International Finance
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Lecture - 29
India's Forex Reserves Composition and Determinants of Optimum Reserves

This session we will be discussing about India's foreign exchange reserves; and the composition of reserves; the determinant of foreign exchange reserve. And we will also discuss about whether India is having, India's forex reserves is optimum in nature; if it is not optimum, what should be the ideal reserve? And while deciding about optimum reserves, which are the component, which are the determinant you have to consider in, that also we will be discussing in this session.

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Let us start with the session. So, before going to the discussion of these optimum reserves we have to understand that, how the foreign exchange reserve developed? How India or any other countries receive foreign exchange? And also, what is the outflow of foreign exchange? When you consider the exchange, foreign exchange reserves, we have discussed in our earlier session that the balance of payment, the country's balance of payment has two parts. One part is called the current; account another part is called capital account. In the current account, the day today transaction of foreign exchange rate takes place; in the capital account, long term movements of foreign exchange takes place.

In day today transaction of current account, generally we have merchandise export that is export imports are the current account composition. Export provides us the foreign exchange; similarly, we have the invisible, invisible receipt provide us the foreign exchange. Invisible receipt we have travels, tourism, transportation, insurance premium, government accounts, the miscellaneous expenditures which are day today in natures.

Similarly, in transfer side we have official transfer and private transfer. Similarly, we have income side that is when the government of India or the any company invest in abroad, particularly give loans or purchase aboard certificate bonds that also have give some kind of interest payment, some kind dividend payment, and that also part of the investment income. Similarly, our NRI's, the non-resident Indian, they are working aboard, their compensation; their employee; their salary is a part of the income; also it is compensation to employee.

In the current account we have the export provide us foreign exchange; invisible transaction provides us foreign exchange; transferred, transfer of payment also provides us foreign exchange; and income provides us foreign exchange. So these are the sources of current account, current account, current account activity which provides a particular country the foreign exchange.

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Similarly, in the capital account, capital account generally India or any other developing country receiving huge amount of foreign direct investment; foreign portfolio investment that also part of the exchange reserves. So in the foreign direct investment, in the form of establishing company, in the form of partnership of a company that foreigners come to India, establish the company, or existing company they do the joint venture, from there we get the foreign exchange. In the portfolio investment, generally the foreigners or foreign company invest in our stock market to purchase our domestic bonds, certificates that also a source of foreign exchange.

Similarly, loans; government of India corporate get loans from abroad both short-term loan, currency borrowing, long-term currency borrowing, medium term notes borrowing, these are also parts of the foreign currency reserves. Similarly, external assistance; government of India gets external assistance from some of the developing, international development associations are there; they provide foreign exchange external assistance to government, to NGO, to different private body, that also part of the foreign exchange a country generally receives.

Similarly, we also receive, the commercial banks are in India, they also transact give you, lending borrowings, lending credit loans they also get the foreign exchange. Similarly they also accept foreign deposit in the form of FC NRI account, foreign currency non-resident Indian account; they also borrow from the aboard market in the bonds in the form of commercial borrowing that also part of the, our foreign exchange reserve. In the capital account, the significant part of the capital account is the portfolio investment; it is the foreign direct investment that provide significant amount of foreign exchange reserves in our country, particularly in Indian context.

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Similarly, if you see that sources of foreign exchange after discussing about the current account and capital account, part of different segments of the current account, different segments of the capital account; the sources of foreign exchange you can identify are the merchandised exports, software services exports, financial services exports, the other business services exports; similarly, travels and tourism, salary and compensation to Indians and working aboard; similarly, official transfers, private transfers, interest, interest dividend earns on foreign, foreign assets, foreign institutional investment in our equity market, foreign institutional investment in our bond market.

Similarly, foreign direct investment, foreign direct re-investment, the external, external assistance, foreign currency loans, foreign currency borrowings, banking sector transaction in foreign currency, all parts of the foreign exchange reserve, all contribute to the foreign exchange reserve. Which are the significant? A significant, significant source is the export, significant source is the travel tourism, significant source is our salary and compensation to Indians working aboard, significant source is the foreign direct investment and foreign portfolio investment. These are the significant sources of foreign exchange reserve and are with, these sources has been contributing, contributing over the year in our foreign exchange reserves.

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Sources of Foreign Exchange Reserves

Period : 1991 to 2000

	Net Amount in US$ Million					
Year	Merchandised Account	Invisible Account	Current Account	FDI	FII	Forex Reserves
1991	-9438	-242	-9680	97	6	5834
1992	-2798	1620	-1178	129	4	9220
1993	-5447	1921	-3526	315	242	9832
1994	-4056	2897	-1159	586	3647	19254
1995	-9049	5680	-3369	1343	3579	25186
1996	-11360	5447	-5912	2143	2660	21687
1997	-14815	10196	-4619	2842	3312	26423
1998	-15507	10008	-5499	3562	1828	29367
1999	-13246	9208	-4038	2480	-68	32490
2000	-17841	13143	-4698	2167	3024	38036

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So, when we outline this reserve over the years, prior to 91, our foreign exchange market was not developed; foreign exchange sources were very minute in nature. After 91, 92 government of India liberalized the foreign exchange part; we have adopted what is called the liberalized exchange rate system; market determined exchange rate system developed in India and that provide importance in foreign exchange, so inflow to India.

We have also liberalized our portfolio investment site; we have liberalized the foreign direct investment; we have decontrolled the licence region and allow the foreigners to start to invest in a, in our development of company; in invest in our joint venture; invest in our stock market; purchase our domestic bonds and, bonds and equity; these are, and we have opened up our sources of investment, foreign investment. After 91, 92 the foreign exchange market developed and is provide source, it provide different kind of items or different kind of a investment, investment product in foreign, for the foreigner to invest in India. So, if you analyze the foreign direct investment, portfolio investment and also the foreign merchandize investment over the year, let us have a look at, the how, what is the development? What is the, how the sources of foreign exchange market, foreign exchange developed over the year?

We will, let us start with from 91 to 2000, the 10 year service. 10 years if you see, the merchandized account was negative in 91 because our exports not pay for our imports, or a imports are more than our export. So, we generally have negative in our export import.

But, in the invisible account was not developed in 91, 92 because of this invisible is negative. Similarly, current account deficit is also negative. However, India received some kind of minute level of foreign direct investment that is 97 million in 91. FI investment almost negligible; and forex reserve was 58, 5834 millions U S dollar. This is very minute level which is not sufficient to pay for our one or two month of imports requirement.

So, if you see, if you see the foreign exchange reserve in 91 we are almost negative in nature, because our merchandize requirement is much more than our foreign exchange reserve. And realizing this, government of India liberalized the foreign exchange market and tried to open up the foreign market, foreign exchange market for what is called the foreign investor. And, after that there has been development of foreign exchange market and there is a growth in foreign exchange reserve.

If you see the data set, if you see the data set 92 onwards, though our export import merchandized accounts has declined, a negative part is declining, invisible increasing significantly over the year; and the current account though it, till negative compared to 91, 92 is still negative, negative part is very significantly. We received significant amount of foreign direct investment and also foreign, foreign portfolio investment; in 93, 94 onwards there has been significant growth in invisible there is a significant growth is foreign FDI, and also FI investment.

And this has given some kind of, some kind of activity our forex reserve; and forex reserve started increasing after 93, 94 onwards. And it has been, in 2000 if you see, there has been significant improved in foreign, foreign, foreign exchange reserve. It is almost 38 billion compared to a 5 billion in 91. Though 10 years have migrated to some have from 5 billion in 91, 92 to 38 billion U S dollar in 2000.

If you see the, the growth in the foreign exchange last 10, that is 10 year service 91 to 2000, it is a invisible and the foreign direct investment FI investment. But, however, our export is increasing then definitely, but our import also increasing faster than our export. We, always we have merchandized account which are negative in nature, that is export minus import is negative. However, invisible and, invisible and foreign direct investment, foreign institutional investment contributing to our export kitty; and this has been significantly, significantly contribution in our foreign exchange reserve.

