DEVELOPMENT

a beginners guide into macro-economics

J.M.M.J. VOGELS

In a development project one may give a farmer a few oxen and a plough. After ten or twenty years however the oxen are dead and the plough is broken. In the meantime the farmer has to save money for new investments. Alas this money loses its value, because the general price level increases rapidly. Investments are impossible. This is why many development programs fail.

Everyone who is involved in development projects should have an elementary notion of macro-economics, as it influences strongly the result of his work. Economics makes the difference between a gesture of charity and continuing development.

This short and simple guide is intended to introduce a layman into the subject, on the mathematical level of a schoolboy of 13 years old. The technical terminology is kept at a minimum. The main principles and mechanisms become crystal-clear to a beginner.

PREFACE

When people in a developing country are looking for development aid, they may be confronted with some questions on a sound economic policy. A correct insight in several economic basic principles may strongly enhance the effectiveness of development programs.

Some questions may arise.

-What is the meaning of a stable currency? How is it to be realized?

-How far has the exchange rate with foreign money to do with a stable value of the home currency? By which principles is the exchange rate established?

-What is the principle behind interest and what is the role of a central bank in it?

-What is a conjuncture fluctuation or a recession and what is a sound policy therefore? -How far is capital accumulation socially accepted?

If one is looking for an economic advice, one finds an enormous literature. There are many textbooks and more or less popular works on economy. Usually one is overwhelmed by too many subjects, insights, theories. It is difficult to grasp the essentials and not to go down into a great number of details, matters of minor importance.

This short guide has been written from the conviction that also an outsider should be able to understand the fundamentals of political economy. The main principles should be crystal-clear to a beginner's mind. The subject of macro-economics is too important to leave it to specialists. Everyone who has to do with development programs should have an elementary notion of economics, as it has such far reaching consequences. Therefore also a layman should be able to read an introduction to it. So in this little guide the mathematics have been confined to the level of a scholar of, say, 12 or 13 years old, apart from some derivations in the appendix. Everyone should be able to read the main text.

If one is asked to summarize a development advice, one may call attention to the importance of capital: savings and investments. Then automatically the reliability of the currency and the role of the central bank become involved. Next some social questions arise. A simple and small guide may be useful. The author wishes the readers a fruitful introduction to some basic principles of macro-economics. They may be surprised to see that the very essentials of the subject turn out to be clear and without serious difficulties.

© copyrights

All rights reserved (2007) J.M.M.J. Vogels, Eindhoven, The Netherlands. This guide may be downloaded and printed for personal use, free of charge. Without written permission from the author any commercial edition is prohibited of this guide, or of its translation into any European language.

Some small editorial changes 2009, 2011.

DEVELOPMENT

3

a beginners guide into macro-economics

CHAPTER ONE

THE IMPORTANCE OF SAVINGS AND INVESTMENTS

In a help program one may send food and other goods to meet direct and urgent needs. Lives may be at risk. But for a lasting development it is better to give a farmer a few oxen and a plough, to improve his harvest and income. If this is all, however, after ten or twenty years the plough is broken and the oxen are dead. So also the sending of capital goods is not enough to ensure a lasting development.

The farmer can take over the role of the help program if he learns to save money and to bring it to a bank. But in the wide rural areas of a developing country a bank may be absent still. There one has to keep his money himself on a safe place. Also without a bank the farmer has to save. The part of his income that is not consumed but saved should be large enough. The capital he gathers this way can be used to replace the broken capital goods or to expand his production capability with new capital goods. The role of saving money needs no further explanation. In a developing country it works in the same way as in a highly industrialized one.

an example

Suppose that capital goods in agriculture are used 15 years. Then one has to save nearly 7 % each year of their value when new, to replace them. If one expands the value of his production equipment with 8 % each year, beside the replacement, one obtains an expansion with a factor of 10 in 30 years. Then one begins by saving 15 % yearly of the purchase value of the capital goods.

One may formulate a similar conduct in book-keeping terms: one writes off 7 % of the purchase value of the capital goods and increases the total value of the productive capacity with 8 % (both the remaining value of the capital goods and the savings). Thirty increases by 8 % make a factor of 10.

Alas it must be noticed that many development programs stagnate. After an initial success the process stops. One of the main causes of the stagnation is that the money has no stable value. In many developing countries the prices increase strongly from year to year, which means that the value of the money decreases too rapidly. A farmer who has saved money for an investment sees that the value of all that money has dropped. A bank office fears the loss of value and changes its saved money into a stable currency, like dollars. Then the money that has been saved in a developing country will be invested in a rich country. The farmer has learned that saving money is stupid. So an unstable currency leads to a dead economy: savings and investments stop.

We see that a lasting development is only possible if the currency retains its value. The central bank is responsible therefore and its instrument is to guard the amount of money that is in circulation. Too much money leads to a lower value of it. Alas many governments are used to pay a part of their activities by printing more money. Politicians want always more money for their plans.

Therefore a classic advice is to keep politicians out of the central bank. Let the central bank be advised by economists and let it be governed under a supervisory board. The supervisors should be people with experience in banking matters and belong to the most solid minds of the country. They should be free from corruption of any kind. No politicians should be admitted. Only a secret service or an inspection against corruption or fraud can be the responsibility of politicians. The decisions about monetary policy however should never be influenced by politicians.

The technique of central banking is less difficult than one may fear, at least in its basic principles.

