LECTURE 4. MONETARY SYSTEM

Agenda:
1. The meaning of monetary system and its elements
2. The law of money circulation
3. Monetary stock and monetary base
4. The essence and mechanism of banking multiplier
5. Inflation: essence, reasons, types, consequences
6. The peculiarities of inflation processes in Kazakhstan. The anti-inflationary policy
7. The monetary reform of Kazakhstan of 1993: its necessity and procedure of conduction

1. The meaning of monetary system and its elements

The evolution of national monetary systems is determined by the manufacturing requirements. Under the influence of these factors the modern requirements to the monetary system form.

First of all as the commodity-money relations developed the necessity of single and integral monetary system appeared which was created in some measure by means of money issue state regulatory activity by one central market. Secondly a stable monetary system is required.

Finally the monetary system formed in the XVI-XVIIth centuries though its separate elements appeared well in advance. The first attempts to regulate the monetary circulation were made by rich money changers who certified standard and weight of the gold ingots. Gradually the right to brand ingots and to stamp coins passed to the state. So the first state monetary systems appeared.

In the process of its development the monetary system passed two stages connected with the evolution of money itself. *The first* is directly connected with the monetary metal circulation which plays role of a universal equivalent and performs all the functions of money (this period was quite longstanding and last went on till the XIXth century). *The second stage* is determined by the fall of gold role as a monetary commodity and its change onto the credit money which consequently became the universal equivalent as in the sphere of internal and external circulation.

For the modern monetary system not only the connection with gold weakening and the inconvertible to gold credit money coming to paper dominancy are indicative but also money issue in the manner of business crediting by the state under the gold and foreign exchange reserves runup.

Credit money presence led to the wide cashless circulation distribution and cash decrease which covered in different countries only sphere of "backsheesh", small snackbars payments, tourist costs.

After the declaration of independence Kazakhstan began the extensive systemic changes of economy and implementation of national currency – tenge (on November 15, 1993). It marked an autonomy getting of our republic in the financial and credit sphere.

On the moment of the national currency implementation its exchange rate was 4.68 tenge for one US dollar. The National Bank carries out a policy of unified exchange rate of tenge reflecting the relations between demand and supply on an exchange mark under the limited interference.

The monetary unit (national currency) of the Republic of Kazakhstan is a Kazakhstani tenge which consists of 100 tiyn.

The Kazakhstani monetary units in circulation are represented by banknotes and coins. The structure of their nominal is determined by the National Bank of Kazakhstan. The legal payment mean is a Kazakhstani tenge.

The banknotes and coins issue into the circulation is made by the NB RK by means of their sale to natural and legal persons. The banknotes and coins act as absolute commitments of the National Bank and are provided by its all assets.

- investment – the coins manufactured from precious metals which are the objects of

investment and saving;

- collectors' – commemorative and other coins of special coinage issued in limited edition as from precious and non-precious metals (collectible and saving objects);
- circulatory – coins from non-precious metals intended for cash money circulation.

Banknotes and coins issued in the Republic of Kazakhstan should have a nominal content, form and ornamental graphic arts. The noted characteristics are published in mass media.

All the banknotes and coins are obligatory for admittance according to their nominal value throughout the whole territory of Kazakhstan under all the types of payments and also for bank accounts placing and for transfers, freely changed and exchanged in all the banks.

No one but the National Bank of Kazakhstan cannot announce circulating banknotes and coins invalid. Worn out and damaged banknotes which saved not less than on 70% are changed freely by the National Bank and any other Kazakhstani bank. Banknotes saved on not less than 50% are accepted by the National bank of RK and changed in accordance with prescribed rules.

The only one who has a right to change a monetary unit is the President of the Republic of Kazakhstan. He determines the procedure, terms and conditions of the RK monetary unit functioning.

2. The law of money circulation

An answer to a question about the required money quantity for the circulation gives a quantity theory of money. It appeared in the XVIth century when under the influence of a great flow of gold and silver from the New World the commodity prices sharply increased in Europe for a short term of time on 2.5-4 times in average. Since then the prices dependence from money quantity in circulation became an object of an intense study of economics.

To a required quantity of money the economists came close in the first half of the XIXth century when became clear that a gold coin standard leads to a money crunch for the macroeconomic links servicing because a monetary stock was limited by an actual gold hoard and a commodity weight sharply increased with a big machine production development.

The idea which underlies in the quantity theory of money is simple: an external change of a circulating money quantity leads to a proportional change of an absolute level of the commodity and services prices and consequently to a change of purchasing capacity of money.

It should be noted that the quantity theory of money doesn't represent a single conception. It is just a line of research in which there are a wide range of opinions and approaches in the limits of basic idea.

Analyzing the possible ways of money circulation development Karl Marx derived a formula which determines a money quantity required for the economics – *the law of money circulation.*

On the basis of maximum money demand as a mean of circulation Karl Marx determined that it should be as much as required for a possibility to purchase all the goods and services which should be realized according to set prices. This formula looks as follows:

$$QM = SP/V,$$

where QM is a quantity of money required as a mean of circulation (in a given time);

SP is a sum of prices for the goods and services which should be realized (in a given time);

V is a velocity of money circulation (determined as an average number of turns of the similar monetary units in a given time).

According to the reduced formula it appears that a monetary stock should correspond to a commodity weight. From this follows that:

- the growth of commodity weight should cause a cross money growth in circulation;
- if a monetary stock will begin to run ahead a commodity weight it causes a price increase (i.e. inflation);

- in case of monetary stock underrun from a commodity weight under the permanent velocity of money it is impossible to realize all the goods, i.e. an artificial overstock appears which leads to a production drop and economic depression.

Under the coin circulation the circulating money quantity and monetary circulation stability were provided spontaneously via the money function as a mean of hoarding and store of value. In the conditions of fiduciary circulation the role of monetary circulation regulator plays a government.

Taking into account a credit development and consequently increasing money usage as a mean of payment the formula which expresses the law of money circulation was expanded:

$$QM = (SP - C + P - MRP)/V,$$

where C is a sum of prices for the commodities and services which were sold on credit the term of payment of which won't expire in a given time;

P is a sum of bond-debt prices;

MRP is a sum of mutually redeemed payments.

The law of money circulation determines a quantity of money required for performance of functions as a mean of circulation and payment.