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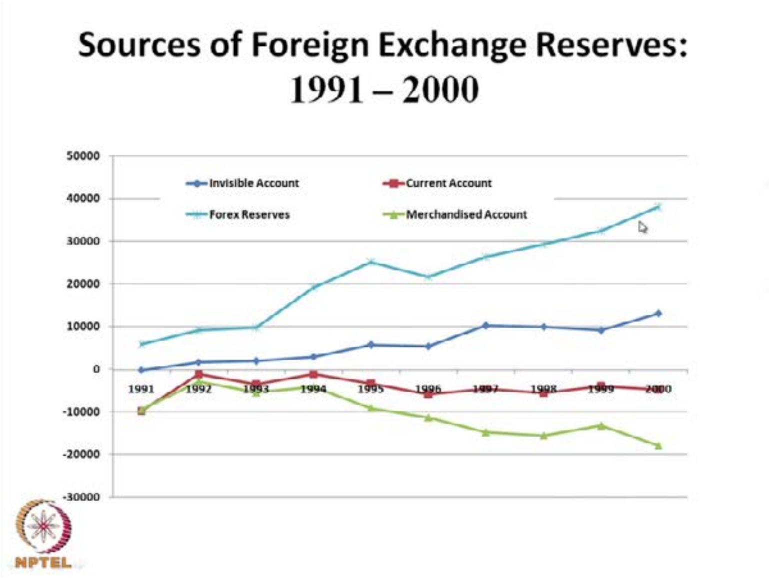

If you see, the growth path if you see, the graph here, the invisible is this one; this is foreign exchange reserve which increasing. And invisible is a blue line, the blue line is invisible; this has contribute significantly in our foreign exchange reserve. Similarly, current account though it is negative, negative is controlled significantly. Earlier it was quite negative in 91, 92; it has been controlled by 2001, 2000. And however, the foreign merchandized account is declining over the year; our export is not in a position to pay for our import which is a difficult situation for India.

Because, if you analyze the Indian export import basket, our exports are primarily traditional goods and services which is, it is not significantly contributing to our export earnings. However, our imports are inelastic in nature and their essential imports are all import which are, which are, which is the significant part our import basket, almost 60 percent; and this has contributed to our negative part of the merchandized account.

However, our current, in a foreign exchange reserve is increasing because of the invisible, invisible side of the, invisible part of our contribution to our foreign exchange reserve.

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Sources of Foreign Exchange Reserves
Period : 2001 to 2012

	Net Amount in US$ Million					
Year	Merchandised Account	Invisible Account	Current Account	FDI	FII	Forex Reserves
2001	-12460	9794	-2666	3272	2590	42281
2002	-11574	14974	3400	4734	1952	54106
2003	-10690	17035	6345	3217	944	76100
2004	-13718	27801	14083	2388	11356	112959
2005	-33702	31232	-2470	3713	9287	141514
2006	-51904	42002	-9902	3034	12494	151622
2007	-61782	52217	-9565	7693	7060	199179
2008	-91467	75731	-15737	15893	27433	309723
2009	-119519	91605	-27915	22372	-14031	251985
2010	-118202	80022	-38180	17966	32396	279057
2011	-130593	84648	-45945	9360	30292	304818
2012	-189759	111604	-78155	22060	17170	294398

If you analyze form 2001 to 2012 that is in later part of the financial sector reform, part that is consolidation part of the reform; that if you see the merchandized account till negative and growing significantly. However, invisible is growing faster than the merchandized account. And invisible almost contribute, what is called, almost, almost 50 percent of our foreign exchange reserve.

Similarly, our FDI also increasing; the FI investment though fluctuating it is also, it has also increased over the year; and foreign exchange reserve from 2001 it was something around 42 billion increased to nearly 200, 294 billion in 2012. Then, if you see in 2011 it was 300 billion which has been reduced because of the financial sector crisis all over the world. In India our export earning reduced and because of this reason our, what is called, our foreign exchange reserve has declined. And significant part of the contribution to foreign exchange reserve in later part of the reform that is a 2001 to 2012, it is a invisible, and the foreign direct investment and foreign portfolio investment.

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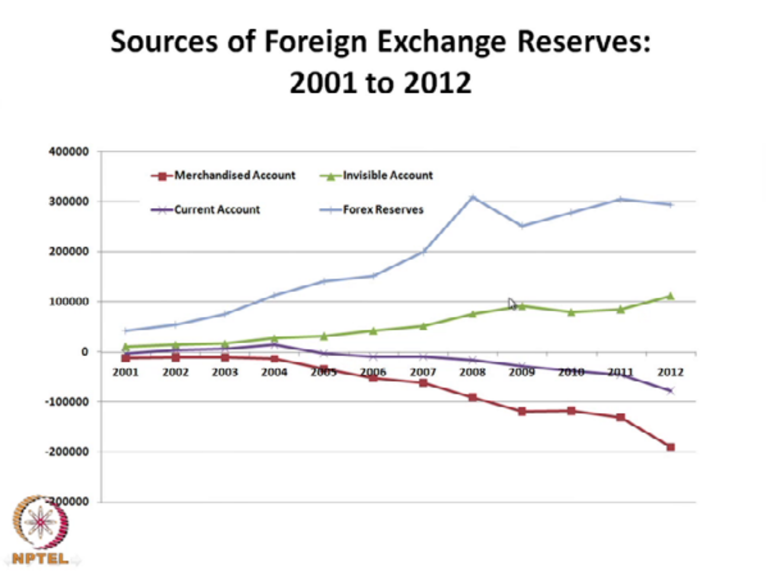

If you see this graph of 2011 to 12, the significant part of our reserve, reserve, contribution to our reserve is invisible which is increasing along with the foreign exchange, foreign exchange reserves. And similarly, our current account deficit after 2005 has declined significantly; and this decline of the significantly part of the current account deficit is a alarming in nature. After 2006 onwards it has declined significantly, ends toward somewhere near, somewhere near, near something around current account deficit merchandized, merchandized account deficit is significant.

And similarly, current account deficit also significant, somewhere near the 90 billion, the 85 billion dollar that is a significant part of the current account deficit. The deficit has started increasing from 2006 onwards because in 2006 onward the world is in recession period; our export earning is not good; our import requirement is essential in nature which has been increasing over the year. And our export, not in a position to contribute or pay for our import because of that reason the merchandized account deficit is increasing; and current deficit also increasing. Invisible at a part of the foreign exchange reserve though increasing, not in a position to control the current account deficit.

If you see the graph, in particular see the, the table here in 2000 current account deficit; current account was surplus in 2002, 03 and 04. After that it started negative, started negative because the despite there has been increase in invisible, invisible sources of foreign exchange increasing. However, the export, the import is much more and because of this reason our export and import deficit is not, is not in a position to cover up by the invisible sources of, sources of earning. And this has, this has increased the current account deficit over the year.

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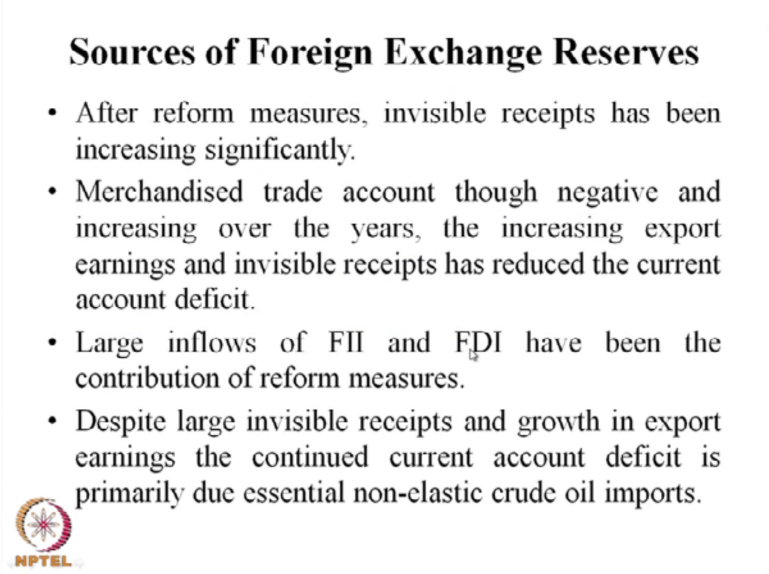

And, if you see the sources of foreign exchange reserve in India, if you analyze last 20 years of data, what we have discussed here, the sources of foreign exchange earning in India after the reform, reform measure the invisible receipt has been the, has been increasingly significant. And, the merchandised trade account though negative and increasing over the years, the increasing export earning and invisible receipts has reduced the current account deficit. Large inflows of FII and FDI have been the, have been contributing to the, contributing because of the reform measures. And, despite large invisible receipt and a growth in export earnings the continued current account deficit is primarily due to essential and non-elastic crude oil imports.

The crude oil imports are essential and non-elastic in nature. And, because of this reason that current account deficits have been increasing, despite increase in FII investment, despite increase in inflow of FDI, despite increase in inflow of your invisible sources of earning. And this current account deficit or the merchandized account deficit which is alarming in nature in recent year because current account deficit has crossed nearly 70 billion dollar; and this is significantly hamper our growth, and our contribute to our inflation, contribute to our what is called instability, and instability, and reducing our sovereign rating.

