International Economics

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Module No. # 01

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last few lectures we have been talking about past and present international monetary arrangements these arrangements were undertaken to solve the nth country problem the nth country problem is that the number of countries are larger number larger than the number of independent exchange rates as a result there is interdependence among the economies so if a country has an excessive balance of payment deficit then the other country the the day the the country the other the other country would have a surplus in its balance of payments what we found after 1973 that when countries adopted the flexible exchange rate system it was believed that it'll solve the nth country problem because the exchange rate would be now determined by demand and supply of foreign exchange but, we found to our but, we found that instead of solving the problem we had regular features of the balance of payment crisis which i'll be defining during in a in a short while.

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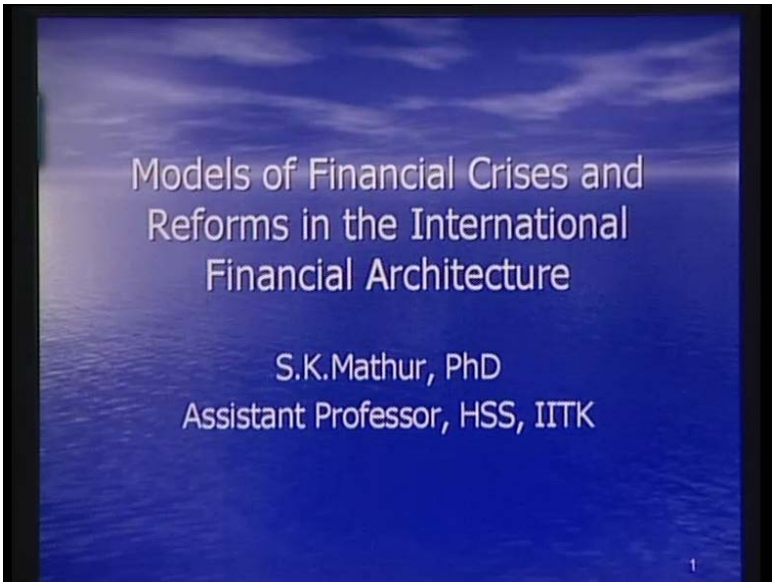

So the topic of today's lecture is models of financial crisis and reforms in the international financial architecture

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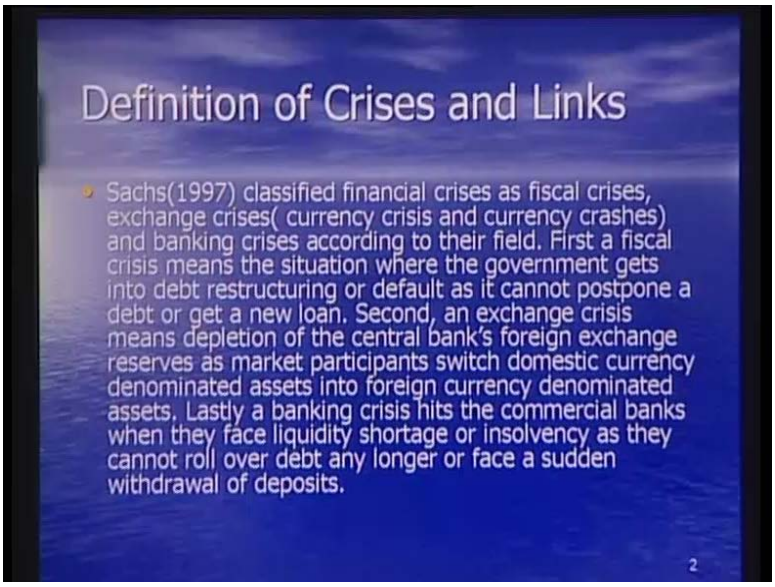

now there are different definitions of crises sachs in 1997 has classified financial crises as fiscal crises exchange crisis and banking crises according to their field first a fiscal crises means that the situation where the government gets into debt restructuring or default as it cannot postpone a debt or get a new loan an exchange crisis means that the countries are not able to maintain the parity in in terms of the exchange rate because it does not have enough of foreign exchange.

So it means depletion of the central bank's foreign exchange reserves as market participants switch domestic currency currency denominated assets into foreign currency denominated assets lastly a banking crises is when it hits the commercial bank when they face liquidity shortage or insolvency as they cannot roll over debt any longer or face a sudden withdrawal of deposits the last banking crises that we face was the in the US where a set of investment banks had a crises had a credit crises and they face liquidity shortage I'll be explaining each one of them in detail in a short while

