

## ASSET MANAGEMENT IN VOLATILE MARKETS

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## 2. Future Trends in Asset Management: Challenges and Observations

### **Presidential Introduction of Professor Robert C. Merton by Catherine Lubochinsky**

The time has come for the 2008 Marjolin Lecture and I have the privilege this year to introduce Robert Cox Merton, professor at Harvard Business School (since 1988), and not to be confused with Robert King Merton, the famous sociologist professor at Columbia University, his father. Not only was he thus introduced to the academic world in his early age but it was also his father who introduced him to poker and stock markets - a premonitory combination.

However, Robert C. Merton, more fond of cars than cards, decided to go to college at Columbia's engineering school. And even more surprising, he published his first paper on Gulliver's Travels in the Journal of History of Ideas. Fortunately for us, Robert Merton diverged into economics when he joined the MIT in 1967 to complete a PhD under the supervision of Paul Samuelson, and later became his assistant. At that time, Paul Samuelson was already investigating warrant pricing. One could say that's how it all began for Robert - the (market) timing was right!

He held his first position at MIT in the Sloan School of Management, where he became a Professor and stayed for 18 years, enjoying colleagues such as Modigliani, Cox, Black and Scholes. His first fields of research were dynamic models of optimal lifetime consumption, portfolio selection, equity asset pricing and contingent claim pricing. During that period, he published what are certainly the most-read papers in finance around the world:

- **Intertemporal Capital Asset Pricing Model** (Econometrica 1973)
- **Theory of Rational Option Pricing** (Bell Journal of Economics and Management 1973)
- **On the Pricing of Corporate Debt** (Journal of Finance 1974), which paper definitely contributed to the Nobel Prize he was co-awarded (with Scholes) in 1997.

Black and Scholes had published their paper on the Pricing of Corporate Liabilities in 1973 (Journal of Political Economy). Quasi-simultaneously, Robert Merton showed in this 1974 paper that the dynamic trading strategy prescribed by Black and Scholes to offset the risk exposure of an option would provide a perfect hedge in the limit of continuous trading. That is, if one could trade continuously without (transaction) cost, one could exactly replicate the option payoffs. This was thus an alternative proof of the pricing technology. This proof in finance is as important as the discovery of the structure of DNA in biochemistry.

But Robert Merton is a man of two lives: besides being an academic, he has always been a practitioner. Over the last 30 years he has been into finance practice. By the end of the 1970's, his research was about applications of his models to social security, pension funds, deposit insurance, corporate investment decisions etc. and he became, not surprisingly, consultant with the Chicago Board Option Exchange. In 1976, with Scholes, he set up the first mutual fund with downside protection (well before the put insurance products developed in the 1980's or floor products in the 1990's). He then spent some time as a top advisor to Salomon Brothers, where Scholes joined him, and where they met the co-founder of what was to be the famous hedge fund LTCM (1994). Robert C. Merton is currently Resident Scientist at Dimensional Fund Advisors.

One could go on for another couple of hours trying to summarize all of Robert's achievements, but I think the SUERF participants are more eager to listen to him. So, Robert, the "floor" is yours to tell us about the "Future Trends in Asset Management".

## **1. Introduction**

Thank you very much for those remarks. If I was a truly Rational Man I would say 'Thank you!' and sit down because it can only go one way following that introduction. I would first of all like to thank SUERF for inviting me to deliver this year's Marjolin Lecture. I do not intend to discuss the current crisis and its immediate interplays with asset management, not because such a topic is not interesting, but because it would be too interesting, and we would not be able to cover any other topic. Fortunately this topic has been excellently

summarized this morning, having been thoroughly researched and discussed during this Colloquium. Instead, I will address the subject of “Future Trends in Asset Management: Challenges and Observations”.

Over the last three decades the financial system has changed enormously, thanks in no small part to advances in computer technology, telecommunications and, indeed, finance science. In turn, the extraordinary financial innovation that practitioners have brought to bear over this period of time has been shaped greatly by academic financial research, with a considerable impact on all of us, as producers, users and overseers of the system. Nowhere has this been more apparent than in the development of derivative securities technologies, including futures contracts, options and more complex option contracts. I plan to divide my remarks today into three parts.

First, I wish to address the recent trends in the asset management industry for the manufacturing or production of asset management services. I will discuss the bifurcation that has taken place with the decomposition of the asset management business into component parts as well as touching upon the implications of this bifurcation for recombining this business for institutional and retail clients. Second, I will discuss sovereign-wealth funds with a brief case study of this large and rapidly growing sector, in particular the execution of sovereign wealth funds, reserves and debt management, which can all be decentralized. I will raise the issue of whether considering an objective function (from which the optimum policies for each are derived) reflects an integrated, generalized asset/liability-management perspective for overall country risk exposures forms an appropriate way to address this particular asset management activity. Third, I will examine risk transfers vs. capital needs and capital flows. Of course, risk allocation forms the essence of asset management. Modern financial technology permits the separation of risk exposure selection and management from physical investment choices, capital expenditure plans, ownership and governance of assets. It is possible to radically change risk exposures without affecting capital, trade or income flows or even the traditional balance sheet. Thus, risk can be viewed as a separate dimension of management decisions.

As we will see, the tools that are most efficient for risk transfers are not necessarily those that are used for managing capital flows, and to illustrate this point I will apply this to the risk management for a whole country with the explicit idea in mind of exploring the trade-off between pursuing the two well-known economic dictums: on the one hand we are instructed to pursue our comparative advantage - whether as an individual, a firm, an institution

or a whole country – whilst on the other hand we are told to diversify efficiently. These two dictums conflict with one another, since the pursuance of comparative advantage clearly means focusing on a few, typically highly-related, activities, whilst diversification advocates investing in many different asset classes, preferably ones that are unrelated to one another. I will illustrate how modern financial technology allows the reconciliation of those two dictums. From the perspective of potential gains as a result of efficient asset management for economic growth, in particular in developing economies, as well as the challenges we have to deal with, we are faced with complexities and increasing demands with regard to required knowledge. Overseers and senior managers of producers in particular find themselves having to address an ever more complex set of situations. In my title, I have deliberately chosen to use the word “observations”, since any single topic of the three I will address could easily fill an entire lecture. As such it will only be possible to allude to certain aspects of points of each topic, so each section should be considered to be a taster menu, rather than forming any definitive discussion on such topics.

