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Financial crises, financial innovation and financial engineering as a background for 21st century firms

The theme of the conference, "firms", revolves around the difficult challenges that companies are currently confronted with worldwide. As Dr. Lorenzi said, our macro economist organizers chose this traditionally micro topic because they see firms at the heart of the current and forthcoming challenges and hopes of the world economy. My remarks, however, are not going to be about firms, at least not directly so. As you can see from the packed agenda of these next two days, our cups will run us over with the multifarious discussions of every facet of the firm. Instead, in this session, I'll try my hand at setting a framework for what is to follow by offering some observations on the external financial environment in which firms must function, namely the evolving character of the global financial system and the opportunities and challenges created by financial innovation. My remarks will make three points:

1. A well-functioning financial system, including its legal and accounting components, is a key driver for realizing the long-term growth and development potential of an economy.

2. Modern financial engineering permits the separation of risk exposure selection and management from physical and capital expenditure plans. Risk exposure can be radically changed without affecting capital, trade or income flows or the traditional balance sheet. Market-proven financial technology exists that makes it possible to do so on much larger scales and at much lower cost than had been true even in the not-too-distant past. Thus, as a practical matter: risk is now a separate dimension of management decisions for governments, for institutions and of course for firms.

3. Financial innovation creates enormous opportunities to improve risk sharing, lowering transaction costs and reducing information and agency costs, with significant gains, especially for small and developing countries. However, the same innovation creates daunting challenges of implementation. So I will offer some structural observations on financial crises, financial innovation and financial engineering.

New financial product and market designs, improved computer and telecommunications technologies and advances in the science of finance during the past three decades have led to dramatic and rapid changes in the structure of the global financial markets and institutions. The scientific breakthroughs in mathematics and finance in this period both shaped and were shaped by an extraordinary flow of financial innovation, which coincided with those changes. The cumulative impact has significantly affected all of us as users, producers or overseers of the financial system. Financial science has informed practice across a wide spectrum with powerful prescriptions for portfolio allocation, asset pricing, performance measurement, risk management and corporate financial decision-making. But surely the prime example is the development, refinement and broad based adoption of derivative securities such as futures, options, swaps and other contractual agreements. It is estimated that there are nearly \$500 trillion notional amounts of derivative contracts sloshing around the earth. In finance, we used to have millions, then to get interest it became billions, and then, in order to get any interest anymore you had to say trillions. We are now up to almost a quadrillion, so you'll get used to the Q-word. Financial innovations have had enormous impact on the global economy, but none of these innovations would have been possible without the theoretical concepts and explicit models of risk and pricing developed largely within the academic community.

Financial systems and economic growth

Now turning to my first point: there is an important causal relation between the effectiveness of the financial system and developing at home a long run economic growth. Nearly half a century ago, Robert Solow demonstrated that it was technological progress, not population growth or frugality of saving, which drove long-term growth. And we now have in a growing and well-developed body of literature a further demonstration that a well functioning financial system, including laws and accounting, is a critical driver of long-term economic development and growth. And the common sense says you may have the technology to do it, but if you don't have the means for firms to transform that technology in scale into the economy, the benefits of technological progress will not be seen. So I would like to underscore the importance even in my view more important than monetary or fiscal policies, of having a well-functioning financial system for growth.

It is often recommended, in designing a financial system, that one look at the best practices. However, in a rapidly changing financial technology learning curve, any new design, any revision of the system should not just look at best

practices at the moment, but incorporate the best and newest technologies in them. And in doing so it's possible to leapfrog beyond the existing systems by using new financial developments for design for the system, and this applies both to regulatory as well as product, services and other design. The sessions on the nationality of the company, new forms of corporate governance, company and public policies and institutional regulation will all address this. I would remind us as we think about the firm that we understand that the functional role goes beyond the neo-classical one of being nothing more than a production function bringing pieces together, but that the firm also serves as a risk intermediary for employees, both in terms of its compensation design and very importantly in the form of employee benefits. This is a role, a function of the firm, that will certainly continue. There are also some dysfunctional characteristics that have been well documented in the behavioural analysis of finance, things like home-bias, where the tendency is to invest much more in your local geopolitical environment than would otherwise be optimal. Firms can mitigate that dysfunction, through foreign direct investment, by in fact investing outside of the environment even if the investors prefer to own shares in local companies.

About risk separation

Modern financial engineering is essentially the process of taking all the risks of an investment, asset, security and decomposing it into its different risk parts, pulling out the parts you don't want, adding parts that you do and then recomposing it to end up with a preferred risk profile. That's a fairly generalized description of the process. And in doing so, the notions of ownership, governance, liquidity and systematic versus idiosyncratic risk are all separable and indeed can be separated. Let me just give you a brief example. Think of the terms of ownership. It is possible to buy the shares of a firm on their initial offering, so your cash goes into the firm, providing the cash investment to the firm. You own the shares, so you get to vote for governance. But then you enter into a total-return swap, where you pay the total return on that share to some counterparty, and receive back the total return on something else. So in effect when you look at those three together, buying the original shares and maintaining ownership but swapping out the risk, you leave that entity in the position that it is an owner and a voter, hence it controls governance, it is providing cash capital to the company, but it is not taking any of the risk. Canada in its pension plans did this for years because of requirements that it invest locally. So this is not just a hypothetical and it is done all the time. And there can be benefits to that, but also some challenges.