CHAPTER TWO

BASIC PRINCIPLES OF CENTRAL BANKING

THE AMOUNT OF MONEY, THE ACTIVITY AND THE PRICE LEVEL

The amount of money m in an economy is used for payments. There is a relation between m, the activity of trade R and the general price level P. In formula:

$$m = R \cdot P \cdot \tag{1}$$

This relation may be understood as follows. As a first example we suppose that the real activity R remains equal and that the amount of money m increases by a factor of two. Then the amount in each transaction increases by a factor of two, so all prices do the same: the price level P increases by a factor of two. As a second example we keep the price level P equal. If then the trade activity R increases by a factor of two, the amount of money m should be increased by a factor of two, to make the extension possible at the same price level P.

We see that the amount of money is a product of the real activity and the general price level (Actually in R not only the trade is included, but also the circulation velocity of the money. For a more thorough derivation of eq. (1) see the appendix).

R		
m	Р	We may depict (1) as a rectangle where the amount of money m is the surface and R and P are the sides.

Now we let increase the price level P by 2 % and the activity R by 3 %. The surface becomes m x $1.02 \times 1.03 = m \times 1.0506 \cong m \times 1.05$. The amount of money has increased by 5 %.

Show on an electronic calculator that $1.02 \times 1.03 = 1.0506 \cong 1.05$. In a multiplication small percentages may be summed in a good approximation. Other examples

 $\begin{array}{l} 1.03 \; x \; 1.04 = 1.0712 \cong 1.07 \\ 1.01 \; x \; 1.06 = 1.0706 \cong 1.07 \\ 0.99 \; x \; 1.02 = 1.0098 \cong 1.01 \end{array}$

We conclude that the percentage by which the amount of money m increases, is nearly equal to the sum of the percentages by which respectively the general price level P and the real activity R increase.

The art of central banking is to keep low the general price level. The central bank should avoid that too strong an increase of the amount of money leads to too strong an increase of the price level. For a higher price level means nothing but a loss of value of the money.

If the money loses its value too rapidly, nobody will save it anymore. Or people will change their saved money into dollars, after which it goes to foreign countries. An unstable currency causes a flight of capital. Furthermore no foreign investor will invest his money in an economy where the currency has no stable value. An unreliable currency leads to a lack of investments. An economy where the money cannot be trusted, is not able to develop well.

THE GENERAL PRICE LEVEL

A country has a need to maintain the general price level P, as we see. The usual way is to keep a price index: a long list with all the products a family uses in a year, by which one calculates the total price.

product	unit	number of units	price of a unit	total price
sugar	kg	20	1.35	27
milk	liter	120	0.80	96
				+

total price $P = \dots$

The list is kept invariable. The products and the amounts remain the same. Only the prices may change. Such an index yields a reliable and clear indication of the percentage by which the general price level has increased during some period.

THE ACTIVE AMOUNT OF MONEY

The amount of money m in circulation, the active amount of money, should be known at the central bank. All the money that is resting in the safes of the trade banks is kept out of consideration: the cash reserves c. If we denote all the money that has left the central bank by M, then the active amount of money m obeys

$$\mathbf{m} = \mathbf{M} - \mathbf{c} \ . \tag{2}$$

The central bank keeps the administration of M and keeps the supervision over the cash reserves c in the trade banks.

It should strongly be prohibited that any trade bank brings a large amount of its cash reserves into circulation suddenly or beyond the supervision of the central bank. For then m increases strongly and one obtains a large increase of the prices. This would be a disaster for the stability of the currency and the confidence of investors. So the central bank should maintain well its supervision over the cash reserves in the trade banks and has to impose rules therefore.

Besides that it should oblige the trade banks to maintain a minimum amount of money in their safes. If a trade bank has an empty safe, there may occur a reaction of panic among the people. Everyone goes in a hurry to his bank office to get his money back as soon as possible, because confidence in the bank is over. A mass in panic is fatal for the confidence in the money. But it leads also to a sudden increase of the active money m and consequently to a raise of the price level P.

We summarize by establishing some essential tasks of the central bank. It keeps supervision over the cash reserves c in the trade banks. It keeps an administration of the active amount of money m, which is the part of M that really circulates.

MONETARY POLICY

We assume that on a fixed date each year both P and m are established. The percentages by which P and m have been increased during the last year are calculated. With our calculation method we know then the percentage of real change, the relative increase of R. From year to year the central bank keeps a table with the real change over the last year. The table leads to a graph as shown. With the graph the real change over the coming year can be estimated. Then one establishes which increase of the prices one will accept. Now the amount of active money to be brought into circulation is known. But if a part of the new money ends in the safes of the trade banks, a correction therefore has to be made according to (2).



an example

A country with the currency unit U has a total amount of money M = U 1,000,000. A part c = U 300,000 lies in the safes as cash reserves. Then m = U 700,000. Last year there was an m = U 660,000. So the increase in m with respect to one year ago is nearly 6%. With the price index an increase of 2% in the price level P has been measured. So the real change must have been 4%. Last year it was $3\frac{1}{2}\%$ and one year earlier 3%. We estimate the real change during the next year to be $4\frac{1}{2}\%$. We accept a price level increase of $1\frac{1}{2}\%$. Then the active money m should increase with 6%, until m = U 742,000. If we assume that the ratio between m and M is nearly equal, so 0.70, then M has to be raised to U 742,000 / 0.70 = U 1,060,000. The total amount of money M increases with 6%. If the ratio m / M is kept in a separate table and graph, a more accurate estimation of M can be made.