## **2. Recent trends in the asset management industry for the manufacturing or production of asset management services**

Last night, we heard from the Senior Partner of Pioneer Investments about many of the issues of trends in asset management from a practitioner’s perspective. If we examine how asset management has been changing, the principal change has been towards a “barbell” type of investment strategy. Two extremes have been responsible for the largest absolute growth within asset management. The first extreme is one of very efficient risk exposures - so-called “Beta” exposures. Such Beta exposures are good for efficient diversification, as is the case in such asset management vehicles as index funds, ETFs, and derivatives among others. It has proven to be a huge area of growth in producing Beta in a scalable and efficient low-cost form. This pure exposure is balanced out by another extreme at the other end of the barbell, which focuses on pure performance, – so-called “Alpha”, where superior performance, beyond that

which can be obtained from core but passive strategies is sought. Typically vehicles for the production of Alpha are so-called alternative assets, such as private equity, hedge funds, direct real estate investments and almost any other kind of niche area, where it is possible to generate excess returns. Both of these extremes have proven to be substantial growth areas, at nil expense in relative terms.

Traditional long-only managers have combined Alpha and Beta together offering exposures to important assets classes, and promising superior performance in these classes. However, many of the star managers, who had hitherto been traditionally found in long-only shops, have now left that sector to become part of these alternatives. Pressure has therefore been placed on this middle group, and in some ways this process is catching up with academic theory. It has always been postulated that one could logically and perhaps efficiently separate those functions and unbundle them and provide open architectures for implementing them, and this appears to be the way that things are heading.

The question arises, therefore, as to the implications of such barbell investment strategies? Primarily, it has become apparent that institutions are moving more towards alternative investments than they were in the past. I would like to point out to you, however, that even if institutions were adopting the same portfolio as they had done in the past, in order to achieve what they had achieved in the past, such a step would nevertheless be necessary. Why? Because, as I have already alluded to, since many of the successful managers that they were using before in the long-only shops have left to set up hedge funds and other alternatives. Effectively, to remain with these managers, they have therefore had to pursue alternative asset classes. Therefore, making that forecast does not necessarily suggest that changing towards the alternatives will imply really different patterns of returns for institutions, although I believe that this will be the case in practice.

Secondly, this bifurcation also creates much greater transparencies of strategies and sources of value added. Producers of pure Alpha, and by this I mean the abstract extreme, have no place to hide and are therefore only able to reply, "Here is my extra return and all the systematic risks expected have been taken out". On the other hand, producers of pure Beta can not proffer statements like, "We did well but the market was down, so what can I say?"

With regard to the aspect of fees, as you are all aware, long-only management fees are very different in terms of the percentage of assets than management

fees for alternative asset classes. For hedge funds, there is an apparent standard for fees of “2 and 20” - a management fee of 2% of net added value (NAV) per annum and a performance fee of 20% of the fund’s up side or profit. However in an actively managed portfolio, the management fee is quoted in basis points, whether it is 75 or 100 or even more basis points; however the management fees are nothing like the percentages that apply for hedge funds.

However, the question then arises of which type of fund management produces the more costly Alpha? It is apparent that this can be measured very simply. For example, for a fund with a “2 and 20” fee structure, it is possible to express the value of the fees as a traditional annual percentage of assets beforehand. This is possible because the performance part of the fee is nothing more complex than a call option, and call options can be valued, so this when added to the 2% management fee gives us a composite simple percentage of assets as an annual management fee. If this is applied for a typical fund, e.g. one that has a similar variance or volatility to the market as a whole, the figure that emerged with “2 and 20” management fees, for pure alpha, i.e. for a provider who is giving 100% of every Dollar or Euro invested in the fund to alpha, then it corresponds to about 2.8% per year of annual management fee. If, however, the manager is producing alpha on only half your invested capital, with the other half producing beta, which costs almost nothing to produce - e.g. an amount of practically zero - say as low as 2-4 b.p. the difference is very apparent. In some instances people actually have a negative management fee, i.e. the fund manager actually pays the investor 2 b.p. to let them index for you, although this again is an extreme. In the event that the split between alpha and beta is 50:50, then the 2.8% you are paying for the alpha becomes 5.6%. It can be compared easily to buying liquid detergent for your washing machine from the supermarket and having two choices - either the large bottle, which is mostly water, or the small one, which is concentrated. If you buy the large bottle, which appears to be the better bargain, you are mostly paying for water, which most of the time costs practically nothing. This is also the case in investment management. The only way that you can compare is to decompose, even with a traditional manager. In a more extreme case, if 20% of the portfolio is dedicated to producing pure alpha and 80% of the portfolio is dedicated to producing beta or “passives”, the effective rate that you are paying for alpha is a management fee of almost 15%. Therefore, the fee structure can be comparatively quite different depending on the actual mix of alpha and beta. The barbell structure makes this transparent - and much more transparent than in the past, and this has clear implications for the industry.

