

Open economy and exchange rates

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The lecture's plan

1. Open economy
 1. Export, savings and investments
 2. Trade equilibrium
 3. Global imbalances
 4. Prevention of currency appreciation by CBR
2. Equilibrium on money market
 1. Classical outlook and equilibrium in long-run
 2. Money supply policy of CBR with fixed exchange rate
3. Fixed exchange rate and currency crises
 1. "Price shocks" of 1992, Russian crisis in 1998
 2. Similarities among other currency crises

Trade in space and time

- $Y = C + I + G + NX$
 - The output is consumed by consumers, state, firms or exported
- $NX > 0$ when country produces, but not consumed
 - it goes abroad
- $NX < 0$ when country consumes, but not produces
 - it comes abroad
- But Y is output and income likewise
 - Selling abroad generates a capital inflow
- But country lends abroad (the value of NX) everything that is earned (Y) but not spent ($C + I + G$)
 - So trade balance and capital inflows are two sides of a coin
 - Current account = capital account

$$S = Y - C - G = (Y - C - T) + (T - G)$$

$$Y = C + I + G$$

$$I = S$$

What stands between I and S in the real world?
USSR's fundamental problem of price signaling

A digression on why do we trade? (FYI)

- Specialization
 - An idea of comparative advantage (Ricardo, 19 century)
 - Not absolute (Adam Smith), but comparative, otherwise country that does everything better won't have reasons to trade
- New trade theory
 - IRS and monopolistic competition (Krugman, 1979)
 - Argument for protectionism and custom unions
 - E.g. Japan
- “New” new trade theory (Melitz, 2003)
 - Intra-industry reallocation
 - E.g. Canada
- Love of variety
 - CES preferences – mainstay in international trade

Borrowing is trading over time

- To buy import we have to borrow abroad, but later we have to produce something, but not consume, to pay off the debt
 - E.g. we can import (borrow the value of) an efficient piece of machinery (e. g. drilling rig)
 - So we can produce more (expanding the PPF), so in future we export and repay with this increased earnings
- In other words: country borrows if consumption today is more important than lost consumption tomorrow
 - Think interest rate
- Over time b/c we buy import and sell export at different points in time
 - If we did everything at the same time then trade would be perfectly balanced

Export, Savings and Investment

- Let's formalize this idea
 - National savings definition: $S = Y - C - G$
 - GDP (expenditure approach): $Y = C + I + G + NX$
 - $NX = S - I$
 - $S=I$ at any point with closed international capital markets. E.g. sanctions
 - In open economy S could be higher than I , but that leads to $NX > 0$
- If we want to buy foreign stuff we have to
 - Either sell stuff for the same value, then $NX = 0$
 - Or borrow from foreigners, then $NX < 0$ and $S < I$
 - Even when we export and keep their currency and not formally lending (e.g. CBR)
 - Foreign currency is a right to buy in the future "use our car, we don't need it now"
- Most lending is formal (bank deposits, foreign shares, (t-)bonds)

This logic is presented in Balance of Payments

- BP is records of money going in and out of one country to another
 - Has two equal sides (current and capital) as any accounting record
- Current account (for most countries essentially NX)
 - Money earned by exporting (NX)
 - Factor (labor and capital) incomes abroad (trivial for most countries)
 - Armenia, Uzbekistan
 - Factories, any other capital gains
 - Unilateral transfers
 - $CA > 0$ актив текущего счета, $CA < 0$ пассив текущего счета
- Capital account
 - Records of foreign debts or lending (many different forms)
 - Investment for the most part (portfolio or direct)
 - E.g. inflow is if a German fund buys a t-bond or a factory in US

Balance of payments

- The CB reserves have a separate record, but it is a part of capital account
 - From macroeconomic POV doesn't matter who buys t-bond or hold foreign currency
 - But since CB reserves have a special purpose they are recorded separately
 - Reserves are zero for free floating currencies, they are required for interventions
- CBR buys low-risk t-bonds, foreign currency and gold
- Everything that we save, but not invest we lend abroad
 - Plus of current account is a capital outflow, or minus of capital account
- Likewise if we invest more, then save we borrow it abroad
- Current account (NX) = Capital account (S-I)

Sneaky Asian countries

- Export always results in capital outflow
- Krugmans in his NYT column once cited a journalist saying:
 - Asian countries will keep exporting more than importing b/c they have cheap product and poor population and...
 - Attract capital since it's advantageously to produce there b/c of cheap labor
- So Asian countries make money by exporting and attract capital
- BUT no country can be net product exporter and net capital importer
 - $NX > 0$ can't go with $S - I < 0$
- In fact, Asian countries lend capital if we examine macroeconomic statistics



Global imbalance of 2000s (“The Twin Deficits”)

- A hot topic in academic and political circles
 - USA become politically dependable on foreign debt holders
- First decade of 2000s developed countries (e.g. USA) had few (negative) savings
 - Overvalued real estate
 - False feeling of opulence
 - Both private and public sectors
 - Public debt is huge, except 1999
- High investments could be maintained by money from outside
- Meaning that $NX = S - I < 0$
- Who is lending? Asia! (Russia likewise)
 - Huge foreign reserves that we lend
 - A “rainy day” savings for us

Problems of chronic deficit of American federal budget

- Deficit can be financed by taxes, printing money and borrowing
 - Our case is borrowing by selling treasure bills
- Government compete with private sector (which is more efficient) for investment (crowding out)
 - This is a zero-sum game for the economy (not in the recession)
- Demand for t-bonds nominated in dollars, drives dollar up, which lead to trade deficit, which is covered by selling US assets (factories, malls, etc.)
- Since 1960s the external debt has quadrupled leading to political dependency
- Paying interest on external debt is essentially a tax on US citizens by foreigners
- Internal debt lead to inequality, since rich holds bonds, yet all are taxed
- Limits on fiscal policy during recession
 - We can cut rate, but fiscal policy combined with monetary is better

Бюджетное правило заставит поднять налоги в момент рецессии, усугубляя ее

However, some economists believe that internal debt is a good thing: public goods and infrastructure

How to get trade equilibrium?

- As in any economic framework some sort of relative price adjusts to achieve equilibrium
 - We have NX and $S - I$ that should be equilibrated somehow
- In this case, this price is “real exchange rate”
 - A hot topic in public discourse in Russia few years ago, b/c of high rate of growth after devaluation in 1998
- Nominal exchange rate (e) – the one we see in banks
 - The price of a dollar (a euro) in rubles

How to get trade equilibrium?

- Real rate is a relative price of our products in terms of foreign ones
 - A bunch of products in our country and the same bunch abroad
- Real exchange rate $\varepsilon = P/eP^*$
 - Home basket is compared with foreign one after conversion into home currency
 - P^* price level abroad; P price level in home (Russia)
 - This is relative price of our products in terms of foreign products
- Case of $\varepsilon = 1$ called price parity
 - In Russia products are cheaper than in the West, but pricier than in Asia
- Real effective exchange rate
 - Weighted average of real exchange rate, where weight is the portion in trade

A digression to GDP and market price puzzle

(a direct implication of price parity)

- The market price of all ultimate products made within a country for a given period (we can't sum units)
- GDP is just an (imperfect) estimate for the size of economy
 - Not a measure of wealth (e.g. home), leisure, ecology, education, equality
 - There were lots of attempts to make something better
 - Northern European countries leader, b/c of great education and ecology
 - Still GDP is the only observable variable that correlates with everything we associate with economic development
- Qualifications on market price convention
 - Change in relative prices with the same level of production
 - Not all products and services do have market price (e.g. army services, education)
 - You can't even buy some sort of products and services (e.g. education, living in your own place)
 - Market price is not always a fair price? (e.g. price abuses by monopolies)

An estimate of an estimate problem (FYI)

- So GDP is just an estimate of the size of the economy
- Official statistic: 1990 – 1998 GDP fell down by 40%
 - How to appraise the product whose production was discontinued after 1992?
 - How can we compare GDP of Russia and Russian Soviet Federative Socialist Republic (RSFSR)?
 - For reconstruction of time series we assign a hypothetical market price to output
 - No certainty that soviet products could be sold for positive price
- How bad was the recession in 1990th in Russia?
 - There are reasons to regard the recession as overestimated

GDP in 2012 in billion US\$

(World Economic Outlook, IMF)

1	USA	\$16 245
2	China	\$8 221
3	Japan	\$5 960
4	Germany	\$3 430
5	France	\$2 614
6	UK	\$2 477
7	Brazil	\$2 253
8	Russia	\$2 030
9	Italy	\$2 014
10	India	\$1 842
11	Canada	\$1 821

GDP by purchasing power parity

- But how correct to calculate GDP in US dollars
- That was GDP in USD where nominal exchange rate is used
 - E.g. Russian GDP in 2012 is about 62 trillion RUR, dividing it over 31 (the annual average nominal exchange rate) we get $\approx 2,03$
- But 1\$ in Russia is not the same as 1\$ in USA
 - We can buy more stuff in Russia
 - The same products cost less
 - GDP would be lower if, for example, a haircut costs lower in Russia than in the US
- This is GDP by PPP, we assume common price
 - Again, dubious, since haircut are different not only between countries, but even within a country