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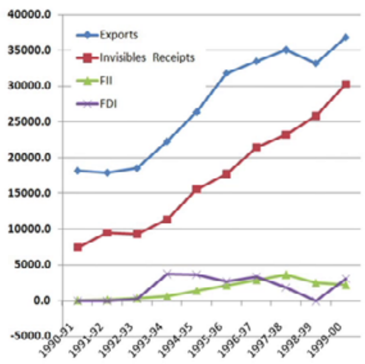
Foreign Exchange Composition

Period :1990-91 to 1900-2000

Year	Exports	Invisibles Receipts	FII	FDI
1990-91	18145.2	7464	97	6
1991-92	17865.4	9502	129	4
1992-93	18537.2	9334	315	242
1993-94	22238.3	11319	586	3647
1994-95	26330.5	15554	1343	3579
1995-96	31794.9	17664	2143	2660
1996-97	33469.7	21405	2842	3312
1997-98	35006.4	23244	3562	1828
1998-99	33218.7	25770	2480	-68
1999-00	36822.4	30312	2167	3024



And, if you see the, analyze the composition last 91, 1991 to 2000, 2000 then you see the export, export has been increasing; invisible receipt has been increasing; FII also increasing; and FDI is somewhat increasing, only in 98, 99 it was negative in nature. All are increasing. However, these are not contributing, these are contributing significantly to our export, our foreign exchange earnings, or foreign exchange reserve; but not in a position to reduce our, not in a position to make our current account deficit, 0. So, export invisible account FII, FDI, all are increasing in nature and contributing to our, contributing to our foreign exchange reserve.

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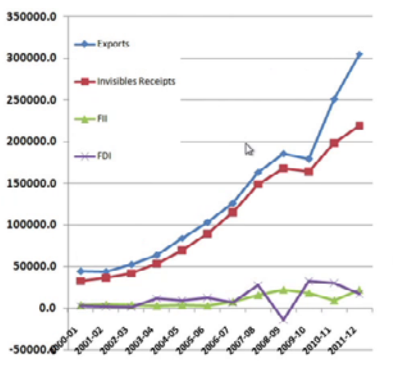
Foreign Exchange Composition

Period: 2000-01 to 2011-12

Year	Exports	Invisibles Receipts	FII	FDI
2000-01	44560.3	32267	3272	2590
2001-02	43826.7	36737	4734	1952
2002-03	52719.4	41925	3217	944
2003-04	63842.6	53508	2388	11356
2004-05	83535.9	69533	3713	9287
2005-06	103090.5	89687	3034	12494
2006-07	126414.1	114558	7693	7060
2007-08	162904.2	148875	15893	27433
2008-09	185295.0	167819	22372	-14031
2009-10	178751.4	163430	17966	32396
2010-11	251136.2	198248	9360	30292
2011-12	304623.5	219229	22060	17170



Similarly, if you see 2000 to 2001 that is recent part of 10 years, export also increasing; invisible earning also increasing; and your FII and FDI also increasing. However, the negative current account deficit is alarming in nature, negative current account deficit is alarming in nature. And, if you see the two parts- the red line is a invisible part; and in along with the export invisible also increasing. However, the FDI side is fluctuating and 2006-07 onwards the FDI is not significant because of the recession in the world economy. And similarly, if you see the green line, FII also not in, FII also significantly reduced after, reduced up to 2007-08. And, because this is part of the, what is called the recession period; and this is a part of what is called instability, instability in our foreign world market. And because of this, FII and FDI not significant, not significantly contributing to our foreign exchange earning position.

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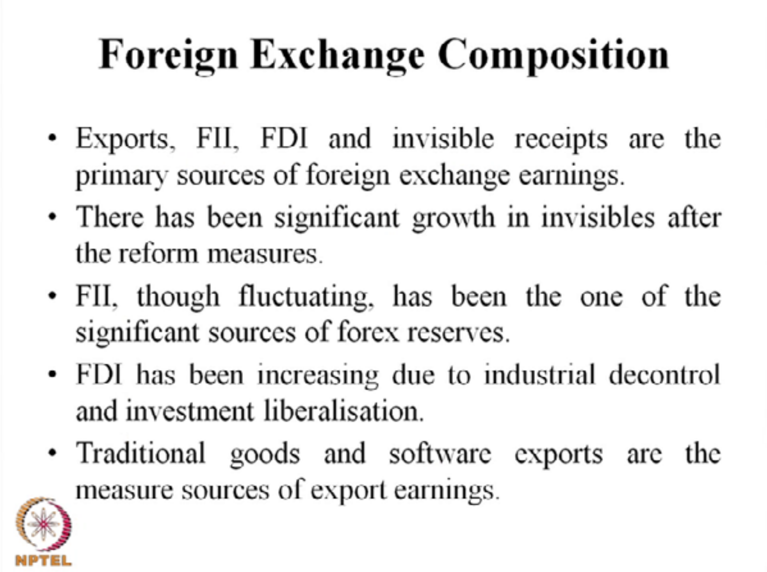

Then, question is here. Foreign exchange composition, if you see the, over the year the composition export FII, FDI; and invisible receipt are the primary sources of foreign exchange earnings. There has been significant growth in invisibles after the reform measures. If you see the invisible part, invisible contribute significantly over a foreign exchange reserve; it is travel tourism, the NRI receipt, the compensation, or the what is called our foreign, our Indian's are earning aboard, they are sending the money that is a part of our invisible, invisible foreign exchange earnings. And this invisible has significantly contribute to our, to our foreign exchange reserve.

And, if your see the, over the year though FII, FII and FDI fluctuating, they also contribute significantly to our foreign exchange reserve. And, traditional goods, traditional good earlier the export was primarily traditional good, now, now recent year because of, because of our services sector export particularly the, particularly export your, our software export has contribute significantly to our export earnings. So, this has, this new way, new sources of revenue in export side are software export and services export. And, this has been significantly contributes to our export earnings.

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Growth in Forex Reserves

Period: 1990 to 2001

Year	Forex Reserves
1990-91	5834
1991-92	9220
1992-93	9832
1993-94	19254
1994-95	25186
1995-96	21687
1996-97	26423
1997-98	29367
1998-99	32490
1999-00	38036
2000-01	42281

In the growth of our foreign exchange reserve you see, 91- 92, 90-91 onwards, last 10 years, I have given you the reform measure of 10 years to up to 2001. The, it has increased nearly 5 billion dollar to something around 42 billion dollar. And this has significant, significantly increased over the year.

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Growth in Forex Reserves

Period: 2001 to 2012

Year	Forex Reserves
2001-02	54106
2002-03	76100
2003-04	112959
2004-05	141514
2005-06	151622
2006-07	199179
2007-08	309723
2008-09	251985
2009-10	279057
2010-11	304818
2011-12	294398

Similarly, if you see the last, previous that is 2001 to 2011-12 that is a consolidation part of the reform measure. This also nearly 54 billion US dollar to increase to 2000, 294 billion US dollar in foreign exchange reserve. And, this has, this has definitely give a, what is called a, a strength to our economy and stability to our export earnings, stability to foreign exchange earnings.

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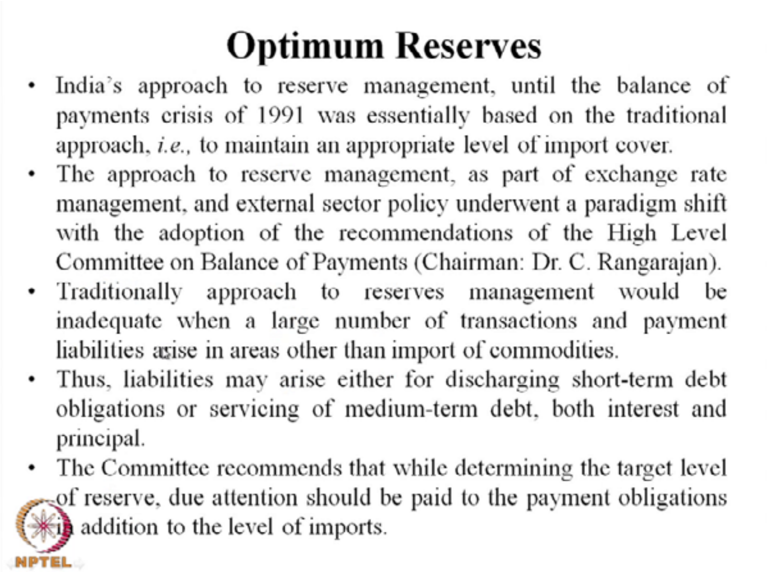

The, when you, no doubt we have achieved a significant development in our foreign exchange reserve. The composition has changed; the amount has changed; there has been significant reserve coming from the FII side, invisible side, FDI side and export side; whether this, from the nearly 5 billion dollar reserved in 1991 we have achieved somewhere nearly 300 billion dollar reserve last 20 years. Whether, this export, this reserve is sufficient; we have achieved a state of adequacy of reserve. And if a, if it is so then what is the requirement of further reserve? Because reserve contributes, no doubt gives strength to our economy. But, it has own cost; the cost of the instability and the cost of keeping the reserve with us.