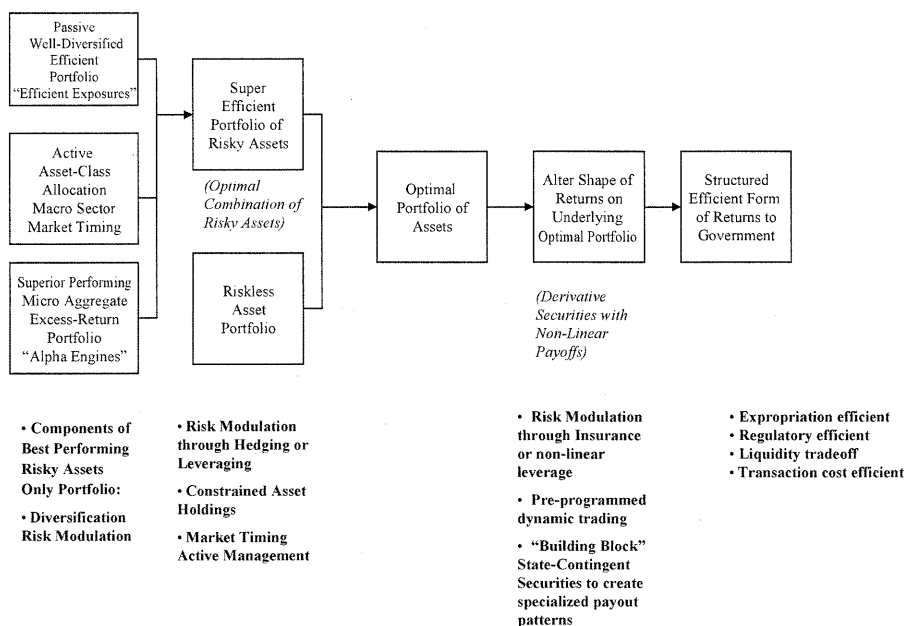
The second result of separating alpha from beta that occurs is that there is an acceleration of the ongoing process of alpha being “turned into” beta. What does that mean? Before answering this question, I wish to define what exactly I mean by alpha in my remarks. By alpha, I mean that any time you can add performance over and above the performance that the client could add without you, you are adding alpha. This may be a little different from some definitions but I think it is the practical definition of alpha. Put in other terms, if I can show you that I can do something better for you than you can do at the moment then there is an added value of performance. But, if the way that I do that is something that could be done systematically and at low cost, then as soon as this is recognized, even though the entity that is getting the alpha is getting the benefit, the fund manager will no longer be able to earn fees of a similar magnitude of “2 and 20”, but will earn fees that are much closer to fees for providing beta. To give you a couple of concrete examples of what I mean by this, there is some evidence that small cap stocks have an incremental risk premium over large cap stocks and that so-called value stocks have an incremental risk premium over growth stocks. If that is true and one tilts the portfolio relative to a base portfolio in the passive market towards holding more small cap stocks and more value stocks, then if this is the case, you should be able to realize a higher performance per unit risk than you would with the passive strategy – and that would be alpha. Some well-known hedge funds follow precisely that strategy. However, once this approach becomes understood in the market place, then the other part of the business - the Beta business - will be able to create small cap vs. large cap, value vs. growth, and they would be able to do this at a very low cost. At that point, the cost structure will then change away from the high management fees for delivering alpha, and that is the sense in which it migrates to beta. The speed at which this is happening is accelerating. Like many other businesses it has become much more competitive, and is much more difficult now to sustain a margin in that environment.

Third, you will witness expansion on the beta side in the following sense: new asset classes, among these asset classes are climate, longevity risk being traded, liquidity, pre-programmed liquidity, and owner-occupied real estate. The concept of owner-occupied real estate as an investor asset class sounds strange – after all, how can you get investment exposure, if there are other people who live in and own such real estate? It is possible though. As these classes expand, we see the Beta side does too. So what is the implication of this bifurcation in terms of what the institutions now have a greater need for – namely the assembler function.



**Chart 1: Stages of Investment Production Process for Given Objective Function**

**Domain of Investment Management: Stages of Production Process for Given Objective Function**



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Figure 1 shows a schematic of money or asset management. It can be broken into three pieces. On the far left hand side is the starting point – the well-diversified, efficient, so-called Beta exposures, passive assets. There may also be macro-market timing across those classes. This forms the first part of the activity. Additionally, as shown in the bottom box on the left hand side, there is the so-called Alpha, from all the specialized areas from which you can pick stocks or other misvalued assets. These three components then have to be optimally mixed together to come up with the optimal combination of risky assets, which is then mixed with the risk-free asset in order to modulate risk. Finally, you come up with your optimal portfolio, and then if you choose to, you can actually bend and twist and shake that portfolio into different types of payoffs. One of the fastest growing areas is floor products, where a minimum return is placed on the optimal portfolio, but where upside is retained. Finally you end up with the efficient form of the product. In the traditional version of this process, everything that is listed in the three boxes on the left hand side of the figure is done by one entity (or by a small group of entities), and the client does not really have to do very much, other than to indicate the exposures it wants. However, it has now become a specialized process with

many different portfolio-component providers and someone has to assemble all these parts for this institution. One of the implications for this, in terms of efficiency, is ensuring that you have integrated and consistent risk measures between alternatives and traditional asset classes. Over the last 25 or 30 years there has been a lot learned and developed in performance measurement for equities, debt, small caps, and large caps – the traditional asset classes. While risk measures for these asset classes are hardly perfect, a lot of experience has been gained about that kind of performance measurement.

The problem with alternatives emerges if you take those same performance tools and attempt to simply apply them to alternatives – you are going to get a mess as they can not be applied well. For example, in any private equity or direct real estate, a feature of those assets, even though they quote their assets once a month or once a quarter, is that they have stale prices, and do not trade very often. Companies in a private equity portfolio sometimes do not get re-priced for years. Now the effect of that is that if you put the historical returns into a standard optimizer, then they look less far less correlated with traditional assets than they actually are. That biases the results to make it look like that segment is outperforming and is a much better diversifier than in reality. It is possible to correct this bias, but to do so of course requires you to actually make the correction. If you just use the traditional measurement tools, you will get a very large, order-one effects that could be as much as a 1000 b.p. of apparent alpha originating solely from the mismeasurement of the systematic risk from stale pricing. In hedge funds, even ones with liquid assets which do not have this problem, the hedge funds have dynamic strategies which systematically change their risks through time, unlike the traditional classes which have reasonably stable risk characteristics. So for example, relative-value funds tend to have the feature of increasing their risk when they go down, thus acting like contrarians. So, if this non-linearity arising from these changes is not accounted for, once again there is a biased measure of the risk and there is then an overstatement of the performance followed of course by a correction.

Another issue that was raised in a different context earlier this morning, was that one ought to know where the extra returns are coming from. If a risk manager is making lots of money, it is also a good thing for the risk manager to be able to say how they are making money.

So part of this assembler process that has been forced onto the institutions as a result of the bifurcation is to understand where their returns are coming from. For example, in hedge funds, there are three systematic sources from

where I think returns could be coming from - whether they actually do or not is of course an empirical issue. One source is that they are just taking systematic market risk, and that they aren't pure performance players, and they are exposed to the same risks that equities are, regardless of whether they are trying to be exposed to them or not. This may seem rather prosaic but it is true.

Second, as a well-done study by a colleague of mine showed, in which there was an analysis of returns for every hedge fund asset class from convertible bonds, long and short equity, through to wealth, there is the systematic factor for at least since 1994 to 2004-5 that seems to explain a large part of the excess returns as usually measured, known as liquidity-event risk. A single variable needs to be placed in the returns which identifies when a liquidity event, such as the one we experienced in Summer 2007, occurs. I do not refer to what has happened subsequently during the credit crisis, as that is a different matter, but when you have a seizing-up in the markets regardless of size, then that risk seems to be one that all classes of hedge funds are exposed to, and all these classes take that risk. Now to a certain extent there is a risk premium paid for taking that risk, but you do not realize it, and that could be a systematic source of return.