The required money quantity is determined either by an equation of exchange which was derived by Irving Fisher and looks as follows:

$$MV = PQ,$$

where M is a quantity of money in circulation;

V is a velocity of money in a given time;

P is a level of commodity prices;

Q is a commodity weight which should be realized in a given time.

The right part (PQ) – "commodity" – shows the quantity of realized commodities on a market. The left part (MV) – "monetary" – shows the volume of money paid for the purchased goods in various dealings.

As money plays role of a representative in the processes of purchase and sale the volume of paid money always will be equal to the sum of realized goods and services prices, i.e. the formula of exchange represents an identical equation.

Irving Fisher supposed that the velocity of money circulation and the quantity of realized goods on a market within a particular period of time are constant. Whereupon the equation shows that the level of prices is directly proportional to the volume of circulating money and velocity of money and inversely proportional to the quantity of commodity transactions:

$$P = (M*V)/Q$$

The equation of exchange is useful for showing up some empirical dependences what gives an opportunity to make forecast. However Fisher's variant considers money and commodities in circulation (flows of money and commodities) but doesn't take into account the goods in storage and money in function of means of hoarding (commodity and monetary stocks). Besides thesis about the velocity of money circulation constancy and the volume of realizing goods on a market under the growth of their production is disputable.

The noted weaknesses of the first variant of a quantitative theory are partially eliminated in the Cambridge variant or in the theory of cash balances. The group of economists from Cambridge (England) among participants of which were Alfred Marshall, Arthur Cecil Pigou researched the quantitative theory of money demand which subsequently was regarded with favour by John Maynard Keynes.

In their version the initials are monetary means (cash balances) which are held by the direct participants of the course of business – firms and private persons. It is one of the differences of this approach from the equation of exchange where the monetary stock and other aggregates are considered so to speak from above.

The Cambridge version of the quantitative theory is expressed by the following formula:

$$M = k*P*Y,$$

where M is a money stock;

k is a coefficient which shows what share of a nominal yield the business entities prefer to hold in the form of cash money (cash balances);

P is a general price level;

Y is a effective yield of a society for a particular period of time, i.e. the quantity of goods and services which could be purchased on a market;

P*Y is a perfunctory yield.

The new in this formula (it is often named Pigou's formula) what differs it from the equation of exchange is an introduction of savings coefficient.

The left part of the formula expresses an offer of money defined outside by the existing monetary and credit system. The right part of the formula represents the demand on money which is determined by a common nominal yield of the society members taking into account that a part of this yield is kept in the form of cash balances and are withdrawn from circulation temporarily.

If compare two variants and consider that PQ is nearly equal PY thus the coefficient k represents the other mode of expression of the money circulation velocity (k is nearly equal to the amount of 1/V).

Notwithstanding the two approaches connection the Cambridge version has an essential feature. Here the analysis is replaced into the economic decisions acceptance zone by all the subjects of economics. Under the economic policy adopting not only the government actions of a currency emission should be considered but also the entrepreneurs', bankers', population' decisions of money keeping in the form of cash balances.

3. Monetary stock and monetary base

Monetary stock is a whole complex of purchase, payment and saving means which serves to the economic relations and belongs to the natural and legal persons and to the state either.

Monetary stock as a whole consists of all types of money (cash, cashless, credit).

The monetary stock volume and its money growth rate changes influence on the important economic variables and on the main objectives achievement of the national economy development. The high employment of the population, price stability (situation which features by a slow inflation and deflation rate), economic growth, external account equation – all these questions expressly or implicitly are linked to the aggregate money supply and money growth rate changes.

The money circulation organization offers a definite structure of a monetary stock. The differences between the elements (components) of the monetary stock which represents a stock of cash and non-cash resources serving an economic turnover are linked to the amount and nature of their liquidity. Proper allowance must be made for the fact that nowadays to money are also considered so called quasimoney (money medium on different bank accounts, various debentures, etc.) which has a different degree of liquidity.

The liquidity shall mean:
- money capability to be exchanged onto the goods and services;
- debenture's posibility to be converted into cash;
- investment cash expenditures (increase of production).

The distinction by the liquidity criterion provided the basis for the whole monetary stock division onto the linked to each other monetary aggregates.

Monetary aggregates are the parts (components) of monetary stock which combine the definite types of money and monetary assets (documents) distinguishing from each other by a liquidity degree, i.e. a quick turning into cash money. Monetary aggregates reflect the structure of monetary stock where the compound of such aggregates is different for each country because depends on the level of monetary market and credit relations development.

Most commonly the following aggregates are used:

M0 – the volume of cash in circulation (paper and metal money);

M1 – the volume of cash money, cheques, call deposits (for example in USA the aggregate M 1 is a monetary stock index which includes cash in circulation, call deposits in the commercial and mutual savings banks, NOW accounts – the type of accounts mediating between saving and current accounts, nonbank traveller's cheques, etc.);

M2 – the volume of cash money, cheques, call deposits and small time deposits (for example in USA it is the aggregate M 1 plus saving accounts, time deposit accounts to 100 thousand US dollars, one-day euro dollar deposits, mutual funds shares of a monetary market, etc.);

M3 – the volume of cash money, cheques, deposits (in USA it is the aggregate M 2 plus time deposit accounts to 100 thousand US dollars and time contracts of sale and following purchase of paper holdings);

L – the volume of cash money, cheques, deposits and paper holdings either.

In such a manner the monetary aggregates are built under the principle of nested doll where the each following includes a previous aggregate and some additional (less liquid) components. The monetary stock dimension by means of aggregates allows determining exactly its structure what is used for the money circulation state regulation.

In the financial statistics in Kazakhstan for the happening changes the monetary aggregates M0, M1, M2, M3 are used:

M0 is a cash money in circulation;

M1 is the aggregate M0 plus transferable deposits in national currency of non-bank legal entities and population;

M2 is the aggregate M1 plus the other deposits in national currency and transferrable deposits in foreign currencies of non-bank legal entities and population;

M3 (monetary stock) is the aggregate M2 the other deposits in foreign currencies of non-bank legal entities and population.

The monetary stock depends on two factors: the quantity of money in circulation and their velocity. The quantity of money in circulation is determined by the state according to the merchandise turnover requirements and budget deficit. The velocity of money circulation is conditioned by the duration of operating procedures (heavy or light industry), the structure of payment cycle (correlation of cash and noncash money), the level of credit operations and reciprocal payments development and the rates of interest on credit either, the usage of electronic technologies in banking.