We have to utilize the reserve in productive way. But, government of India or the RBI has not been used, has not been utilized this reserve for investment purpose. They are investing in, in government treasury bill of aboard. But, they have never utilized this for real sector development of our country. So, whether we should keep the reserves because when foreign exchange reserve is, is increasing; or say equivalent amount of rupee or Indian currency circulating in Indian market, this may create inflation in our country. To reduce the inflation RBI is auctioning bonds in domestic market. With the auctioning of bonds in domestic market, domestic interest rate is increasing. And, this is hampering our domestic growth. Our cost of capital is increasing; our borrowing cost is increasing; and this negatively affecting our domestic economic expansion. So, reserve, excess, excess reserve is not good for the economy, so long as the reserves are not being utilized in investment for the development of the country.

So, we have to understand, what is the adequacy of reserve? Or, what is the optimum reserve? We, we should have in our, for our, for our country. So, when you mention that adequacy of reserve, it is very difficult to decide what actually contribute to adequacy of reserve. If you see, if you see the approach to reserve management, after 91-92, our approach to reserve, reserve management is not, has come from what is called the balance of payment crisis. We, we face the balance of payment crisis in 91, and that time we realized that we, we supposed to adequate amount of foreign exchange; so as to, so as to import essential goods and services.

Then question is here. The traditional approach is the, of reserve is nothing but to fulfil the import requirement; but modern approach of reserve is nothing but beyond the import requirement. You should have a reserve recovery, reserve with sufficient to pay for our short-term liability which are denominated, denominated in foreign currency. So, the approach to reserve management, as a part of exchange rate management; so, when you have, we, because prior to 90-91 we were not the market determined exchange rate regime.

At present we are market determined exchange rate regime. Any fluctuation of reserve also, also have a effect in our market, market rate of exchange rate, market rate of rupee and that also affect our export earning, export import earning. So, you have to understand that, is a reserve management, is a reserve management should not confine to balance sheet management, only the reserve management should have a wider prospective. The prospective should be, not only to cover the import requirement, but also to pay for our short-term liability. At the same time you have to address the speculative attack on Indian rupee, or excessive fluctuation of Indian rupee, or excessive what is called the any, excessive depreciation or appreciation of Indian rupee. Because, any appreciation or depreciation which is beyond the purchasing power, but is not which is speculative in nature, affect our export, affect our import.

So, when you discuss about optimum foreign exchange reserve, you should also take into account, not only the balance sheet crisis but that import requirement, a short-term liability management, also you have to take care the management of exchange rate in market. So, when you consider exchange rate market management, you should understand that the traditional approach is not, is not adequate at present. So, because of this reason government of India and the RBI, realized that we should develop what is called a optimum reserve requirement policy. And, for the, they appointed a committee what is called the committee on balance of payment, that is a professor Rangarajan C, as a chairperson of this committee to develop the criteria for optimum reserve requirement.

They, they mentioned that the approach to reserve management, the approach to reserve management as a part of exchange rate management, and external sector policy has undergone a paradigm shift over the year. Which, because with the adoption of what is called the external sector policy; a policy of market determined exchange rate; a policy of management of balance of payment, balance of payment; this has to be factored into in reserve management.

The traditional approach to reserve management would be inadequate when a large number of transaction and payment liability arise in area other than import of, import of commodity. Thus, the liability may arise either for discharging short-term debt obligation or servicing of medium-term debt, or both interest and principal. The committee recommend that while determining the target level of reserve, due attention should be paid to payment obligation, in addition to the level of input requirement. So, we have to take care, both the short, both short-term liability management which may be in the form of payment of principle, may be payment of interest rate; at that same time we should also take care our import, import requirement. So, import requirement and short-term liability management should be the primary criteria for a deciding the optimum level of foreign currency.

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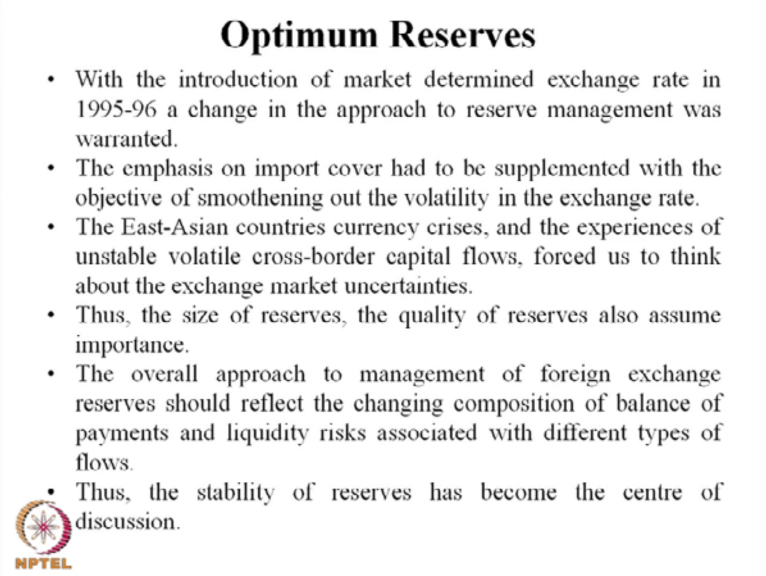

So then, question is, question is here. With the introduction of market determined exchange rate in 95 96, its change in the approach to reserve management was warranted. Because, it is not the payment only, the obligation or payment of, payment of import is the only policy, the reserve management should do, here because we are at present has a market determined exchange rate. So, market determined exchange rate, market may devaluate the rupee, depreciate the rupee, or appreciate the rupee; the investor may speculate, attack the rupee in speculative, speculative purpose if you take care that also. So, with the, with the introduction of market determined exchange rate, a change, change in the approach to reserve management is required.

The emphasis on import cover had to be, need to be supplemented with the objective of smoothening out the volatility in foreign exchange market. Because, rupee may be highly volatile; a volatile rupee leads to, create instability in the financial system; it may affect the export; it may affect the import. So, volatility, we have to address the volatility of rupee also as a part of reserve management. Because, the East-Asian crises, that East-Asian currency crises in 95, 95-96 that time we have experienced the unstable volatile cross-border capital flow. Because, this unstable volatile cross-border capital flow affect, create uncertainty in foreign exchange market; and a uncertainty in foreign exchange market create instability in the overall economic position.

So, you have to understand the size of the reserve, the quality of the reserve and, and after that you have to take care the reserve management. It may happen, our reserve is not adequate in nature; it may be unstable reserve; it may composed of mainly some, such kind of foreign exchange reserve which are highly volatile in nature; it may composed of only FII investment which are highly volatile in nature; it may be composed of NRI deposit which also can do economy movement. So, the stability of reserve that is a quality of reserve, also important while deciding the optimum foreign currency requirement.

So, the overall approach to reserve management of foreign exchange, foreign exchange should reflect the changing composition of balance of payment, and liquidity risk associated with the different type of flow. Because, as, as we discussed that in current account the, a stability is come from the export earning only; stability come from the some kind tourism, some kind of interest earning, dividend earning. But, in case, similarly in case of capital account, stability comes from the FDI earning. So, other account; other segments of revenue earning; other segment of foreign exchange inflow, are unstable in nature. They may have liquidity risk; and this liquidity risk need to be addressed in reserve, reserve requirement also. So, the overall approach to reserve management, or the foreign exchange reserve management should reflect the changing composition of balance of payment, and the liquidity risk. Thus, we have to give more importance to stability of reserve, as the centre of discussion of foreign exchange and reserve requirement.