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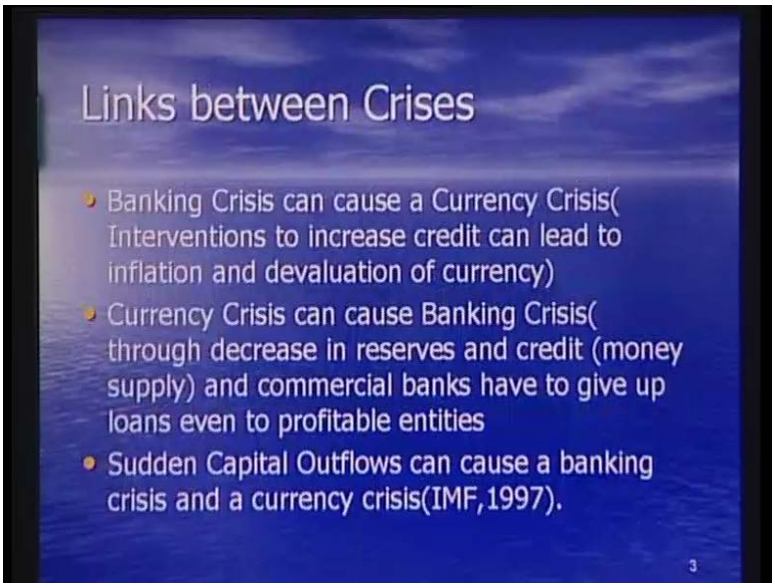

but, there are also links between crises banking crises can cause a currency crises it is through interventions to increase credit which can lead to inflation and devaluation of currency as we saw in the case of US when most of the bank's investment banks in US were failing the government intervened and the as a result it led to an increase in credit which can lead to inflation and subsequently devaluation of the currency the currency crises can also cause banking crises because during the currency crises there is a loss of reserves which leads to reduction in money supply and credit and so the commercial banks have to give up loans even to profitable entities and the sudden sudden capital outflows can cause a banking crises and a currency crises.

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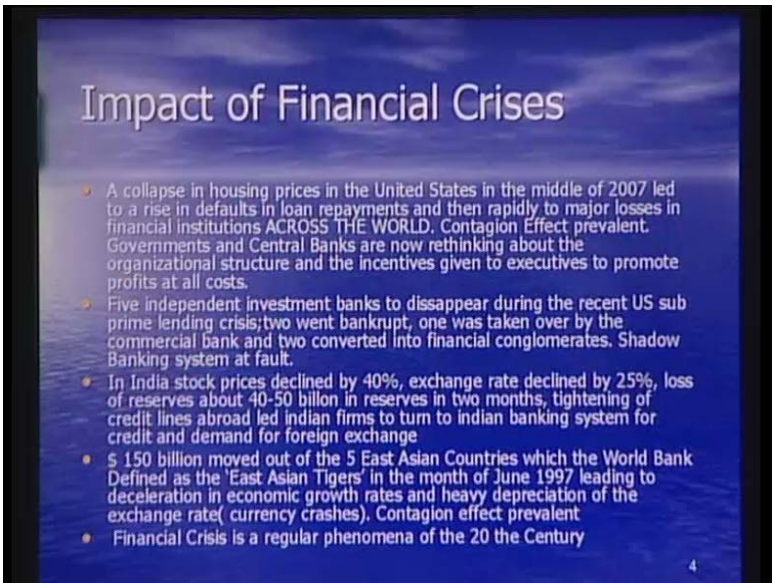

what is the impact of these financial crises what what we saw in in the recent case in US that a collapse in the housing prices in the US in the middle of 2007 led to a rise in defaults in loan repayments and then rapidly to major losses in financial institutions across the world contagion effect was quite prevalent and the government and the central banks were thinking about the organisedational/organizational structure and the incentives given to executives executives to promote profits at all costs therein they found 5 independent investment banks which disappeared during the recent US subprime lending crisis two went bankrupt one was taken over by the commercial bank and two were converted into financial conglomerates the shadow banking system was at default in fact in the US due to the failure of the banks and loans amounted to a around 6 trillion dollars that is equivalent to a Chinese economy it had a contagion effect the crises in one country in US had a contagion effect on the others in India stock prices declined by 40% exchange rate declined by 25% there were loss of reserves about 40 to 40 billion in reserves in 2 months and the tightening of credit lines abroad led Indian firms to turn to Indian banking system for credit and demand for foreign exchange and this has put pressure on the Indian rupee the Indian rupee depreciated by 25% during 2007 2008 but, this financial crises as I say say that it is a regular phenomena throughout the twentieth century in 1997 around 150 billion moved out of the east Asian countries which the world bank defined as the east Asian tigers in the month of June 1997 leading to deceleration in economic growth rates and heavy depreciation of the exchange rate there also the contagion effect was quite prevalent similarly, you had the Argentinean crises

you had the Mexican pecks/peso peso crises you had the European monitory union crises when these speculators played a a role and when the market participants felt that there should be a crises there was a crises in 1982 the Latin American countries faced a major crises so this crisis whatever you call it be at the fiscal crises the banking crises or the currency crises this is prevalent throughout the twentieth century so financial crises's are regular phenomena of the twentieth century.

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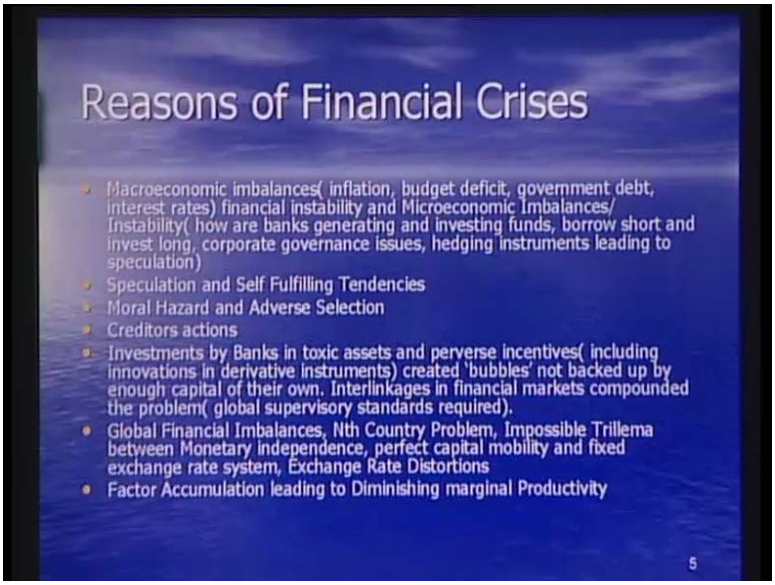