The monetary aggregates' indexes and their changes from 2000 are shown in Table 4:

Table 1. The monetary aggregates indexes

Index	01.00	01.01	01.02	01.03	01.04	01.05	01.06	01.07	01.08	01.09

1. monetary base (reserved money) among them:	104 724	125 033	159 646	186 926	298 521	485 842	616 639	1 391 002	1 509 503	2 032 438
1.1 cash money outside the NB RK	93 836	104 859	127 461	156 107	250 756	377 357	426 426	679 704	784 885	839 101
1.2 STB and other organizations of NB RK deposits	10 888	20 174	32 185	30 819	47 765	108 485	190 213	711 298	724 617	1 193 337
Monetary base (in narrow expression) including:	-	-	-	-	-	456 538	550 390	1 234 895	1 496 026	2 005 052
reserve deposits of STB in NB RK	-	-	-	-	-	104 246	521 119	654 018		608 632
2. M0 (cash money in circulation)	87 682	96 126	116 261	143 087	231 074	345 726	385 714	599 308	677 389	714 096
3. M1 among them:	139 877	174 647	193 220	255 430	403 279	616 318	749 574	1 250 609	1 441 389	2 006 257
3.1 transferable deposits of population in tenge	14 536	14 406	1 548	16 208	26 790	36 921	54 339	96 190	121 082	129 880
3.2 transferable deposits of non-bank legal entities in tenge	37 660	64 115	75 412	96 135	145 415	233 670	309 522	555 110	642 918	1 162 281
4. M2 among them:	210 793	271 849	315 711	441 962	700 991	1 108 353	1 478 931	2 867 170	3 443 604	4 207 184
4.1 the other deposits in tenge and transferable deposits of population In foreign currencies	13 528	22 027	48 515	63 275	127 027	229 943	282 946	669 699	791 620	594 499
4.2 the other deposits in tenge and transferable deposits of non-bank legal entities in foreign currencies	57 387	75 176	73 975	123 258	170 685	262 092	446 410	946 862	1 210 595	1 606 428
5. M3 (monetary stock) among them:	255 838	380 659	536 985	725 019	970 542	1 564 903	1 999 223	3 608 049	4 596 133	5 970 359
5.1 the other deposits of population In foreign currencies	26 791	55 274	137 407	174 641	180 736	170 579	256 070	283 496	522 011	756 445
5.2 the other deposits of non-bank legal entities in foreign currencies	18 254	53 536	83 868	108 416	88 816	285 971	264 223	457 382	630 518	1 006 730

The money transfer from a cashless circulation into a cash causes a cash money lack in the country, leads to a shadow economy appearance, faciliates an evasion of taxes by the enterprises, gives evidence of the state capability fall to influence on the actual business activity.

The monetary stock depends on two factors: the quantity of money in circulation and their velocity. The quantity of money in circulation is determined by the state according to the merchandise turnover requirements and budget deficit. The velocity of money circulation is conditioned by the duration of operating procedures (heavy or light industry), the structure of payment cycle (correlation of cash and noncash money), the level of credit operations and reciprocal payments development and the rates of interest on credit either, the usage of electronic technologies in banking.

The money velocity in circulation of social product cost is determined as an attitude of a gross national product or national income to a monetary stock (GDP/M3).

The velocity of money in payment cycle is determined by an attitude of an amount of money on bank accounts to a circulating monetary stock annual average.

The monetary base (reserve money) corresponds to a cash money amount outside the National Bank and second-tier banks' deposits and other organizations in the National Bank. The

narrow monetary base is a monetary base excluding the time deposits of the second-tier banks in the National Bank.

The reserve money indexes and narrow monetary base in Kazakhstan for the period from 2000 are shown in Table 4 "The monetary aggregates indexes".

4. The essence and mechanism of banking multiplier

The emission of cashless money is performed by the commercial banks. Hereunder not a monetary stock growth by means of a part of cash money transfer into cashless is understood but a cashless money growth which happens itself in a result of a banking multiplier mechanism action.

Banking multiplier could be credit, credit-depositary or depositary. *Multiplier* is a process of a multiple increase (multiplication) of the lines of deposits in the commercial banks under their transfer from one bank into another.

Thanks to banking multiplier the deposits widening happens via a multiple increase of any new reserves got by the bank system, i.e. it determines a dependence between the sum of reserves which should be saved by banks on an account in the National Bank (obligatory reserves) and free reserves of their credit operations and bank deposits.

One commercial bank cannot increase the cashless monetary stock; it is done by the system of commercial banks. Let's see how the mechanism of banking multiplier works.

The resources of commercial bank consist not only of its own capital but mostly of attracted funds: private deposits, corporate deposits, and also credits received from other banks including the National Bank. It is clear that the attracted funds are not only saved. They are used for credit granting in favor of enterprises, organizations and population and also for other active bank operations. Thus the mechanism of cashless money volume increase starts working.

At first let's see how this increase happens under the Central Bank regulation absence. Let's say that the enterprise 1 places to its account of its serving bank 100 thousand tenge which are temporarily disposable and within some period stay on this account. Using the attracted funds of the enterprise 1 the bank can grant these 100 thousand tenge for credit to the enterprise 2.

Let's suppose that this credit is required for the enterprise 2 in order to pay to the enterprise 3, that is why these 100 thousand tenge passing through an account of the enterprise 2 will appear on an account of the enterprise 3 opened in its serving bank. If the enterprise 3 doesn't need them for a time they will stay on their account. On this moment initially placed by the enterprise 1 money will be considered in cashless form twice already, i.e. on the accounts of the enterprises 1 and 3.

Further while the enterprise 3 won't use the received money its bank can grant these 100 thousand tenge for credit to the enterprise 4 which will use them for payment to the enterprise 5 and consequently money will appear on an account of the last in its serving bank. If the enterprise 5 won't transfer these money at once to the next enterprise it results that for a time the initial 100 thousand tenge are considered triply already (on the accounts of the enterprises 1, 3 and 5).

When the enterprises 1, 3 and 5 will use in settlements the present on each of their accounts 100 thousand tenge in circulation will come the monetary stock increased triply against the initial sum.

It is clear that such growth of cashless money quantity could last forever and the circulating monetary stock would increase uncontrollably. In order to avoid it the Central bank limits the commercial banks opportunities to emit cashless money by means of *the system of obligatory reservation.* It is about that the commercial banks are obliged to reserve the definite percent of the attracted funds in the National Bank. This percent is called *a rate of mandatory reserves.*

Under the system of obligatory reservation presence the banking multiplier action will be different than in mentioned above example.

