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Innovation and Authenticity

Robert C. Merton[1]

INTRODUCTION

The study of Islamic finance is not a specialty of mine, and thus I will not attempt to address the rich set of technical issues and questions on the subject. Instead I will give an individual perspective in identifying a very important area for economic development and for the management of risk in an efficient way in the economy. My remarks will make three points.

First, that modern financial engineering permits the separation of risk exposure selection and management from physical and capital expenditure plans. Risk exposures can be radically changed without affecting capital, trade, or income flows, or even the traditional balance sheet. Market-proven financial technologies exist that make it possible to deal with risk of a much larger size with a much lower cost than had existed in the past, and thus as a practical matter, risk is now a separable decision, and a separable dimension of managerial decisions.[2]

Second point, risk transfer innovations using existing market-proven financial contracting technologies offer the prospect to eliminate or greatly reduce the classic economic trade-off between pursuing comparative advantage, which by necessity requires that you pursue a very few and quite related items, a well-known dictum of

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[1] Nobel Laureate, John and Natty McArthur University Professor, Harvard Business School, Boston, MA. Keynote speech delivered at the Eighth Harvard University Forum on Islamic Finance, April 2008.

[2] Robert C. Merton, "You Have More Capital Than You Think," *Harvard Business Review* 83(11), November 2005, pp. 84–94.

economics, and another well-known dictum from economics, undertaking efficient risk-diversification, which by its very nature says invest in many different things, and preferably diverse and uncorrelated ones.[3]

So in this conflict between these two dictums, we face an economic trade-off. Now this trade-off applies at the level of households, firms, or even whole countries. I will briefly illustrate with the case of a strategic management of country risk, which offers the opportunities to smaller and developing countries to develop their economic potential with efficient risk transfer and risk-bearing.

Now my third point: I have done a little investigation on risk transfer within Islamic finance. I have asked questions, not provided answers, in an attempt to find out for a layman such as myself, what you can and cannot do and where the challenges are. To make full use of the innovations I will be talking about in finance, while at the same time maintaining the principles of Islamic finance, is indeed a challenge.

INNOVATIONS IN FINANCE

New financial products and market designs, improved computer and telecommunications technology, and the advances in finance over the last generation have led to dramatic and serious changes in the structure of global financial markets and institutions. The scientific breakthroughs in finance theory in this period both shaped and were shaped by the extraordinary innovations in finance practice that coincided with the revolutionary changes in the structure of world financial markets and their institutions. The cumulative impact has significantly affected all of us, as users, producers, or overseers of the financial system. Financial science impacts practice across a wide spectrum, while offering powerful prescriptions for portfolio allocations, asset management performance measurement, risk management, and corporate financial decisions. But surely the exemplifying case is the development, refinement, and broad-based advancement of contractual technologies, derivatives securities such as future options swaps and contractual agreements. It is estimated that there is nearly five hundred trillion US dollars notational amount of

[3] Arthur Sullivan and Steven M. Sheffrin, *Economics: Principles in Action,* Upper Saddle River, New Jersey: Pearson Prentice Hall, 2003.

derivatives sloshing around the world.[4] It used to be millions that got our attention, then we had to talk about billions, then when it came to asset management, in recent years, unless it had a "t" on it, it couldn't get you attention. So now we are up to "q" quadrillion — half a quadrillion of notional amounts! Now innovations in financial contracting technology have improved efficiency by expanding and reducing information and agency costs, lowering transaction costs, and improving risk sharing. And they would not have been possible without the contributions that came from the academic and scientific community. And these innovations offer enormous potential for improvements in risk sharing and, with that, material improvements in economic growth.

INTERNATIONAL SWAPS AND GAINS FROM INTERNATIONAL RISK SHARING

Now the example I offer is a relatively simple one to describe. And it is one that is doable today with existing technology in size, in scale, and at reasonable costs. But as far as I know, it is not really being done, so it is a little time warp for everybody. And that is on the idea of the trade-off between comparative advantage, which is focused on what you are good at, and efficient diversification, which says spread everything out. So how do you deal with that? Well I thought of some examples, even though it may be controversial, I believe using of contractual agreements such as swaps and so forth requires a lot of attention to see whether it would be consistent with *shari'a*. To remind you, the swap is a contractual agreement that permits one to exchange one set of risky returns for another set of risky returns on the same total investment base and therefore, except for transaction fees, it doesn't cost anything, because it is a pure exchange.[5] I trade you a million dollars worth of risk in the Standard and Poor's 500, for a million dollars of risk in the FTSE 100. So it is a pure exchange, a fair exchange in value, and therefore, no money changes hands with the contract. So there's no capital flow, no payments, but there is an enormous risk transfer.