PPP and nominal GDP in 2012, billion US\$

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3	India	\$4 716
4	Japan	\$4 576
5	Germany	\$3 167
6	Russia	\$2 486
7	Brazil	\$2 330
8	UK	\$2 313
9	France	\$2 238
10	Italy	\$1 813
11	Mexico	\$1 798

Real exchange rate and net export

- Real exchange rate is a relative price of our products to foreign ones
 - So, drop in ε increase export and stimulates import substitution
- In Russia drop in ε doesn't lead to export, only to decrease in import, which essentially import substitution given that consumption is relatively constant over time
 - In other words export in Russia is inelastic to real exchange rate, in countries that export machineries the situation is different
- So ε is negatively related to export. Keep this in mind
- BTW. Some economists call for devaluation since of growth after double devaluation of ruble in 1998
 - It was the first growth after 70th. 70th till 90th period of «застой»
 - But it is very limited POV, price always adjusts to supply and demand. Price never determine those two

Formalizing this idea

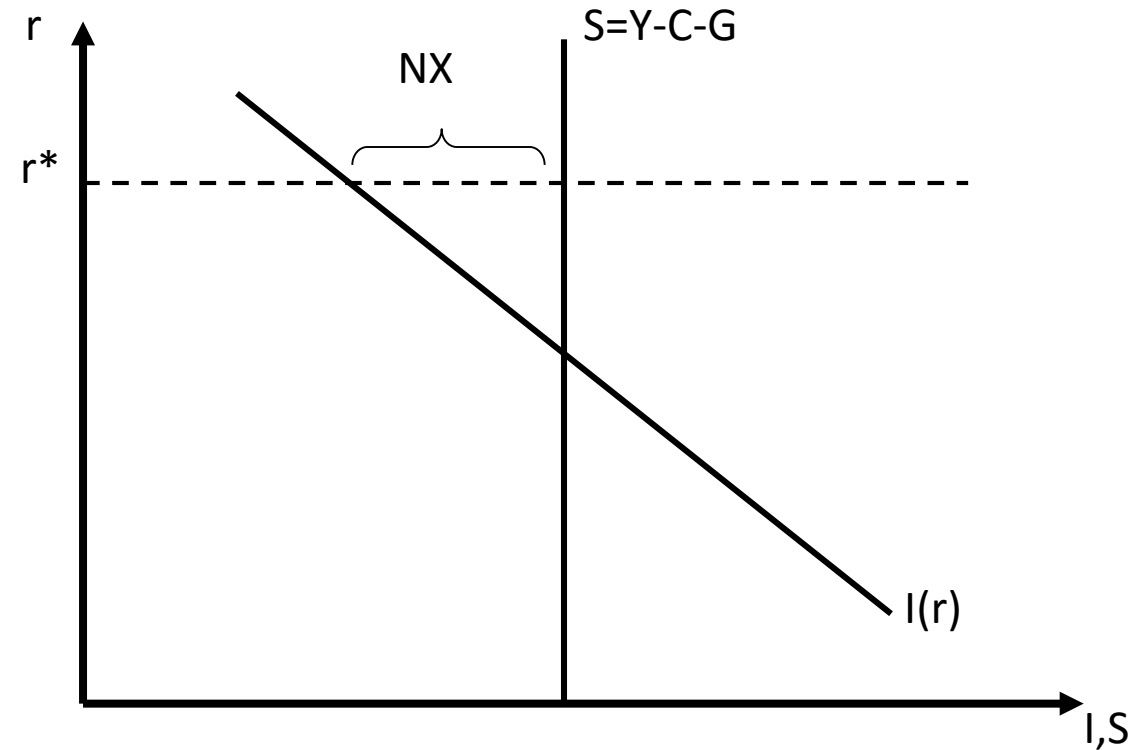
- Yet we know that in equilibrium $NX = S - I$, where
 - S and I are determined by aggregate decisions of firms, households and government
- Real exchange rate adjusts to equalize net export to different between savings and investments
- We will consider “small and open economy”
 - Country can't effect world prices and interest rates. Russian GDP is 2 trillion, while World's is 50, this economy has no effect on the world economy
 - Most countries except the US are small economies, they individually too small to effect on prices and interest rates
- Assumption of perfect capital mobility (that's why open)
 - Real expected interest rate (r^*) are equal all over the world
 - r^* is determined by world savings and investments
- BTW. What is “capital control”?
 - E.g. Ukraine, China. Handing in all foreign currency. All domestic credits in local currency

Specifying other variables

- Defining savings as $S = Y - C - G$
 - Y, C, G are all exogenous, and determined by decision of respectful agents
 - Usually C endogenous and depends on r , but in real life dependency is trivial and we can disregard it
- Positive S we put on the world's saving and investment market
- As usual investments is a function of real interest rate $I = I(r)$
 - r is a exogenous to economy and defined on the world market
 - This is actually the only difference between open and closed models
 - If interest rate is low and returns are high firms invest and the other way round

Graphical solution for NX

- I and S are identical and independent from r
- I is negatively related to r
 - In closed economy intersection would define r
- Here r^* is defined by world S^* and I^*
- On this graph savings are higher than investments, so we lend money
 - r^* could be high b/c of lack of S or high I
- So we put our saving on the world market and foreign firms ready to use them
- We have a capital outflow and positive NX
 - selling abroad more than buying and lending the difference

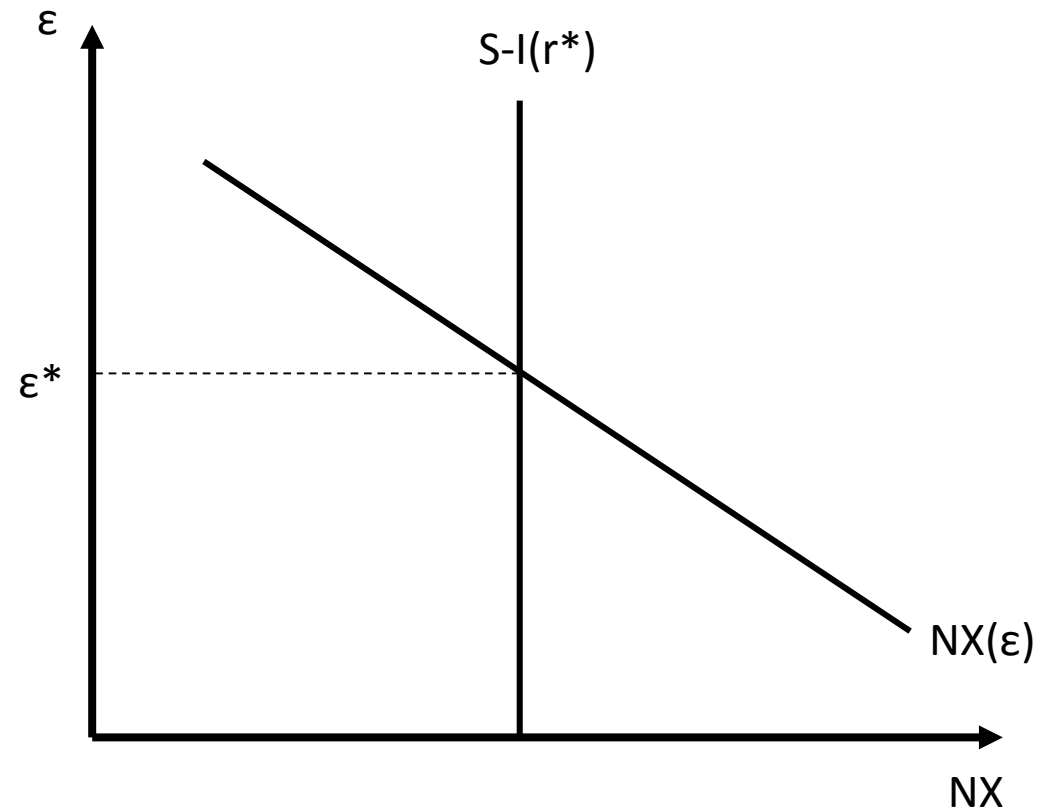


Factoring in real exchange rate

- So we already got NX without real exchange rate and it is not weird
- Real exchange rate doesn't effect NX because it is a relative price of our products to foreign ones
- And as any other price is adjusts to supply and demand. In our case to equalize: $NX = S - I$
- BTW. It works only in long-run, it works a bit differently in short-run