Let's suppose that the rate of mandatory reserves is 10%. In this case the bank serving the enterprise 1 which took his investment for saving in amount of 100 thousand tenge will be obliged to reserve in the NB RK 10 thousand tenge. Consequently it can grant a credit to the enterprise 2 only in amount of 90 thousand tenge. And the bank serving the enterprise 3 which accepted from the last 90 thousand tenge for saving is obliged to reserve in the National Bank 9 thousand tenge, i.e. it can grant for credit to the enterprise 5 only the amount of 81 thousand tenge.

To this moment the initially placed money by the enterprise 1 is fixed as follows (in thousand tenge): on the account of the enterprise 1 will be 100, of the enterprise 3 – 90 and of the enterprise 5 – 81. When the enterprises will use these means in settlements the circulation will enter not 300 but only 271 thousand tenge.

If we'll continue this example thus we'll see how the possibility of cashless money growth by means of granted credits on the basis of the attracted funds hereafter more and more decreases and winds down.

The mandatory reserves are one of the main instruments of the central banks' monetary policy. Obliging the commercial banks to reserve the part of the attracted funds the central bank keeps the circulating monetary stock on a definite level. The bigger the rate of mandatory reserves the lesser money quantity can create the bank system. And conversely the lower the rate of mandatory reserves the more opportunities "to create money" the commercial banks have. Thus the multiplier ratio looks as follows:

$$K=1/r*100\%,$$

where K is the multiplier ratio;

r – the rate of mandatory reserves.

This ratio shows a maximum possible increase of the money quantity by the commercial banks.

In the example under the chosen rate of mandatory reserves equal to 10%,

K = 1/10%*100% = 10 times.

It means that initially received funds further could be increased on maximum 10 times.

On March 1, 2005 the rate of mandatory reserves is equal to 7%, consequently K=1/7%*100% = 14.3 times.

This formula shows that the amount of multiplier ratio is inversely proportional to the rate of mandatory reserves. The process of multiplication is permanent and the multiplier ratio is counted within a definite period of time.

On practice the multiplier ratio never reaches the maximum value because a part of the attracted funds are always used by banks for noncredit operations. The central bank also can influence on the commercial banks' credit money issue applying the other instruments of the monetary policy. For example by the high-yield securities and currency emission to a public market the National Bank can "extend" a part of bank resources decreasing their credit potential.

The monetary multiplier decreased from 2.99 in April 2009 to 2.91 in May 2009 as a result of the priority rates of the money base widening against the money growth rate.

5. Inflation: essence, reasons, types, consequences

The essence of inflation. The violation of money circulation laws leads to the inflation. Such economic phenomenon as inflation exists long ago. The term "inflation" (from Latin inflatio – swelling) for the first time came for usage in North America in the period of the War of Secession in 1861-1865 and meant the process of fiduciary circulation swelling. In the XIXth century this term was either used in England and France. The wide distribution in the economic literature the meaning "inflation" got in the XXth century after the World War I and in the Soviet economic literature – from the middle of 20-s of the last century.

What is the reason of inflation? As a rule the inflation appears because of an excess liquidity, i.e. in a situation when a money stock volume sufficiently exceeds a commodity

volume. The increase of circulating money quantity leads to goods and services demand growth. If the increased demand is not covered by a relevant growth of product release the prices rise. The best explanation of this interrelation is an equation of exchange derived in the XIXth century by an American economist Irving Fisher. According to Fishers equation $MV=PQ$ is the product of M (monetary stock) and V (velocity of money circulation or turnover numbers made by a monetary stock in a given time for the final goods and services costs) is equal to the product of P (price level) and Q (quantity of goods and services final output).

Considering that the velocity of money circulation – V is quite stable the monetary stock increase M usually leads to the growth of an aggregate expenditure. Under the increase of M in the short run usually a relative price level growth P happens under the conditions that a product release Q cannot increase in the short run. Consequently the short-term monetary expansion causes the growth of prices.

In a modern understanding the inflation is a complex multifactorial socio-economic phenomenon generated by a production disproportion in different spheres of market economies. It is one of the most acute problems of the economy development in many countries.

Traditionally the inflation is determined as the turnover channels flooding by a monetary stock over the goods circulation demand causing monetary unit devaluation and consequently the growth of commodity prices. Thought it is reflected in the commodity prices growth it couldn't be explained only by the monetary phenomenon.

As a result of constant and common growth of prices the fall of purchasing capacity of money, their devaluation happens.

Totally during the inflation the money devaluates in relation to:
- gold (under the gold standard);
- commodities;
- foreign monetary units.

As a result in the first case the increase of gold market value in paper money occurs; in the second – the commodity prices grow; in the third the national monetary unit rate drops in regard to foreign currencies.

Nevertheless in the period of inflation not all prices grow. The prices for one goods can grow, for the other can stay stable, besides some prices can grow faster than the others. In the basis of these proportions lays a different correlation between demand and offer and variable elasticity.

However not every price rise serves as an index of the inflation. The prices can increase as a result of changes of labour productivity dynamics, cyclical and seasonal fluctuations, structural changes in the system of reprocessing, market monopolization, government regulation of the economy, introduction of new taxation rates, devaluation and revaluation of the national monetary unit, market change, external-economic factors influence, acts of God, etc.

The reasons of inflation. The increase of prices and appearance of money overhang are only the external factors of inflation. Its underlying cause lays in a ratio gap of the national business as a result of various factors (general equilibrium disturbance):
1. general economic (economic policy of the state government, cyclical phase, GNP production level, payment crisis presence, etc.);
2. social (social programmes acceptance and the degree of their realization, methods and sources of their financing);
3. financial and credit (taking the measures intended on money circulation stabilization, monetary accommodation, etc.).

There are a lot of reasons of the inflation which could be noted in many countries. However the combination of various factors of this process depends on the concrete economic conditions. All the reasons of the inflation are linked to each other and each of them can lead as to the growth as to the fall of demand and offer misbalancing them. The significance of the inflation sources is important for the concrete control measures development.

In order to study the mechanism of inflation it is necessary to look through its two types:

Demand inflation under which the supply-and-demand equilibrium is broken from the demand side.

Proposal inflation (cost-push inflation) when the supply-and-demand misbalance occurs as a result of the production costs growth.