[4] Semiannual OTC derivatives statistics at end of December 2008, available at http://www.bis.org/statistics/otcder/dt1920a.pdf (accessed June 29, 2009).
[5] K. C. Brown and D. J. Smith, *Interest Rate and Currency Swaps: A Tutorial,* Charlottesville, VA: Financial Analysts Research Foundation, 1995.

Consider a hypothetical country that is not subject to Islamic finance, so therefore I would not be presupposing the feasibility of doing it. Consider a country like Taiwan, a small country, strong economically on the whole, but very, very concentrated in the industry of computer chips.[6] That, we could assume, is the comparative advantage of Taiwan; it doesn't have very many other industries represented. To the extent that this is the comparative advantage, Taiwan would be pursuing the right strategy. So what is the problem? The problem is from the diversification point of view: it makes the country very concentrated in one area and industry, and while I use computer chips and Taiwan, you may substitute any other industry or country that comes to your mind. It is the same principle. So how might we address this issue of allowing the pursuit of its comparative advantage but at the same time getting efficient diversification for a country?

Suppose that Taiwan were to enter into a swap, let's say on a nice big number, like $10 billion USD. So that is a large amount, a swap in which it paid that total return, each quarter or each year, on an index of stocks in the chip industry—Intel, AMD, and so forth. So that is what it pays. So each year Taiwan would look at the total return on the portfolio, apply that total return to $10 billion, and that is what Taiwan would owe. What does Taiwan receive back for that? I would suggest, how about the world portfolio of equities? By that I mean, you invest in all the equities, or at least all the ones you can invest in the world. Now theoretically, the best-diversified portfolio in the world is the world portfolio, not just of stocks, of course, but of all assets, at least until we go to Mars or Venus. So that moves Taiwan in the direction of becoming much better diversified, because instead of its risk being concentrated in one industry, it now has risk exposure to the whole world.

Taiwan starts out invested in Taiwanese chip industry. There are two risks associated with it. The sensitivity of Taiwan's chip industry to the world chip industry. Obviously what happens to the world's chip industry influences the relative success of Taiwan. The other is a Taiwan-specific component: what Taiwan does in terms of the efficiency in which it manages its industry, how it taxes its industries, and so forth. And that is specific to Taiwan. So the return to the Taiwan

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[6] "The Ugliest Economy of Them All," *The Economist,* February 12, 2009, available at http://www.economist.com/world/asia/displaystory.cfm?story_id=13109874 (accessed June 29, 2009).

industry can be broken up into two parts: the part that is not under the control of Taiwan but that influences in a significant way the return earned by Taiwan, which is the world chip industry; and then its own specific component. What we have done with the swap is that we have paid out the total world chip risk and replaced it with receiving the whole world portfolio. So Taiwan, in this simple-to-describe transaction, has transformed ten billion dollars of world chip risk and replaced it with ten billion dollars of world diversified risk. So its return would now be total world return, a highly diversified risk, the extra return from the comparative advantage in its expertise chip industry, plus the incremental risk it has to take to get that extra return. Now when you look at the breakdown of country risk, a big part of that did come from the world chip industry and that was concentrated in one industry. We have replaced it with much more diversified risk using a simple contract. It is non-invasive and non-disruptive, meaning that the day before Taiwan was to enter into this, employees went to work. And the day after they went to work, they see or feel no difference. Same thing with the other components; it is a pure transfer of risk.

If Taiwan were to introduce this policy, and two years or six months from now it was determined that there was a better policy, what could Taiwan do to undo this? It would simply have to enter into a swap reversing the original swap by receiving world chip risk and paying world portfolio risk, and we are back where we started. A change in the contractual agreement after that second change had happened is non-disruptive and non-invasive: people going to work the day before and the day after are not affected. There are two components of this strategy which are characteristics of contractual solutions: one is that they tend to be non-invasive, relative to starting up a new industry to try to diversify their country, which is very disruptive. And it is reversible; all you need to do is enter into a reverse contractual agreement. Imagine you started an industry and five years later you decided it was a mistake—that is not easily reversible. So our approach has these features.