Similarly with liquidity, if you want to have the market returns on private equity but you need liquidity, you can get that by buying liquid bonds and entering into a total-return swap with a counterparty, say a pension fund that doesn't need liquidity, which you receive the returns on the private-equity fund over the next seven to nine years, but you hold in your actual portfolio liquid bonds giving you short-term liquidity. So again, liquidity can be bought and sold separately from other characteristics of the instruments.

Firms, too, can benefit by risk transformations and indeed some have already done so. Probably the classic case is banks, because of a mismatch of desires of their various customers, end up with enormous interest rate exposures. We know that banks get rid of these risks very easily using interest rates swap contracts. That is an example of eliminating a very large risk for the corporation, but one, which was not adding value. It reduces costs and improves efficiency because the bank does not have to hold as much equity capital.

If you look at developing countries over the last thirty years of the 20th century, had they been able to find ways to efficiently diversify their risks while maintaining pursuit of their individual comparative advantages, they would have gained between 500 to 600 basis points a year, for thirty years. I mention these numbers not because of their precisions; I mention them to say that we often think of risk as being simply an important but essentially utility activity, important because if you don't manage risk you get into trouble but managing risk is not adding huge value. I disagree. Managing, controlling and measuring risk well can do a lot to add value either to the firm or to the country at large.

That all said there is a downside to this. Obviously the subprime is one example we have heard about, in which we have had a case where ownership and origination of the loans was not the risk-bearer of the loans and you had real difficulty between understanding who had the governance rights and a number of other factors. So with all the benefits of this risk transformation we have real challenges to transparency and incentives. But that said, we see that there is a role for innovation there and opportunity for innovative risk management, and we will be discussing this all through those topics later.

Financial crises

Financial crises are certainly related with innovation and engineering. In the past there have been financial incidents and deep crises; their cause seems to raise questions about innovations and the soundest of the financial science used to engineer them. With the ongoing major liquidity and credit crisis that has hit the financial market institutions, particularly in the US and Europe, UK, these questions are again being raised. We are still in the process of addressing

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the immediate impact of the crisis and gathering data to properly understand what has happened. So I'm certainly not going to offer any observations on that detail in my last four minutes. But I would like to make a few comments that are structural, about the nature of financial crises.

Of course, it goes without saying, we have greed, bad management, poor incentives, flawed models and poor oversight. Those were there and those were important, but they are not the whole story. There are structural things that don't go away even without such dysfunctions. For one, when you are dealing with financial innovation, which has often been associated with the causes of crisis, part of that association, I think is behavioural, and really isn't a valid reason. It comes from our being much more comfortable with those risks which are familiar than risks that we are not familiar with, and of course innovations are always new. I have a quick example in mind that is the following: if you look at a standard corporate pension plan in the United States or the UK, and they are holding equities in their pension plan, I think General Motors might be holding 75 billion dollars of them. That position, combined with its pension liability is exactly the same risk as if GM enters into a 75 billion dollar total-return swap where it receives the total return on the stock market and pays a fixed rate of interest. Could you imagine the CEO of General Motors getting up to the stake holders and saying: "We've decided that we're going to take a 75 billion dollar total-return swap bet on the stock market and interest rates", where one standard deviation on that amount is larger than the entire market capitalization of GM stocks? The GM board would be carrying this guy out, it would say "Excuse me, excuse me, this person needs to be looked after." I point this out to you because this happens every day. The risks between the pension investment and the swap are identical, but one is familiar, and one is not. That said there is a valid structural relation that is likely to occur between innovation and crisis. And the simple reason is that it is not possible in advance to create the full infrastructure to support each innovation at the time the innovation is introduced, because most innovations are not successful. So you can't go out and build the whole infrastructure for any idea you have. By necessity, you will find that successful innovations are going to run ahead of the infrastructures to support them. And I think we have seen that, both for good and for bad. Now the trick is: how do we control that mismatch? At one extreme, we could regulate the innovation to hold it down so that we won't have any risk mismatch or problem. But then we'll never get any of the benefits of the innovation. At the other, if we don't recognize that structural mismatch and control it, we are likely to find ourselves with the kinds of problems that we have observed in this last twelve months.

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It is often said about dysfunctional crises that we never learn. We keep making the same mistakes. I'll tell you a little story. Tie styles are wide, narrow, wide ... they're getting narrow again by the way... Last time they were wide, and they went to narrow, I took all my wide ties; I put them in a drawer, and saved them. And next time, when the narrows became wide again, I triumphantly pulled my wide ties out, said "I got them", only to discover what? Yes, it was true the ties had gotten wider again, but not the same width as the old ones. They were different. And just so with crises. At some level it looks like they're always repeating. But when you drill into them they're always new, and that's one of the reasons they are called crises.