CONJUNCTURE: FLUCTUATIONS IN THE ACTIVITY

In a primary economy of farmers a conjuncture fluctuation is not to be expected. All products are intended to meet the primary needs of the people. But a conjuncture fluctuation may arise as soon as luxurious products become involved: products of which the purchase may be delayed for a long time.

It is a general phenomenon that people keep their money in possession when their economic expectations are pessimistic. This causes a recession, a situation of lower spending. A part of the money in the families becomes inactive, as it is saved up in an old biscuit-tin. Then the cash reserves c in (2) should be extended with the cash reserves in the families. Is it possible to measure these? One may try it by asking about in, say, 1000 families. The changes in the saving up of money by the families should be monitored.

More usual indicators are the confidence among people and the sales figures of some luxury products, which can be measured by questioning the public or the traders respectively. If the questioning satisfies some fixed standard, the result can be expressed in a number, an indicator. After a long run of years each indicator yields a time series. These series may be used to look for correlations between several phenomena in economic life or to construct prediction formulas for other phenomena. This is the mathematical field of econometry: correlation coefficients, least squares adaptations and linear algebra. At this moment it would lead us too far away from our simple considerations.

If the indicators yield the typical figures of a recession, a central bank or a government should know what to do. A classic situation is the great depression between 1930 and 1940 in the industrialized countries. Then the governments were inclined to save up their money as well, by reducing their spending. Furthermore the central banks considered a fixed amount of money as a solid policy. That combination turned out to be fatal! Such a disastrous development may also occur sooner or later in developing countries. Therefore they should be warned from the very first beginning.

The appropriate measures may be that a government spends more, for instance in infrastructure works, or that the central bank enhances the amount of money M, because a larger fraction of it is inactive. Government spending keeps the activity going when the public is careful with its money. Also a larger amount of money stimulates trade and sales. When the recession fades the central bank should diminish the amount of money M again and take care over price stability.

For a correct calculation of the proper measures a number of indicators should be kept during a long time. For countries in the beginning of their development this program may be too ambitious still. But the warning for recession and depression phenomena is useful at the very beginning. Sooner or later they will come.

CHAPTER THREE

SOCIAL ASPECTS

Development programs are usually dealing with groups, with people in some social structure. This is helpful, because people learn from each other or are accustomed to a social pattern in which they live. In emergency cases they help each other. They may protect each other against errors or wrong decisions. Is it realistic to expect that people are ready to save money for investments after generations of poverty? Collective arrangements may bring relief therefore, comparable with house-building societies in the western world. In many successful projects the capital goods are hired from a corporation, which takes care for capital management and investments. A corporation is able to minimize the money in stock, to reduce the losses when the price level increases strongly. But it facilitates also the savings for a population that probably will not have a notion of their necessity during the first one or two generations. In the agricultural development in European countries from the end of the nineteenth century until rather recently a social structure has been dominant as well: the co-operations of farmers with their supervision on the local bank offices, their agricultural advisory organization or their own grain factories. Today the industrialized countries of America and Europe are rather individualistic. Every farmer or entrepreneur stands on his own.

One of the risks with development programs is that a developing country takes over western individualism. In a long period of dry weather or another adversity this individualism may cause a social disaster as well. No one is interested anymore in the circumstances of his neighbors. A social disintegration introduces new problems.

A special problem arises as large companies emerge: the accumulation of capital in a few families. This is an old Marxist point of view. Marx has predicted that an impoverished mass would make a revolution against these few families. In Russia this has happened. There the state took the supervision on the capital. But the communist regime there has been a disaster as well for the country. Western Europe has followed another scheme. The excesses of capital concentration have been regulated by the political reform of general elections, by unions of workmen, by social laws and so on. Nevertheless also in present day Europe the large differences in wealth are a permanent source of social tensions. People never accept really that someone becomes very rich, more than he deserves on the basis of a personal effort or merit.

So we observe that a developing country gets concentrations of capital. This capital is needed, especially as larger companies arise or bank offices are going to co-operate. Capital concentrations belong to economic development. At the other hand there are serious worries about the acceptance by the people of extreme wealth. Social contrasts may undermine one of the most valuable things in a country: social cohesion and the responsibility of people for their fellow-men.

There is a way out of this dilemma. Quite a lot of families have set up a foundation for their wealth, so that it is no longer a purely private property. A board of supervisors keeps the wealth embedded in social relations and guards decency in the use of it. Alas these foundations are not obliged in Europe or America. But a law that limits the wealth in a family to a maximum and that brings the rest into a foundation may be of use for many developing countries. So they may avoid a permanent source of social tensions and injustice. If they are so wise, they bring capital to its proper goal: not to be a vehicle for greed and excesses, but a natural and necessary ingredient for economic development in a social embedding. One may have a good hope that developing countries will be so wise to avoid the pitfalls of capital concentration, and take their measures to bring capital into a socially acceptable structure of responsible control. Then some day people from industrialized countries may visit a developing country and learn a lesson there about social coherence and decency.