There are other benefits to this swap agreement. It retains both the risk and the benefits of local contributions of the industry. So incentives are aligned, so-called moral hazard issues are minimized, and you are putting in people's hands that part of the risk which they have more control over, for which they are more responsible and take the risk, compared to the world chip portfolio in this example, where they would not have control. Without getting too technical, I will just say that the credit risk for this $10 billion transfer of risk is very

minimal. Because it is not like loans, there's no principal capital flow, it is not like FDI or foreigners owning local shares; there's no capital flow. Therefore the exposure to non-performance for the amount of risk that you are transferring is rather small. Furthermore, half the time you owe the counterpart money versus it owing you. And if you are the creditor (when I say creditor, I mean the counterpart owes you risky returns, not a fixed amount of cash). Furthermore, it is also robust because it can be applied for risk transfer in countries that don't even have a stock market. Something that cannot be done with having foreigners hold shares as a means for doing it. So you can use it because it doesn't take capital flows again.

I give this example because it sounds relatively simple to describe. It is a way of transferring risk but without capital flows. I also wanted to show that the benefits potentially are great, particularly to smaller countries, if they could solve this problem of pursuing their comparative advantage, whether it is one industry or three, but getting much better diversification. You all have seen the standard risk-returns frontier. Y-axis: expected return. X-axis: standard deviation of portfolios. A colleague of mine, Andre Perold at HBS, measured the average returns and average standard deviations as a measure of risk for several kinds of world portfolios over the last thirty years of the twentieth century. And he plotted them. I am making use of it now. One particular point is a portfolio of developing-country equities. It already has diversification relative to a single country. Now I can tell you what the return on that portfolio was in dollars for that 30 years: it was somewhere over 9 percent average return, with a standard deviation of 22 percent. Had you been holding a well-diversified world portfolio of all industries for the same 30 years, for the same risk, the return would be close to 16 percent. So in simple terms, in the limit (we won't ever get there perfectly) of a fully-diversified portfolio, the pick-up in those 30 years would have been around 600 basis points a year. Now to put that in perspective let's use the Rule of 72.[7] It is a fast way, when you don't have a computer, calculator, or even a piece of paper, to figure out how many years it takes to double your money at some rate of return. You take the rate of return, you divide it into 72, and that is roughly the number. 72 / 6 = 12. You double your money approximately every 12 years. If you earn an extra 6 percent a year,

[7] Wikipedia, Rule of 72, available at, http://en.wikipedia.org/wiki/Rule_of_72 (accessed June 29, 2009).

over 30 years that is around 5 or 6 times more wealth. That is a very big number for a whole country.

I give you those numbers not to suggest that they will repeat themselves over the next 30 years. That is not the point. The point is that when we talk about efficient risk transfer, it is usually viewed either as providing safety, making things safer, or yeah it is nice, it will add a little bit. I give you these numbers to say that this is a big deal, this is a big event. Four or five or six times more wealth in 30 years is a huge gain. And if the next 30 years is not that big, let's say half that much, it is still big! That is why I am telling you this story and saying that through efficient risk transfer, efficient diversification, the ability to improve performance of returns, either in lowering risk for the same return, or getting much higher returns on average for the same risk, is a big deal. This is beneficial for developing countries, which by their nature tend to be more concentrated in risk. This transaction could be done tomorrow, in size. So this is not something in a laboratory that you might be able to do 20 years from now, you could do this tomorrow and it has the features of reversibility. Can we do it tomorrow within the context of Islamic finance? That becomes our challenge. How can we take advantage of these tools that offer the potential for significant improvements in economic growth, particularly in smaller, developing countries?

I did a little investigation on the acceptability of swaps in Islamic finance for this very reason, because I thought this might be an interesting case to point out, since it manages the risk of a whole country in a non-invasive way. I am not an expert on *shari'a*, but it is not an example of receiving interest, or exchanging something risky for a sure thing; you are just exchanging one risky return for another. And we could make the underlying portfolio of equities compliant if you needed to. At first pass, when I asked if this works, I got favorable responses. So I thought, oh, maybe this would be the theme of my talk. Then thanks to the efforts of the Islamic Legal Studies Program, they, as they should, pursued it more deeply with more people and the feedback wasn't so clear. Maybe you couldn't do it. It is not for me to describe why that might not work, but it might be doable. Hence I put it this way: look, here's something that I think is pretty important. Question is, can we find a way to be able to make use of this kind of tool within *shari'a*? And that is really my question to you as we go forward.