Graphical solution for ε

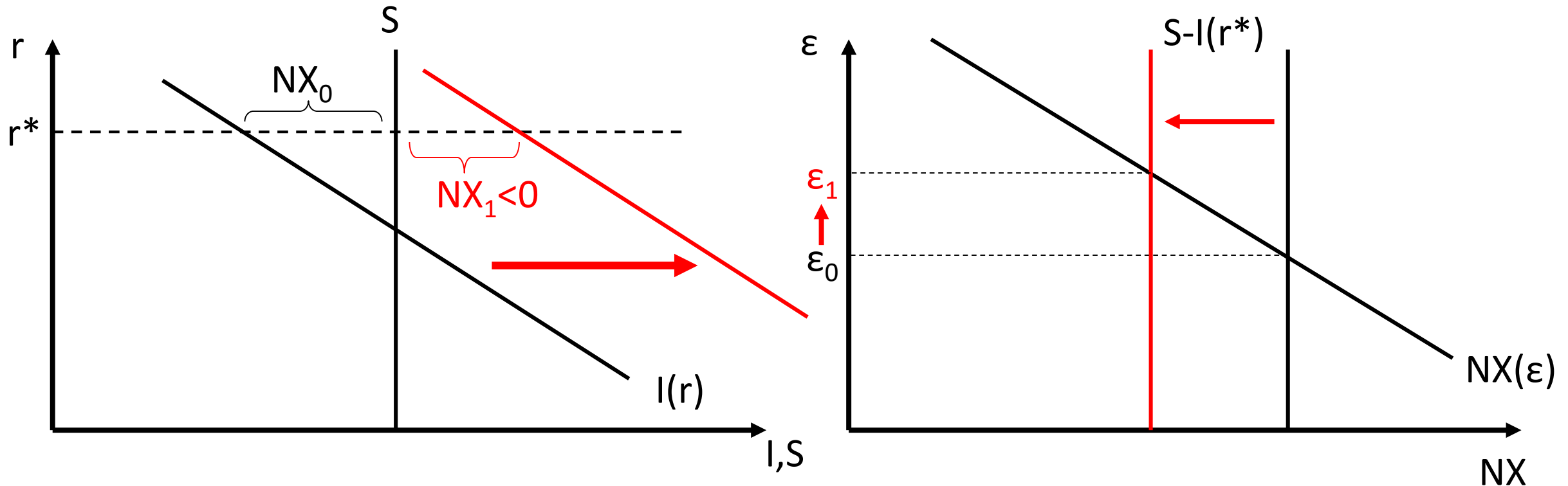
- NX is negatively related to ε and defined by S and I, or by preferences
 - If, with given prices, we prefer import line moves to the left, if foreigner prefer our products line moves to the right
- But how people get to know about it? They simply buy and sell after all
- The real exchange rate adjusts so that people buy as much import as they can given S and I



An example: increase in optimism

- Investment goes up.
 - E.g. technological advancement or improvement of investment climate
- Investors observe increased returns (optimism in business plans) that fosters demand for rubles (for assets nominated in rubles)
 - In real term it is demand for Russian products, services and labor
- The price of ruble in real terms gets higher, so our products become less competitive and export goes down
- So S-I went down and NX adjusted in a little while

An example: increase in optimism

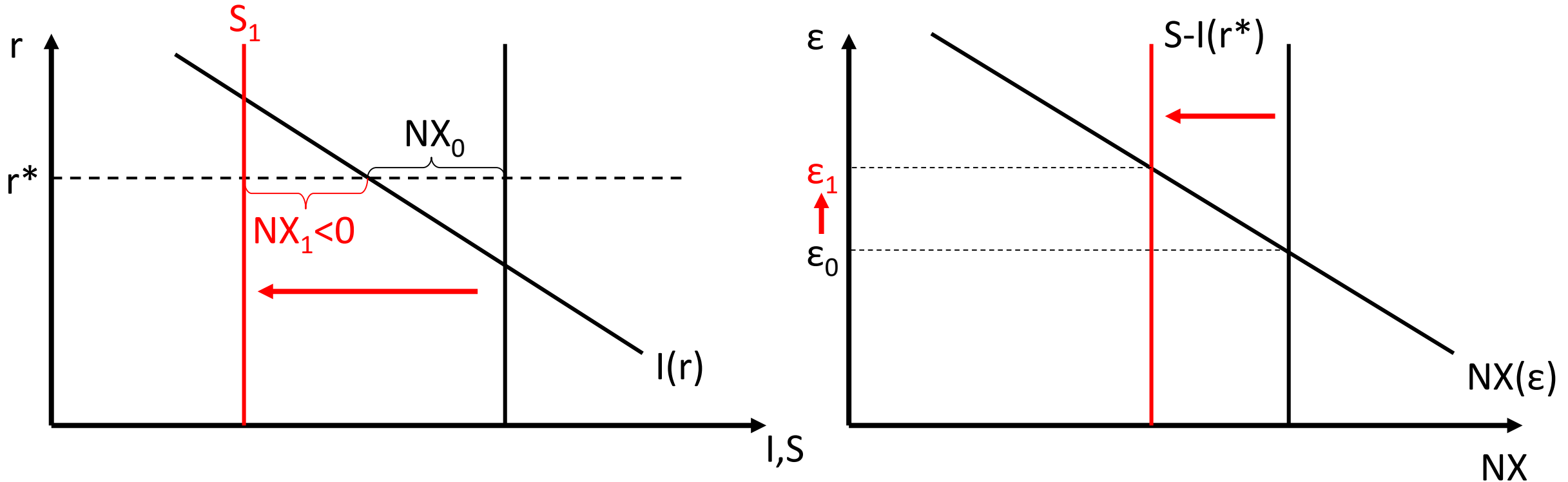


Here I is so high that S (with given r^*) is not enough, so we borrow and that is $NX < 0$
Capital inflow appreciate the currency, e.g. Russia in 2006 and 2007

USA and Asia

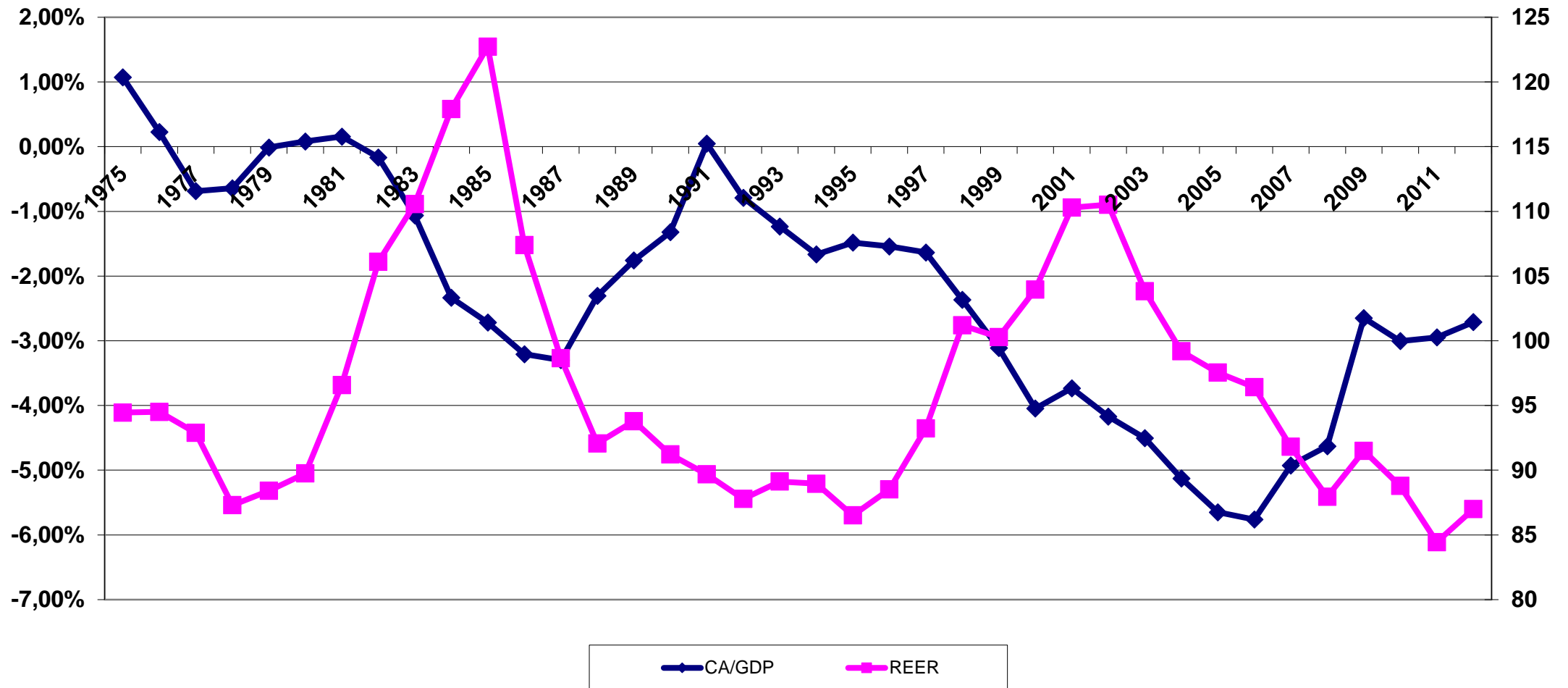
- Let's apply this logic to global imbalances
- America doesn't save and borrows a lot
 - Both private and public sectors
 - Meaning that Investments are higher than savings
- This excessive demand shrinks supply of dollar on the world market
 - Investors demand dollar to buy American assets
 - That is the reason for raise in price for dollars in 1995 – 2003
- This is an increase in real exchange rate for dollar, so that American products get relatively pricey
- Thus, Americans buy less American and more Asian
- The equilibrium is reached: $S - I < 0$, and $NX < 0$ adjusts in a little while

A graphical illustration, Stateside.