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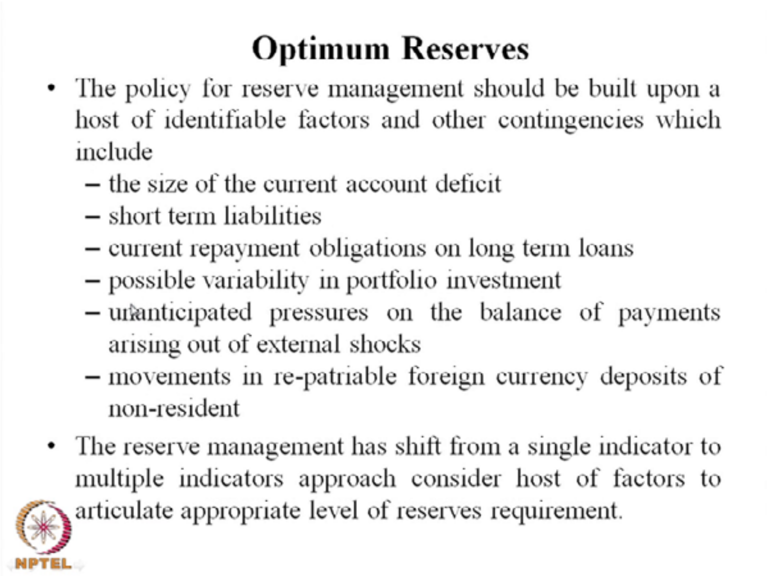

Similarly, when you discuss about optimum reserve that should be some criteria of understand, deciding the optimum reserve. But, you have to see, the policy for reserve management should be build upon, build upon a host of identifiable factor and other contingency which include: the size of current account deficit, the short-term liabilities, current account repayments obligation, long-term loans requirement, the possible variability, variability of portfolio investment, unanticipated pressures on the balance of payment arising out of external shocks, the movement in re-patriable foreign exchange, foreign currency deposit of non-resident. These are the some kind of items, some kind of segments, or some kind of factors which should, we should, we should discuss while deciding the optimum foreign exchange earnings. Because, how much, what is the size of current account deficit the country can absorb?

Because excessive current account deficit may depreciate the rupee, affect the internal as a domestic stability of the country. So, we have to understand, what is the optimum size of current account deficit? We can absorb. Similarly, you have to understand, what are the short-term liabilities the country going to face? Similarly, the current account repayment obligation because we might have taken long-term loans, short-term loans, this principal repayment, the interest repayments are liability for us; that it may happen that, our foreign exchange reserve might be having huge amount of portfolio investment. The portfolio investments variability, or volatility of the portfolio, portfolio investment should also effect taken, should also be discussed.

Similarly, there may be some, what is called the external shock in the economy? The external shock are the, are the world may be in the recession. The recession factor affects our export earnings. It may happen that, there may be our foreign exchange earning which is, which is significant part in the form of a workers income that, Indians are working aboard they may, they may repatriate NRI deposits. So, it may also affect our foreign exchange reserve. These are the factor we need to be, need to be, need to be discussed while deciding about the optimum foreign exchange reserve.

The reserve management has need to be, need to be shifted from a single indicatives to a multiple indicatives because it is not only the, how much foreign exchange reserve is there? And, how many month of import we can get out of the foreign exchange reserve? It is not the only criteria for deciding the foreign exchange reserve. Some single criteria of import coverage to, a multiple criteria of (( )) changes in foreign exchange reserve should be factor into account, while deciding the optimum foreign currency reserve. Then question, which are the criteria?

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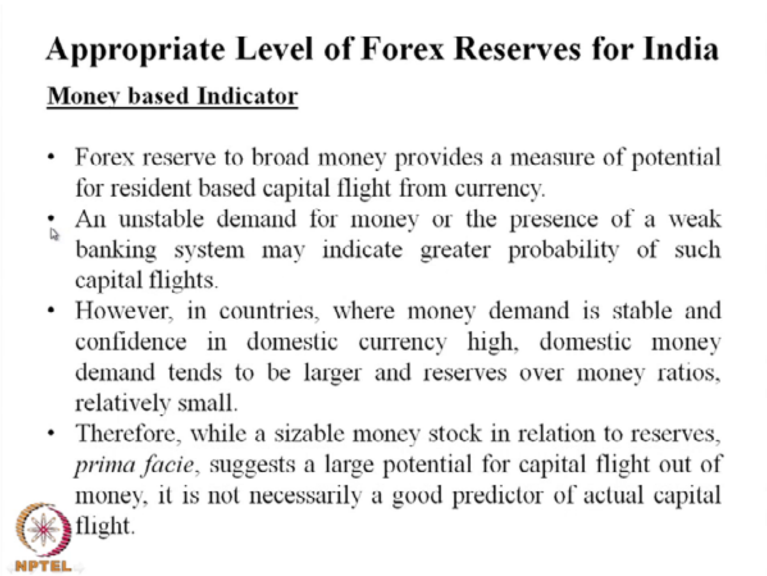

The criteria here, we have to develop different criteria. The criteria are however money based indicators. The question, domestic money supply also affected because of foreign exchange reserve. The, how much domestic money supply should be there? Their foreign exchange reserve supposed to be one of the linkages, one of the factors to decide the monitory management. So, here money based indicator is very important. So, what is the money based indicator?

Forex reserve, forex reserve to broad money, broad money provides a measure of potential for resident based capital flight from currency. Because, how much do, M 3 is abroad money supplied? And, forex reserve to M 3 provides measures of potential for resident based capital flight from, from currency. Because, it may happen when depreciation of rupee inflations are there, high inflation in India lead to outflow of foreign currency. High, high, high inflation in India lead to, may have real, real earning power of a domestic foreign currency may reduce. It leads to outflow of foreign currency in India. So, we have to understand money based indicator indicate the ratio of foreign exchange reserve to board money supply.

An unstable demand for money or the presence of a weak banking system may indicate greater probability of such capital flights. However, in country where money demand is stable and confidence in domestic currency is high, domestic money demand tend to be larger, and reserve, and reserve over money ratio relatively small. So, this kind of indicator is not applicable to a country where, where the money demand function is very stable in nature. The country has a confidence in domestic expansion; the country, country is a growing country. So, this indicator is not, not a ideal indicator. However, this indicator indicates some kind of capital flight if the excessive money supplies are there, in relation to foreign exchange reserve. Therefore, while a sizable money stock in relation to reserves, prima facie suggests a large potential for capital flight out of money, it is not necessarily a good predictor of actual capital flight.

So, we may consider this is indicator of capital flight, however in a country where potential development, development potential is there; a country where demand, money demand function is stable; a country where confidence is there in domestic expansion process, domestic money, domestic banking system confidence is there; this kind of indicator may not be true. However, this indicates some kind of, some kind of instability in having a large money supply, in relation to foreign exchange reserve.

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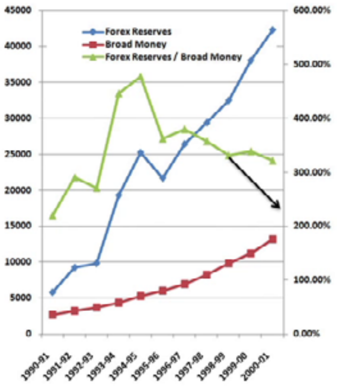
Appropriate Level of Forex Reserves for India
Money Based Indicator

Period: 1990 to 2001

Year	Forex Reserves	Broad Money	Forex Reserves / Broad Money
1990-91	5834	2658.28	219.47%
1991-92	9220	3170.49	290.81%
1992-93	9832	3640.16	270.10%
1993-94	19254	4310.84	446.64%
1994-95	25186	5275.96	477.37%
1995-96	21687	5991.91	361.94%
1996-97	26423	6960.12	379.63%
1997-98	29367	8213.32	357.55%
1998-99	32490	9809.60	331.21%
1999-00	38036	11241.74	338.35%
2000-01	42281	13132.04	321.97%



If you see, in Indian context the money, money indicators, I have taken, taken into account the foreign exchange reserve, or reserve from 91, 1991 to 2011-12. Similarly, I have taken the broad money supply. And I have taken into account, the amount of foreign exchange reserve. And I have estimated the ratio of foreign exchange reserve to money supply. The ratio I have taken into account. I have divided the period into two part- the one part is called 1991 to 2000-2001, is a part of what is called reform measures; and second part is 2001 to 2002 to 2012 that is a consolidation phase of reform. Then two, two different period, what is the nature of this money, money based indicator?

If you see the money based indicator here, 1991-2001, the money based indicator forex reserve is growing; at the same time the broad money supply, red colour is also growing. But, if you see the green colour line that is green colour line indicate the forex reserve to broad money supply; this has been fluctuating over the year. And, it has quite high in 95 96, which has been reduced significantly to nearly 300 percent in, after 2000, that is, 97 91, or it continued to decline. This indicate, secondary axis indicate the reserve percentage, that is a forex reserve to broad money supply; primary axis indicate, this axis indicate the millions of foreign exchange reserve in U S dollar. And, U S dollar amount is increasing; the broad money supply also increasing; and at the same time that, ratio of foreign exchange reserve to money supply also is quite high up to 2000 95-96, after that it continuously declining.

