Nobel Laureate for Economics Prof. Robert F. Engles' keynote speech and dialogue "The prospects for global financial stability" on Monday, February 13, 2017, at Naresuan University in Bangkok (Thailand)

I would like to talk today about what I call the prospects for global financial stability, and what you can see in the slide is a lake, it's perfectly calm, there are soft clouds overhead, and there is no volatility along this lake. But what we need to understand is that it's not always going to be like that, and what are the forces that make it change, and what are the predictions that will make this quiet lake get rough and produce volatility?

This is a map of the world and also the welcome page of our website which is called vlab (https://vlab.stern.nyu.edu/en/), and that stands for volatility laboratory. When countries in the map are shown in green then it means that the financial markets in this country have volatility which is low relative to the past, and when it's red its high relative to the past. What you can see now, is that almost everywhere in the world we are in a very low volatility period. That may be surprising to you, because it seems like the world is a very dangerous place and there are dangerous forces pushing us in different directions from what we've experienced before. But so far the financial markets are not exactly responding to this. We are going to talk about this today, and about what are the actual risks that we see going forward in the financial arena, and we will come back to this map a little bit later.

So what's the goal of financial stability? Is it that volatility should be zero and what would that actually mean?
It would mean that stock market prices are known without uncertainty in the future. Other asset prices would be known without any uncertainty in the future. This is not something that we can have in financial markets, because in fact, financial markets will not work if there is no risk. If everyone knows what a stock is going to be worth in the future then everybody is going to own the same one, and that isn't going to work. If we know what the future is going to hold then firms will have no incentive to improve their productivity, or reduce their costs. They will have no incentive to innovate, to produce new products, to expand their market and capital will not be allocated to the best companies. Finance depends on risk, and so we need to understand what we mean by financial stability. Do we mean no risk? Well, that is not what we mean. Let's try to get a better picture of what it is we actually mean by financial instability.

I am going to do this with a picture. This is a picture of a chimpanzee who is in the top of a very tall tree, and he is trying to catch insects which he would like to eat and he is taking a lot of risk. He could fall out of this tree and hurt himself, in fact the further he leans out the better chance he has to get insects, but the more risk he is taking. We think of this as the risk-return tradeoff, how much more risk do you have to take to get more food, and he probably learns pretty fast how much risk he can take and how much food he is going to receive for this. This is our model for financial markets. There is risk and there is return, without taking some risks you can't expect return.

But we recently learned how important something called systemic risk is, and what is the difference of the kind of risk I was just showing with this image of the chimpanzee and systemic risk? Let me show you a picture of systemic risk.

This looks like the same picture, but I am going to give you one more piece of information. Suppose I tell you that this is the last male chimpanzee, he is the only boy left. If he dies it is the end of the race. We feel differently about his risk, he is taking risk for himself in this tree, but also for all of us, and this is what we call systemic risk. When the town mothers get together to discuss what he is going there up in the tree, they are worried about whether they should do something to reduce his risk.

What can they do?
Well, one thing they might do is to put a rope around him and tie him to the trunk of the tree, but then he might not be able to feed himself and reach the insects. Another thing they might do would be to stand under the tree with four government workers and hold a tarp. Now the tarp is actually a nickname for the policy that the US instituted when they bailed out the banks in 2008, so this is actually a little bit of a joke too, that you could stand under the tree with a tarp. However, you need to realize that the tarp would encourage him to lean out even further and take more risk. It doesn't really reduce risk to have someone stand under the tree.

So we have to think about how we give him the incentive to take less risk. How do we regulate risk taking firms, and this is one of the things we have taken a great deal of time on since the 2008 financial crisis is: How do we regulate financial markets if the risks they are taking endanger the economy itself?

We defined now that systemic risk is when the failure of an institution - we could think of it as the chimpanzee - to meet its obligations has serious consequences for the real economy. It turns out that the failure of one institution is somewhat dangerous, and it's going to be much more dangerous if other institutions are also weak at the same time. I guess we are talking about all the remaining boys being in the tree at the same time, and you what happens when you get a lot of boys together.