The current account deficit and appreciation of dollar are both the results of American borrowings. Dollar reached it maximum in 2002-2003

Real exchange rate and current account



Why dollar started depreciation in 2003

- Why dollar started depreciation in 2003 long before jump in savings?
- Most likely it happened on expectations
 - Anticipation of dollar devaluation made investor to sell dollar nominated assets
- And the opposite chain of events kicks in
 - Dollar depreciates, and current account turns non-negative
- However Americans started to save only because of GFC, but government still in huge debt because of bail-outs
 - Public debt keep current account still negative, Americans still borrow 3% of GDP
- Why savings have elevated?
 - The burst of real estate bubble undermined consumers confidence, they can't take loans using real estate as collateral
 - And Asians stopped buying t-bonds, lack of demand for them, increase interest rates and the US government will stop borrow at expensive rate

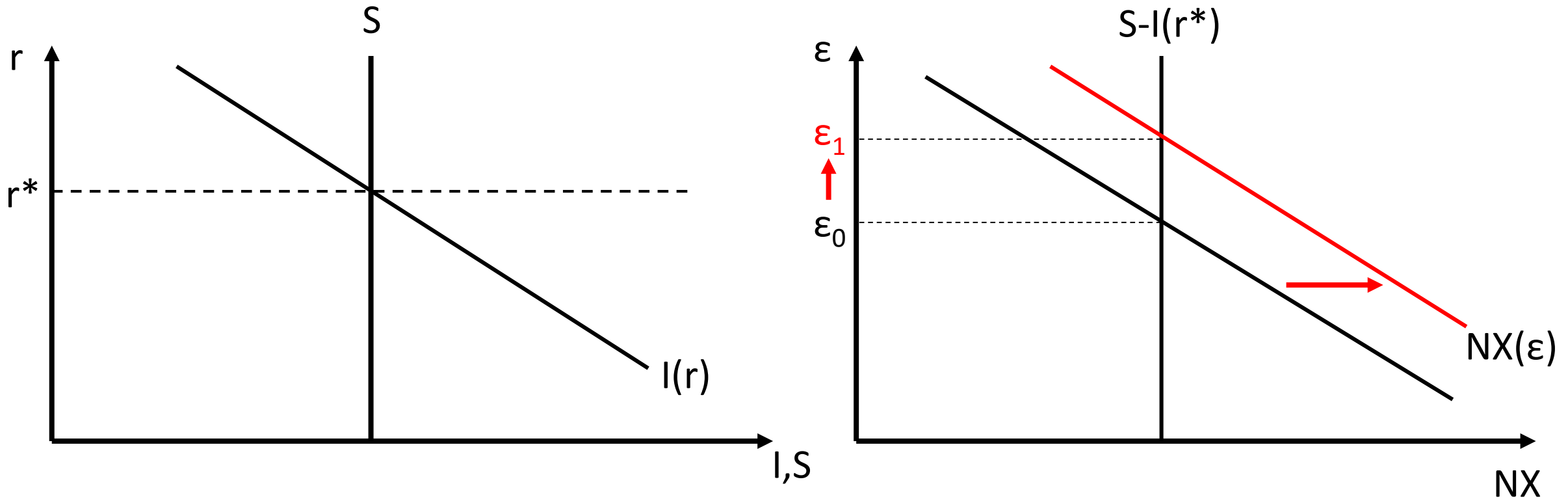
Russia

- In 2000s we had a huge surplus of current account
 - We sell commodities, but buy import on lesser amount
 - But if money go into country we again have to import the same amount or lend
- Oil prices: ~20\$ in 90th, less then 10\$ in 1998, but in 2000th >100\$
- CA surplus maintained deliberately by CBR and MinFin
- Meanwhile in 2000s government paid off a debt of 150 billion from 1990s
 - Back there debt was bigger then GDP
- And before 2005 and after the beginning of crisis private sector likewise exports the capital

Oil prices and real exchange rate

- Increase in oil prices moves $NX(\varepsilon)$ rightward
- We predominantly export raw materials (80%), which is independent from real exchange rate
 - Essentially, this is a net transfer from abroad
 - You can rewrite $NX(\varepsilon) = X_0 + NX_1(\varepsilon)$, where X_0 – raw materials
- It means that we are eager to export more with the same exchange rate
 - From 1999 till 2013 we increased out export in 8 times
 - Keep in mind $NX = S - I$
 - Thus, import should increase on the same amount
 - Likewise, the real exchange rate