A question of a different kind is that of unworthy labor circumstances. A hot issue in the industrial development of European countries has been the miserable condition of the working class. In a nutshell the problem is described as follows: the most competitive production is the cheapest one. Therefore the competition in a free economy tends to create the most miserable labor circumstances. So for home made products a minimum level of production circumstances should be established, with a corresponding labor inspection, to keep a minimum level of decency out of the sphere of competition. For products from abroad this cannot be done. The competition by foreign products should be met by import taxes, which compensate for the profit by unworthy labor circumstances elsewhere. Without social laws and corresponding import taxes an industrial development may lead to miserable labor conditions.

Beside the concentration of capital there is a more general item, the concentration of power. In organizations there exists a hierarchy, a structure where every individual is dependent on the decisions of his superiors or has power over people in a lower position.

Such a structure of well defined relations is essential for an organization and gives coordination and force to its actions. But it makes great demands on the complaisance of its members. Without knowing one's position it is impossible to function in hierarchical relations. Alas the relations of power may cause a submission or a domination that goes beyond the essential requirements of the organization. There slavery comes near. It may be doubted whether organizations are really sound if any of its members has an unassailable position. People in a situation of power get readily accustomed to the idea that their authority is natural. Power corrupts easily. It may lead to the government by a kind of godfather. Therefore it is a wise custom to oblige every man in power to justify himself. For the men at the top a committee of supervisors from outside the organization may be appropriate. Let the subordinates appoint one or more of the supervisors, their representatives at the top level. In this way the worst excesses of power relations may be avoided. Hierarchical relations may be necessary, but they should never be a justification for unworthy dependencies.

CHAPTER FOUR

FINANCIAL MARKETS

THE MONEY EXCHANGE RATE

As we have seen, the anchor for the value of the money is a simple price list. The exchange rate between different currencies has nothing to do with that, although it is often thought so. As a country develops, its export grows and foreign investors buy its money for their plans. So both by trade and investments there arises an abundance of foreign money, which it makes it cheaper. One may also say that in an exchange market a deficit arises of the home currency. This causes automatically a higher price of the home currency in, say, dollars. The exchange rate therefore is not set by the central bank, but is just a natural outcome of trade, investments and exchanges.

Sometimes a country intends to stabilize its exchange rate with respect to the dollar. This is always a dangerous receipt. If the attempt fails, it causes a monetary crisis usually. Then for many years savings and investments will go down. Stabilizing the exchange rate is one of the most tricky things. No developing country should take the risk of a monetary crash. And besides that: does it have the instruments to realize its goals? Or will it merely sell off its possessions?

The exchange rate is to be established by the trade banks. As an example we suppose they send someone to a meeting each week. For the sake of convenience they convert all the foreign money in their possession into a standard currency, say dollars. Of course this is only a calculation scheme. The money is not exchanged really. The total number of dollars at all the trade banks together is n. If each dollar has a price q in home currency, then the total amount of foreign money in stock is a buffer

$$\mathbf{B} = \mathbf{n} \cdot \mathbf{q} \,. \tag{3}$$

Of course B is measured in home currency. Now the trade banks together should agree to deal with a common standard stock B which is kept constant. This standard stock is a buffer of sufficiently large proportion, so that no trader has to be disappointed if he wants to buy foreign money. But also the fluctuations in q due to trade fluctuations should be small. It may be a responsibility for the central bank to prescribe a minimum stock B in order to keep fluctuations in the exchange rate small enough.

In our calculation scheme for equation (1) we saw already that the percentages by which n and q are raised are together nearly equal to the percentage by which B is raised, which is zero. For B had to be constant. So the trade banks are protected against a tidal wave of dollars, coming from over the whole world, if they would accept them without a limit. If we have then a number of dollars which is 1 % above the level of last week, the price is 1 % lower. If the weekly meeting is open to the public or to supervisors, no one has a reason for suspicion of any kind: the exchange rate is transparent and varies as a reaction to natural variations in the financial market.

an example

Let U be the unit of home currency. Last week at all the trade banks together there were n = 1000 dollars in stock. As the fixed buffer stock amounts to B = U 5000, each dollar had a value q = U 5.00. This week there are n = 1050 dollars in stock, which is an increase of 5 %. The value of each dollar has decreased by 5 % until q \cong U 4.75. One may also calculate q = 5000 / 1050 = U 4.76. The difference is small. An abundance of foreign money is directly translated into a lower price, as the trade banks simply don't want to have a larger value in foreign money in stock.

As the price q is given by market conditions, one may ask by which trade mechanism q is constituted exactly. The supply of dollars at the exchange market is given by the export and investments from elsewhere. The demand of dollars is given by the import and the investments by home companies elsewhere. The price q is lowered at an abundance and raised when dollars are rare. The equilibrium is stable. Let us for a moment forget the investments. Then an excess of export creates a cheaper dollar, so that the import increases. But also the home currency becomes more expensive elsewhere, so that the export decreases. Both mechanisms cause the export excess to diminish of itself. So the price q adjusts itself so that demand and supply become equal. The inevitable conclusion is that the exchange rate q brings automatically the balance of payments to equilibrium: the sum of the export and the incoming investments becomes equal to the sum of the import and the outgoing investments.