The regulatory challenge that faces us is how to ensure that financial institutions have sufficient capital, so that they can not only withstand a financial crisis, but they can continue to provide essential services to the real economy. That is the goal. Good regulation is prevention it's not rescuing companies after they fall out of the tree, but preventing them from falling. But of course we have to be careful that we are not just preventing the last or current crisis, we need to be sure to prevent the next crisis.

People and banks are kind of the same, we need capital cushion, we need reserves. I mean that if you lose your job or have sudden expenses that are unexpected, will you have enough money, enough savings to get by? That's the question we ask ourselves all the time and if the answer is no, then we better increase our savings. Banks and financial institutions have the same problem. They borrow money, sometimes it's from us, through our deposits, sometimes it's from the capital markets, and they invest it typically in loans, but if these loans go bad then they won't have enough capital to pay back the money they borrowed. So the event that the loans go bad is the event we are worried about, and the question is, will the banks have a capital cushion, sufficient to protect them in this case?

We are going to measure this by considering a stress event to see if there is enough capital in this bank. I am going to measure something that I call SRISK, and s in this stands for systemic, so I'd like to measure systemic risk. This is the answer to this question which we should think about: How much capital would a financial institution need to raise, in order to function normally if we have another financial crisis?
If I am a regulator I hope the answer to this question is zero that you've already got enough capital and you don't need to raise any new capital in a financial crisis. If this is a big number, then in a financial crisis a firm would have to raise new capital and that is the worst time to have to do that. It's exactly when financial institutions come to the government and ask for financial help. The government might say yes or no, but the idea of good regulation is that that's not even a choice, but the choice is to be prepared ahead of time and not to ask for it when you need it.

Here is my only equation in this presentation. SRISK is actually a rounded variable, because we want to know how much capital would a firm need if something happens that we don't have data for, that is if there is a crisis, it's a counterfactual, and what we think is that we would like to count the median of all the outcomes if there is a crisis. What we mean by the capital shortfall is we think that the assets of a firm which are made up of debt plus equity, there should be some fraction of those assets, colored little k, that is the capital that you should have. The capital that you do have is what we call equity, and the capital you want to have is k x dept + equity, and so the difference is the capital shortfall. But we don't really want to know what your capital shortfall is today, we want to know what it would be if we have a crisis, and so we have to forecast what the equity is going to be if we have a crisis, because we have a pretty good idea that the liability, that is the debt, won't change very much in a crisis. So the econometric question we have to ask is: If we have a crisis, what does it do to the amount of equity that financial institution holds? This is a common question in finance.

We often run a regression were we look at the return on a stock market of a company, and we regress that on the return of the global market. We get a coefficient which is a fraction that we call the beta which tells us if the global stock market goes up how much do we think our stock is going up, and if the global market goes down how much do we think our stock is going down. We are going to do this for financial institutions all over the world, and we are going to use a global equity market as a measure. In fact what we are going to do is to assume that the global equity market collapses by 40% over the next six months and ask what tis is going to do to our firm? What is going to happen is that the assets of this firm and the loans the firm has made are going to go down in value. Do they have enough capital so that they can withstand this and still have enough capital ratio of little k?, that's the question we are going to ask, and if the answer is no, how much would they need?

We think that's a measure of a systemic risk of this one firm, and we're going to measure that firm, we are going to look at all the firms in a country and at all the countries in the world. To see how big a number is this, so this is how much capital would you need to recapitalize all companies, all the financial firms in the world if we have a crisis of this magnitude. One of the special features of this is that we think, that this beta might estimate how much our stock is going to go or up or down, and is not constant over time, it's time variant.