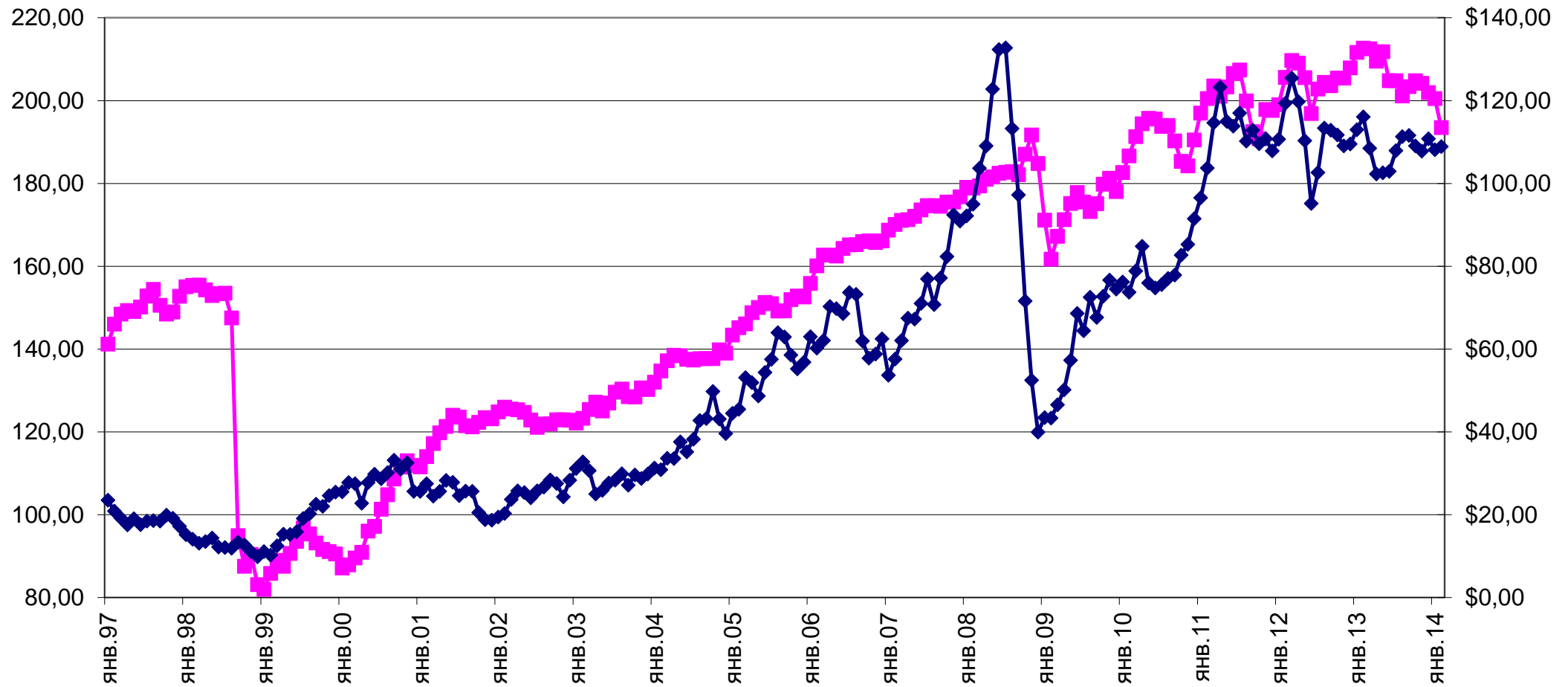
Russia



An increase in ruble is the result of increased foreign currency income

So we have more petrodollards for given amount of rubles

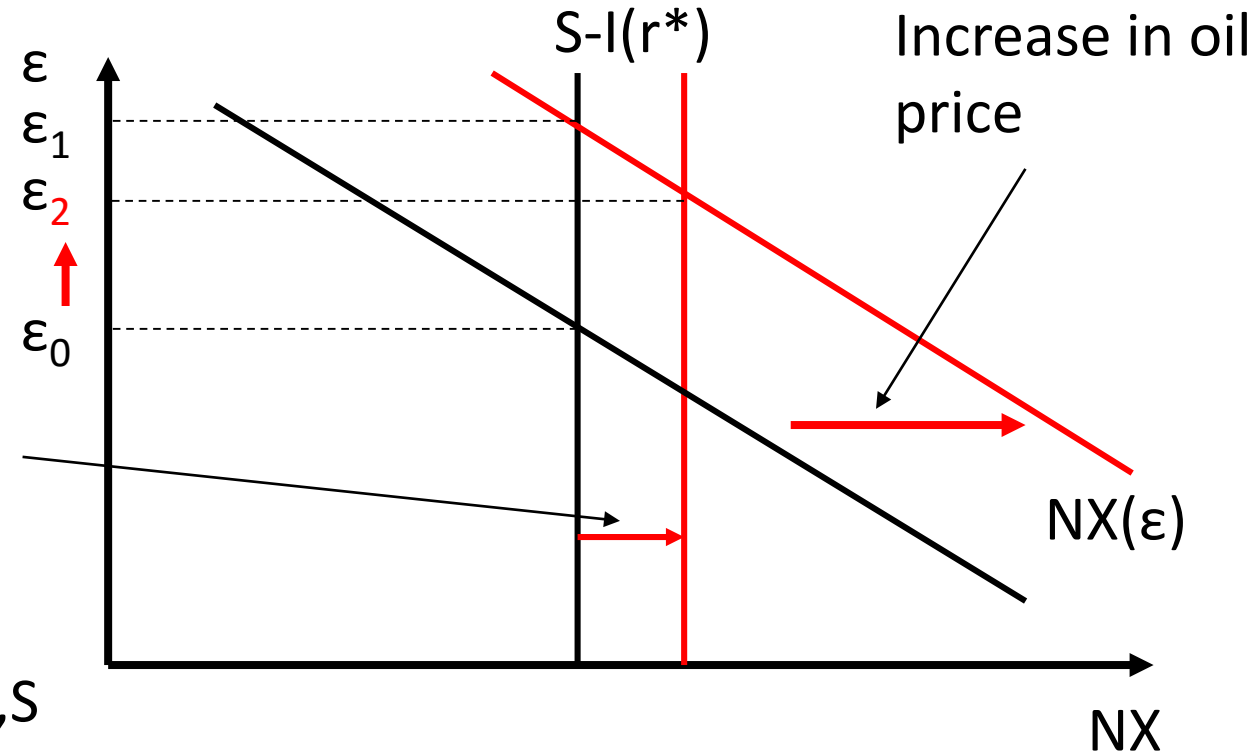
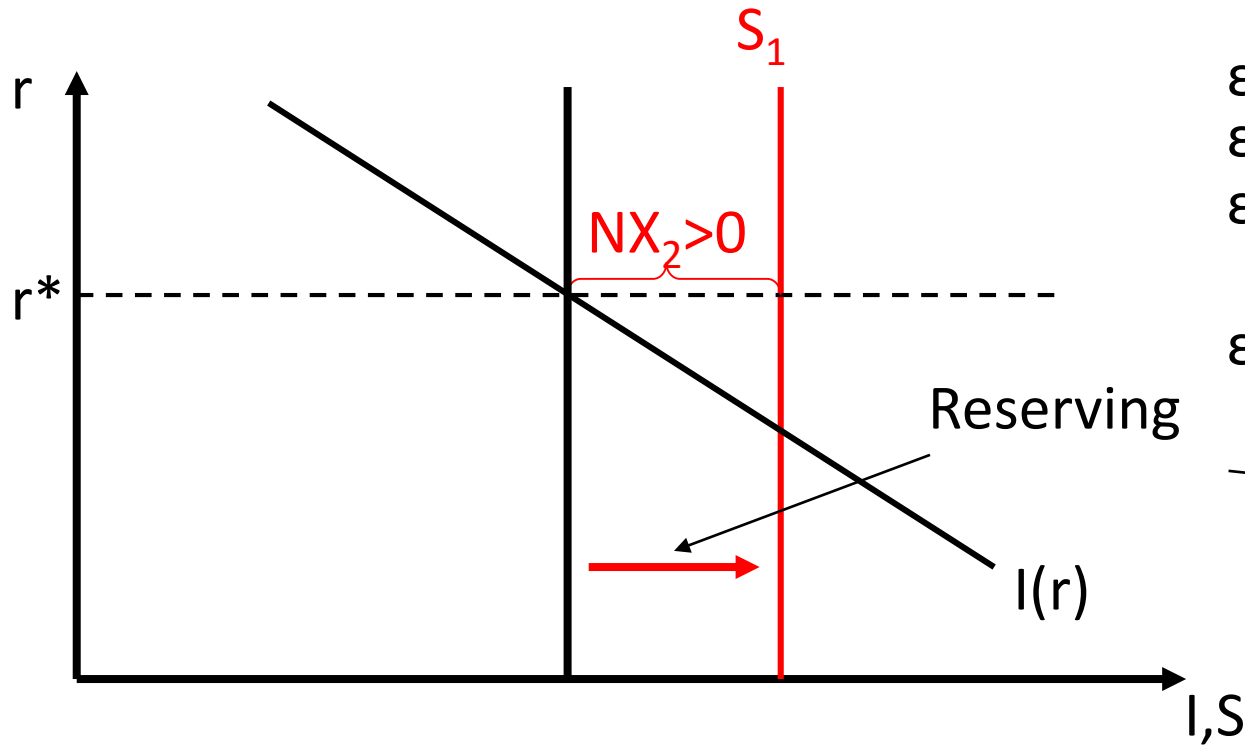
Graph: oil prices and real exchange rate



Reserves and real exchange rate

- Bank of Russia and Ministry of Finance amass foreign currency reserves
 - Among other things, to prevent strengthening the ruble
- This operation is essentially a “reversed” oil exporting: dollars are removed from the economy
 - In 2000 – 2007 20% of export revenue was removed
- As the result, the exchange rate is lower
 - Actually, will simply increase at lower pace
- And we get a current account surplus
 - Would consumers spend everything on import?
 - Or would export capital as do Bank of Russia and Ministry of Finance

Amassing the reserves



Reserves and Stabilizing Fund prevent ruble from appreciation

Why real appreciation is a problem?

Dutch disease

- Lots of petrodollars, increase in real exchange rate, make import affordable
 - That's good from consumers POV
- In 2000s we bought lots of goods, half of which was machinery, which is great, since now we produce some new goods
- But why even bother to produce if we can import everything?
- Country eventually specialized on those things that can't be imported
 - Services
- Petrodollars spread in the economy through services
- Sector of services doesn't demand education and R&D
 - Simplification of the economy and technological progress slows down
- Dutch disease has no empiric confirmation. There are advanced and backward commodity based economies

Demand for money

Switching to nominal value

- Money is an asset and has market
- Demand: the portion of wealth that agents want to keep in liquid assets
- We can keep wealth in
 - Money
 - Cash
 - Deposits
 - Foreign currency
 - Financial assets, real estate, jewelry
- Liquidity: how fast we can turn thing into cash
 - Foreign currency
 - Deposits (penalties in US and Russia)
 - Stocks (tradable/nontradable)
 - Bonds (short-term)

Supply for money

- Monetary base (M0)
- CB buys something in the economy on the secondary market. It is determined by monetary policy
 - Bonds (Minfin issues bonds to fund the budget)
 - Sterilization
 - Foreign currency
 - Holders of foreign currency (those who sell abroad, mostly oil) sell them to CB to buy rubles
 - Minfin tax-stab fund-selling to CB (reserves). That's how CB got reserves
 - REPO
- Credits and deposits of CB
- All of these is M0 only, then we get M2

Money multipliers

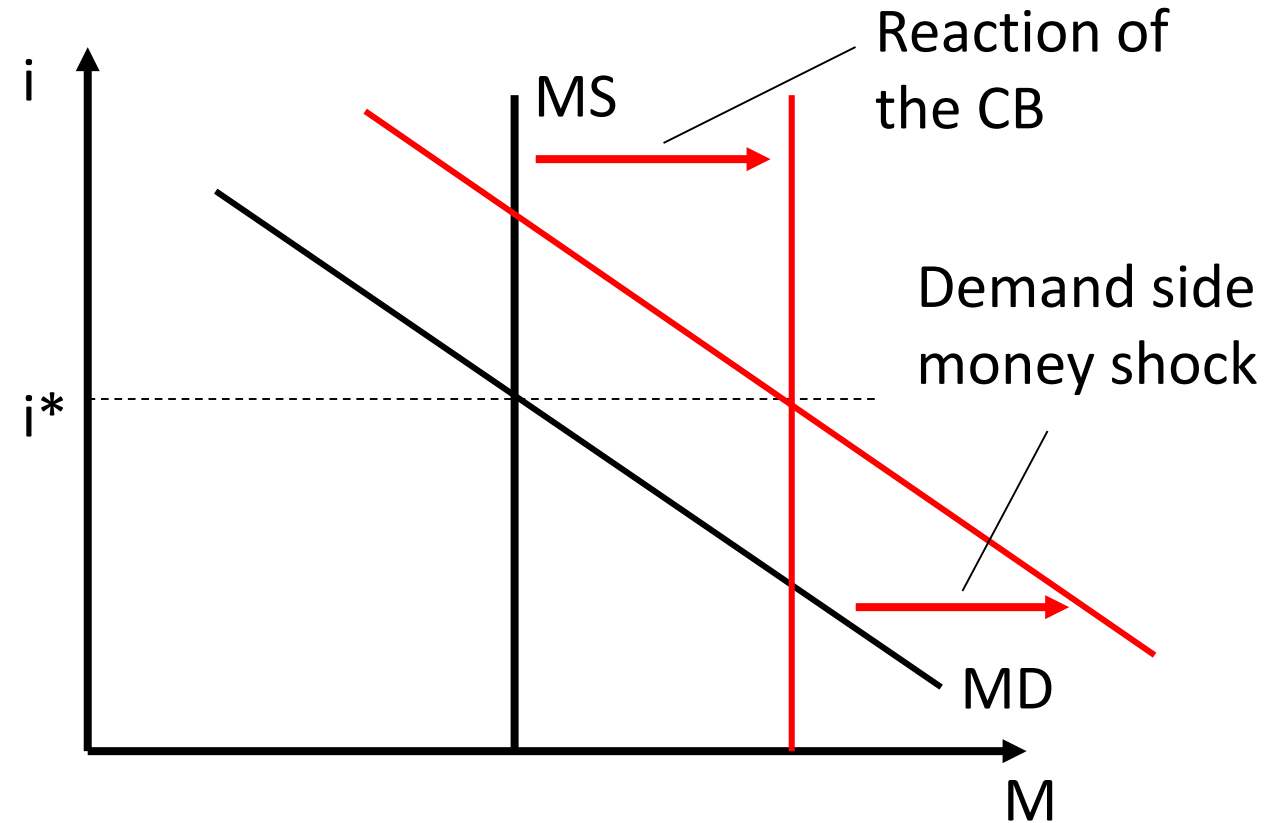
- Bank A gets 100 RUR of deposit from mister X
 - Assume 10% reservation norm (положение 254)
- The rest 90 RUR goes to mister Y as a credit
- Mister Y deposits 90 in bank B
- So that economy already has 190 RUR of deposits
- But the process keep going endlessly
 - Bank B gives 81 RUR to mister Z; economy has 271
 - So, the eventual monetary supply is calculated as a sum of geometric progressions:
 $100 * 10 = 1000$
- 100 monetary base (M0), 1000 monetary supply (M2), 10 – money multiplier