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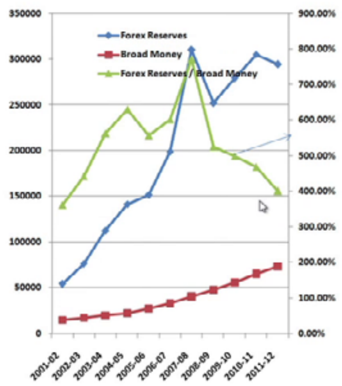
Appropriate Level of Forex Reserves for India
Money Based Indicator

Period: 2002-2012

Year	Forex Reserves	Broad Money	Forex Reserves / Broad Money
2001-02	54106	14983.38	361.11%
2002-03	76100	17179.36	442.97%
2003-04	112959	20056.54	563.20%
2004-05	141514	22456.53	630.17%
2005-06	151622	27194.93	557.54%
2006-07	199179	33100.38	601.74%
2007-08	309723	40178.55	770.87%
2008-09	251985	47947.75	525.54%
2009-10	279057	56026.98	498.08%
2010-11	304818	65041.16	468.65%
2011-12	294398	73592.00	400.04%



If you see the 2002, 2012, the reform, the consolidation phase of reform, that part also if you see the graph here, that graph also indicate the line blue, the red line is indicate what is called the broad money supply; and the forex reserve, forex reserve is a blue line increasing over the year; and this indicate that green line indicate the forex reserve to broad money supply, this also declining over the year, this also declining over the year. It was quite high in, up to 2008-09, after that continuously declining; and indicates that there is increasing strength in our domestic economy. There is no capital flight because of the excessive money supply in the economy.

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Appropriate Level of Forex Reserves for India

Trade-Based Indicator

- Trade based indicator, usually the import-based indicator, defined in terms of reserves in months of imports provide a simple way of scaling the level of reserves by the size and openness of the economy.
- Number of months a country can continue to support its current level of imports if all other inflows and outflows cease.
- As the measure focuses on current account, it is relevant for small economies, which have limited access and vulnerabilities to capital markets.
- For substantially open economies with a sizable capital account, the import cover measure may not be appropriate.

The other indicators are there, trade based indicators. Trade based indicators are import coverage, primarily import coverage. Trade based indicator, usually the import-based indicator, defined in terms of reserves in months of imports cover. How many month of import cover is there because of, because of foreign exchange reserve? How many months, without any earning, how many month you can sustain with the existing reserve, existing reserves? So, that is called number of month of a country can continue to support its current level of import, if all other inflows or outflows ceased to exist.

As the measure focuses on current account, it is relevant for small economies, which have limited access to, limited access to foreign exchange and also high vulnerability to capital market. For substantially open economies with a sizable capital account, the import cover measure may not be appropriate. However, a country like India where foreign imports is, import requirement is essential in nature, the oil imports are there, this also indicate a good, good sign, good indicator for assessing the foreign exchange reserve requirement.

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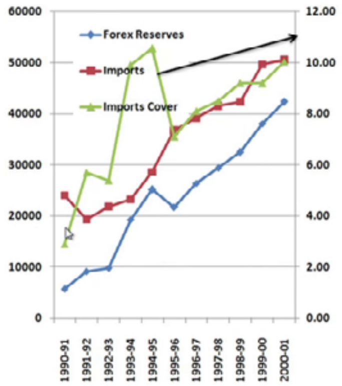
Appropriate Level of Forex Reserves for India
Trade-Based Indicator

Period: 1990 to 2001

Year	Forex Reserves	Imports	Imports Cover
1990-91	5834	24073	2.91
1991-92	9220	19411	5.70
1992-93	9832	21882	5.39
1993-94	19254	23306	9.91
1994-95	25186	28654	10.55
1995-96	21687	36675	7.10
1996-97	26423	39132	8.10
1997-98	29367	41485	8.49
1998-99	32490	42389	9.20
1999-00	38036	49671	9.19
2000-01	42281	50537	10.04



If you see, the import coverage over the year, same two period data I have covered. It was quite negligible in 1991, only 2, nearly 3 month of export, 3 month of import requirement that much of foreign currency you had, in 1991. And over the period with the liberalization of foreign exchange market, with a significant inflow of a FII, FDI, invisible, invisible foreign exchange inflow, this has been increased over the year. And, it was in 2000, 2000-2001, you have 10 month of import cover. Without any foreign exchange earnings, their existing foreign exchange can allow us to import 10 month of import. And, if you see the graph the blue line, the blue line of foreign exchange reserve; the red line is the import requirements; and the green line indicate, how many month of import you can have over the year? This import cover we have, and this has been increasing over the year.

The secondary axis indicates the number of month. And, up to 10 month of import cover we have, we have up to 2001 and, 2001, 10 month of import cover, the foreign currency reserve was having.

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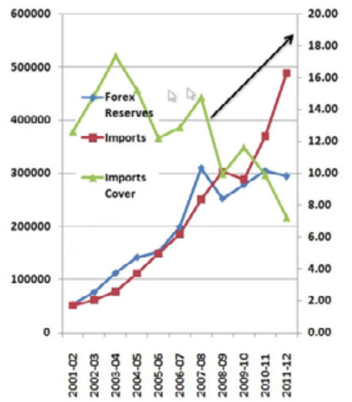
Appropriate Level of Forex Reserves for India
Trade-Based Indicator

- Period : 2002-2012

Year	Forex Reserves	Imports	Imports Cover
2001-02	54106	51413.3	12.63
2002-03	76100	61412.1	14.87
2003-04	112959	78149.1	17.35
2004-05	141514	111517.4	15.23
2005-06	151622	149165.7	12.20
2006-07	199179	185735.2	12.87
2007-08	309723	251439.2	14.78
2008-09	251985	303696.3	9.96
2009-10	279057	288372.9	11.61
2010-11	304818	369769.1	9.89
2011-12	294398	489417.4	7.22



If you change it 2002-2012, this import cover has, though it was quite significant, if you see a 203-04, we have 17 month of import cover, which has been declined after 2007-08. 2007-08 onwards declining, because the foreign exchange, the export was declining; import earning, import, import has increased significantly because of oil price increased. And also, FDI, FII sources has declined; and foreign exchange reserve also fluctuate because of during this reason; this in time because of the world level crisis.

If you see the graph, the import cover is declining over the years. And is, at present is a only 7 month of import cover you have; over 300 billion dollar, we can cover only 7 month of import. If there is no further earning, this is a alarming situation. Situation is not good, if the, you have to increase our export, export so as to pay for our import.

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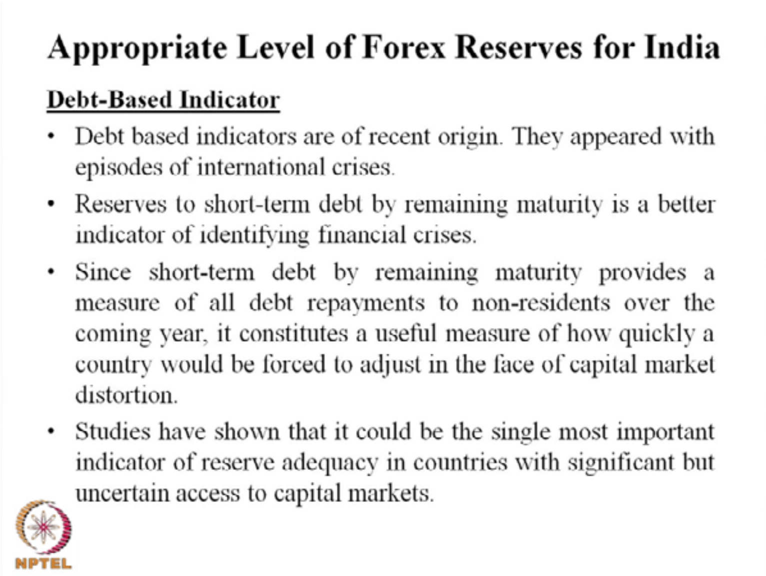

Any other indicators are there? The other indicator here, debt based indicator. What is debt based indicator? Debt based indicators are recent origin. They appeared with episode of international payment crises. If a country, short-term debts are quite high, the sovereign rating will be reduced. Because, short-term debt you have to repay immediately. If you do not repay sovereign rating will be negative; and it create capital flight. So, you have to cover a short-term debt through our use of requirement. So, short-term debt by remaining maturity provides a measure of all repayments of non-resident Indian coming over year. The non non-resident Indian deposits they are short-term in nature. A short-term deposit, non-resident Indian may withdraw the money anytime. So, you have to pay, for paid them. So, short-term, how much foreign exchange reserve we have, to cover the short-term debt.