If we are estimating this beta in an ordinary regression then those of you who are studying economics probably have already seen a lot of regressions, and those of you how are in PhD programs will probably have run regressions, one of the hidden assumptions in our regression models is that the coefficients are constant over time, but here there is no reason to think that the coefficients are constant and so we are going to use a new statistical technique to estimate this which is called Dynamic Conditional Beta. It is basically developed through the same tools that I used in my Nobel Prize, that is tools which allowed volatilities to change over time, and also correlations to change over time, and in that way also regression coefficients can change over time. So we are going to use at each point in time our best estimate of what this regression coefficient would be. We do this once a week and post it on vlab (https://vlab.stern.nyu.edu/en/), we adjust for different time zones, and we have this measure of SRISK that we've just talked about.

So this was the basic idea of DCB, Dynamic Conditional Beta, and this picture demonstrates it as well: we are going downstream and we have to change directions when the stream does, and we are exploring new territories.

What do we see when we look at these betas?
This is the beta of Bank of America, one of the big banks in the US that went through a lot of trouble during the financial crisis. On the right hand side of this axis you can see numbers and if the number is 1 then it says that the beta is 1, and what that means is that if the global market goes down by 1% then Bank of America stock is going down by 1%. If it goes down by 40% then the stock of Bank of America will go down as well, it's not exactly linear but approximately by 40%. If you look at the Bank of America stock you see that on average it's been 1 or a little bigger than 1, but in particular in 2008 and 2009 it was much bigger than that, as high as 3. So you can see that when the global stock market went down a lot in 2008 and 2009 Bank of America stocks went down a whole lot more too, and the reason for this is that Bank of America was heavily invested in subprime mortgages and the mortgages market, which is the part of the US financial sector that collapsed the most, and so Bank of America was very sensitive to any information about how the US and global stock market are doing. You can see that there was also a little rise in 2011 and 2012 when the European markets got into trouble with their southern debt crisis. Other than that the beta of Bank of America has been pretty stable.

If you look at Goldman Sachs you see a rather different picture. Goldman Sachs is an investment bank and their beta didn't go up that much during the financial crisis, because they were not invested in subprime mortgages and the mortgage market in particular. They didn't respond much to the European debt crisis either, and so it's all pretty constant.

Mitsubishi, the largest bank in Japan, had a brief high beta during the financial crisis, but then it came back down again. But interestingly is has gone up fairly substantially recently to an average that is a little bit bigger than 1 and 1.5. I think this is one of the consequences of Abe-economic, that it seems like the volatility in the Japanese market has gone up.

PNB Paribas, a big French bank, showed very little change in data during the US financial crisis, but at the European financial crisis they were heavily invested in southern debt for peripheral regions of the Euro-zone, the Greek, Italian, Irish and Portuguese debt, and therefore the bank had a big rise in their beta at that time period. You can also see a rise more recently at the end of the scale, a rise for to a bit more than 2.5 in 2016 and that is BREXIT. So the vote for the UK to leave the Euro-zone actually increased the risk of PNB Paribas.

The same happened to Deutsche Bank during the European crisis and with BREXIT, but Deutsche Bank came earlier which was a result of the US justice department, ruling that they had behaved badly during the financial crisis and were going to be subject of very large fines. The fines were eventually reduced substantially and negotiations were completed before the change of administrations in the US, and I think that is why the beta came back down again.

Barclay's, the British bank, went up during the financial crisis in US and in Europe and really went up after BREXIT. We see a very strong increase in risk in Barclay's at that point in 2016.

What about the Chinese banks?
The beta for the Chinese Construction Bank doesn't look like it moves much at all, but it is stable at around 1 which is not particularly serious, and it hasn't changed much over

time. If you look at the Agricultural Bank of China you can see that its beta is substantially less than one, so these banks actually don't seem to have as much risk to them as the other banks we've been looking at.