Equilibrium on money market

- In most countries nominal interest rate equalizes demand and supply
 - Not in Russia before the crisis
- E.g. Bank of Russia announces short-term interest rate (ключевая ставка)
 - Most rates are not under control of CBR (interbank, deposit, bonds etc.)
 - CBR can influence the rates. If too high then not enough money, so it can buy bonds or lend money at ключевая ставка
 - Banks won't borrow at rate higher than CBR's
- If demand $>$ supply, the CB reacts and increase the supply until $D=S$
- On contrary, if the CB is fixes monetary supply, then interest rates adjusts
 - The CB can't control both at the same time

Graphical illustration

- The CB announce interest rate
- If demand for money is up then the CB reacts to keep the announced rate
- The CB changes monetary base if multipliers vary



Equilibrium with fixed exchange rate

- This equilibration is more aptly describes Bank of Russia policy before 2008
- Practical pegging to “dual-currency basket”
 - 45 eurocent and 55 American cents cost around 29,5 RUR
- How does it work exactly?
 - Nothing is banned, the CB buys and sells foreign currency at announced rate
 - CBR would need lots of foreign currency to do that b/c it doesn't print it
 - If not CB then – MICEX
 - NB! The CB can't control rate and monetary base concurrently.
- If agent choose to hold rubles, then supply is increased
 - In some year M2 grew by 50%
 - The main reason for inflation

Equilibrium in long run. Price adjustment

- The last way for equilibrating is through price level.
- M is a nominal variable, while M/P is a real one
 - Economy choose M/P , while the CB choose M, so P is a market choice
- P adjusts to balance demand and supply
- If supply > demand actors dump money to buy the same amount of money, the only result is inflation
 - “too much money chase too few goods” problem
- Interest and exchange rates adjust instantly, but prices are rigid
 - Btw: price and wage rigidity are the main Keynesian assumption and the main villain of the Great Depression.
 - We’ll talk about this much more during my next class

This is actually
QTM

Monetary policies and level of development

- Is Russia a developing country?
 - \$40000 per capita threshold
 - Problem is overtaking development
- Are there any peculiarities in developing countries?
 - High inflation
 - Relatively large capital in and outflows (“sudden stop”)
 - Currency crises
- Next time we’ll be talking a lot about monetary policies of developed countries
 - Stabilization around potential GDP (Taylor rule, moderation etc.)
- Monetary policy principles are the same and inflation targeting is the predominant monetary policy
 - Change in CBR monetary policy

Monetary policies in Russia

- 1992 – 1994: the period of high inflation (e.g. 2500%)
 - “Price shocks”
- 1995 – 1998: “Валютный коридор”
 - Pegged exchange rate essentially
- August 1998: currency crisis
 - Devaluation, allegedly flexible exchange rate
- 1999 – 2008: managed floating
 - Formally the exchange rate is flexible, but under Bank of Russia supervision
 - Some think that it should be classified as fixed
- 2009 – present days: an attempt to switch to inflation targeting.
- 2014: sectorial sanctions and lack of foreign funding
 - A complete change of monetary paradigm.

Monetary objectives in developed countries

- Developed countries try to stabilize GDP around the historic trend
- They are already on the production possibility frontier
 - All technologies are already utilized
 - Enough capital is accumulated for given technologies and population
- Technological progress drives the economic growth
 - New capital is employed as technologies progress
- This growth is not a monetary authorities domain
 - Cycles moderation is the only thing they can do
 - “Great moderation”
 - CB independence, Taylor principal, structural change (labor, IT, JIT)
- Abnormal exceeding of productive capacity might happen b/c of uncommonly intensive resource utilization
 - This is called “overheating”

Monetary objectives in developing countries

- These economies are not on frontier (idle resources)
 - Modern technologies are not utilized
 - A excess of labor with scarcity of capital
- The objective: to reach the possibility frontier
 - By investments and innovation they can “jump” above trend, unlike e.g. USA
 - Does term “overheating” in regard China and Russia make any sense
- Healthy political and economical institutes are needed for investment (e.g. property right protection), that’s not a monetary domain
- Macroeconomic stability
 - A challenge for developing countries

Macroeconomic stability

- Low and stable inflation
 - Impedes borrowings for overtaking development
- Low volatility in exchange rate
 - Esp. if economy has lots of foreign currency (“dollarization”)
 - “Original sin”
- Absence of default risks
- People never notice macroeconomic stability
- Yet they always notice instabilities
 - Russia: 1992-1994, 1998, 2008

Fixed exchange rate

- Popular monetary policy in developing countries
- Central banks announce nominal exchange rate
- And commit to sell and buy any amount at this rate
 - Or market will set its own rate
- However, a central bank needs sufficient amount of foreign currency (b/c it doesn't print those)
 - It won't be able to keep the rate when runs out of reserves
- The variety of fixed rate policies depending on the degree of strictness
 - Currency board (Валютный контроль) (e.g. Estonia 2010, Argentina 1991, "White" Russians) by law money is issued only if agents want to sell foreign currency to central banks. Local currency is fully reserved
 - Horizontal or crawling band. No law, CB can announce or can simply resort to interventions at discretion (Russia prior to 2008, China)

Why to fix exchange rate?

- To cope with inflationary expectation
 - Tying central bank's hands (“Nominal anchor”)
 - Important signal that CB won't print money
- Central banks rarely enjoy confidence in developing countries (recall dollars in 90th)
 - Actors might not believe that CB (\equiv government) won't print money
 - The reason for CB independence
 - Any emission beyond will change FX rate
 - Harder to brake the promise not to print
- That's why many countries fix FX rate
 - Including Russia (1995) and almost all post-soviet countries
- Fixed FX rate also reduce uncertainty
 - Especially if economy is highly dollarized like ours
 - Some research that fixed FX rate fosters international trade (EU)
 - Dubious point; related to developed countries

Reducing the uncertainty

- Any FX rate fluctuations hurt business
 - Ruble appreciation hurts real sector
 - Reduce competitiveness of export
 - And home profits
 - Ruble depreciation makes import of machineries and raw material pricier
- Both lead to financial losses
 - Can't plan sales and production
 - Ensuing fall in investments
- Financial markets make up for volatility and fall in investment (e.g. forwards)
 - Yet in developing worlds financial market are weak

Costs of fixed FX rate

- Total dependency of monetary system (an advantage in some cases)
 - The CB can't do what it's meant to do
 - Stabilize the economy around the historic trend
- Let's play out a scenario
 - Ruble is pegged to dollar
 - The Feds increase the interest rate (consider "overheating")
 - Capital torrents to the US
 - Dollar would go up if ruble had a flexible exchange rate
 - But being pegged ruble stays the same
 - So, everyone changes rubles to dollars
 - Ensuing contraction of monetary base, interest rates go up
 - b/c rubles go to CBR for dollars
 - But maybe Russian economy doesn't need higher interest rate?
- We essentially import American monetary policy

Digression to interest rate parity

- An open economy extension to IS-LM – Mundell-Fleming handles relationship between interest rates and exchange rates
 - You can analyze fiscal or monetary stimulations with both floating and fixed FX rates
- The main assumption is uncovered interest parity
 - Stylized fact

$$\frac{(1+i)E^e}{E} = (1 + i^*) \text{ or } E = \frac{1+i}{1+i^*} E^e$$

- Two direct implications:
 - $\uparrow i = \uparrow E$
 - To keep E cons the CB should keep i and i^* the same
- Efficient financial markets – covered interest parity