The last one, which might be very important for overseers to recognize, is that I believe hedge funds, even if managers do not think of it this way, perform a very important role in dealing with the global institutional rigidities that we see. We have a global financial system and yet as we all know we have individual nation-state systems that do not match up in regulatory terms, which on the whole act a bit like a speed limit sign, in that they are designed to approximate the best conditions, but clearly at times they create an unintended negative kind of restriction for various types of institutions. This is more likely to occur, the more global and more complex the system becomes. The role here of hedge funds is that they can intermediate for the intermediaries. However, they do not intermediate the way a banker intermediates - i.e. on a one-on-one basis, facing the clients. They intermediate through markets. The common factor for all hedge funds, as far as I know, since they do everything in investing, is that they are lightly regulated. That is the only common factor I can really come up with. If you have someone who is regulated in the same way as the institutions who are up against institutional rigidities, they cannot be an intermediary, as they face exactly the same rigidity. So it becomes necessary for there to be an alternative way, so that there are some institutions that are not regulated in the same way, thereby allowing them to be on the other side of the transaction, not with the intention of superseding or circumventing policy, but to play the

role of service shock absorbers for the complex realities of all the systems that are interacting and are writing a fixed set of rules. This is not meant to be seen as a criticism of the system, it is just a structural description that when fixed rules are written, they do not work well all the time, and sometimes there can be unintended consequences. If you are able to have an unregulated entity that can form the other side of the transaction, then it is possible and they can help you. One of the key reasons why hedge funds are making money is not because they are smarter, faster, or have better models, but is in fact because they are providing a service, an intermediation service, a risk transfer service, particularly in the environment I have mentioned, which would be one way of trying to understand where these extra returns, if any, are coming from.

I have hitherto described the implications of the bifurcation for institutions, but there are also implications on households, as has been alluded to by the practitioner's view of asset management. One of the big visible trends around focuses on the retirement part of the life cycle and the oft-quoted metaphor is of a three-legged stool approach for retirement, with the respective legs of the stool being personal savings, the government/social security type schemes, and an employer or equivalent institutional accounts. For the most part, the corporate or institutional provisions of the three-legged stool have taken the form of defined-benefit plans, or at least this has historically been the case. As you are all aware that has changed radically. In the US and the UK and many other parts of the world, such defined-benefit plans are disappearing, although they still contain approximately USD 3 trillion as well as asset tools, so managers of such funds are unlikely to go out of business for a while. For people worried about their retirement provision, however, such defined-benefit plans are no longer a viable prospect. What has happened is that by substitution the defined-contribution plans have come in, which I happen to think they are not the answer, but I would have to save any further elaboration for another day's discussion. A next generation does exist, but I do not wish to comment upon this. But what is the consequence of this trend? Suddenly professors, brain surgeons or auto assembly line workers are now confronted with the task of having to figure out how to allocate their assets in order to be able to enjoy an adequate standard of living in retirement, which is often decades into the future, and which often lasts for decades after retirement, and which is a very daunting complex problem - even for professors - to try to address. The idea that brain surgeons and professors or auto assembly line workers can do that in an effective way, even with the benefit of all their education, is about as likely as me being able to make my own decisions on surgery. Imagine how I would feel as I was being wheeled into the operating theatre, as I am about

to go under from the anesthetic and my surgeon asks me whether I would like 12 or 17 sutures. I would not know.

However, this dilemma is one with which we are confronted with the defined-contribution plan. In this instance, the bifurcation confronts households with decisions they have never had to make in the past, ones which they are unable to make in the present, and ones which, even with education, I do not think they will be able to make in the future. The answer to that is going to be a recombination coming back, we are going to have to use intermediation again and create user-friendly, easy-to-understand products. To have millions of people go through their retirement being poor can not be viewed as an acceptable long-term equilibrium. It is one matter if you lose money and are unable to afford to have a second home or second car or whatever, but for the general population's retirement that does not make sense. This is currently a very big trend which I foresee happening in asset management and we have that reversal going through that.

### **3. Sovereign Wealth Funds**

The second main topic that I wish to address is that of sovereign wealth funds. With regard to sovereign wealth funds, I really wish to make three points. I think we are all aware that sovereign wealth funds are an expanding area. Currently sovereign wealth funds are worth about USD 3 trillion and are growing fast.

Firstly I would like to address the objective function of sovereign wealth funds. In this morning's plenary session it was mentioned that depending on which country you are in, there exist sovereign wealth funds, pension funds, stabilization funds, savings funds or sector funds. Rather than focusing upon all these definitions, I would prefer to look at the balance sheet for the government, representing a particular country.

Table 1: Government Economic Risk Balance Sheet (For China in this instance)

Assets	RMB bn
<i>Present Value of Incomes from:</i>	
<b>TAXES</b>	3325.7
Excise	188.6
VAT	1278.5
Sales	512.9
Customs	112.8
Income	949.3
Motor Vehicles	68.8
Dividends	86.8
Land	128.1
Others	TBD
<b>FEES</b>	0.0
Administration	TBD
Penalty and Confiscatory	TBD
<b>SEIGNORAGE</b>	TBD
<i>Balances of:</i>	
<b>INVESTMENTS</b>	1500.0
Sovereign Wealth Fund	TBD
Industry and Transportation Fund	TBD
Culture and Education Fund	TBD
Social Security Fund	TBD
Agriculture Fund	TBD
Housing Accumulation Fund	TBD
<b>INFRASTRUCTURE</b>	TBD
<b>CASH</b>	1.7
<b>SPECIAL DRAWING RIGHTS</b>	TBD
<b>CURRENCY RESERVES</b>	7775.8
<b>MONETARY GOLD</b>	33.7
<b>STATE-OWNED BANKS</b>	TBD
<b>NON-BANK STATE-OWNED ENTERPRISES</b>	TBD
<b>DEPOSITS</b>	1021.1
<b>OTHER ASSETS</b>	TBD
<b>TOTAL</b>	13657.9+TBD