So it's time now to take all this information and put it together to see what it tells us about the world's financial system. We've got the betas and we are going to put those together with the data on assets of liabilities of these firms and come up with their measured SRISK. Here you can see the SRISK as a whole, the sum of all the countries, and what you see is that in the US subprime crisis the total cost of recapitalizing almost all the countries, all the financial companies in the world, was just a little under 4 trillion dollars. It was even a little bit higher during the European Southern Debt crisis, and then it was improving until sometime in the summer of 2015 when things turned around again. There is this last peak which we don't exactly know what to associate it with. A lot of people think it could be connected to the slowdown in China and collapse of the Chinese stock market in the start of the summer of 2015 and continued for maybe another six months.

At the end the number is three trillion dollar. It's a pretty big number, but it's about what the Chinese foreign exchange reserves are. So in one sense this is a number which means that China, if it really wanted to, could recapitalize all the banks in the world if we have another financial crisis.

So where is this risk today? These three trillion dollars can be divided by countries and then it turns out that the country with the largest SRISK is China, followed by Japan, France, the UK, US, Germany, Italy, Canada, Spain, Korea, India, Switzerland, Taiwan, Australia, Sweden, Netherlands, Belgium, Brazil, Israel and Greece. Of course, if we think about this as capital that a country should think about having available to recapitalize its own banks then maybe we should ask how big is this number is relative to the GDP? The capacity we have to recapitalize the banks. On the same chart relative to the GDP we see now France on the top and this is a worry, because the French banks are way than quite undercapitalized, and we estimate that it would take 14% of GDP to recapitalize those banks, and that is very expensive. France doesn't want to do that, they don't think there is a problem, but from the numbers it looks like there is a problem. Second is Japan, then the UK, Switzerland, Spain, Canada, Greece, Italy, Korea, Israel, China – see China drops way down the list and US actually drops of the list.

Let's look at a couple of regions just to see what is going on in different places of the world. In the US we see basically a pretty optimistic story. The total SRISK during the financial crisis was 8 or 9 hundred billion dollars, tarp was 700 billion and the Federal Reserve put in some more, so we are talking about sort of the right order of magnitude. Increase began during the European southern debt crisis but not by too much, and then it has been decreasing except for a peak in 2016 which we think of as being related with China, and then substantial decline after that. When you look at the final number, and this is as of the end of January 2017, the final number is really about where it started, so in away the US has pretty much managed to get itself back to a banking system that is as well capitalized as it was before the financial crisis. It isn't back to zero, but it's certainly a big improvement. Some of the last little part is due to Trump, the stock market went up when Trump said that he will deregulate the banks.

When you get this 200 billion of risk that we have now in the US, you can divide this up across the banks. Citigroup is the top, Bank of America is second, followed by two insurance companies, then Morgan Stanley, JP Morgan, Goldman Sachs, and so on. One of the things that happened is that we have a lot of insurance companies that are contributing substantially to this SRISK, and that is a legal and political issue in the US, is to whether the banking reforms that we've put in place, the Dodd–Frank Act, should be applied also to insurance companies.

In Europe the story is not quite as good, maybe not surprisingly, because we know that France looks pretty risky, but you can see we are not nearly as low on SRISK as we were in the US. We are talking about an amount over a trillion dollar to recapitalize the European banks. The regulatory progress is more scattered and less effective in Europe and I think that shows up in this numbers.

If you look at emerging markets without China then you see a picture that is more pessimistic. You can see that the SRISK here is increasing since 2010, maybe it's flat-lining now, but it shows substantial increases, and I think this is an issue we need to think about. Many people would say this has to do with a collapse of commodity prices which have impacted particularly emerging markets, especially the Latin American markets, but there's a lot more to say about that.

Let’s take a look at China, which looks even worse, as the SRISK is increasing quite rapidly. It is what the Chinese call the “debt problem”, because so much of their expansion has been debt oriented and it has lead the banks to hold lots of bad debts, and therefore their assets are undervalued. If you look at the Chinese financials you can see China Construction Bank on the top, then Bank of China, Agricultural Bank and Industrial & Commerce Bank, followed by Bank of Communicat, China CITIC Bank and so forth, and these are almost all state-owned banks which raises the question if this model actually applies to China?