The balance of payments may be compared with a housekeeping booklet. Suppose that a family has a regular income from work, domestic spending, making debts at the bank and saving at the bank. Then income + making debt = spending + saving. A reasonable domestic management may compensate an excess of income by saving, but will avoid making debts by excessive spending. Likewise a country should avoid too large an excess of import.

export	import			
+	+			
incoming investments	outgoing investments			
supply of dollars	demand of dollars			
makes	makes			
home currency expensive	home currency cheap			
balance of payments				

current account + capital account

INTEREST

The interest is the price to be paid for the use of some amount of money during some time. When there is an abundance of capital available, the interest rate will be low. In an economy where people are ready to save money, interest will be low and it is cheap for investors to get money for their plans. If interest is high, investments are expensive and difficult to realize. So a high interest should be a signal to save more or to restore profits.

The interest rate brings supply and demand of capital to equilibrium. It constitutes the self correcting mechanism for the capital market. Many people think that the central bank sets the interest rate. This is not true. The interest is the outcome of a natural process. If the central bank is closed, as for a holiday period, the interest rate will remain at its natural level. By small variations around the natural level the central bank may influence the amount of money in circulation. If the central bank chooses a lower rate than the natural one, it brings more money into circulation. If it chooses a higher rate, it takes money out of circulation. But the central bank should never deviate too much from the natural interest rate.

The interest rate of the central bank is called the rate of discount. This is never equal to the real interest for, as we saw already, the trade banks are obliged to keep a part of their money in cash as a reserve. Because the cash reserves do not generate interest, the interest of the active money should compensate therefore. So the interest at the trade banks will be higher than the discount of the central bank.

A capital market can be seen like a public sale of vegetables. Let the trade banks send someone to a weekly meeting. There every bank reports the amount of money it offers or demands at the actual interest rate. Of course the obligatory cash reserves remain out of trade, as the central bank prescribes them. If there is a shortage, the interest rate will be raised gradually until supply and demand are in balance. If there is an excess, the interest rate will be lowered little by little until all traders are content. Then the equilibrium at the capital market has been reached. As soon as the relation between the adaptation of the interest and the initial unbalance in supply and demand is known from experience, the negotiations don't take much time anymore.

In many countries actually two markets exist, the one for short-term money at a scale of a few months, the other for long-term capital.

INSURANCES

In quite a lot of business matters there are risks. Suppose that a trader sends a load of goods to a foreign country. From experience he knows that a transport will fail once in, say, 20 cases. A damage will result. The probability of damage, the part of all cases that fails when seen over a large number of experiences, is 5 % then, or 0.05.

As a general principle one should handle that risks are acceptable as far as one is able to bear them. If damage will occur one should be able to keep upright. For risks that exceed ones capacity there are insurances. A large financial institution may be able to bear the risk of a failing transport. It will be clear that it asks a premium of at least 5 % of the possible damage, in our example. Then each 20 transports it receives a total premium that compensates exactly for the damage. In practice it will ask somewhat more, to build up a buffer, a guarantee fund. As we see the premium should at least be the product of the damage and its probability.

Another view on insurances arises as a large number of people together bears the risk of damages that occur to a few of them. If, say, 100 people together pay for the damages of 2 among them, the premium should be more than 1 % of the total sum of damages. Then the premium is at least the total sum of damages, divided by the number of participants.

Often an insurance company classifies comparable risks into classes. After some time it knows which percentage of the total insured value in a class will be lost. The premium for each separate risk then is a percentage of its value that is at least equal to the percentage of the loss in the whole class.

The financial institution itself should avoid to accept risks beyond its capacity. So natural disasters or epidemic diseases cannot be insured. Another way out is to re-insure too large a risk at the international capital markets. A common problem with insurances is that the customer becomes careless, as the risk is no longer for himself. For the financial institution this causes a loss. A usual way to reduce careless behavior is by imposing an own risk to the customer: a minimum part or percentage of the damage he has to bear himself.

An insurance company keeps always an administration of premiums and damages. For without a careful administration it will never be able to estimate risks. A statistical approach needs the experience with a large number of cases and incidents. Otherwise the institution will remain dependent on the experience of appraisers from outside, if available at all. The data to be produced are both the extent of the damage and its probability. Also the desired proportion of the guarantee fund can be estimated. But that calculation requires a certain knowledge of the mathematical field of statistics, which goes beyond the scope of our considerations.

BONDS AND SHARES

With our elementary notion of insurances we may understand bonds and shares. A bond is a loan with a fixed interest. It may be considered as a combination of lending out money and insuring the risk that it will be lost. After a large number of experiences a bank is able to estimate a risk. Besides that it likes always to deal with an own risk for the customer. And as the customer offers a security with some capital goods, the risk for the bank may be diminished further, which leads to a lower interest for the bond. So, after all, the interest will be the sum of the basic interest at the capital market and a premium for the risk that remains. As the basic interest often the interest is seen for state loans at a term of 10 years, at least in a safe country.

The same notions are valid for shares. A shareholder participates in the risk of the profit of a company. As profits may fluctuate strongly, there is much risk with shares. As a consequence the profit of shares usually exceeds that of bonds. There is a way to reduce the risk of shares. If the investment is spreaded out over a large number of different companies, the one may increase in value, the other may decrease, but the average result will be stable. For this reason some banks offer share trusts, where many investors participate in a spreaded way. Is there no considerable risk anymore? A serious warning should be given here.

For a country in the beginning of its development it is unlikely to have an exchange market for shares, a so called stock exchange. Often such a market is seen as the extreme of capitalism. Nevertheless marketable properties ask for their own market place. As soon as people deal in shares, a kind of stock exchange will emerge. Such a market however attracts easily financial adventurers, people who are sensitive to the promise of becoming rich and who are ready to pay too much for shares. Therefore sometimes the prices of shares are too high. And then, by surprise, they will crash, so that the investor loses a part of his money.