<b>Liabilities</b>	
	RMB bn
<i>Present Value of Non Discretionary Expenses on:</i>	
<b>ECONOMIC DEVELOPMENT</b>	901.9
<b>SECURITY &amp; EXTERNAL RELATIONS</b>	377.9
<b>SOCIAL DEVELOPMENT</b>	1500.5
<b>GOVERNMENT ADMINISTRATION</b>	335.6
<b>BENEFITS</b>	
Industry and Transportation	TBD
Culture and Education	TBD
Social Security	TBD
Agriculture	TBD
Housing Accumulation	TBD
Commerce and Trade	TBD
<b>SUBSIDY TO STATE-OWNED ENTERPRISES</b>	18.0
<i>Balances of:</i>	
<b>MONETARY BASE</b>	TBD
<b>GOVERNMENT DEBT OUTSTANDING</b>	
Local Currency	285.6
Foreign Currency	TBD
<b>CENTRAL BANK BILLS</b>	TBD
<b>BANK RESERVES</b>	651.7
<b>Contingent Claims (Implicit Guarantees)</b>	
<b>GUARANTEES TO BANKS AND NON-BANKS</b>	TBD
<b>GUARANTEES ON RETIREMENT INCOME</b>	TBD
<b>GUARANTEES ON SOCIAL WELFARE</b>	TBD
<b>General Balance</b>	
(Economic Assets in excess of Economic Liabilities)	9586.7 +TBD
<b>TOTAL</b>	<b>13657.9+TBD</b>

Sources: State Administration of Taxation, Tax Income Statistics; The People's Bank of China, Balance Sheet of Monetary Authority; Ministry of Finance, 2006 State Fiscal Income/Expense Final Account

What we are trying to achieve, and this could be applied to any country, is to draw up a balance sheet where all the assets of the government are listed.

This is also done for other reasons, e.g. for fiscal policy we try to assess the valuation for the various taxes and present value of those tax assets, as well as values for cash and currency reserves, monetary gold, state-owned banks, etc. Additionally we also include investments, like sovereign wealth funds, the industry and transportation fund, culture and education fund, social security fund, - i.e. all the funds that a country might have. The right hand column of the table shows the present value of non-discretionary expenditures, the ones that you will not skip even if you cannot pay your debts. Then you have the various monetary bases. Here I have lumped the Central Bank balance sheet together with the government balance sheet including Bank Reserves, as well as aggregating accounts and the various contingent claims, (i.e., guarantees to banks and non-banks, retirement and social welfare). At the bottom of the table there is then a general balance that is available, which is like the equity of that sector of the economy. If you are trying to manage the risk in any meaningful way, and that is certainly a key role of sovereign wealth funds, which whilst being a source of savings it should be remembered that asset management, when applied, largely revolves about how you allocate the resources you save across different risks. It therefore, does not make sense to treat the sovereign wealth fund as if it is a stand-alone entity, when you are trying to decide what the optimal objective function is. The only thing that makes sense, in that instance, is to do a sort of asset/liability management for that whole balance sheet, and to then examine how do these risks interplay with all the other risks and the liabilities, and then decided upon what is optimal for the sovereign wealth fund in terms of its objective function, given all these characteristics. This can be done, or is certainly as doable as the naïve approach of treating the sovereign wealth fund as a stand-alone, and it really defines risk in an appropriate manner. It also allows currency reserves to be run by the monetary authority separately, which also happens to be very practical, and debt management can also be handled separately, although it is essential that there is a rationalization of the risks somewhere along the line, not to act as a constraint on the behavior of the individual players, but rather to ensure ultimately, that there is the right risk return characterization for what matters to the government.

I would submit to you, that one of the advantages to this approach is that it does not matter what the sovereign wealth fund is defined to do. It falls into its characteristics when put together with all the other assets - a point I will return to - when talking about it in a different context. Certainly one of the roles that the fund can serve, besides simply saving intergenerationally, which in a certain world it will, e.g., by putting money in bonds, where it does not matter what you invest in and is typically used for diversification outside the



country. In China, for example, China Investment Corporation (CIC) was specifically set up for that purpose, and the reason for doing so can be seen on the risk list – as the tax revenues listed are risky. And what is the risk related to? One thing that is however certain, is what the country's productive activities are. So clearly if you know from diversification that if you have a very heavy domestic investment, and let us understand that computer chips in Taiwan form a large part of your industry, then you do not want to be investing in computer chips in your sovereign wealth fund, since you already have exposure to this, whereas if you are, for example's sake, Chile and have thriving copper and forestry industries, but no computer chips, you will want to. That is just a simple illustration that you cannot come up with an optimal strategy for asset allocation within a sovereign wealth fund without the context of other government assets and liabilities. In China's case it is trying to address the asset bubble, which has been addressed at least in part in the last six months with the halving of the stock market, but these things still come and go, and there are ways to deal with them. Now, as a case in point of policy, not wishing to be critical, as an outsider I would have to say that I am very confused by the policy pursued by CIC. I understand its mandate is to invest outside the country and what it is doing is supposed to be representative of the proof-of-concept to the ruling powers. Why then, when starting out, did CIC begin by investing in individual deals. I quote the example of its investment in Blackstone Group, which, whilst it happens to have gone down by 30%. Had it gone up by 30% it was still not the correct thing to do. My recommendation, for all sovereign wealth funds, but particularly for the ones that are getting started, would be, if their mandate is to invest outside the country, their core position, right to begin with, should be to hold a whole world market portfolio ex their own country's securities, which consists of a highly diversified passive set of assets. I say this not because I do not believe in active management, but because one starts with the core.

Returning to figure 1, every optimal actively managed portfolio strategy always involves significant allocations to passive assets. It is never based purely on alpha assets. So you are going to need to have passive assets. Second, it is possible to put trillions of dollars to work very quickly with almost no market impact, let alone needing to enter into individual deals. You are then not under the pressure that China has found itself under, of having to go out and try to find outside partners in a rush and to then put this money to work without a coherent strategy – the results of which, I am sure you can imagine will be to overpay – not that I mean this disrespectfully to those people involved in the industry – I, too, am a part of it. However, when someone with a huge amount of resources is in a hurry to invest a lot

of money, and they admit that they do not know what they are doing outside the country, then they are unlikely to end up in deals that really are the best deal for them. There are other benefits for investing in a whole world market portfolio. Such an investment is scalable and, reversible, to a far greater extent than pursuing any of the active strategies, and from a political point of view it is a non-entity in terms of attracting political attention. I realize that I have barely touched upon the negative political aspects that have been going on in relation to sovereign wealth funds and their exercising too much power. Such aspects disappear with a broad index strategy. Once they have also established that they can take resources out at their pleasure to do the active parts. For this reason, I am, therefore, very confounded why this advice has neither been given and nor been followed, but there remains plenty to be done of order-one importance to help to ensure that development and to move forward.