Now if this has been a regular phenomena of the twentieth century then it raises number of questions one needs to diagnose the problem and for diagnosing one has to go behind the reasons of the financial crises one is the macroeconomic imbalances which are created through government policies they may be leading to inflation high budget deficit high government debt high interest rates this leads to an impact on the exchange rate the exchange rate depreciates the exports decline balance of payment comes into deficit and that puts pressure on the exchange rate and the governments governments which do not have enough reserves have to move from fixed exchange rate to flexible exchange rate another is the micro economic imbalances and instability micro economic imbalances would mean how a banks generating and investing funds issues related to corporate governance hedging instruments which are leading to speculations and the third is as in the case of US we saw a financial instability due to the credit shortage created by the fall out of the investment banks.

So macroeconomic and microeconomic stability is required along with financial stability then the second reason is speculation and self fulfilling tendencies this is when the market pert/participants participants feel that there should be a crises there is a crises the third is the reason is asymmetric information when one side knows more than the other and the two manifestation of the asymmetric information is moral hazard and adverse selections these two phenomena create distortions in the economy moral hazard is tendency tendency to take risky actions by the debtors because creditors cannot supervise their actions so if the governments are borrowing from outside and they have been backed up by the government then the countries can take risky actions because they know that if they are not able to pay back the money the governments can support it.

So the tendency to take risky actions create distortions in the economy adverse selection is inability of the governments to select the right borrower the right borrower would mean that who is who has enough economic backing to provide the returns and adverse selection is that because of the asymmetric information it is not able to find out the right borrowers the forth reason is creditors action this can also be reasons of the financial crises as we saw in 1997 in the case of east Asia around 150 billion US dollars moved out in a single day this was precipitated by the fact that most of the countries had very high short term debt to reserves short term debt to reserves had reached around more than 100% so this created some sort of a tension a in the mind of the creditors because they started feeling that the debtor countries would not be able to payback their money as a result the creditors took out the funds that they had invested the other reasons for financial crises is that as in case of the US in case of US we found that the banks were investing in toxic assets and perverse incentives which created bubbles not backed up by enough capital of their own so it was a case where the there was bad regulations which led to artificially creating bubbles of the assets and these interlinkinges/interlinkages were quite prevalent and which had impact on the other economies another reason is the global financial imbalances it has to do this has to do with the same nth country problem where the nth country if it has a balance of payment deficit then the other countries would have a balance of payment surplus but, if there is an excessive balance of payment deficit then the other countries would have an excessive balance of payment surplus this is what was happening throughout the eighties and the nineties the US had excessive balance of payment deficit the excessive balance of payment deficit led to the surplus funds been invested in US which meant that the interest rates in US were going down

and the US was ready was ready to give loans at low interest rates.

So one of the reasons of the US subprime crises is the go/global global financial imbalances because surplus funds from Germany Japan and china were available and they could easily lend to people who did not have enough economic background or enough economic backing to pay back the money then there are some exchange rate distortions which are created like for example, in china they have undermine their exchange rate as a result there/they they have a balance of payment surplus with most of the countries another reason for financial crises crises is the that factor accumulation leads to diminishing marginal productivity if you keep accumulating labour and capital then the returns marginal productivity of capital and labour declines this was the krugman's hypothesis in 1994 when he predicted that in case of east Asia because there was not not much focus on total factor productivity he had surmised that the east Asian economies can face a crises in future which they did eventually in nineteen ninety seven or the recent case in united Arab emirates in Dubai where most of the investments have been done but, they are more of factor accumalatation/accumulation type they are not there to promote technology innovations.

So the simple economic theory which explains this phenomena is that when you accumulate factor marginal productivity would go down as the result the returns go down and there is a deceleration in the growth rates so these are some reasons for the financial crises a proper way of dealing with the financial crises from the teaching point of view is to put them under different models of financial crises