However in practice it is difficult to distinguish the one type from another: usually they are in close coordination, thus for example the wage hike can look as demand inflation and as proposal inflation.

Demand inflation. The essence of the demand inflation could be explained by the phrase: "a too much quantity of money hunts for a too little quantity of goods". The main reasons of this type of demand inflation are:

- the increase of demand from the side of population the factors of which are the wage and employment growths;
- the increase of investments and demand on capital goods under the economic recovery;
- the increase of government expenditures (military and social procurement).

Proposal inflation means prices rise which was provoked by the production costs escalation in the conditions of manufacturing resources underexploitation. Sometimes it is also called as cost-push inflation. Recently the type of inflation when the prices grow under the composite demand fall is widely met in the world practice. The main reasons of the inflation are:

- salary increase;
- raw material and energy sources appreciation;
- monopoly and oligopolistic pricing practice;
- financial policy of the state.

Cost push on a commodity unit decreases input and product volume which the producers are ready to offer under the existing prices level. As a result the offer of goods and services decreases and the prices grow.

General price increase leads to decline in real income of the population. The unions demand to increase the nominal wages of the workpeople and the state policy of the inflation pecunial losses compensation generate a vicious circle: the price increase causes the requirement to increase in population earnings, the increase in income leads to the enterprises increase of costs on salaries (proposal inflation) and/or to the purchasing power recovery (demand inflation).

Types of inflation. Under the usage of different basis for classification several types of inflation could be derived.

By nature (form of appearance) of the inflation process:

Open inflation is an unconfined, free and constant price rise. It is indicative for the countries of market economy where the interaction of supply and demand promotes an open and unlimited growth of prices. Though the open inflation distorts the market processes but nevertheless it keeps the role of prices to serve as signals indicating to the producers and suppliers the spheres of profitable capital investment.

Hidden or suppressed inflation is when the state makes a strict control over the prices in the conditions of commodity shortage. Whereby the loss of product quality without its price decrease is allowed, the prices of so-called new products are drove up. Simultaneously the prices on black market grow. In this case a monetary depreciation is expressed in deficits and queues.

Inflation shock is a one-time price explosion which can give a push for the open accelerated prices level rise.

By the sphere of distribution:

Local inflation when the increase of prices happens in the borders of one country.

Global inflation covers the group of countries or the whole world economy.

By speed of price increase (growth):

Creeping or moderate inflation when the prices grow gradually but steadily under the moderate speed (on about 10% a year). The value of money remains unchanged, no risk to conclude the agreements in nominal prices. In the industrialised countries it is considered as an element of normal functioning of the economics which doesn't cause a special trouble.

Galloping inflation is featured by the rapid price increase (from 10 to 100-200% a year). Such speed can cause heavy economic and social consequences (drop in production, closure of many enterprises, fall of population living standards, etc.), contracts are linked to the growth of prices, money are quickly materialized.

Hyperinflation is a catastrophic price rise (from 500 to 1000% and more a year). The world record became a hyperinflation in Hungary (August 1945 – July 1946) when the prices monthly grew in average almost in 20 times. The hyperinflation causes a crash of monetary system. Money stops performing its functions adequately, the biggest enterprises become unprofitable and loss-making. Such type of inflation shuts down an economic mechanism because the effect of flight from money for purposes of its conversion into the goods spurts. The economic relations are ruined, the barter exchange returns.

By the stage of price increase equation:

Balanced inflation under which the prices of different groups of goods stay unchanged relative to each other. In this case consequently to the annual price increase grows a percentage rate what is equal to the economic situation with stable prices.

Unbalanced inflation when the prices of different goods constantly change relatively to each other moreover in different proportions. The industry cannot develop in such conditions, the industrial development seems impossible. Only the short speculative intermediation transactions are possible.

By the inflationary expectation rate:

Anticipated inflation which could be forecasted on some period or "planned" by state.

Unanticipated inflation which is featured by a sudden jump in prices what has a negative impact on a money circulation and tax system. If in the economics there were already some inflation expectations thus the sudden jump in prices can cause the following inflation expectations which will boost the price increase. However if the sudden jump in prices happens in the economics where the inflation expectations still didn't gain ground the population behavior and its reaction on the price increase could be different: the consumers will save more and represent less money on a market in the form of purchasing power. As a result the economy again returns to the condition of equilibrium. Such phenomenon is called "Pigou effect" (real balance effect) however it works only in the conditions of flexible prices and interest rates and also the inflation expectations absence.

The inflation consequences. On practice there are three main variants of the inflation consequences for the economic entities:

- positive (what meens an income surplus);
- zero (neutral);
- negative (unprofitable).

Positive variant. The inflation brings income to the state (seigniorage – a levy for the right on money issue). When the government cannot dare to increase the direct taxes for its costs financing it organizes a new money issue through the central bank. In such a way the budget deficit is covered. However the seigniorage decreases the cost of old money which is on the population hands. It is obvious that in this case the real incomes of the population fall on an inflation tax rate.

The money cycle velocity increase has a positive impact on the commercial banks because the participants aim to spend quickly the increased money stock.

The various industrial and trade monopolies will gain a big profit from a price increase by means of an artificial deficit creation decreasing the sale of fast-moving goods and saving them in the warehouses. As a result an additional demand appears which affects the goods price increase.

Zero variant. The neutral consequences of the inflation processes are quite rare phenomenon when the losses from the price increase are fully covered by the income increase. Such cases happen when in separate enterprises or in national scale "an automatic indexing" of money incomes is held.

Negative variant. The losses of cash money kept at home determined by the additional money quantity which could be got under the saving on a bank account (at a definite interest). Nevertheless quite often the nominal interest rate by the bank deposit is lower the inflation level thus even placing cash money on a deposit doesn't fully guarantee them a protection from inflation losses. Their volume is equal to difference between the inflation level and the bank's interest rate.

The inflation growth is connected to price increase in the shops, cafes, of transport tariffs, etc.

The losses of the wrong inflation expectations appear when people doesn't forecast the price increase or determine wrong the inflation move.

In whole though the inflation as many other economic phenomena couldn't be estimated definitely it shouldn't be considered as an absolute evil because it could be an instrument of economic growth stimulation producing recovery of conjuncture, increase of prices and income norms.

That's exactly why the creeping inflation is considered as an attribute of modern economic development having most positive than negative consequences.