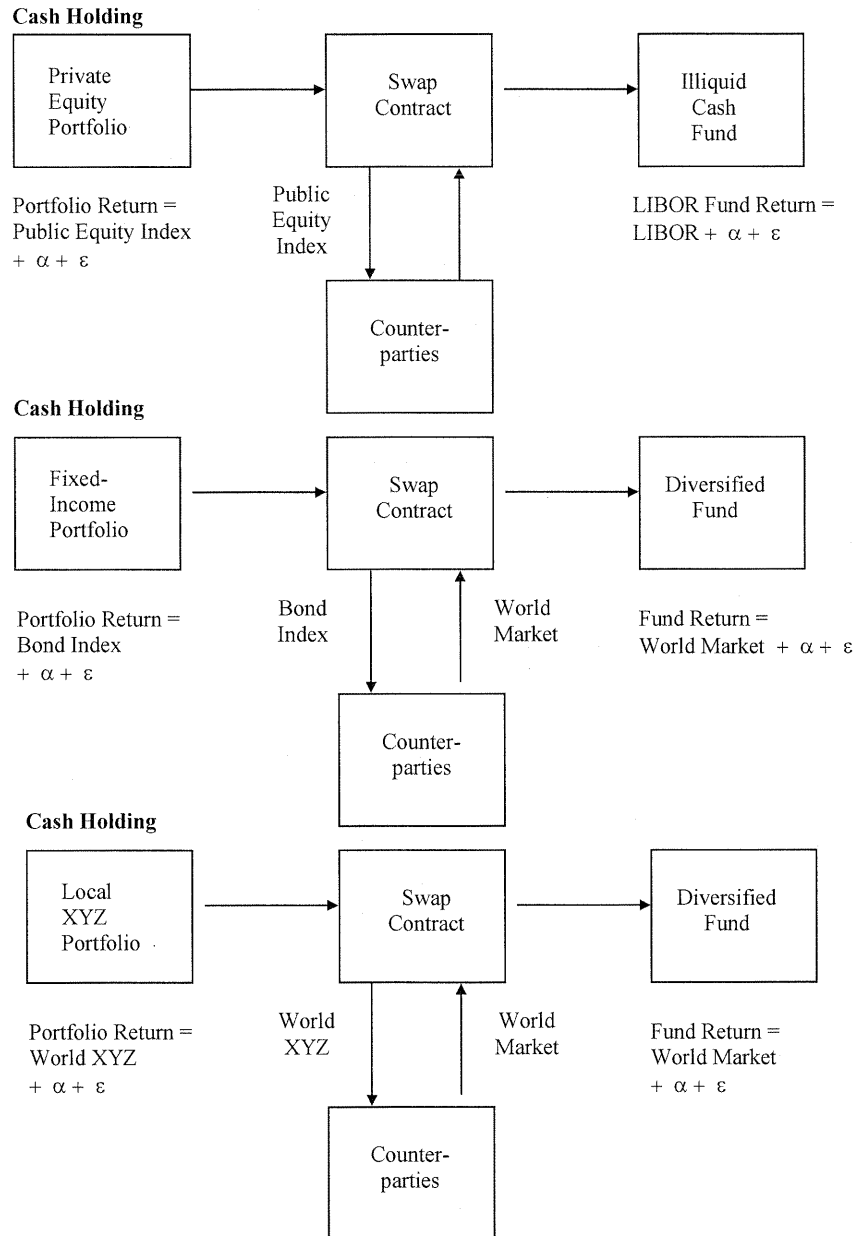
#### **4. The Difference between Risk Transfer and Capital Flow**

Continuing on from my previous example, I would once again like to use Taiwan as an example. Suppose that you represent Taiwan and suppose that, to make it simple, its sole industry were computer chips, which is a comparative advantage for Taiwan. One of the consequences of this being the case, is that if you have normal investments in Taiwan and you do nothing about it, you are exposed to a very, very concentrated risk, namely an exposure to the world chip market, which Taiwan does not control, and which anyone is able to invest in, and yet as a result of this it has a very undiversified risk exposure as a country. Now it is clear, that while computer chips form a comparative advantage for Taiwan, bearing the world's chip risk does not form part of the positive value creation from Taiwan's exposure, because it is possible for anyone to do that. It is what we call a zero net present value type risk, with a fair return which anybody can get. It is certainly not necessary or desirable for Taiwan to take the whole world chip risk.

The question, therefore, arises as to what Taiwan can do to diversify, while still maintaining its comparative advantage? In the old days, the country would have had an industrial policy that would start to develop another industry - such as a forestry industry or an oil-based industry or an industry which reflected just what is needed in the world. But what could a country like Taiwan do instead today?

I would suggest that Taiwan does the following thing, as shown in figure 2 above. Taiwan enters into a swap contract in the form of a total-return swap contract. The swap contract has two parties and basically based on a certain notional amount of the size of the actual investment, they swap returns with each other on two different asset classes. This can be done with any two assets and since the returns of any two assets are being swapped, and you are just exchanging returns applied to the same investment base, there is no investment cost involved for the swap in question – even for the transaction, as it is a pure exchange of returns and such contracts have initial zero value. No cash flow or investment are required, it is just an exchange. Every futures contract is effectively also the same, as there is no investment in a futures contract either.

**Figure 2: Separating Risk Exposures from Cash Investments, Governance and Liquidity: Pursuing Comparative Advantage vs Efficient Diversification**



In this instance, suppose that Taiwan put a notional USD 10 billion into a contract which states that it will pay the return on the world chip market,

which will be measured by putting a portfolio together of stocks in Intel, AMD and all the other companies in the chip industry, something which is done all the time, and that portfolio is monitored and its total return-including dividends and capital gains or losses – is examined. Whatever that total return is, is multiplied by USD 10 billion each year. This would be what Taiwan must pay to the other party. What does Taiwan get in return for that? Suppose Taiwan gets back the return on a world portfolio, i.e. one based on all industries, which in theory is the best diversified portfolio, at least until we are able to go to Venus, or Mars. So, Taiwan in this instance would get back the return on the world portfolio, multiplied by USD 10 billion. In other words, we see a swap on return, the world chip returns in exchange for world diversified portfolio returns.