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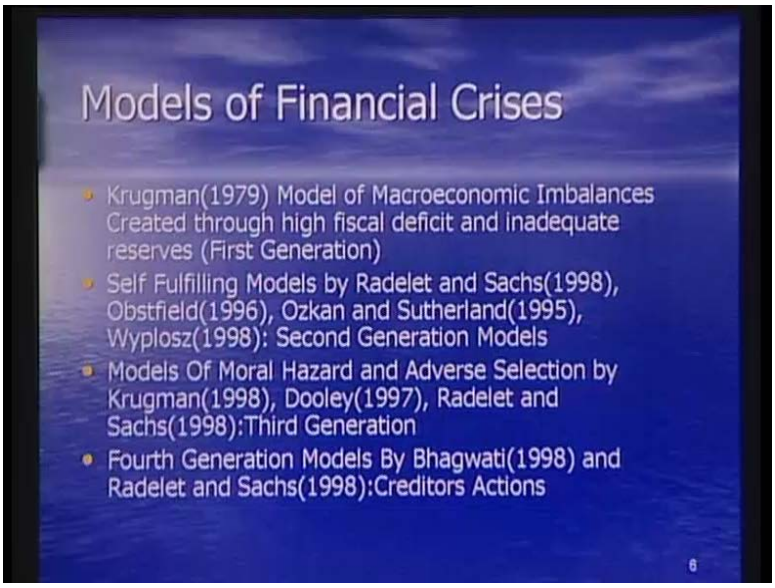

the first one is the krugman's 1979 model this is also called the first generation model this is model of macroeconomic imbalances which are created through high fiscal deficit and inadequate reserves.

Now I mie/may like to explain this point in the board through a simple definition of the real exchange rates

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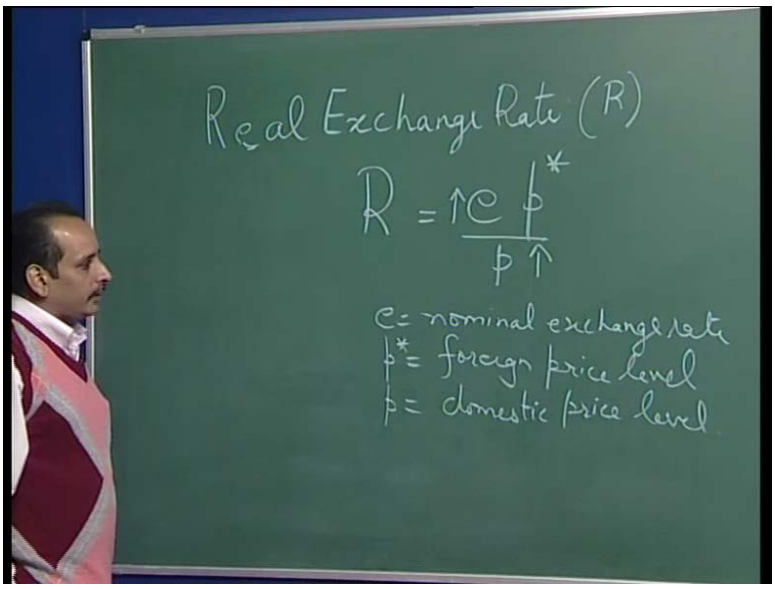

so the real exchange rates ((no audio 18:25 to 19:15)) the real exchange rate is given by the nominal exchange rate multiplied by the foreign price level divided by the domestic

price level now what krugman was saying in 1979 that due to fiscal imbalances there is an increase in the domestic price levels so this increases and if a country who wishes to maintain the real exchange rate then e which is the nominal exchange rate it has to go up so if e is say one US dollars if it is 40 rupees and if e goes up it'll become one US dollars to be equivalent to 50 rupees that means it leads to appreciation of the foreign currency or depreciation of the domestic currency.

Now in the case when the countries want to maintain a parity want to maintain the exchange rate it should have enough reserves to maintain that exchange rate otherwise the currency its own currency would depreciate now to maintain that exchange rate it has to have enough of foreign exchange reserves so what krugman was saying that in case of high fiscal deficit it would lead to an increase in prices and if governments want to maintain the real exchange rate then it has to increase the nominal exchange rate but, if it was a fixed exchange rate then it has to maintain that exchange rate at that level now to maintain for maintaining that exchange rate it has to have enough of foreign exchange reserves and in case it finds that it does not have enough of foreign exchange reserves then it leads to a crises of confidence it has to approach the I M F for the required amount of foreign exchange so this was the krugman's model of macroeconomic imbalances cread/created created through high fiscal deficit another point that I want to explain is that behind this high fiscal deficit are the current account imbalances which are created this can be explained by simple macroeconomic identity and

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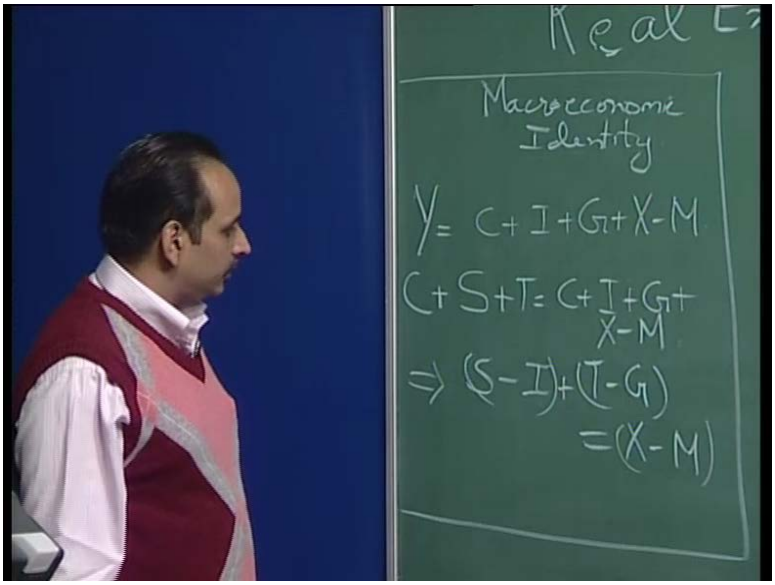

that macro economic identity is the following all students of economics know that y is equal to C plus I plus G plus X minus m where Y is G D P C is consumption expenditures I is investment expenditures G is government expenditures X is exports M is imports.