Can a right price of shares be calculated? Suppose that the yearly interest for longterm state loans is 5.5 % and that the country is safe. The ratio between profit and value of these state loans then is 5.5 %. For a share trust the risk of different companies is spreaded out, so that the main risk is a collapse of the whole stock exchange. Such an incident happens once in several decades. So the premium for the risk each year may be estimated to amount to 2 or 3 %. Let us say that the sum of interest and risk is 8 %. Then the ratio between profit and value is 0.08. We may reverse this by saying that the ratio of value and profit is 1 / 0.08 = 12.5. This ratio may be considered as an equilibrium value. But suppose that a newspaper reports a standard ratio between value and profit of 25 at the stock exchange. Then it is clear that the investor buys purely air for the half of his money. The overall price level, as expressed in an exchange stock index, may contain a large fraction of air, of nothing. This makes an investment in shares unreliable if one only follows advisers. Sooner or later a panic breaks out for this reason. The histories of stock exchanges show a number of examples of panic, of crashes. Is it the greed of the public that causes them, or its ignorance? After this warning it may be repeated what has been stated earlier. Let the proper goal of capital be that it is a vehicle for economic development and not for excesses and greed. That is necessary to keep it socially accepted. For, after all, financial matters should serve people in their personal and social lives. People are not the servants of their money.

CHAPTER FIVE

UNEMPLOYMENT

One of the phantoms in industrialized countries is a large scale unemployment: a multitude of people without a job and probably without an income. The lesser problems are seasonal influences and friction.

In an agricultural economy work will unequally be distributed over the seasons in the year. Also some industrial activities are related to the season. This needs no further comment. Besides that some friction may occur: people who switch from one activity to another and who are without work in the meantime. If this time is short enough, no considerable problem will arise.

One of the more serious unemployment situations is a recession, a situation of decreased spending. Conjuncture fluctuations cause a fluctuation in employment. As we discussed already, a government or a central bank has to know what to do with a recession. A wrong understanding of this phenomenon may lead to large scale unemployment and a monstrous social problem. In the great depression around 1935 the industrialized world has learned its lessons about this.

Then at last there is structural unemployment, the part of unemployment that cannot be ascribed to conjuncture fluctuations of a limited time, but is a long-term phenomenon. Here the classic advice may be given with which our considerations have begun. Let the currency be stable and let the savings and profits lead to a supply of capital which enables investments on a sufficiently large scale, to generate a higher level of prosperity.

A special situation of structural unemployment may be far ahead for developing countries, but is a practice in industrialized countries. It is too interesting to overlook it here. For social reasons a minimum income has been introduced, a general minimum level for wages. It is decent that everyone with a job can live fairly or is able to maintain his family. Alas minimum wages may block the market mechanism. As we have seen, for capital and foreign money there is a market mechanism: the price adjusts itself so that it brings equilibrium between demand and supply, just as it works for goods. This is a basic mechanism in a free economy. But at a labor market with minimum incomes it does not work anymore. In such a case a government should introduce an artificial price mechanism. For companies it may vary the basis of taxes. As it taxes the wages mainly, labor becomes expensive and there arises an excess on the labor market. But as it taxes the production as a whole, labor becomes relatively cheaper and unemployment decreases. This policy however requires an elaborate system of taxes. The promise of a well balanced labor market nevertheless is highly interesting, as large scale unemployment will be finished.

Although unemployment is often experienced as a shortage problem, it is essentially a remainder of production capacity. It is potential prosperity. Also from this point of view a termination of unemployment may be of interest. As stated already, this kind of matters will be far ahead for a country that begins to develop.

CHAPTER SIX

MORE ABOUT STABLE EXCHANGE RATES

In our discussion of the money exchange rate we warned against attempts to stabilize it. In many cases these attempts have failed and a devaluation could not be avoided. A considerable devaluation all at once discourages foreign investors for a run of years and may bring the whole capital market to disorder. Therefore a stabilization of the exchange rate is not without danger. What are the mechanisms?

As we have seen a developing country may produce a stronger export and more incoming investments. Both mechanisms lead to a larger supply of dollars, so that the dollar becomes cheaper or the home currency becomes more expensive. Generally an economy with a stronger growth than that of its main trade partners may get a more expensive currency. In the same way a weaker development may weaken the value of the currency in the exchange market.

Of course also a moderation of the internal spending leads to a stronger export and a lower import, so that the home currency increases in value. The balance of payments will of course tend to equilibrium, but at another exchange rate. Then foreign investors become confident and the incoming investments will increase, which makes the effect on the exchange rate stronger. This conduct however is only possible if the public and the unions of workmen are ready to moderate their claims. Otherwise it is not realistic to support the value of the home currency this way.

It is easy for the central bank to weaken the value of the home currency by an increase of the general price level. Then a standard list of products corresponds with a larger amount in home currency, while the price in dollars at the international markets will remain the same for these products. So a higher internal price level may make the value of the currency low at the exchange market, at the cost of a loss of value of the capital. Foreign capital may flee, which enhances the effect on the exchange rate. The reverse policy however is hardly possible. A lower internal price level to keep the value of the home currency high at the exchange market leads to serious difficulties: people will reject a lower income and traders don't like to diminish their prices. A lower level of prices and wages will simply not be accepted. Therefore the instrument of another price level to influence the exchange rate will only work in one way: a devaluation is easy, a revaluation is hardly possible.