The economics of this swap contract for Taiwan would be as follows. Previously, Taiwan's returns from the chip returns were made up of two parts. Part of Taiwan's chip returns, which includes the world market, meaning that when chips are doing well for the world, then it is also good for Taiwan's chip industry. In contrast, when chips are not doing well in the world, it is also bad for Taiwan. In addition, because Taiwan has its own industry, it has an additional return, which is Taiwan-specific, which is its alpha. We hope that this additional expected return is positive so that Taiwan has a comparative advantage, as well as there being another error term, which relates to events like there being a strike in Taiwan, which affects Taiwanese chip manufacturing, but not chip manufacturing in the rest of the world. So Taiwan is getting world chip returns plus alpha for comparative advantage, plus the residual for the local risk. World chip represents a big part of the total risk. This swap has kept the alpha, and the local risk with Taiwan, but has removed world chip risk by instead putting the risk in world diversified risk.

With a single contract, we have transformed the core risk of Taiwan, or in this case, at least USD 10 billion of risk, with this risk changing from being concentrated in one industry to diversifying it into the best diversified performance in the world, while retaining the comparative advantage and the local issues that the country controls, 100% for Taiwanese. This has been achieved with a single contract, which it is possible to execute in large size at a low cost and which can be also reversed if you don't like it. The swap contract is very non-invasive and offers a whole range of other features too, although the feature I am particularly trying to highlight in this instance is that of the risk transfer. No money has been taken, there have been no capital flows or trade, just a pure risk exchange. Some people might believe that there is an investment flow going in and an investment flow going out, but if all you want to do is a simple risk transfer,

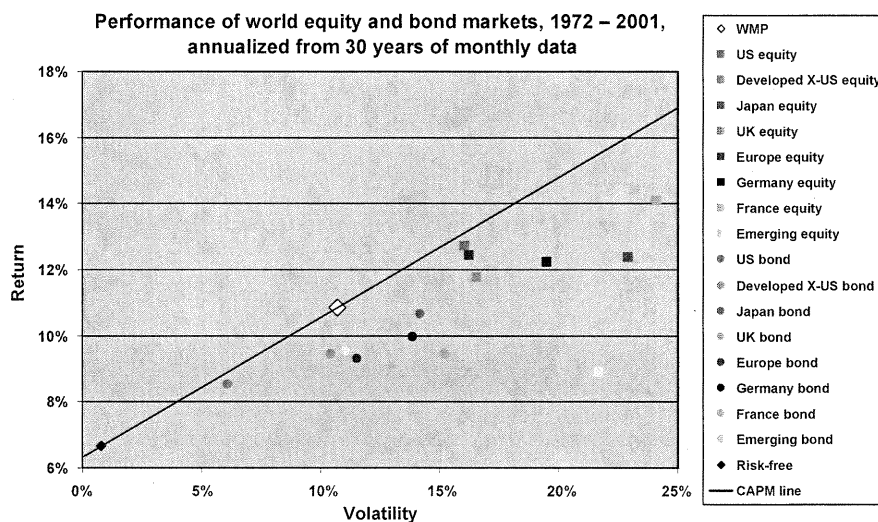
then it would be very inefficient to have Taiwanese sell shares in Taiwanese companies to foreigners, and then have foreigners and the Taiwanese go and buy foreign shares and to have the investment flow come back. Anyone trying to develop smaller countries will know that there is no coordination of those two capital flows at a later stage, whereby one country's activities start to take off, while the other country's do not. At that point you get the kind of disruption which leads to people calling for capital controls. By doing it using the swap contract instead, you have married the two investments as an exchange, so you never have a mismatch of the capital flows involved and that is why there are no capital flows. Simple risk transfer does not, therefore, provide any core investment for Taiwan, but instead just provides risk transfer or risk reallocation. In this way, derivatives are very much more efficient than the cash market in terms of risk reallocation - both from an overseer's point of view, as well as in terms of efficiency of costs and everything else. There is a built-in coordination between the implied flows and the two directions. Of course, if capital needs to flow in a country, this won't directly give you any new capital, so it is necessary to use the right tool.

**Box 1: Relative Advantages of Country Swaps for Diversifying Risk**

- *Minimizes Moral Hazard* of Expropriation or Repudiation
- *Locals perform* industrial governance, trading in shares in local market, receive benefits/losses of local-country-specific component of industry returns, thus avoids political risk of "selling off the crown jewels of the country"
- *Credit Risk*: no principal amounts at risk; set frequency of payments (0.25, 0.5, 1 years); "right-way" contract [pay when the country is better able]; potential for credit guarantee and/or two-way-market-to-market collateral
- *Policy is non-invasive*: doesn't require change in employment patterns and behavior, changes in industrial structure or changes in financial system design
- *Policy is reversible* by simply entering into an off-setting swap
- *Robust* with respect to local financial system design: works well with capital controls, pay-as-you-go pension system, or no local stock market at all
- *How to measure country risk*: Patterned after BIS model for banks
- *Potential Gains*: From 1972–2001, a gain of 600+ b.p. in average return for same risk level by efficient diversification
- *Global political question*: In the future if all countries had economic risks that were nearly perfectly correlated with the World Market Portfolio, then how might that affect global political behavior?

The above box shows the advantages of this method, although it is not the only way of going about matters. Let us, however, consider what this simple contract has achieved. It has moved Taiwan in principal from having a concentrated risk in one industry to a world-diversified risk while retaining its comparative advantage, and its workers still do exactly the same thing,

it is non-disruptive and that's considering all kinds of activity related to it. Furthermore, this size of feature also allows you to separate governance, liquidity and things like zero net value present risk. Some people may wonder why I mention governance. Rightly, or wrongly, many countries are worried about having foreign ownership of their shares and their industries. Some countries even place in some restrictions in what their pension and other funds invest in. This is done, not because they want to force concentrated investment, but because they want to ensure that governance also remains within the country. They also may want the cash that is raised by local industries for the pension fund to go into local industries as investment for the workers – which are both reasonable policies, and this also happens to be the case of Taiwan in this instance. All Taiwan shares can be 100% owned by Taiwanese, and they could also be in pension funds in Taiwan - as the pension funds bought the shares, and thus the local risk is being borne locally. What has also been done is to strip out the part of the risk which Taiwan has no control over and to substitute a much better risk for term pattern. The potential benefits for countries are clear, particularly for smaller countries, which by their nature have to be more concentrated with their pursued comparative advantages, as well as for developing countries. This technical risk-transfer tool could really contribute substantially to economic development.