Now the G D P can also be written as consumption plus savings plus taxes which is equal to C plus I plus G plus X minus M and this would be equivalent to savings minus investment plus T minus G is equal to X minus M now a country which has a current account deficit that means imports are greater than exports this can be due to the saving investment imbalances that means investments are greater than savings or the government expenditure has been greater than the tax revenue now what krugman was saying that in case of high fiscal deficit that is when the government expenditures more than taxes it would lead to the current account imbalances that means imports are greater than exports and this would pressure put pressure on the exchange rates now if governments do not have enough foreign exchange reserves to maintain that parity then it has to move out of the fixed exchange rate and move from fixed exchange rate to flexible exchange rate so there will there high fiscal deficit or high government expenditure would lead to a loss of lead to loss of reserves and the country would have a a moval/move move out from the fixed to the flexible exchange rate system .

So this was the first generation model given by krugman the second generation models are called the self fully fulfilling models given by radelet and sachs obstfield ozkan and sutherland Sutherland and wyplosz and these models are a self fulfilling in the nature it means that if the market participants feel that there should be a crises there will a crises now I would again like to go to the board and give a simple moral/model using game theory to explain the second generation models I am going to discuss three cases when the central bank has lot of reserves a case when it does not have enough reserves of foreign currency and a third where the reserves are adequate.

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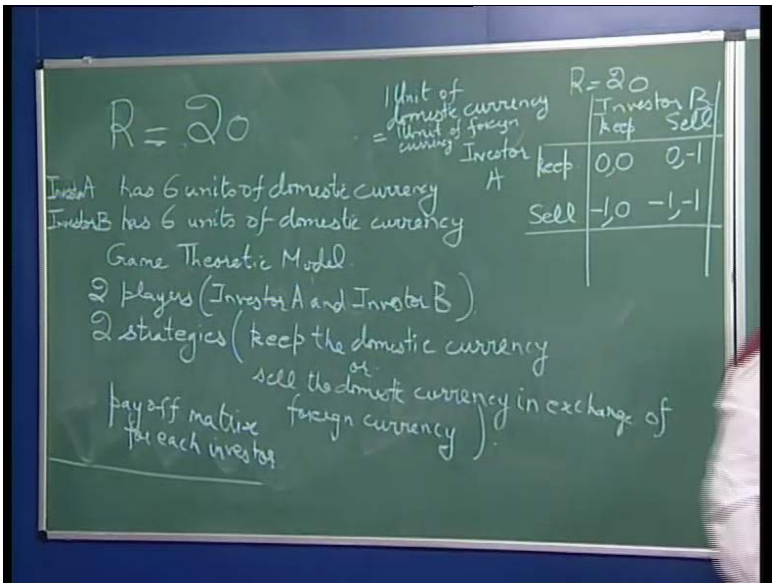

so let us discuss the first case when there are enough reserves I M taking a hypothetical example there are 20 units of foreign currency and in this economy there are 2 investors A and B investor A has 6 units of domestic currency investor B has 6 units of domestic currency.

So investor A investor B investor A has 6 units of domestic currency investor B has 6 units of domestic currency now we will use simple game theoretic models in game theory you can define a game if you have a payoff structure if you define their strategies and if you define the players so there are 2 players this is a game theoretic model there are 2 players investor A and investor B there are 2 strategies which are available the 2 strategies is keep the domestic currency or sell the domestic currency in exchange of foreign currency the second is when it wants to sell the domestic currency when it sees that there is probably a case where the domestic currency will depreciate in future so it like it would like to sell the domestic currency in exchange of foreign currencies so it is a game theoretic model where there are 2 players there are 2 strategies and there is a payoff payoff matrix for each investor.

now so the model is R is equal to reserves are 20 there's investor A there's investor B now if both the investors keep the domestic units with them they do not sell the domestic currency in exchange of foreign currency then the payoffs that they get is 0 and 0 if the investor B sells domestic currency then there is a transaction cost of one unit so the

payoffs available are 0 and minus 1 similarly, for investor a if it sells the domestic unit the payoffs available are minus 1 and 0 because there's a transaction cost of 1 unit and if both of them sells the domestic currency then the payoffs available are minus 1 and minus 1 because there is a transaction cost now we are assuming that the exchange rate is such that the 1 unit of domestic currency is equal to 1 unit of foreign currency in this example we will show the Nash equilibrium to be equilent/equivalent to