Furthermore capital flows between countries may be used to obtain stable exchange rates. The unbalance between export and import is compensated by an equal unbalance in outgoing and incoming investments. The total balance of payments will automatically tend to equilibrium, as we have seen. Generally it is a position of strength for a country to compensate an excess of export by accurately attuned outgoing investments. This way of stabilizing the exchange rate may be maintained for a long time. But compensating an excess of import by attracting incoming investments is a risky scheme. One sells off his possessions and production facilities, the infrastructure of the country. Sooner or later foreign investors will lose their confidence and withdraw. A crisis will be the result. Then, after all, the country has come down in the world and a devaluation becomes inevitable.

Our warning should be repeated here: a stabilization of the exchange rate is a dangerous policy. History shows a number of failures and correspondingly disturbed capital markets in the countries that crashed. Probably the best advice is to keep the general price level at an increase of, say, 2 % each year and to let the exchange rate free. The small increase of the price level works as lubricating oil in an economy. It keeps everyone content with some increase of his income or his prices. A free exchange rate brings automatically the balance of payments to equilibrium. This may be a more solid policy than the adventure of stabilizing the exchange rate, with its uncertain result. Only a short-term stabilization by gold or foreign money may be of use, so that traders are not hampered by too large uncertainties. Often a central bank has a reserve of gold or foreign money. By selling some gold abroad it may increase the amount of dollars at the exchange market and so support the value of the home currency. Daily fluctuations in the exchange rate may be reduced this way. But as all reserves are finite, such a conduct is impossible for a long time.

For traders however there is another way out. The risk for international trade that arises from uncertain exchange rates may be cancelled by term swaps, as offered by some trade banks. Someone offers dollars at a time in future, and someone other needs these dollars then. Both fix a price in future. If the real price will deviate, the one will obtain a profit, the other a loss. But both keep word and are sure about the price. So the bank has no risk and the traders are insured against exchange rate fluctuations. A trader has only to fix his need of foreign money amply before and has to keep word.

At last there is a moral item. Exchange dealings are a way to profit without a reasonable effort. For this reason they may be condemned. Nevertheless differences in the exchange rates between the trade banks will be settled. Here it may be better to introduce a system of governmental permissions than to stabilize the exchange rate, with its risks.

We have seen that the exchange rate may yield an indication on how far an economy grows more or less than others. Economists may see a competition here. The task of the economy however is to serve the people in their needs, not to use the people for a sporting event. As economists are inclined to aim at maximum growth, it should never be forgotten that this is a political question: the expression of a will. In developing countries every increase of production and trade may be welcome. But a highly developed country may decide to set other priorities, as leisure or a better environment. Ultimately economic policy is a matter of will and not of compulsive growth rates.

CHAPTER SEVEN

MORE ABOUT CONJUNCTURE

As we have discussed, a conjuncture fluctuation is mainly due to psychological factors. The public is lavish as it is optimistic and sparing as pessimistic expectations dominate. From experience it is known however that the industrialized countries may

expect a lower activity of trade once in 7 or 8 years, and that the phenomenon has an international character. Is there also an economic mechanism?

When in a recession people bring their money to a bank, rather than to spend it, the supply of capital may generate a lower interest, as we have seen. The cheap capital leads to investments. So building-companies and other producers of capital goods become more active and generate the activity that may draw the economy out of the recession. Next the new investments lead to a higher level of prosperity and activity, which makes the public optimistic. After some time the productive capacity is fully utilized, so that the trade activity cannot increase anymore, but the public is inclined to spend more and more. This leads to a larger activity of the money. One may also say that the circulation time of the money decreases (for the mathematics see the appendix: a decrease of T leads to a smaller value of R, so that P grows). The price level may increase during a boom, unless the central bank diminishes the amount of money in circulation. The end of the feast is usually announced by some event that alarms the public: a crash of the stock exchange when the prices of shares have become unreasonably high, a political reverse, a war or something like that. Gives a boom the public an uneasy feeling? As the public comes to its senses, it becomes sparing. Then the trade activity decreases and the circulation time of the money increases (see the appendix: as T increases this effect dominates the decrease of trade, so that the expression R increases and P decreases). The price level gets a tendency to fall, unless the central bank increases the amount of money. Now the cycle is completed and repeats itself.

This view of a conjuncture cycle needs some comments. In the first place it is possible that during a recession the money does not return to a bank but disappears. In the time of the crisis around 1935 workmen got their money not by way of a bank, but directly in a small envelope. It was stored at home in old biscuit-tins and became inactive as the recession became worse. The central bank should compensate for such an effect. Generally the central bank reduces conjuncture fluctuations by striving after a stable price level: during a boom the circulation of money is restricted, but during a recession it is enhanced. So a policy of stable prices is one of the main measures to prevent too large conjuncture variations, with their evil social consequences. The same truth may be seen from the angle of salesmen: if the demand decreases, they will lower the prices. So if, by some action of the central bank, the prices are kept constant, it is clear that the demand remains on a normal level. A consumer's point of view is that during a boom the public should be stimulated to bring its money to the central bank, but that during a recession it should obtain a flow of cheap money from that bank. In this way the central bank influences the spending behavior of the public.