At the same time it is necessary to remember that the inflation going out of control is fraught with extremely negative social and economic consequences. The galloping and moreover hyperinflation lead to the reproduction process abnormality and heavy social disruption. Besides the inflation can affect negatively the international economic (especially foreign currencies) relations.

The modern inflation has a raw of peculiarities. If before the inflation covered the economy of one or several countries but nowadays the price increase has not a local but a common world character.

In different countries the inflation develops differently, irregularly, discontinuously. The inflation development velocity is determined by the internal factors the action of which could be multiplied or slackened according to one or another phase of cycle and the stage of government intervention into the economy regulation.

The modern inflation has not an episodic but a constant, chronic character. In separate countries in past the periods of inflation interchanged with the periods of relative stability of money circulation. But nowadays the prices grow on all phases of industrial cycle and don't decrease somehow significantly even in the periods of economic crises.

Anti-inflationary policy. First of all it is necessary to make a best definite diagnosis as it possible in what kind of inflation and crisis are we in. Whereupon we can define the way out of current situation alternatives.

The government of each state which faced with crisis should lead an anti-inflationary policy. The methods of struggle with inflation could be direct and indirect. To the indirect methods could be referred:

1. the total money regulation via the controlling or by the central bank;
2. the commercial banks' loan and clearinghouse processes regulation via the central bank controlling;
3. the commercial banks' obligatory reserves, the central bank operations on the paper holdings open market.

The direct methods of the purchasing power regulation of a monetary unit, i.e. the anti-inflation fight which includes the state regulation of:

1. credits and thus monetary stock;
2. prices;
3. salaries (under the agreement with labour organizations);
4. external trade of capital and foreign exchange rate flow.

To run down the inflation rate means to minimize the difference between the monetary and commodity weight in economy. For this purpose all the methods which lead the economy to stability suite. The following are the initial methods:

1. The provision of country with food. This is the first condition of any reformatory efforts. In order to get the food provision going the state should provide financial assistance to the agricultural enterprises of all the forms of ownership. Either to establish the state purchasing prices and prices of the consumed resources by the agricultural sector on the level which provides a profitable work of commodity producers and to create the system of the industrial products contract trade in exchange for agricultural production.

2. The reconstruction of ruined agricultural investment field without which the economy functioning becomes impossible. For these purposes first of all it is necessary to restore on the enterprises' bank accounts by means of indexing the lost because of a sharp price increase and tenge devaluation depreciation amount and native circulating monetary means.

3. The establishment of the supply distributive relations between the enterprises. The enterprises' economic relations in the market regime are the most effective basically through the system of large gross merchants syndicates. These structures can function in the limits of separate regions in the state and interstate scale.

4. For the duration of crisis it is necessary to centralize the bank system of Kazakhstan including the obligatory performance by the commercial and investment banks of the central bank directions according to priority and privilege of the regions, fields, enterprises crediting and the document flow normative period observance.

5. In order to stabilize a consumer market it is useful to generate a system of small business development stimulation in the field of production and services. To introduce the state credits for the production premises renting and equipment loan leasing credit (with the following purchase option) and also an obligatory insurance of the small enterprises for the first 3-5 years of activity when a ruin probability is especially actual.

6. During the crisis period it is necessary either to conduct a rational state policy of the internal market security and strict control of the private export activity. All the export operations should be performed through some big firms and syndicates which are controlled by the state and perform the export operations on the commission taxes.

In 50-60s of the last century the inflation went gradually in most of the countries. But in 70s became to get out of control transforming into "the society enemy number one". The most acute the inflation became in the second half of 70s. Thus the average annual rate of retail prices growth in USA in 1956-1965 constituted 1.7%; in 1966-1974 – 5.1%; in 1975-1980 – 9.3%.

In the same time periods in England: – 3.1; 7.1 and 15.8%; in Italy – 3.4; 6.0 and 17.9%; in France – 5.5; 9.19 and 9%. In the end of 80s the rate of price increases fell and constituted about 4% a year what corresponds to the model of moderate inflation. It could be explained by the raw of reasons among which are the fall of free market price for petroleum, the price-related competition strengthening mainly in the international scale, the development of labour productivity, the wage restraint.

The inflation exercises a significant influence over the economy and the consequences of this influence are difficult and various.

If its small rates promote the price increase and the input norms being in such a way the factor of temporary improvement in the economic conditions but due to its development the inflation transfers into the great obstacle and aggravates the economic and social strain in the society.

The galloping inflation (without mentioning a hyperinflation) disorganizes economy, has a serious negative impact even on monopolies and complicates an economic policy adopting. The irregular price increase strengthens an imbalance between the economic fields, disarranges the consumer demand structure and aggravates the goods realization problem on an internal market.

Such inflation activates flight from money to the goods transforming this process into the burst-type, aggravates a goods famine, breaks the motives to save money, breaks the money

and credit system functioning. Besides the household savings devalue, the banks and institutions granting credits suffer losses.

6. The peculiarities of inflation processes in Kazakhstan. The anti-inflationary policy

In the economics of Kazakhstan the year 2004 was characterized by essential inflationary background retention and in separate fields the price changes were highest for the last years. In whole for 2004 the inflation in annual terms (December 2004 to December 2003) stood on the level of 6.7% decreasing a little in comparison with 2003 (6.8%). Food commodities became more expensive on 7.4% (in 2003 – on 7.1%) and non-food products – on 6.2% (6.9%), charged services – on 5.9% (5.9%). The annual average inflation constituted 6.9% (in 2003 – 6.4%).

The salaries, wages and incomes of the population in real terms in 2004 grew on 13.9 and 13.2% accordingly. Under the exclusion of petroleum participation from the GDP and salaries increase an excess comes out to be bigger.

In 2004 a great expansion of money supply had a significant impact on the inflation. An increase of monetary aggregates was provided by a high rate of domestic economy growth and a bright external environment for a foreign capital inflow in Kazakhstan. A monetary base in 2004 increased on 82.3%, monetary stock – on 68,2%, cash in circulation – on 59.0%.

As known from January 1, 2004 the purpose of the National Bank is maintenance of stable prices. Accordingly the National Bank under the monetary policy adopting took all the required measures in order to avoid prices overgrowth irrespective of whether factors influence on dynamics of inflation (monetary or nonmonetary).

In 2006 the inflation level constituted 108.6% and in 2007 (first of all because of the world crisis on the financial markets) the inflation jumped to 118.7%.