Reaction to exogenous shock

- Flexible FX rate is a natural economical stabilizer
- A scenario
 - Assume that country ran into recession
 - Demand for funds go down, likewise interest rates
 - Capital outflow depreciates national currency
 - That stimulates import substitution
 - Which, in turn, soften the recession
- With fixed FX rate, on contrary, recession is intensified
 - Capital outflow shrinks monetary suppl
- This exact mechanism intensified recession in Russia in spring 1998 and autumn 2008
 - In both cases Bank of Russia maintained the fixed FX rate and increased the interest rates, which badly hurted the economy

The menace of currency crisis

- Often fixed rate regimes spring into crises
 - Sharp capital outflow depreciates national currency
- Change in macroeconomic fundamentals
 - Fixed rate diverges too far from fundamental market rate
 - Actors observe significant discrepancy and dump national currency
 - Sharp instantaneous devaluation and huge financial losses
 - Recession
- Monetary authorities can try to ward off the speculative attack
 - They might succeed or fail
- Or let go

Currency crises

- Last wave happened in the end 90th
 - Are these connected? (In hindsight through collective actions of investors who concurrently recognized the problem in those countries)
 - Mexico (1994 – 1995); Asian crisis (South Korea, Malaysia, Thailand, Indonesia, 1997); Russia (1998)
 - Then Brazil (1999) and the culmination of Argentinian crisis (2001)
- The common reasons
 - Fixed FX rate – capital outflow – devaluation – shift to floating FX rate
 - Domination of fiscal over monetary reasons
 - The CB fixes the rate on one hand and meanwhile does actions that contradict it

What about policy inconsistencies

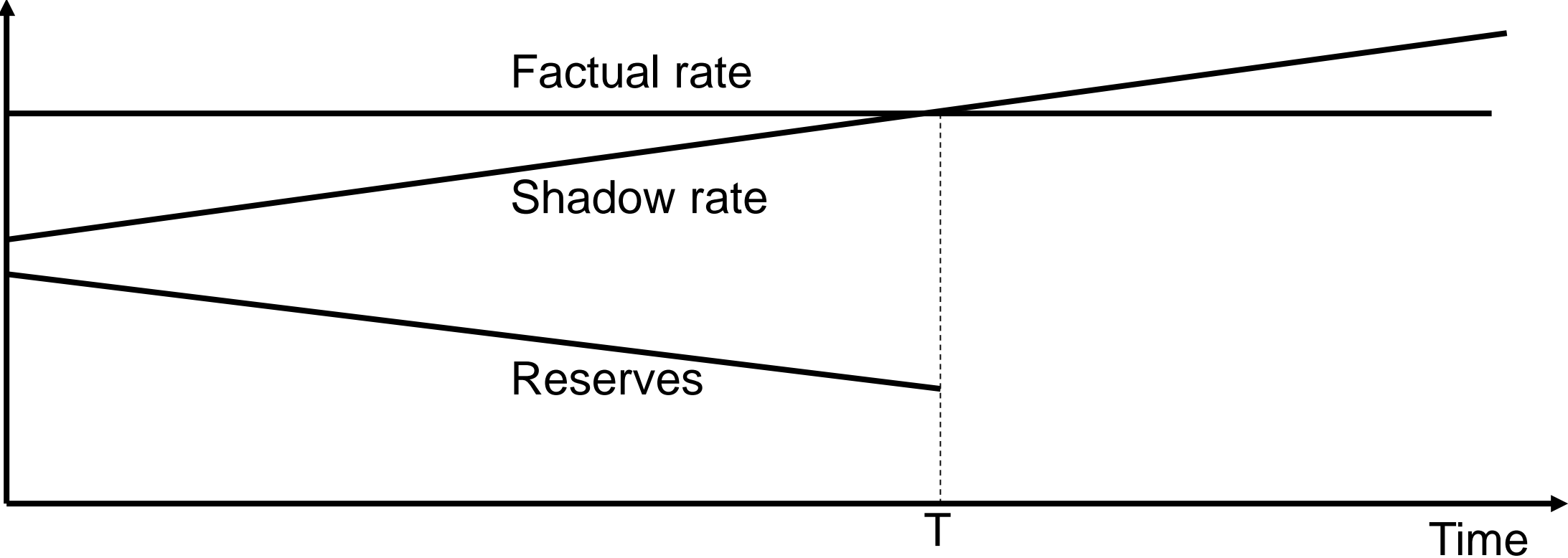
- What happens with fiscal leniency under fixed exchange rate
 - E.g. seigniorage financing of government spending or lending to commercial banks
- People getting more rubles, while the value of import stays the same
 - E.g. washing machine costs the same in dollars, while the costs of dollars is fixed
- Huge demand for dollars to buy import
 - Essentially the CB provides a discount to purchase foreign goods
- Eventually the CB runs out of reserves
- And have to liberate the FX rate
 - It could happen gradually by expanding the rate brackets
 - But in problematic countries it all too often ends through colossal devaluation and crisis

Moment of speculative attack

- Attack happens when the CB does have enough reserves
- Market (banks, investors) estimate their own “shadow” FX rate
 - The one that would have been if the CB did not intervene with given supply of money, interest rates etc.
- If actors believe that ruble is way cheaper than officially stated they dump ruble to buy yet cheap dollars
 - If someone else overruns them they lose the value of ruble assets
- With currency they sell all assets nominated in rubles (bonds)
 - Sold en masse bonds push rates up, money becomes scarce, fall in investment, recession, full scale crisis
- Essentially this is a self-fulfilled prophecy, like bank runs
- Won't happen if the CB has enough reserves

Moment of speculative attack graphically

(1979, Krugman)



A bit more on “shadow rate”

- Krugman’s model assumes that increase in money supply decrease “shadow” value of ruble
 - Marshall’s motto “Natura non facit saltum” (like in any other economic model)
 - But in real life “shadow” rate jumps
 - Dump rubles if feel like it might go down
- Expectation of money emission has the same effect
 - Exactly how expectations of inflation cause inflation itself
- Thus, speculative attacks take place not because of factually increased money supply, but if actors feel like it will happen
 - Lack of trust to ruble and government
- Currency market break down makes “shadow” market price unobservable

Expectation formation

- Formalized by Sargent and Wallace
 - Unpleasant monetarist arithmetic (1981)
- Monetary contraction can lead to inflation expectation
 - Inflation decrease relative price of ruble
- Assume that the CB finances budget deficit
 - That accelerates inflation
 - To fight inflation governments starts to fund itself through T-bills
 - But Minfin doesn't have other sources. E.g. A failure in tax system
- To pay off t-bills government will have to
 - Find the way to collect taxes or resort to seigniorage
 - This time higher b/c of interest on debt
- Lack of trust that government won't cover this seigniorage with higher seigniorage in the future