Let’s think about this for a moment. The fact that banks are state-owned means that they are too big to fail in an even more permanent way than in more capitalist styled markets. Chinese banks are not going to fail, if they need more capital then the government will inject capital to them, so there is no reason to expect them to fail, they are not risking in that same sort of way. But the net effect of them being too big to fail is that they make bad choices about taking risk, they take risks that other people or institutions wouldn’t take. Furthermore the government guarantees of being state-owned and with most of the debt being from state-owned enterprises distort risk taking. Regulatory incentives encourage lending that would not be prudent in a more capitalist society. Shadow banking is a very big part of the banking sector in China and it is maybe guaranteed by the government or it may not be, nobody really knows until something happens, and so people don’t know whether their money that’s in the wealth-management products and so forth, is in fact guaranteed or not.

The sovereign has plenty of capacity to recapitalize banks and does so when needed. In my view what the high SRISK in China needs is not that there is an imminent collapse about to happen, there is not going to be a run on capital the way we saw after Lehman Brothers and so forth, but I think we are much more likely to see a slow stagnation, more like the Japanese style stagnation and that is a very bad outcome for China. It’s not as bad as having a crisis, but it’s still a bad outcome for China and a bad outcome for the world that actually trades with China.

If we look at ASEAN we see a story which suggests that everything was fine until around 2014 when the SRISK began to increase. I think this comes from the slowdown in China, which affected especially Singapore and Malaysia, while Thailand and Indonesia seem relatively unaffected.

When we go back to the map of the world that we were looking at at the beginning of my talk we can see the data from June 2018 where most of the countries are displayed in green. A couple of weeks later after BREXIT, at June 28, the map displays a dramatic change where high volatility is in place in most countries. United States turned red, Canada is soft red, there are maybe twenty countries in Europe that are all red, also Australia, New Zealand, Japan, but not so much in Southeast Asia except for Myanmar. That was June 28 and if we go forward to July 10 you can see that some of the volatility around the world has reduced. You should probably not be surprised that Russia, India and China were green and stayed green, so this volatility that we are talking about is not felt in those countries. Then when we get to the end of the summer it is all green again, so the volatility that followed BREXIT seemed to last for a couple of months, and then slowed down at a new level of prices that reflected the costs and benefits of the BREXIT move I think.

The next image shows the map on November 8, the day of the US election, so it is the day the volatility looked like when we went to the polls to choose in between Clinton and Trump. What you see is that most of the world is green, with the US and Canada being pale green. A couple of days later, November 14, what you see is that the US is still green, but Mexico has turned red, and so did most of the countries in South America, Australia, New Zealand, Japan, Indonesia, the Philippines, Thailand, all of them are red. If you think about the TPP trading partners, they are all red. So the fact that Trump won the elections and promised to cancel TTP was viewed as a big negative by all these countries who were supposed to be trading partners. It didn't really have that much impact on Europe and as I said, surprisingly it didn't have much impact on the US itself. Today we are all back to green, as I showed you in the beginning.

So what is the future of globalization?
The US under President Trump will move to reduce immigration, they already said that they will be trying to do that, the US will negotiate and renegotiate trade policies and the US will threaten tariffs on imports. But within the US it is not so clear that this can and will happen, because there is increasing opposition to these policies including by Republicans in Congress, the business community and now by the judiciary. It seems to me quite possible that the internal opposition to Trump will actually reduce the impact of some of these policies, and this is what I think we should be watching. There is also of course, opposition arising in the Western World, almost all the allies of the US have been offended so far, and will be objecting to some of the policies that the Trump administration is trying to impose.

China in particular has taken on the role of being the advocate for globalization, and I think this may be effective, but I really don't know whether the ASEAN countries are ready to sign a TTP agreement with China. My impression is that there is a lot of hesitance to do this, but it might be that that's what's going to happen. I think that the kinds of restrictions on free trade that the WTO is trying to impose may not be as easy to enforce, because the WTO is going to lose some of its influence and power if the US doesn't support it.