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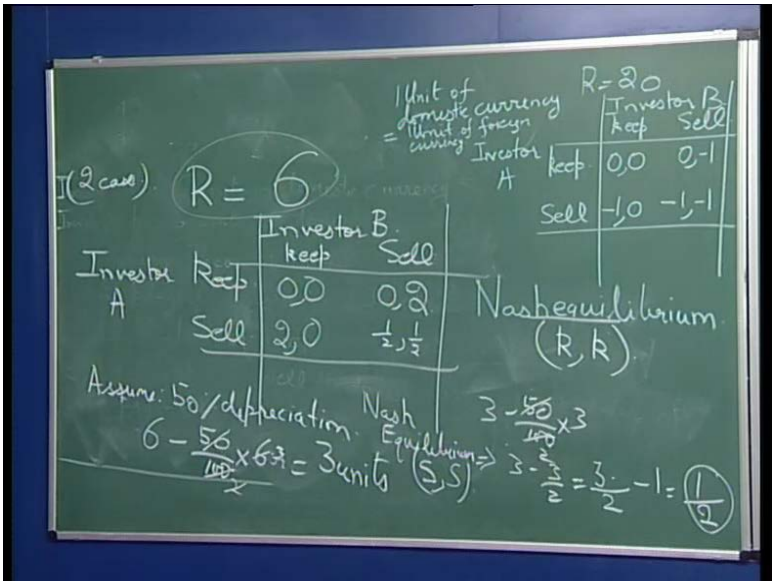

this is game where the Nash equilibrium is S and S S because by unilaterally deviating from the Nash strategies all players become verse off.

Now in this theory will thin/in this game there will be no crises because even if investor A investor B sells 6 units of domestic currency each the central bank will still be left with 8 units of foreign currency so it can maintain that parity it can maintain that exchange rates so this is a game where the central bank has enough foreign exchange reserves even if investor A investor B decides to sell both the currencies both the domestic sell the domestic currencies there will be no crises in this the Nash equilibrium a correct small correction is here it is would not like to play s and s it would like to play k and k so this will be the Nash equilibrium this is because by unilaterally deviating from k and k all players would become verse off so a case where even even if they want to sell the domestic currencies they will not it will not lead to any crises because the government would still have enough of foreign exchange.

Now this is the first case when the central bank has enough reserves the second case is when the reserves are with the central bank are only equivalent to 6 units of foreign currency again we have two investors 2 players they have 2 strategies keep the domestic units sell the domestic units keep the domestic units and sell the domestic units now here the payoffs would be if both of them keep 6 units of domestic currency with them the payoffs are 0 and 0 but, say for example, if investor b sells its 6 units the central bank will be left with no foreign exchange reserves this would lead to a crises where the country has to move from fix exchange rate to flexible exchange rate I have defined crises as when you move out of fixed exchange rates now in if this case the payoffs would be 0 for investor a but, investor b if it sells 6 units it would lead to depreciation of the currency now assume we have assumed fifty percent depreciation if there's fifty percent depreciation it would mean that if it exchanges 6 units of domestic currency it'll be left with 3 units and because there is a transaction cost of one unit it'll be finally, left with 2 units only similarly, investor a if it sells 6 units there is a depreciation of 50% it'll have it'll be left with three units and 1 unit goes for the transaction cost it'll be left with 2 units only the payoffs in the case when both sell the domestic currency.

Now remember both have 6 and 6 units but, the central bank has only 6 units only so the maximum amount of domestic currency that it can sell is three there is a depreciation of 50% so it'll be left with 3 by 2 units 1 unit goes for the transaction costs so it'll be three by 1 minus 1 so it will be left with half units only so the payoffs available would be half and half.

now in this case as a post to the first case the Nash equilibrium would work out to be so the Nash equilibrium in this case would work out to be the strategies S and S and it would lead to the crises this is a game where the foreign exchange the central bank does not have enough foreign exchange reserves and so in this game you will have a crises because country has moved from fixed to flexible exchange rate now you can see the dominant strategy here is selling and selling both end up playing strategy sell and sell because by unilaterally deviating from selling and selling all players would become verse off so this is a case where you have a currency crises.

Now third is the case which explains the self fulfilling nature of the crises again you have again

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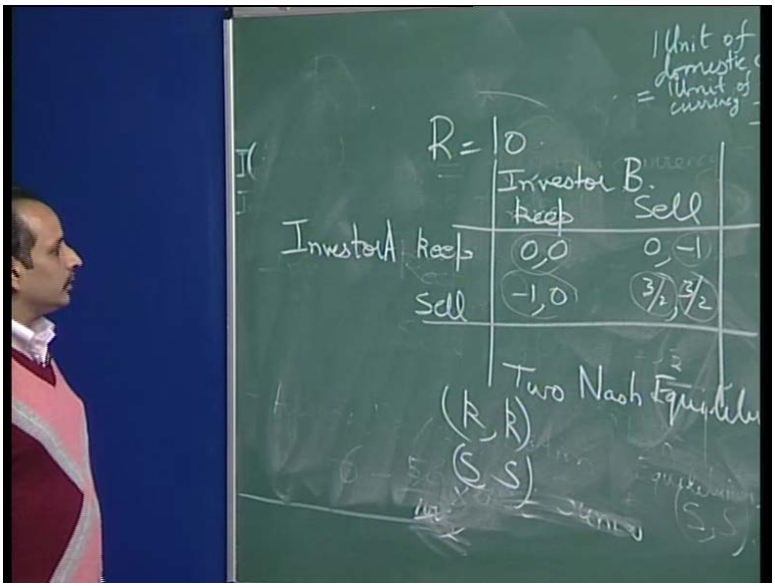

