplifies the pricing methodology**. This simple replication idea is so powerful that it represents the motivation for the 1997 Nobel Prize in Economics to Robert Merton and Myron Scholes. In essence, even the most complex derivative instrument at the end can be obtained as a combination of some more basic instruments and evaluated as an appropriate mixture of the underlying asset and some borrowing or lending. Hence, **fund managers should remain free to select derivatives instruments (exotic or not) that best suit the interests of their investors**.

Let us present an example that shows why complex derivatives could be useful for asset managers to use. As in many other parts of this report, the motivation is related to obtaining a **specific risk management goal at a much lower cost**, which is clearly beneficial to the final investor in the fund.

Example 7: Portfolio Insurance with a Barrier Put Option

→ Barrier options are options that turn into something else when the price of the underlying asset crosses some pre-determined level. Let us focus on a classic example of a so-called ***Knock-in*** put option, which is not activated until the underlying price drops below the barrier.

Assume the CAC 40 stock index is at 3,800 today. An equity fund manager has become suddenly negative on the market prospects for the next four months and would like to protect his portfolio using a standard put option on the index, with a strike price equal to the current price of the index today, strike price = 3,800. A broker is quoting a price of 290 for such option, but this is judged to be too expensive, as it represents about an 8% cost on the value of the portfolio.

The fund manager instead wishes to buy a barrier option, which does not knock-in unless the index drops below the barrier of 3,000. The cost of such a more exotic option turns out to be 140, which is less than 50% of the price of a plain-vanilla put.

An investor in the fund would be glad for the manager to use such exotic risk management instrument, as it meets the objective of insuring the portfolio for a bad scenario with a moderate cost that would not penalize too much the performance of the fund.

6.2. Are derivatives unregulated or opaque?

Mutual funds are regulated in all countries. For example, in the U.S., mutual funds have to comply with the Investment Company Act, which contains a number of provisions on derivatives use. In Europe, the use of derivatives by mutual funds is also disciplined by regulation, most recently with a set of 43-page guidelines published in July 2010 by the CESR, the Committee of European Security Regulator, now ESMA, European Securities and Markets Authority, specifically for UCITS.[2]

Let us elaborate on these European rules in more detail. The first aspect of the regulation is to use **appropriate methodologies to determine the exposure** of the fund to the price movements of the asset underlying the derivatives instruments. The methodologies for this exposure assessment are different for the minor derivatives user (commitment approach) and the intensive derivatives user (the Value at Risk approach). In both cases, the rules are prepared at a very fine level of detail, such that the compliant fund cannot get exposures that are inappropriate or unwanted.

The second aspect of the regulation is the management of the **counterparty risk exposure**. For derivatives that are not traded on an exchange, this becomes a relevant source of risk. Actually, the recent evolution of derivative markets, have seen a lot of Over-The-Counter derivative products migrate toward exchanges types of settlement, with the presence of a clearing house and thus a

[2] UCITS stands for Undertakings for Collective Investments in Transferable Securities. This is the European regulatory framework for an investment vehicle that can be marketed across the European Union.

well-designed institutional system of counterparty risk management. In any case, for the remainder of derivatives still not centrally cleared, the regulator prescribes that appropriate amounts and type of collateral that are to be set aside for this purpose. Furthermore, ESMA imposes limits on concentration of positions with the same counterparty and/or for the same issuer.

The third aspect of the European regulation is **concerned with risk of liquidity**, the so-called *cover rules* for transactions in financial derivatives instruments. A mutual fund should, at any given time, be capable of meeting all its payment and delivery obligations incurred by transactions involving financial derivative instruments. Monitoring to ensure that financial derivative transactions are adequately covered should form part of the risk management process.

The comprehensive set of European rules shows very clearly that any fear for lack of regulation for asset manager use of derivatives is unfounded. As we have explained, on one hand the risk of the fund is strictly regulated along several dimensions, from market exposure, to counterparty exposure and liquidity exposure. On the other hand, the fund is never a black box, as the European investor in UCITS has currently access to plenty of essential information about the nature of the risk in the fund from what has been labeled the *Key Investor Information Document (KIID)*, which is a replacement for the former simplified prospectus.