Why is the US stock market blown up so much?
First of all, Trump plans to reduce bank regulations, and I've already said, this makes bank stocks look better, and when bank stocks go up it means that our SRISK figure goes down. That means the banks have more capital cushion than they did before Trump won the election, and that they would be more able to withstand a financial crisis in the near future, but eventually they would be riskier and there would be more chance for a financial crisis. So I think what we're seeing, is a temporary reduction in the financial risk in the US in return for bigger risk in the future.

Secondly, Trump plans to reduce corporate taxes and give incentives to repatriate dollars earned abroad. This is also is a business friendly proposal were lower taxes will make businesses and the stock market happy. He has plans for infrastructure investments, but we haven't seen anything except for two, one is the wall and the other is a pipeline, neither of these is what I think of as infrastructure. Also his policies for immigration and tariffs are unpopular with business, and I think the business community is really one source for opposition to his policies. So I am not completely sure why the stock market has gone up, but I don't think it is necessarily a permanent increase and I think we will see a collapse coming at some point.

We have been worried about the global economy for several years now. After the financial crisis we lowered interest rates to zero, almost all around the world, and it still didn't spur very much investment and growth has been hard to find. The question is: Why is this and what will happen if growth doesn't reappear?

It seems that growth in a way solves a lot of problems, issues like income inequality for example become less important if the economy is growing and a lot of people participating, so it's a common way of solving problems, and it would certainly solve a

lot of the banking problems. A lot of countries, and I include China in this, consider growth to be the most attractive solution to the economic problems that face them.

In my opinion monetary policy has done as much as it can do, we lowered interest rates, we did quantitative easing and the Europeans are still doing it. It's when interest rates are low and nobody borrows, it's because you don't see any good investment opportunities in the future, and that is the problem.

My feeling is that we need responsible fiscal policy. What I mean by that is that spending that increases growth can decrease the deficit, it doesn't necessarily lead to an increase in deficit if it's effective in increasing growth then it will reduce the deficit. Spending that increases the marginal product of capital can generate private investment and again, lower the deficit. Policies that focus on infrastructure, education and structural reforms can do this, trade restrictions can not. I think that China has done a pretty good job of fiscal expenditures, in fact they may have overdone it and that's the reason we have this debt-bomb in China. It has to solve its debt crisis while there while the rest of us have been maybe more cautious as we should have been about our spending, I think.

I suggest that we remember Keynes, who during the great depression in the 1930 exactly described our situation, interest were zero but people didn't borrow, and he gave it a name: the liquidity trap. You can pull on a string but you can't push on a string, you can't force people to borrow even by lowering interest rates to zero, and that's kind of the situation. In addition even the government doesn't borrow with zero interest rates and that's silly, because this was a big opportunity.

So what we did was, we had the WPA, CCC and various other depression stimulation programs which really was fairly inventive fiscal policy, but in the US we stopped going this in 1936, because it seemed like we were running such big deficits and didn't need to do it, we raised taxes and stopped the expenditures and lo and behold, we went back into recession again. The only thing that pulled the US out of the great depression was World War Two.

That is a lesson that I think is important for us to remember. War is not what we want as the main solution to the growth problem, because if it is then we are in very big trouble. I think it is important for us all to raise our voices and point out that we need another solution to getting growth to occur besides having a war. I think we can all see seeds of militarisms on all sides which is very worrying, because if we can't get the growth through natural economic ways or stimulations through fiscal policy, then someone is going to start war. Especially if we have some sort protectionism on different sides it makes it even easier and even more natural to think of starting a war.

I think that the priorities are very high toward finding another solution. I think fiscal policy is a good example of a way that we can grow the economy, I particular like investment in infrastructure and education. I think education is a key part of growing our economy, making the work force have a higher skill level so that its more attractive to businesses to invest, in Thailand, Indonesia or the US or any other country alike. I think this is a message that is really important for us to understand.

We need very good economic policies going forward, because the obstacles to growth are actually quite substantial.
Thank you.