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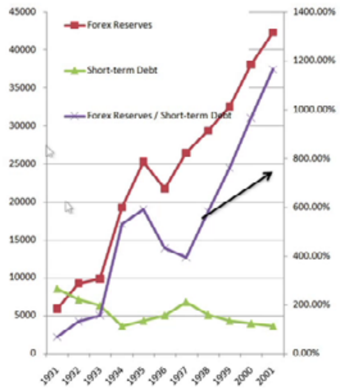
Appropriate Level of Forex Reserves for India
Debt-Based Indicator

Period: 1991- 2001

Year	Forex Reserves	Short-term Debt	Forex Reserves / Short-term Debt
1991	5834	8544	68.28%
1992	9220	7070	130.41%
1993	9832	6340	155.08%
1994	19254	3627	530.85%
1995	25186	4269	589.97%
1996	21687	5034	430.81%
1997	26423	6726	392.85%
1998	29367	5046	581.99%
1999	32490	4274	760.18%
2000	38036	3936	966.36%
2001	42281	3628	1165.41%



If you see, this indicator over the year short-term debt, we have significant amount of reserve, to pay for our short-term debt. In 2001, in 2002, 68 percent of our reserve because of short-term in nature, which is increased to, because we can pay for our 60, our foreign exchange reserve can pay only 68 percent of short-term, short-term debt. Now it has increased to nearly 1165 percent because we are sufficient, significantly sufficient to pay for our short-term debt.

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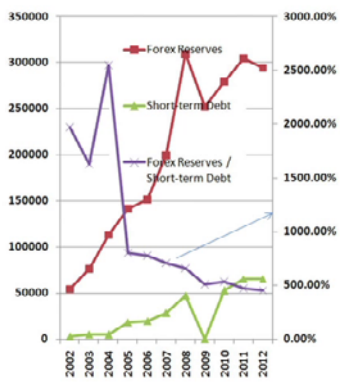
Appropriate Level of Forex Reserves for India
Debt-Based Indicator

- **Period: 2002-2012**

Year	Forex Reserves	Short-term Debt	Forex Reserves / Short-term Debt
2002	54106	2745	1971.07%
2003	76100	4669	1629.90%
2004	112959	4431	2549.29%
2005	141514	17723	798.48%
2006	151622	19536	776.12%
2007	199179	28130	708.07%
2008	309723	46999	659.00%
2009	251985	49373	510.37%
2010	279057	52329	533.27%
2011	304818	64990	469.02%
[illegible]	294398	65130	452.02%



Similarly, in 2002 to 2012 similarly, short short-term debt we are significant reserve is there to pay for our short-term debt. So, there is no fear in repaying the short-term debt. However, a short-term debt is added with the import requirement then, all are short-term liability in natures.

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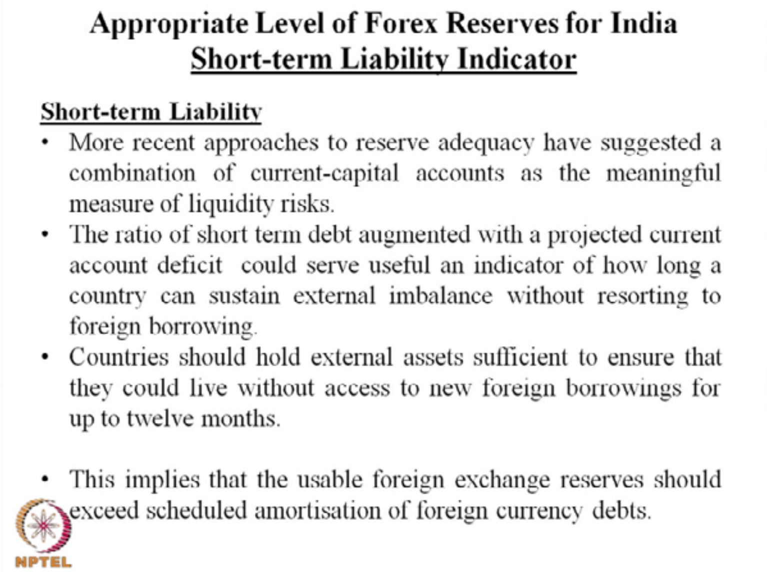

So, short-term liability, also part of the reserve requirement; that, this is the ideal indicator of foreign exchange adequacy to understand. Because, short-term liabilities are short-term debt repayment, and our import coverage requirement. And these two, together called short-term liability. And short-term liability is an ideal indicator of foreign exchange adequacy to understand.

So, how much foreign exchange reserves you should have? You should have that much of foreign exchange reserve which can pay for our short-term liability. So, foreign exchange reserve, to short-term liability is an ideal indicator.

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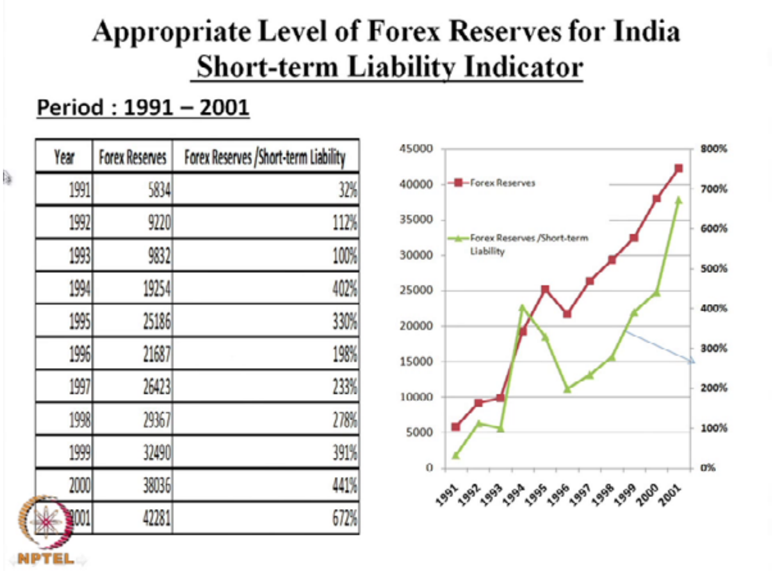

Appropriate Level of Forex Reserves for India
Short-term Liability Indicator
Period : 1991 – 2001

Year	Forex Reserves	Forex Reserves /Short-term Liability
1991	5834	32%
1992	9220	112%
1993	9832	100%
1994	19254	402%
1995	25186	330%
1996	21687	198%
1997	26423	233%
1998	29367	278%
1999	32490	391%
2000	38036	441%
2001	42281	672%

If you see the short-term liability to foreign exchange reserve that, in Indian case in 91, 92 to 2001, in 91 only 32 percent of our reserve, 32 percent of our short-term liability covered by the foreign exchange reserve. So, say 68 percent of foreign exchange reserve is not covered. So, 68 percent negative we had. But, over the period liberalization and inflow of foreign currency, the short-term reserve in 2001, the short-term reserve, short-term liability; and foreign exchange reserve, foreign exchange reserve can cover say 672 percent of short-term reserve. So, we have adequacy of reserve that you have to, in 2001.

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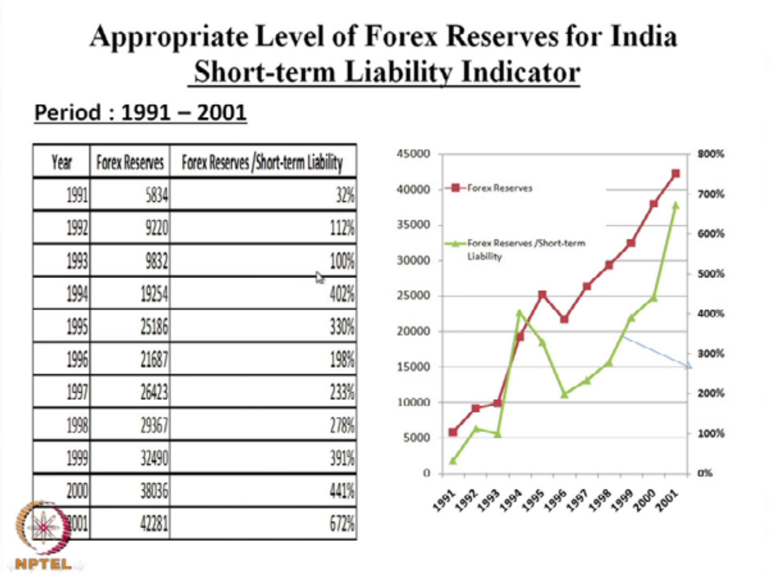

Appropriate Level of Forex Reserves for India
Short-term Liability Indicator
Period : 1991 – 2001

Year	Forex Reserves	Forex Reserves /Short-term Liability
1991	5834	32%
1992	9220	112%
1993	9832	100%
1994	19254	402%
1995	25186	330%
1996	21687	198%
1997	26423	233%
1998	29367	278%
1999	32490	391%
2000	38036	441%
2001	42281	672%

So, this adequacy reserve started after liberalization. And, 93, 94 in a, if you see 93 data, this data 93 data, you see 100 percent, this 100 percent. Because, what much, that much of foreign exchange you had, which can cover our short-term liability. Short-term liability is nothing but short-term debt payment, that debt repayment; and, plus foreign exchange import requirement. These two together 100 percent. And, our foreign exchange reserve is equivalent to short-term debt requirement. However, after that we, our foreign exchange reserve increased; our short-term debt requirement decline, declined over the year. And, we have 72 percent requirement.