The high level of inflation in 2007 was conditioned mainly by the exogenous factors: the world financial crisis, food and energy crises.

The high credit rating of the country opened an access for the commercial banks to the international financial markets thanks to which the credit resources for entrepreneurs and population in 2006-2007 became quite available.

It led to a surge of inflation in the country.

The increase of prices for hydrocarbons, motor fuel, grain and food products also made a contribution to this process.

In October 2007 the Government, the National Bank and the Committee for the Regulation and Supervision of the Financial Market and Financial Organizations (further the Financial Supervision Committee) assumed the raw of high priority measures in order to mitigate the negative consequences of instability on the international financial and food markets. From Autumn 2007 the state budget allocated about 550 billion tenge.

Within the implemented measures which were intended for the national economy support the events and actions were developed which constituted the basis of the following documents:
1. The Decree of the Government of the Republic of Kazakhstan dated form March 10, 2009 №275 "About the Anti-recessionary Council establishment".
2. The Decree of the Government of the Republic of Kazakhstan dated form January 13, 2009 №6 "About the plan of measures endorsement for the realization of Joint Operating Plan of the Government of the Republic of Kazakhstan, the National Bank of the Republic of Kazakhstan and the Committee for the control and supervision of financial market and financial organizations of the national bank of Republic of Kazakhstan for the economy and financial system stabilization for 2009-2010".
3. The Decree of the Government of the Republic of Kazakhstan dated form November 25, 2008 №1085 "About the Joint Operating Plan of the Government of the Republic of Kazakhstan, the National Bank of the Republic of Kazakhstan and the Committee for the control and

supervision of financial market and financial organizations of the national bank of Republic of Kazakhstan for the economy and financial system stabilization for 2009-2010" (further – Plan).

4. The Decree of the Government of the Republic of Kazakhstan dated form March 10, 2009 №274 "About the plan of measures endorsement for the realization of operating plan of the Government of the Republic of Kazakhstan for 2009 in order to realize the message of the head of state to the people of Kazakhstan dated from March 6, 2009 "Through the crisis to renovation and development" (Road map)", etc.

In order to provide with housing the citizens who invested their own or loan proceeds in a shared construction the tenant builders were supplied with 184.7 billion tenge through the second-tier banks. In order to supply the business activity of small and medium businesses the financing of their projects in amount of about 155 billion tenge were provided.

For the agroindustrial complex development and the food supply security provision 135 billion tenge were allocated.

From the beginning of 2008 the Government, the National Bank and the Financial Supervision Committee enforced the economy situation monitoring on external and internal markets and provided the set of measures.

The law of RK was developed and adopted "About the introduction of amendments and additions to some legal acts of the Republic of Kazakhstan regarding the financial system stability" (further Law) by which the measures of administrative and criminal responsibility for the intentional drive into bankruptcy of the financial organizations were stiffen.

The government has a right of purchasing and mandatory buyout of the bank shares getting thus the required market instruments for the interference in the activity of the financial organizations which violate the set prudential regulations. In their turn the banks have a right of the issued bonds prior redemption and the shares of distressed assets establishing fund purchase.

In order to keep confidence in banks the Law provided the increase of a guarantee repayment sum of the private deposits from the foreseen before 700 thousand to 1 million tenge and in 2012 (within three years) – to 5 million tenge.

From November 18, 2008 the minimum reserve requirements were decreased under the internal liabilities from 5 to 2% and under the other liabilities – from 7 to 3%. It allows to banks to increase their resource base in amount of about 350 billion tenge.

The Central Government Budget deficit in 2010 is planned in amount of 3.4-3.5% to GDP and in 2011 will be decreased already to 2.4% to GDP. The triennial Central Government Budget in current conditions becomes a key instrument of economic activity supporting. The composite demand and business activity will be provided by means of retention of high level budget expenses which are marshaled first of all on financing of higher priority infrastructural and industrial projects, agricultural development providing the domestic products demand and employment in economy and also on a human capital development.

In whole for the period of 2009-2011 the investment from the state budget will grow on more than 1.5 trillion tenge.

Kazakhstan enters the period of the global economy contraction with a strong margin of gold and foreign exchange reserves and national fund. Their overall volume in November 1, 2008 constituted 47 billion US dollars.

For the financial provision of the Plan the means of the National Fund will be used in amount of 10 billion US dollars (1 200 billion tenge) which will be intended for:
1. the financial sector stabilization – 4 billion US dollars (480 billion tenge);
2. the housing sector development – 3 billion US dollars (360 billion tenge);
3. the small and medium businesses supporting – 1 billion US dollars (120 billion tenge);
4. the agroindustrial complex development – 1 billion US dollars (120 billion tenge);
5. the realization of innovational, industrial and infrastructural projects – 1 billion US dollars (120 billion tenge).

The Government, the National Bank, the Financial Supervision Committee , the Samruk-Kazyna Sovereign Wealth Fund (further – the Fund Samruk-Kazyna) and the National Holding

Company KazAgro (further – the Holding KazAgro) provide constant monitoring and controling of the appropriate and effective expenditures.

The main operator of the Plan realization from the government is the Fund Samruk-Kazyna. For this purpose the government additionally capitalized the Fund on 607.5 billion tenge.

The Fund Samruk-Kazyna and the Holding KazAgro will draw money from the National Fund by means of bonds issuance in amount of 4 billion US dollars and 1 billion US dollars accordingly. For this purpose the investment policy of the National Fund will undergo changes.

The government takes measures in order to save the real inputs of the population and provides the realization of the head of state messages of social payments, pensions and wages of public sector worker increase in 2010 on 25%. The volume of pension payments will grow to 2011 to 50% from the volume of minimum subsistence level. Annually the volume of state social payments and special state payments will rise on 9%. From 2010 the level of lump-sum allowance for the birth of fourth or more child will increase to 50 monthly calculation index and in 2.5 times to the level of 2007 – the Nursing benefit upon reaching by the child an age of one year.

In whole from the realization of stabilizing measures the economy of Kazakhstan additionally will get a state support in amount of 2 172 billion tenge, among them at the expense of:

- the National Fund means – 1 200 billion tenge;
- the National Bank measures – 350 billion tenge;
- the tax alleviation in the limits of the new tax code action – 500 billion tenge;
- the distressed assets fund establishment – 122 billion tenge.