Question:

I have a question regarding the dynamic beta. I noticed that these financial institutions appear to have very different level of beta, some are at one whereas others are at almost three. Is it possible to say if a financial institution is having a beta that is too high?

Because we see that some institutions has an upward trend in terms of the dynamic beta, and I have in mind that in terms of policy applications the government or a central bank could say to a certain financial institution that their dynamic beta is too high and should do something about it.

Prof. Robert F. Engle:

That's a good question, and I think the answer is that the SRISK depends on the dynamic beta, but it also depends on the size of the bank and the leverage. So really what the regulator should say is, we want your SRISK to be small, not necessarily the dynamic beta to be small, but if you have big dynamic beta you should have leverage, or maybe not so big.

For example, the Chinese banks have low betas, but they are extremely big and have high leverage, so that's why we think they have high SRISK. Not because of their beta but because of their leverage and size. So I think those are combined in a sensible and nice way into a single measure and so I would rather not regulate the dynamic beta and rather regulate the SRISK.

Question:

I am very curious about how you, as an expert who monitors risk every week, are you allocating your investments? Are you substantially in US markets or are you substantially in emerging markets or do you prefer bonds or commodities?

Prof. Robert F. Engle:

I am an investor, but I am sort of closer to be a passive investor than an active one, but I do change my mix pretty ardently on response to information, and I would say I am probably more than half in the US and the other half is both, developed and emerging markets. I have relatively little exposure to fixed income, partly because it seems it's like a one sided battle, though in fact it turned out that it would have been a good investment if I had done it. I don't particularly have a commodity exposure.

My view on investing is that I don't' want to have too much of my intellectual being following the market on a day-to-day basis, despite of the fact that vlab might give me a way of doing that. So I do a lot of index investing and then pick individual stocks that I

like for one reason or another, and often stocks that my wife likes for one reason or another, and she has a pretty good taste and done pretty well until recently.

Question:

I remember reading and interview with Robert Stieglitz just a few weeks before the financial crisis hit in the US, and he was saying that based on the actual knowledge that there are no clues on an impending crisis at the US stock market. Do you think we need any improvement regarding forecasting or anticipating financial crisis and do you think we made any improvements in anticipating or upraising of any big crisis?

Prof. Robert F. Engle:

No matter of transparency can tell us what the future will bring. I think one of the important things is that we have good ideas of how much risk we are taking, because if we want to evaluate the risk return risk-return tradeoff the in fact, when risk is high we may not hold the same portfolio when risk is low. One of the things we get from vlab is measures of how risk is changing over time, and we can use those at least in a simple way to tell us whether we take too much risk or not.

My measures of SRISK are designed to help us to try to understand whether there is systemic risk building up. They are not very good in telling us when a market might collapse, and you probably noticed when I said I don't think there is going to be a market collapse in China, even though SRISK is very high, but it's pretty complicated to predict a collapse. One of the ways to produce a collapse is to predict it, and people say I better sell this stock before a collapse and if I have enough credibility I can create a crisis. There is a difficulty with trying to predict things like that, because it's endogenous. It can actually produce exactly the result that you are trying to avoid.

Question:

What do we do about financial instability and the possibilities of war that might come in the future and that might be a result of economic politics that we are seeing today?

Prof. Robert F. Engle:

I think it's important first of all, to pay attention. We have to read the newspaper, watch TV or whichever way you would like to get information. I think it's part is us teaching economics that we need to cover current events so that the young people actually have a way of understanding the economy. I sort of made it simple here for my talk, but it is actually very complicated process and I think if we can present it in a way that students really can understand it would become much more of a lifetime process and it would help them be better voters and better citizens of the world.

It seems like in the US the people who were most in favor of some of the things Donald Trump wanted to do were older or less educated people. I think that is not surprising. We do need to target our education system and challenge it to help people understand how economies are actually work, and I think ultimately as citizens of one country or another we get to vote and be part of politics, we can write letters to the newspapers, school newspapers, if there is something that is important we can peacefully demonstrate to make the general public aware of this. I think there are a lot of things that we can do, we should do. I start with ones were I think we can all agree with, education and voting what you believe in.