the third case is more interesting when there are adequate level of foreign exchange reserves reserves are equivalent to 10 units again there are 2 investors A and B which have 6 units of domestic currency they have 2 strategies keep and sell when they both do not sell the domestic currency the payoffs available are 0 and 0 when one of them sells the domestic currency there is a transaction cost which is of one unit so the so the payoff available is 0 and minus 1 now you can see that if investor B sells 6 units the central bank still has four units with it so it can maintain that exchange rate in similarly, investor a when it sells and the other investor keeps the domestic currency the payoffs available are minus 1 and 0 reason being that if it sell 6 units of domestic currency for exchange of 6 units of foreign currency it still has the central bank still has four units of the foreign exchange reserves to maintain the exchange rates the payoffs available when both players pale/play play sell and sell strategy is 3 by 2 3 by 2 reason being that if both of them sell then the total reserves will be exhausted and they could maximum sell 5 units of domestic currency each.

So this is a case when you have a currency crises the payoffs available are that when you sell domestic 5 units of domestic currency there is an an assumption that there is a 50% depreciation 50% depreciation would mean that you would have 5 by 2 units left and one unit goes for the transaction cost so you're left with 3 by 2 units so this is the gain that you would have by playing sell and sell strategy now please see in this game there are 2 Nash equilibrium 1 is K and K and the other is S and S because you can see that by

unilaterally deviating from the Nash equilibrium strategies all players become verse off now K as A K and k is when they play k and k there will be no crises but, when they play S and S there will be a crises now what self fulfilling models are saying that you would have a multiple equilibria you can have a situation where if the market participants feel that they would or they would feel that there there is there are enough vulnerabilities in the economy then they would sell the domestic units in exchange of foreign foreign exchange reserves as a result there will be a crises now this is what happened in 1992 in the European union when the market participants participants felt uneasy about the high unemployment rate.

so that vulnerability was translated into a problem of confidence as a result everyone wanted to sell the domestic currency in exchange of foreign currency so despite the the the countries had had enough or adequate foreign exchange reserves you had a crises so this simple game theoretic model shows that you can crises have a self fulfilling type of crises if the market participants feel that there should there should be a crises so this is the second model of the second generation model of financial crises the third is the model models of moral hazard and adverse selection which were griven/given by krugman Dooley radelet and sachs these are the third generation models these models are arguing that the crises occurs due to asymmetric information now to explain the moral hazard as I said moral hazard is the tendency to take risky actions by debtors because creditors cannot supervise their actions.

Now one of the explanations which were given for the east Asian crises nineteen ninety seven was that the creditors were unaware of what debtors were doing debtors were using the money money for buildings making buildings where the rents were so high that people were not able to stay there so it the so the debtors invested in stock markets in real estates in places which were highly risky now if the creditors are are not able to supervise the actions of the debtors this creates distortions in the economy so this was one reasons which was given for the crises now in case the creditors find that the debtors are taking risky action it would lead to credit rationing the moral hazard models and the adverse selection models were popularized by the nobel laureate akerlof in the early seventies where he gave the more the the he he gave he gave an explanation of the moral hazard and adverse selection through his famous paper on market of lemons adverse selection is inability of the creditors to decide about the the the borrower which has the

ability to pay back the money.

So the creditors are unable to decide between bad and good borrowers this also is due to market asymmetricasymmetric information the fourth generation models are given by the Indian economist bhagwati and radelet and sachs and it talks about the creditors actions rather than blaming the debtors it is the creditors which have to be blamed because creditors take out the money when they find that there are enough vulnerabilities which are created in the countries like in the case of the east Asian crises they found that the short term debt to reserves had reached very high levels twenty five percent is normal but, most of these east Asian countries the Thailand Indonesia Malaysia Korea and to some extent say Hong Kong or Singapore they had very high short term debt to reserve a short term debt to reserves so this creates created some tension in their mind because what it meant was that the countries did not have enough of liquidity to payback their money as a result the creditors took away dollar one fifty billion u US dollars in a matter of day in the month of June nineteen ninety seven so the fourth generation models are talking about the the creditors actions.

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So then the question is how do we reform the international financial architecture to reduce vulnerabilities of countries the first point is about having transparency in reporting of macroeconomic and microeconomic indicators not merely information but, the methodology as well as we saw in the recent case of US where most of these

investment banks were investing in toxic assets and also simultaneously lending to investors at subprime subprime rates.

So there is a primate there is a subprime rate sub prime rate is lower than the prime rate so they were lending the money to the investor at a lower rate and they were converting these loans into securities so they were quite active in the capital markets now all this information was hidden somewhere in the balansho/balance balance sheets or in some cases it wasn't even available in their balance sheets so when the bubble burst when the prices came down heavily of these assets there was not much adequate information available so transparency whether it is reporting of macroeconomic indicators or microeconomic indicators is essential then you need strengthening of financial institutions including banks there is already an organization which is called the B I S bank for international settlement which talks about the capital adequacy standards which have to be maintained in the banks.