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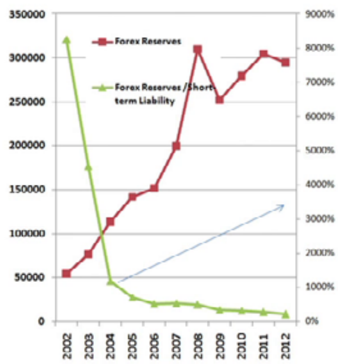
Appropriate Level of Forex Reserves for India
Short-term Liability Indicator

Period: 2002-2012

Year	Forex Reserves	Forex Reserves /Short-term Liability
2002	54106	8260%
2003	76100	4541%
2004	112959	1170%
2005	141514	701%
2006	151622	515%
2007	199179	528%
2008	309723	494%
2009	251985	326%
2010	279057	308%
2011	304818	275%
2012	294398	205%



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So, say in 2012 also, 02 to 12, ours, we have significant amount of short-term debt requirement. However, it has been declining over the year. And, this alarming situation has come in 2011-12 onwards, because twice of the short-term debt that much of reserve we have. So, we have to increase our foreign exchange reserve further.

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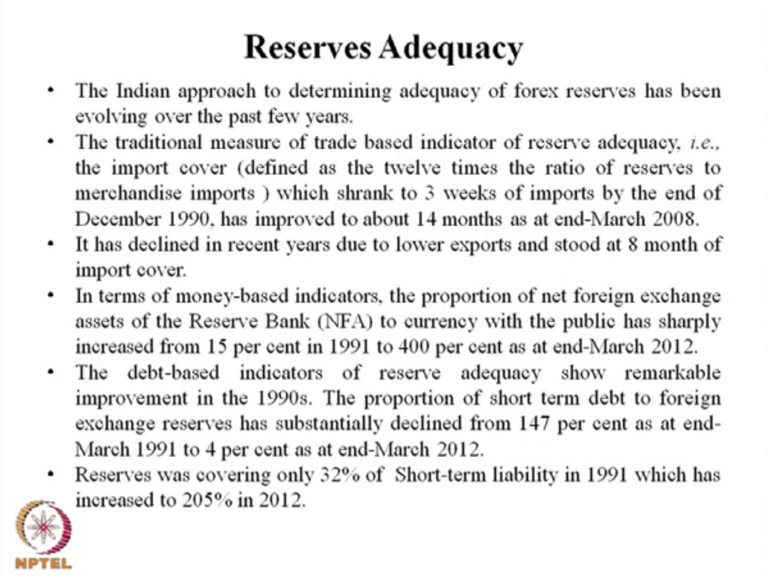

And, what is a reserve adequacy? We have significant amount. Reserve adequacy you understand that, it is evolving concept. Thus, reserve adequacy requires, we have to factor the traditional view of import coverage, for single factor determinant to a multiple determinant you have to develop. The multiple determinant should take into account the, not only the import cover but also the stability of the reserve. The, you have to take into account the short-term debt repayment, debt repayment; we have to take into account the money based indicator; you have to take into account, what is a debt repayment services; you have to take into account the possibility of intervening in foreign exchange market whenever there is a instability in foreign exchange market; so, with the ability of reserve you have to understand that, this has, their, a reserve adequacy over the period, over the period has changed.

And Indian context, Indian context the short-term liability to reserve requirement is the ideal indicator to understand the foreign exchange reserve adequacy. And, if you see that reserve adequacy in the form of short-term liability is, reserve, it has 32 percent of reserve requirement, 32 percent of liability covered by reserve require, reserves. However, it has increased to, in 91 it was there, it has increased to nearly 200 percent in 2012. However, at present we cannot say our foreign exchange reserve is a adequate in nature because the composition of reserve is very important.

Our composition is not stable in nature. Our own earning, that earning of in the form of export is not significant in our foreign exchange, foreign exchange kitty. So, our actual foreign exchange reserve is highly unstable. It is more towards, in the form of invisible; in the more towards in the form of what is called FII investment, which has not stable as per, as per as, as per as the history is concerned. So, we have to develop a reserve adequacy which is more stable in nature; which is more, more to, more earning in nature; other than, rather than a debt; rather than a investment in our country.

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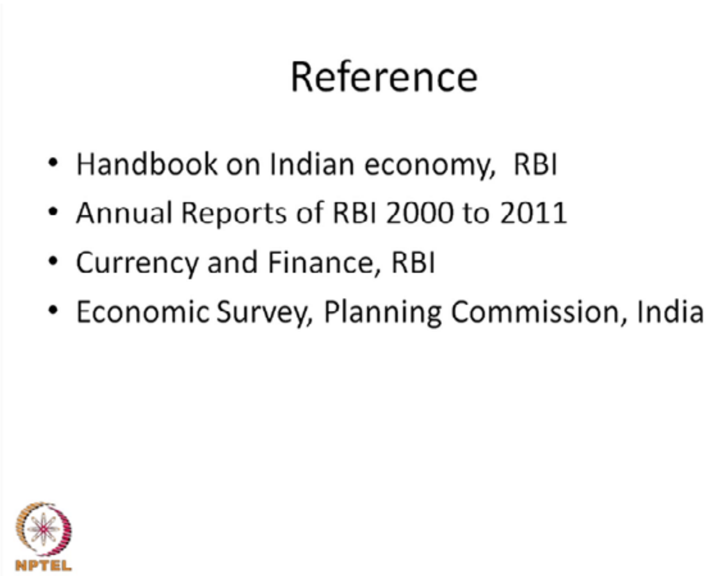

So, in, with this, let me complete this. And, you can go through the handbook on Indian economy by RBI, that the handbook provides all data on foreign exchange reserve side, composition side. You have to take into also discuss, something I have taken into account from annual reports of RBI, various issues. Also I have taken into account, something from currency and finance of RBI, various issues. Economic survey, of planning commission also indicates the requirements of foreign exchange reserve.

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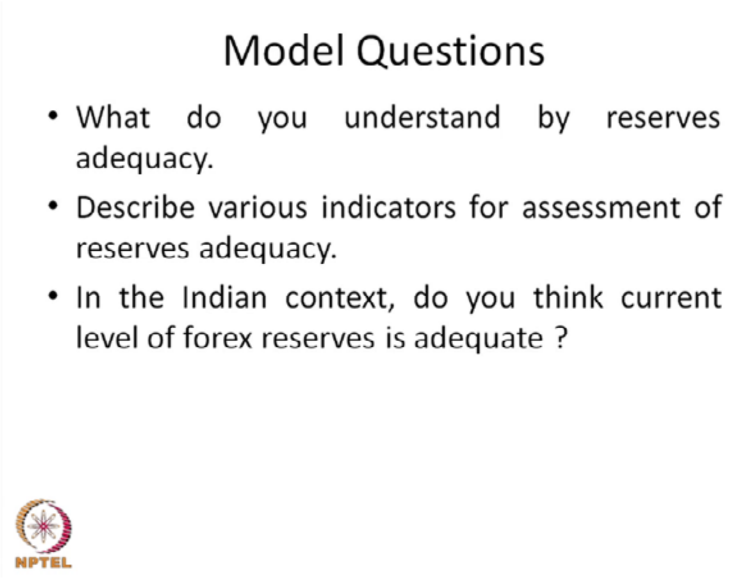

And the model question, I have designed for you, here. What do you understand by reserve adequacy? Here you discuss what is actually meaning of reserve adequacy, by criteria of reserve adequacy, you have to discuss there. Also you describe various indicators for assessment of reserve adequacy. We have discussed assessment, various criteria or indicators of reserve adequacy; the indicator of money based indicator; the indicator debt; debt services indicators; short-term liability indicator; trade indicator; you discuss about that.

In the Indian context, do you think the current level of foreign exchange reserve is adequate? You have to estimate the, the various criteria of reserve adequacy and along with that view factor, instability composition of foreign exchange reserve, that stability part of the foreign exchange reserve, and decide whether Indian context, the current level of foreign exchange reserve is adequate in nature or not.

Thank you.