Question:

Could you elaborate more in the choice of investment in education, what are the priorities that you would pay attention to? Would you give the first priority to the primary education or would you give it to the secondary or other learning institutions?

Prof. Robert F. Engle:

I think I actually shouldn't really go there, because this is not really my field. I think the goal of education is partly to make better citizens and partly to make workers that have skills that are going to help businesses in the region. Some of that would be professional education, some of that would be in primary school teaching citizenship and I think we should be starting to talk about economics at an early age, because in some ways economics becomes very complicated as soon as you start drawing these supply and demand curves and some such, but we can really talk about economics in terms of your own budgets and things like that staring early on, I think actually teaching people investing in the stock market with sort of mostly with these simple passive strategy investments that I use. That would be a very good thing to do at an early age too so that these are not mysterious.

When we talk about how to teach economics, it is a question of what age group we are thinking of. We could be talking about 10 year old, we could be taking about 20 years old, and this would be different answers. When we talk about 20 year olds we probably want to divide them between those that are sort of more mathematically sophisticated and those who are not, because economics is really easier to understand if people are mathematically inclined, but there is very good common sense ways of explaining economics to people who are not mathematically inclined, only it's a more difficult teaching process, because it isn't as precise.

Now, when we are talking about 10 year olds then you don't have this distinction anymore. When we talk about teaching economics to 10 year olds we are talking about examples like: you have 10 dollars in your pocket and what do you want to buy with it? How much does it cost in the store and are you going to save it for tomorrow or spend it today? I think that would still teach you important things of how economics works, I mean I call it economics but other people call it business. What is the difference, one is more focused on how you run a firm and so on, the other is more focused on economy, but a lot of the tools are the same and so it serves both purposes.

Question:

We have the ASEAN community and the ASEAN community integration which was formally integrated in December 2106. Do you have any suggestions for the ASEAN member states with regards on giving them financial stability?

Prof. Robert F. Engle:

I think the ASEAN member states are very important, not only for Asia but for the whole world, because this is a region of rapid growth, and it will be going through the same transitions that China has been when it's going from low-wage producer to being a high-wage producer. I think Thailand has already been gone through this is, so this is probably more true for countries like Vietnam, Indonesia and Cambodia for example.

The management of the growth of the AEAN country is actually very important. I think one of the things that Is important to do is to monitor it. Most developed countries have some sort of banking supervision and stress tests, which they might do on an annual basis. What I have shown you in my presentation is basically a stress test without actually having to go in and get data from the bank itself, we're using basically accounting and stock market data, so I think of somewhere in between this hands-off procedure that I've got and more careful scrutiny of bank management is something that bank supervisors should do, and it might be that this would be a process that the ASEAN countries could do collectively.

The Euro-zone has agreed to let the EZB do this for the whole Eurozone, at least for the biggest financial institutions, and I think that makes some sense because the banks in Europe do banking all over the world, they're not just in France or Germany, but they're global. I am not sure whether the ASEAN banks do banking services throughout Asian countries or whether they are mostly domestic entities, but that would be a way of thinking about whether supervision should be done locally or as a collective.

There are probably other things to consider but this would be a first step in the direction of financial stabilization.

Question:

I have a question on your recommendation to go forward, when you say that fiscal policies are the answer, investment in education and infrastructure, and I wonder what you would say about structural reforms?

Prof. Robert F. Engle:

I think structural reforms are always valuable and in some respects are cheap, because they don't necessarily cost money, they would just be a change in rules. I am totally in favor of them and if you sit back and think about what could make the countries' economy work more efficiently you could probably think of lots of things and I think there is reason why this shouldn't be done at the same time as anything else on my list. This could be reforms in the labor markets, in poverty and medical provision and maybe social safety nets, there are lots of kinds of structural reforms that would be very profitable.