Besides compliance to regulation, investors are also traditionally safeguarded by a set of voluntary fund provisions or internal fund procedures. For example, an academic study by Almazan, Brown, Carlson, and Chapman (2004) shows that mutual funds voluntarily adopt additional prescriptions on derivatives holdings. Another example are the internal procedures related to the use of 'over the counter' derivatives, besides what is required by regulation. Derivative counterparties of mutual funds would traditionally be subjected to the same level of assessment as all other credit investments. Fully executed ISDA Master Agreements would be in place between the mutual fund and the counterparty prior to dealing.[3] Furthermore, a set of investment parameters would typically be signed off by the Chief Investment Officer and usually monitored by the Compliance team.

6.3. Are derivatives used by naive users?

The recent financial crisis has portrayed derivatives as complex financial constructions that are difficult to evaluate, if not even to simply understand for the final investor. More specifically, the final investor is depicted as a naive user that does not fully understand the derivatives payoff implications.

[3] The International Swaps and Derivatives Association (ISDA) aims to make over-the-counter derivatives markets safe and efficient. The association has developed a wide range of documentation materials for OTC contracts.

But this is not the relevant dimension here, as **the derivatives user is a professional investor**. If a complex derivatives construction is better achieving the risk management objectives of the fund manager (for example, because it is cheaper), the fund should not be prevented to use it just because the final investor might not understand it. After all, we all benefit from using advanced technology products, for example Ipads, but we do not need to be able to understand how they work.

A sufficient condition is to make sure that the fund manager fully understands the implications of the derivative product he is including in the portfolio. As discussed in the section on derivatives complexity above, fund managers are clearly competent derivatives users. Furthermore, it is important that the regulator is also not naive about derivatives. The regulator that understands derivatives instruments will be able to implement appropriate risk management regulation, as we just discussed in the previous Section.

6.4. Are derivatives used to implement risky bets?

Since derivatives are flexible and relatively inexpensive instruments to use, they can be easily misused and that could be the case also in the asset management industry. The most prominent fear is probably their use to implement speculative bets that are akin to gambling. We have already explained in the subsections above that empirical evidence is inconsistent with the use of derivatives instruments that are either complex or conflicting with the mutual fund mandate. Along similar lines, existing regulation, especially for European mutual funds, imposes strict risk management requirement that would safeguard investors because risk exposures would need to be adequately covered.

This discussion already suggests that **there is little chance for derivatives to be misused** to implement risky bets within the asset management industry. To understand more rigorously the effect of the use of derivatives for asset managers, the ideal experimental setting would be one where you compare two mutual funds that are very similar along many dimensions (e.g., same country, same investment style, similar size,...), but differ in that one is a derivatives user and the other is not. Koski and Pontiff (1999) is a study of 679 U.S. equity mutual funds that adopts precisely this experimental setting. They find that derivative users have return profiles and risk exposures that are very similar to non-users along different metrics, dispelling any notion of derivatives being used for speculative activities or for return enhancing strategies.

Another ideal experimental approach to understand the effect of the use of derivatives in the asset management industry would be to examine a change in regulation about derivatives use. Ideally, one would be able to compare the same mutual fund over time, where it was a derivative non-user and

then a derivative user. Interestingly, such a regulation change occurred for Italian mutual funds in 2005, when the regulator substantially relaxed the limits of the investment in derivatives instruments for mutual funds. Garcia-Appendini and Rangel (2009) find that this change in regulation spurred indeed derivatives use by mutual funds, which doubled on average their use of derivatives. Mutual funds that started using derivatives with the new regulation also experienced a higher than average increase in risk-adjusted returns, and a stronger reduction in idiosyncratic risk, suggesting that derivatives were clearly not used to set up speculative bets.

In summary, that there is little scope for mutual funds to misuse derivatives to take on risky bets is **fully corroborated by rigorous academic research**, which did not find any empirical evidence of this behavior.

7. Takeaways

The main takeaways from this study are summarized in the following bullet points:

1. In general, financial derivatives are very widely used.
2. Derivatives are so widely used because they allow to manage financial risks efficiently and with low transaction costs.
3. There is evidence that derivatives use allows non-financial firms to function better along several dimensions and thus to be worth more.
4. Derivatives are vital tools in the asset management industry: even more so than for non-financial firms, they allow users to obtain the desired risk-return profile with high efficiency and low transaction costs.
5. The benefits of using derivatives in the asset management industry are even more relevant for smaller size asset managers, which could not benefit of economies of scale if they had to implement these investment policies *without* the use of derivatives.
6. If derivatives were not allowed in the asset management industry, the investable choice set for the final investor would be dramatically reduced.
7. All the common fears about derivatives use are misplaced for the asset management industry, as the asset manager derivative user is competent and is carefully regulated.

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