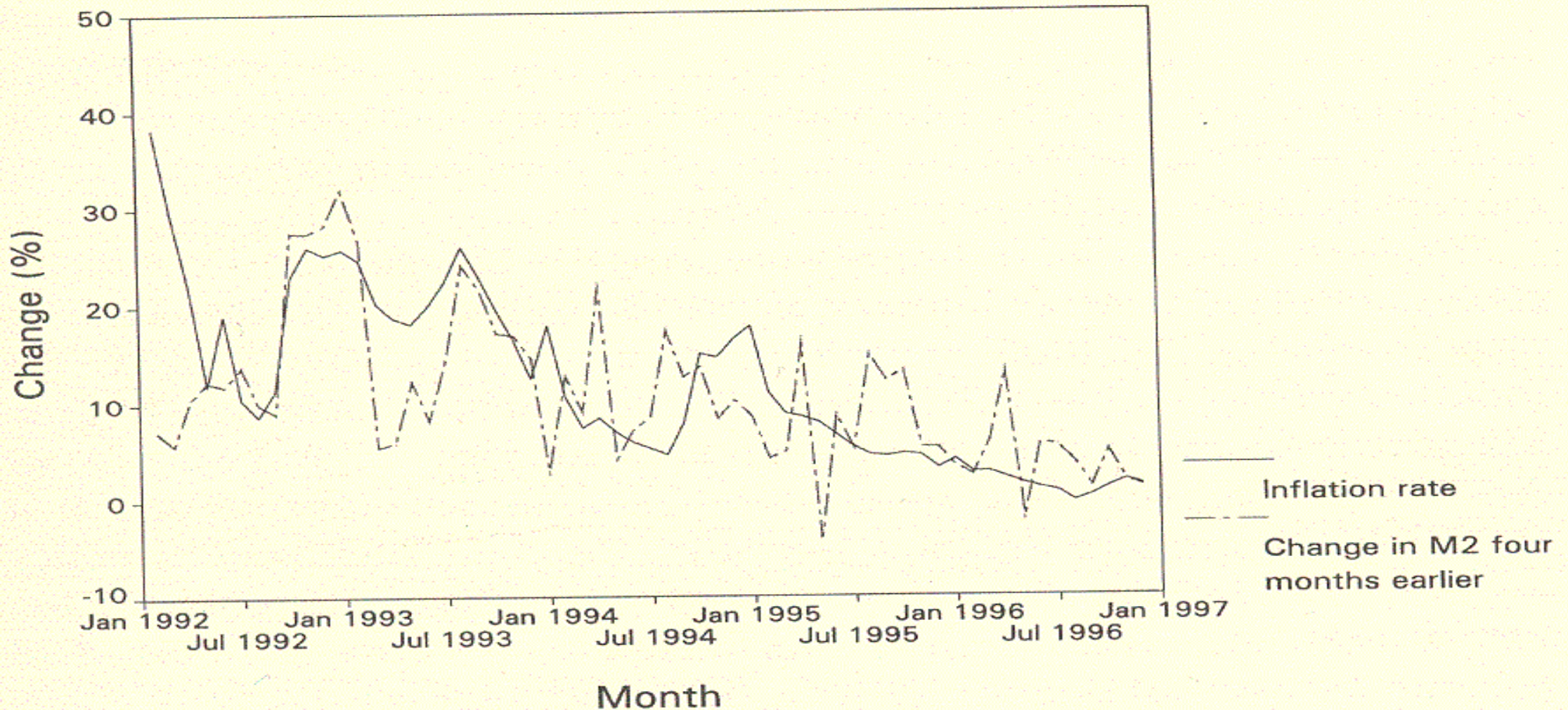
Practical implications

- Ideas of Sargent and Wallace and Krugman's model can explain many crises, including Russian of 1998
- Inflation expectation (lack of trust to government) is enough
 - Then "shadow" price jumps and a speculative attack follows
 - Lack of trust that those borrowings will be ever paid off
- Never combine tight anti-inflationary monetary policy of fixed FX rate with lenient fiscal policy
 - When money is spent irresponsibly or out of taxation capacities
- The key is inflation expectation (will talk a lot about that next class)
 - The CB can't cope with those if factors that away of its control kick in
 - An argument for balanced budget

Prehistory of Russian crisis

- 1992-1995 high yet decreasing inflation
 - 1992 2500%; 1993 840%; 1994 204%; 1995 128%
 - “price shocks”
 - Positive current account with ruble zone (1993 new banknotes)
 - Abnormal savings, uncontrolled money supply (credit forgiveness) and deficit of goods (QTM)
 - Controlled prices, interenterprise arrears, uncontrolled money supply and price misbalances
 - Failure of tax system, introducing inflation stable VAT
- Social tensions, only in 1992 due to inflation budget was balanced (pension in 1992 \$3 (wage \$7), in end of 1992 \$8 (wage \$39)
 - CBR credits cover budget deficit and numerous sectorial development programs
 - Money pours into foreign currency market
- Shleifer and Treisman: Without a Map: Political Tactics and Economic Reform in Russia
 - Emission was a political decision. Banks, industries and government was interested
Huge lobby effort for emission

Money and inflation in Russia

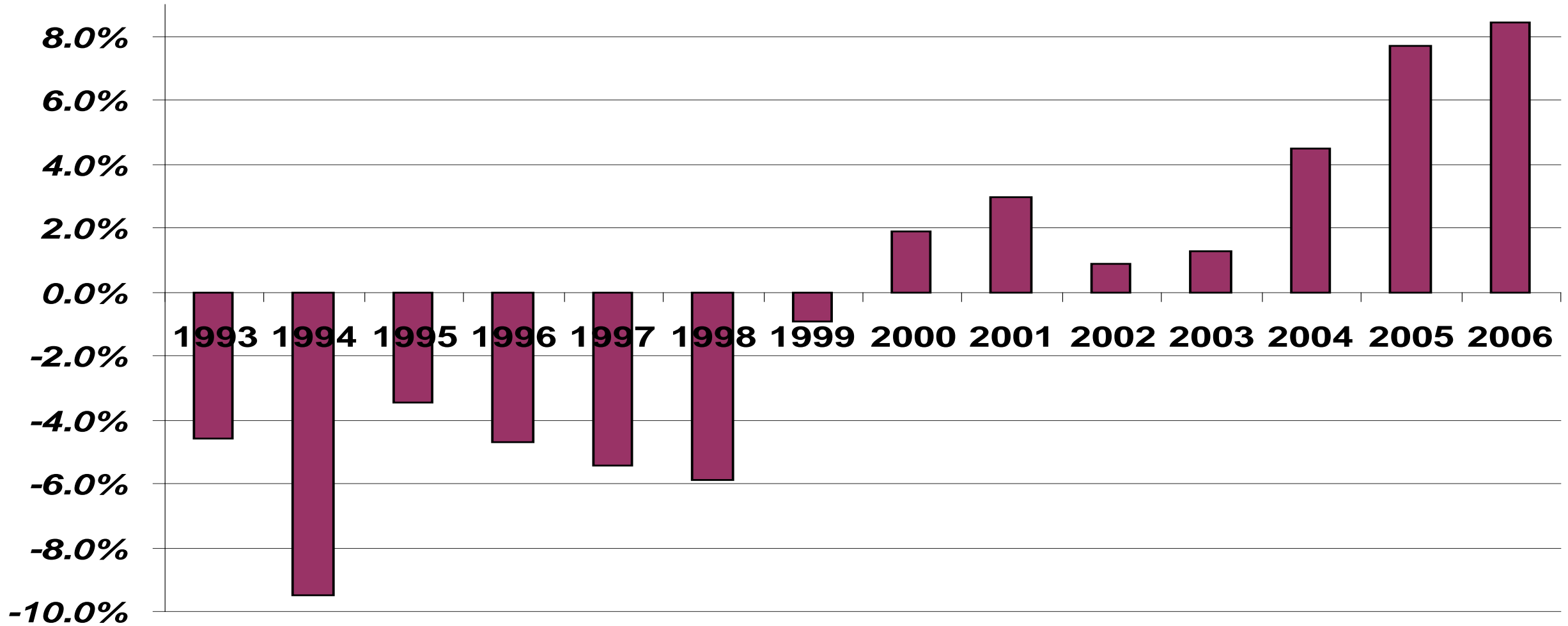


Source: Shleifer and Treisman (2000)

Stabilization

- 1994 – 1995 first attempt to supplant CBR credits with t-bonds (ГКО)
 - Was lobbied by banks to stop credit income erosion
- The deficit from then on was covered by borrowings
- Concurrent implementation of fixed exchange rate policy to curb inflation
 - Валютный контроль
- In two years, by 1997, inflation dropped to 11%
- Everything seemed fine, except government still had huge deficit

Budget deficit in Russia



Crisis background

- Direct manifestation of the “unpleasant monetarist arithmetic” ideas
 - Tight monetary (fixed rate) and lenient fiscal policies
- Basically deficit is a normal phenomenon for developing economy
 - They need money for investment, both government and businesses borrow
 - Economy expands as does the tax base
- With fixed rate, actors should be sure that seigniorage won't take place
 - Then “shadow” and factual rates would be the same
 - Otherwise wait for a speculative attack
- At first everything went great
 - Registration of the first economic growth in 1997
 - Stable political situation

Crisis outbreak

- 1997 – 1998: government keeps losing the trust
- Failure in tax collecting
 - Contracted monetary supply pushed economy into barter
- Summer 1997: the first fair auction
 - Svyaz'invest had adequate price
 - Oligarchs attacked the reformers' government
 - Last hope for political stabilization was lost
- Autumn 1997: wave of crises in Asia,
 - Sharp drop in oil prices (external shock)
 - Drop in tax incomes
- In other words, economy was attacked from all sides

Crisis culmination

- No trust, no taxes, “shadow” rate jumps
 - People refuse to hold rubles and save in dollars
- On August the 17th 1998, after the series of attacks, government refuse to keep the rate fixed
- Four-fold drop in nominal rate. From 6 to 15 rubles in few days then lower than 20
- Forward contracts obligations leave huge financial holes
 - Foreign investors insured the rate to cash out the t-bonds’ yields
- To save banks government allows them to default on forwards
 - Effectively a default on t-bonds
- Many banks are t-bonds holders
 - Bankruptcy of many banks and full-scale bank crisis, lack of investment
- 1998 was the lowest point of transformation recession
 - From 1990 till 1998 economy lost 40% of the value

Similarities to Asian crises

- Asia also had fixed rates and low inflation
 - But with low budget deficit
 - So what caused “shadow” rate to jump?
- Lots of bad credits in banks sector
 - Risk of banks’ default
 - Government would have to bail them out
 - That’d cause inflation
- That cause massive sell-off of national assets and sharp devaluation
 - The main reason again inflation expectations

Main lessons

For stable FX rate and inflation not only monetary policy matters

1. Fiscal discipline is crucial

- Always live within your means (Borrow only if tax base allows to)
 - The CB will never cope with inflation expectations if Treasury acts irresponsible

2. Stability of financial markets

- Prudent (and developed) regulation, adequacy of bank themselves

3. Independence of the CB (from government obligations) and its motivation for price stabilization

4. Fixed rate only a temporal measure

- Poland, Hungary, Czechia floated the rate peacefully, while Russia under the attack