FINANCIAL INNOVATION AND FINANCIAL CRISIS

Now some further remarks about the relation between innovations and financial crisis. I will point out to you—there are structural elements that suggest that innovations will often be involved when it comes to financial crises. And the structural reason is that it is inherent that infrastructure will lag behind successful innovation in finance. The reasons are structural because if you think about it, you have a hundred ideas for innovation and you try those hundred. Maybe two are really successful if you are lucky. So you cannot go out and make infrastructure for each potential innovation in advance of knowing it is a success—by infrastructure I mean the oversight, testing, the whole nine yards of support for wherever that innovation's being used. You cannot, as an economic matter, go out and build an infrastructure for every innovation, because 98 out of a 100 won't be worth it. Most will fail; they are not even going to exist! That is a pretty costly approach, and if you tried, you will get today's innovation done somewhere in the next century. So I think it is structurally the case that the successes are going to be ahead of the infrastructure that supports them. So that sets up not the guarantee of a crisis, but the conditions for a crisis. If you permit me a metaphor: the tension here is if we consider a high-speed train, certainly an innovation, one with great use, but if the tracks, i.e., the infrastructure, have not been built to sustain that train's potential speed, then running the train at full speed on those tracks is a dangerous proposition. So since it takes time to build the infrastructure, you need control, you need oversight, you need to make sure you don't run that train too fast! But it is not that simple. You can certainly avoid any accidents. Just put a regulation that the train cannot go any faster than any of the other trains that ran on the track before this innovation. But then of course you get no benefit of the innovation. So it is a trade-off. If you are too restrictive, too slow, you will lose out on that innovation. If you are not careful enough to oversee it, you run too big a risk. And that is a metaphor for what we are seeing in finance and financial innovation. And that is real, and that is why I would say that the two are inexorably going to be linked to one another structurally.[8]

That said, there is a second behavioral finance perspective, which is to take two things which I can objectively show have identical risks.

[8] Robert C. Merton, "Financial Innovation and the Management and Regulation of Financial Institutions," *Journal of Banking and Finance* 19, July 1995.

One that you are familiar with and one with which you are not familiar. The perception of the risk of the one you are not familiar with will be way out of proportion to the one that you are. A quick case in point: If I hear a song for the first time, I like the tune but don't get the lyrics. When I listen to it 10 times, I eventually get the lyrics. So in that spirit, please hear what I am saying now. Take a defined benefit pension plan, a corporate pension plan in the United States, which holds 75 percent equities in its plan. It is very traditional, we have been doing it for 35 years, and it seems very, very sedate. I can show you as a matter of structural arithmetic, the decision to hold equities in that portfolio rather than match off the risk is equivalent to entering into a total-return swap of the same magnitude of the pension investments in which you receive the returns on the stock market and you pay a fixed payment liability. Now, putting in context for General Motors, which at one point had $75 billion in equities in its pension plan, could you imagine the CEO standing at a stakeholder meeting, and saying, we, this auto company, have decided this year to enter into a $75 billion total returns swap where we receive stock market returns and pay fixed rates, which means we are speculating not only on the stock market, but on the interest rates as well. This is in a context for a company at the time whose entire market cap was less than $20 billion. That is a pretty risky bet! If framed this way, I believe the board would probably postpone the meeting, and ask that the CEO take a vacation for a while. But I can show you that identical risk is contained in corporate pension plans, where there is not a ripple of concern.[9]

The meetings of this forum are not about pension plans, they are not about corporate finance, and they are not about computer chips, but what I will say to you is that the structural issues are exactly the same. That which we are familiar about, we tend to underestimate how much risk is involved, and that which we aren't, we often over-estimate.

That is a behavioral problem. The innovation element of it, though, is structural, and we will have to address that. And we will always have to live with the tension between the benefits of innovation and keeping the infrastructural support for safety. Now I thank you very much for your attention. Although I have not been involved in the specific subject of Islamic finance but have become interested and am

[9] Jin Li, Robert C. Merton, and Zvi Bodie, "Do a Firm's Equity Returns Reflect the Risk of Its Pension Plan?" *Journal of Financial Economics* 81(1), July 2006, pp. 1–26.

ready to learn, I hope that I brought something to the table for discussion.