Source: André F. Perold, Joshua N. Musher (2002), "The World Market Portfolio"

The above graph, by a colleague of mine, covers the last 30 years of the 20<sup>th</sup> century, plotting the average returns in percent on one axis, against the

volatility measured on those returns on the other axis, covering a period of 30 years from 1972–2001 for a number of large equity and bond asset classes, putting weight on their average returns and standard deviation. In addition the CAPM line passes through a point, which is the World Market Portfolio. All these asset classes have been taken and put together, weighted by the size of their market value.

In theory, the World Market Portfolio should be the most efficient investment as a risk return trade-off, and this graph proves this to be the case, even though realizations can sometimes be different to expectations. Moreover, the CAPM line, which goes through the risk-free asset and through the WMP's point, gives you a higher slope, or a higher return to the unit risk than were it to go through any of the individual boxes. And that's solely a consequence exposed due to diversification. If we then turn to look at emerging market equities - not for one emerging market country, but the whole portfolio of emerging markets, which has diversification relative to a single country. It has an average return of about 9%, with 22% standard deviation. Some degree of diversification is already apparently due to having banded and put together all the emerging markets. Now, if we were to suppose that those emerging market countries had been able to follow the strategy we just laid out, whether they proceed using a single industry or whatever their best option is, and were able to enter into contracts for all the risk exposure, not for a total of USD 10 billion but for their entire risk exposure, and to do so fully, even though in practice this is not possible – however the point here is to illustrate the size of the numbers involved. For taking the same risk as they actually took, of 22%, and heading straight up until the CAPM line is hit, it would be at this point that you would be on for the same risk if you invested in the market portfolio and the risk reacted to the same level of risk as if just concentrating on emerging markets. That difference to this point is approximately 600 basis points.

Put simply, and after all this is hypothetical although it does demonstrate the magnitude involved, if you apply the rule of 72 to calculate how many years it takes to double your money at a specific interest rate of 6% it would take 12 years (i.e.  $72/6$ ) to double your money. Therefore, in 30 years, which is two and a half times 12 years, had they followed this risk rule completely, they would have had 5 or 6 times more accumulated wealth in their country at the end of 30 years – which is a big, big number. However, in reality it would not be possible for this doubling to be done perfectly, and after all, it is also not certain that the future will be the same as the past has proven to be. All I am trying to convey to you is that while fancy stuff using derivatives may sound very technical and kind of nice it can not be applied as a big important policy.



In this case we can see how large the magnitude of efficient risk transfer can be, particularly for developing and small countries. So the effects on welfare in terms of economic growth and wealth creation are substantial, even if they are not as big as in this hypothetical situation. Furthermore, this is not achieved by unearthing the next Warren Buffett and getting that person to run the country's assets, but is a result of pure diversification and is the result of improving the efficiency of risk transfer.

## 5. Conclusion

To sum up, I would like to say that I think that there are wonderful opportunities coming out of all of this – some of which I have tried to allude to, with the last one being in the benefits potentially of risk transfer at a very large level. But there are also big challenges. These kinds of things are easy to describe and could even be implemented tomorrow, since they are not like having GDP bonds or some other assets that no one knows how to trade. We can do this, in this size, tomorrow morning - in fact we could even start today, since everything I have described to you is doable with market proven technologies today. This is not a purely experimental thing, but something that could be done instead, even though it is more complex than my illustrations. And the challenge, particularly for overseers and for management, is knowing what the investments are in. Taiwan, for example, would be doing business in this way with all these different countries. And in fact it has transferred a huge amount of risk the other way, and is actually not exposed largely to the world chip market but is instead exposed to something very different. And that's what's engaged here in this process and that's the challenge. There are challenges for all the three groups that SUERF represents, with a need for a better understanding of modeling and factors that change institutions. We need to understand how to design better institutions, to understand how risk characteristics are changed, and how flows work. For the academic economists, particularly the monetary and macro people, there is a need to return to the risk balance sheet in order to understand these markets, and to understand that when you create these markets you change the transfer mechanism, you change the control mechanism, you change the risk patterns, and you can't get away from it. They are first-order. You can't use those models and have any degree of comfort with them without a thorough

understanding of their limitations and capabilities. For the practitioners, the excitement and challenges are clearly going to be: how is it going to be possible to produce all these products and how can we keep control over these standard risks which are changing across geopolitical borders? We are also going to need ex ante and ex post a better understanding of risk characteristics. Finally for the overseers, life is going to be much more complex, as there will no longer be a single challenge that can be watched. The overseers will no longer be able to say: “We know where all the risks are, there are right here and we control them, and the risks can not go anywhere else!” This will not be the case, and certainly isn’t currently the case, nor will it be in the future, which will make overseers jobs more complex. Central Banks will have to approach all these markets and risks in a far more sophisticated manner – and they already approach them in a more sophisticated manner than they did, say, a decade ago. It will be necessary to know more about that the markets, be more engaged towards them and aware of what is going on in them.

Finally, with regard to the role of innovation, we have to recognize the risk-benefit trade-off in innovation: it is structural that successful innovations will run ahead of the infrastructure, I use the term infrastructure to cover regulation and oversight. And the reason for that is very simply that most innovations are not successful. It makes no sense, nor is it practical, if you have 100 ideas for innovations for you first to build 100 infrastructures to support all of them and then see what’s going to work – if you were to try that, you never get anything done. What happens is inevitably that most of them fail with some amount of support put in, but the successful ones, whether it is sub prime mortgages, which I think has some positive aspects to it although it may have been poorly done in its current form. We will have to wait to see that - at least in the US. But these innovations are going to run ahead. If you focus solely on the innovations in ensuring that you do not have a crisis, and avoid having one, then there will be no innovation. It is a little bit like a high-speed train. If a high speed train can go 250 km/h, but the track (i.e. the infrastructure) is only capable of handling 100 km/h, if you say, “Fine, we will never let you go over 100”, you won’t have a problem with the track but you won’t have the benefit of the 250 km/h innovation. At the other extreme if you just let it go at the 250 km/h with an infrastructure that can only handle speeds of 100 km/h, then I need not have to tell you what is going to be the outcome. So the essential trade off is between managing the mismatch structurally of innovation to infrastructure security, and trying to do it in an efficient way. I wish that there was a golden rule for this, but there isn’t one, in my judgment, except for judgment and understanding of what it is that you’re analyzing.