Now as we saw in the recent case recent case of US that the in the US most of the investments which were done in risky assets they were not backed up by enough capital so it meant that there was not there was it was a case of bad regulations although the Basel two norms talks about capital adequacy standards in this case most of the investment banks did not have enough capital adequacy standards then Basel two norms also talk about internal risk assessments through value at risk models value at risk models calculate the losses due to changes in prices exchange rates now these value at risk models they are they come with an assumption that the the variable is normally distributed and there is no inter dependence but, you saw that in case of the US subprime crises there was so mush a/of correlation of the risks which was not counted for in the value at risk models so the value at risk models will not give a correct picture in case you do not take into account the contagion effect and also you need to take into account the operational risk the credit risks and there should be adequate regulations which take into account capital asset ratios credit expansion and maturity mismatches in boom and recessionary conditions on the other hand one also needs strengthening of the I M F in the form of raising their money that is the special drawing rights and liberal disbursement policy because we find that at the time of crises every institution needs money and they may not be forth coming as we saw in the case of moral hazard and adverse selection models it leads to credit rationing.

So you need more I M F money and you have you need to have a liberal disbursement policy and you also should have a global supervisory standards because as we saw that these risks are all correlated with each other at the time of the crises you need private sector bail in as we saw in the case of the the Dubai crises that one of the other states of u a e intervene and provided the necessary credit when the the the united the Dubai city was facing a problem of credit the other option is nationalization of banks which was done in the US at the time of the US subprime crises but, as a long term solution one needs to see to it that the self discipline is prevalent among the banks there should be adequate supervision and prudential regulations to curb distortions which are created by asymmetric information there should be coordination of fiscal policies and monetary policies across countries to curb excessive surplus and deficits in the balance of payments recently g 20 met there are twenty influential countries of the world met to decide about coordinating their fiscal and monetary policies to curb this excessive surplus and deficits other option is to invest the surplus that is foreign exchange which is been created due to global financial imbalances in infrastructure and social sector needs to reduce unemployment to reduce poverty questions that need to be answered is what is the adequate level of reserves and what are the instruments of financial intermediaries like in India we have this special purpose vehicles which uses in our India's three hundred billion foreign exchange reserves to invest in infrastructure.

So you need to find out instruments which can help to deal with the with some of the inadequacies so we need to decide about the adequate level of reserves and instruments of financial intermediaries like India has a special purpose vehicles which uses the surplus foreign exchange reserves we have a foreign exchange reserves of three hundred billion US dollars which can be used for purposes like in strengthening the infrastructure investments in social sector reducing poverty and unemployment.

so it it would mean that the surplus funds which were created through global financial imbalances can be used for a very purposeful activity in the economy and also outside then the growth of manufacturing sector is necessary so that excessive money does not chase too few goods this has something to do with what krugman was saying that if there is factor accumulation it would lead to diminishing marginal productivity so growth of manufacturing sector is necessarily/necessary along with the other sectors so total factor productivity growth instead of factor accumulation is necessary and there should be

controls on movement of financial capital and keeping currency competitive.

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So that adequate reserves can be build up for further research what one can do is that it can do a regression exercise where an index of crises can be created based on the amount of reserves that a country has the interest rates prevailing and once that crises indicator is found it could could be regressed on various right hand side variables which are potential determinants of crises they can be M 2 multiplier domestic credit to G D P ratio real interest rates lending deposit rate ratio excessive M 1 balances M 2 to reserves ratio fiscal deficit government debt to G D P short term flows to G D P index of financial liberalization among others in fact there have been studies which have used this type of research and they have found that short term debt to reserves is one of the robust factors which can explain the crises and also index of financial liberalization as we saw that if countries have a financial liberalization it is followed by crises in some of the countries but, this is not a very robust a determinant of the crises we can use a time series date of country and use logit and probit analysis or we can do a pooled exercise

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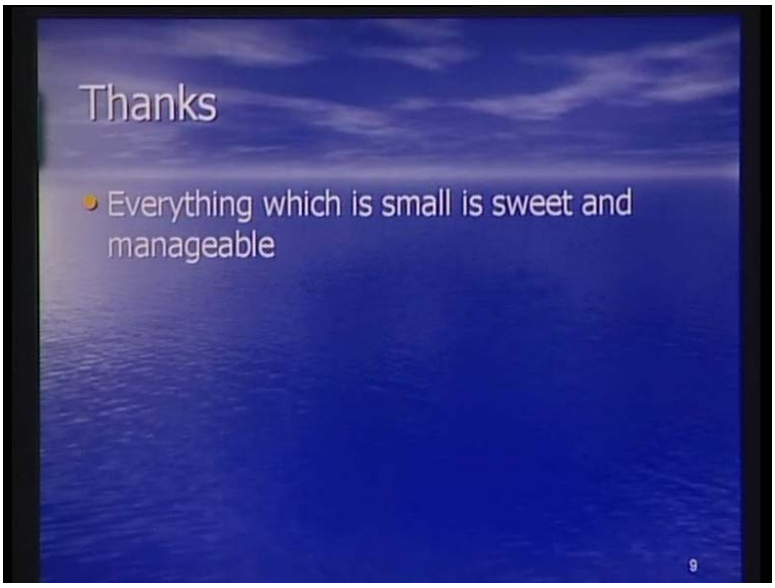

so the final thing is that if it is small if anything anything is small it is sweet and manageable if it becomes very large if the banks becomes very large if they start doing many things then it becomes real difficult for these banks to to manage things and this is what happened in the recent US crises so it is better to have manageable things make it small and do things in an efficient way thank you so much