7. The monetary reform of Kazakhstan of 1993:its necessity and procedure of conduction.

Since the coins of turgeshes bearing the legend "tanga of the holy turgesh-hakhan" were implemented in the world trade 13-14 centuries passed already. These coins were minted by Turkic sovereigns on the middle Syr-Darya in the Otrar oasis and Semirechye and were discovered not only in the Central Asia but in the East Europe, Baltics and Scandinavian either. The high-grade silver coins (the silver content there reached 80%) from the Central Asia were quoted as the world money and according to the modern comprehension were the freely convertible and hard currency.

Even when the content of silver decreased on a half (the alloy contained iron and copper) and they were only covered by gold and silver the coins of Turkic sovereigns were widely spread until the money of Russian Empire appearance in the XIXth century in this region.

In the beginning of 90s of the last century in the former USSR simultaneously with the process of economy liberalization the disintegration processes enhanced in the money and credit sphere. The first who implemented in 1992 their own national currencies were Baltic countries, Azerbaidzhan and the temporary monetary unit – Ukraine, Moldova and Belorussia. In May 1993 their example followed Kyrgyzstan. In July - August 1993 in Russia the monetary reform was implemented in the process of which the Soviet rubles were completely withdrawn from circulation and exchanged on the new Russian rubles.

The rest CIS countries which belonged to ruble zone didn't receive the same terms of the old monetary units exchange onto the Russian rubles of new tenor as Russia had. The monetary system division of Russia and other CIS republics happened which used ruble as a payment mean in an internal money circulation.

The political and economical course of Kazakhstan from the beginning of the reform was intended on to the integration of the Commonwealth of Independent States economies. Our republic was an initiator of the ruble zone foundation of new type; the proper agreements were signed including the agreement from September 27, 1993 with the Russian Federation about the monetary systems union. Moreover it was ratified by the Supreme Soviet of the Republic of

Kazakhstan. However notwithstanding the forces of President and the government of our country the offers of Kazakhstan which were intended on the introduction of the Russian banknotes of 1993 tenor in the republic and of the new ruble zone foundation were not supported by the government of Russia.

The Russian terms of the new ruble zone entry found to be unacceptable for Kazakhstan because infringed its root economic interests and required a definite limitation of the national sovereignty.

Meanwhile the uncontrolled release of old money in Kazakhstan happened which caused the inflation rate acceleration and fall of living standards of the population. The usage of the other state monetary unit (Russian ruble) in the quality of its own currency put a curb on a possibility of its own money and credit policy adopting and threatened with an aggravation of available problems with monetary cash.

In such a way the sequence of events get the republic to admit a necessity of its own national currency introduction.

Before the tenge introduction a comprehensive procedure of preparation had precedence which included not only the design of national currency development but either the foreign countries' and CIS' experience study of the own currency introduction and monetary reforms implementing. To the moment of tenge introduction in difficult circumstances the National Bank of Kazakhstan could create a definite gold value stock. The required stock of new notes was created either which were issued in short term in Great Britain because of absence of its own banknote factory under the auspices of the firm "Harrison and sons".

A manufacturing order of 6 nominals of paper tiyns was performed on the factory of paper holdings in Alamty. The paper tiyns were issued in due time and to the moment of introduction were present in all the areas of the republic.

Tenge got subsistence right and on November 15, 1993 was successfully introduced. In the period from November 15 till 18 a parallel circulation was allowed of the national currency together with Russian banknotes. And from November 18, 1993 the national currency became the only legal payment mean on the territory of the Republic of Kazakhstan.

From the beginning of the national currency introduction all the assets and liabilities of banks and all the business entities were recalculated in tenge. The initial foreign exchange rate was set at 4.75 tenge for one US dollar. And each tenge was exchanged on 500 soviet rubles. The advised by the board of directors of the National Bank exchange rate was 1 to 1000. According to all the canons of the economic theory the money should be exchanged in this correlation. The exchange rate which was adopted by the State Commission had an adverse effect on the national currency prestige subsequently: for the first two years tenge fell intensively. Nevertheless from that time tenge became the main instrument of our economy and the basis of the state monetary system.

The introduction of national money became the beginning of important work of the stability and convertibility provision of the national currency which the government and the National Bank began to perform in the difficult conditions of avalanchine falling-off of production and galloping inflation. Either the choice of floating exchange rate regime had a special meaning.

To the moment of tenge introduction in Kazakhstan a huge work was done in order to reform a bank sphere: a two-tier banking system functioned, all the specialized banks were reformed into the joint stock companies and the National Bank got the raw of functions of central bank.

The introduction of the own national currency raised beyond measure the role of the National Bank in monetary accommodation because only from that time the adoption of its own monetary policy and the foundation of the foreign exchange regulation mode became possible.

In order to achieve the stability of tenge the National Bank became to conduct a tight monetary and credit policy. The granting of credits for the budget deficit coverage and the target-oriented loans stopped. Simultaneously the functions of economy crediting were completely transferred to the second-tier banks.

Gradually the range of monetary policy instruments was widening. Besides the refinance rate, the introduction of norms of obligatory reserves and the intervention on the domestic foreign exchange market the National Bank became to issue its own paper holdings (short-term notes), to perform the operations on open market and grant cr edits "overnight". As a result for the period of 5 years the inflation was decreased from 2165% of 1993 to 1.9% of 1998.

The efficiency of monetary policy adoption was reached thanks to the Law "About the National Bank of the Republic of Kazakhstan" (March 1995) according to which the National Bank became reporting to President and in the limits rendered by the legal acts assignments independent in its activity.

Became free from the political pressure the National Bank began a large-scale work of the effective banking system creation taking purchase on a control increase and the commercial banks reliability improvement for their transformation in future in one of the main channels of the internal fundraising of the long-term economy investment. As a result a quite transparent and stable banking system was created which was protected from the state bodies' interference.

The national currency introduction gave to Kazakhstan first of all the freedom of reforms conduction. Our country was not linked to anybody and acted only according to legislation and in compliance with the economic and political situation. Of course for the beginning it was difficult. And the tenge introduction became one of the economy growth compounds in the state.

The comprehension questions

1. *Give an essence of monetary system.*
2. *Who derived the law of money circulation?*
3. *Who counts today the monetary stock in the country?*
4. *Due to credit development and consequently growing money usage as a mean of payment the formula expressing the law of money circulation was developed, how it looked like?*
5. *List the money aggregates rated in Kazakhstan and their components.*
6. *List the methods of monetary reforms conduction.*