In the second place we have assumed that the lowering of the interest rate gives rise to more investments. This is only true as the investor may expect a new readiness at the public to spend. In the great depression this optimism of the investors was far away and the economic activity could not restore of itself. In such a deep crisis only a government may be able to restart the machinery. It borrows money from the capital market and starts the construction of infrastructure works on a sufficiently large scale. When the activity has been restored, the government pays off its debt. So the government spends and saves against the movement of the public and the market, which makes the conjuncture movement less intense. This process is called anticyclic policy. (In the appendix a calculation is treated of a multiplier, a large effect of a small government investment. In short it means that at large unemployment one may give some people a job and an income. Then they will spend that, so that others get a job, and so on. The result is a chain of jobs and incomes.) A conjuncture fluctuation needs to be described by a multitude of causes. Here econometric methods are necessary.

A government that intends to meet a recession by enhanced spending should be warned against some troublesome consequences. In the first place it should attract money from the capital market, which leads to a debt that has to be paid off at a later time. Will the government be able to pay off? Will it be able to resist politicians who don't like economy measures at the moment that the recession is over? And a serious problem may be that it is difficult to fix the times when the additional spending has to begin and to end, for each government has its own planning moments in the financial year and sometimes makes plans related to elections. Generally it turns out to be very troublesome for politicians to be sparing when the conjuncture is booming. In practice this is the main problem with anticyclic policy.

Is it possible to foresee recessions? Periods of lower confidence are usually preceded by a financial mechanism. The trade banks obtain their money by short-term contracts from the central bank. They put it out by long-term contracts. During a boom the short-term interest rate will increase, so that the trade banks lose a part of their yields. This makes the bankers less optimistic. Gradually the public will be influenced by the sentiments in the financial world. Finally some incident causes a state of alarm and a recession is there.

CHAPTER EIGHT

ECONOMETRY – A SHORT DESCRIPTION IN WORDS

Econometry is the way to test qualitative statements on economic questions with measured data. But it is also the best way to numerically correct predictions. As the level of mathematics in econometric calculations exceeds that of secondary school level, we will only try to give a description in words. The mathematically skilled will be able to see the exact techniques behind the text.

First we assume that a country disposes of a number of time series, periodically measured indicators, extended over a long run of years. All numbers in one time series should be obtained according to the same procedure, so that the successive numbers remain comparable. Usually one is only interested in small deviations from a known situation, differences in small percentages. We will base ourselves on this assumption.

Suppose that we want to describe a quantity by a combination of indicators. The first problem is now to find those indicators that are relevant for our quantity and to reject all other indicators. The criterion is the value of a so called correlation coefficient, a number that expresses how far two time series are connected: our quantity and the indicator. We accept only indicators with a sufficiently strong correlation with our quantity. The correlation of the quantity and an indicator may be illustrated in a diagram, where every dot





If we have obtained a set of indicators that are relevant to describe our quantity, our second problem is to construct a formula by which our quantity is calculated out of the indicators. The simplest way is a linear combination: the quantity is nearly equal to the sum over all indicators, with a weight factor for each indicator. In other words: the quantity is described as the sum of all indicators, each multiplied by its own weight factor.

Of course the matching is never exact. Always a rest term remains, the difference between the quantity and the linear combination. We want to have the rest term as small as possible, in order to get the best fit. This rest term makes a new time series. Now the weight factors are calculated so that the sum of the squares of all the rest terms together becomes minimum. This is called a linear regression procedure or a least squares adaptation. The resulting weight factors give the best fit between the quantity and the linear combination. With the formula one may calculate the quantity out of the indicators, by merely filling in their values.

As we have stated, a linear combination is the simplest formula. Fortunately it is nearly always sufficiently accurate. Let the quantity and the indicators concern differences of, say, 1 % with respect to a known situation. Then higher order corrections like products among two indicators or squares will have a magnitude of 0.01 % and can be neglected. If the indicators are chosen wisely, the linear combination yields sufficient accuracy. A better one does not exist.

A prediction formula is obtained as follows. Suppose that we want to predict a quantity next year out of indicators at this moment. Then we move the time series of the quantity to one year earlier. We look for correlations with indicators (not moved) and we construct a linear combination that is the best adaptation to the quantity (moved). By this procedure a prediction is made: a calculation of a future quantity with indicators of today.

Indicators may be distinguished into two kinds, as the one kind is given and not capable of influencing (data) and the other kind depends on a chosen policy (instruments). With the linear combination that has been constructed one may calculate how the quantity changes as the instruments are adjusted. The consequences of a proposed policy can be calculated this way.

Is the reverse procedure also possible: to establish the desired values of some quantities and then to calculate how the instruments have to be adjusted? Mathematically this can be done when one disposes of a number of adaptation formulas, if this number is equal to the number of instruments that have to be adjusted. But economic policy remains policy: it concerns decisions of a political will. It is hardly imaginable that the economic policy of a country could be merely the result of a computer calculation.

The techniques of econometry can also be used elsewhere. We take the organizations of producers as an example. A question may be to predict the sales figures of a product one year from now. Typical indicators that correlate may be the confidence among consumers, the incomes to be expected and so on - in differences of small percentages with respect to one year before. With the corresponding time series (moved in time as far as desired) the weight factors are calculated. Then the sales figures are predictable as a linear combination of a few indicators at one year earlier.

For econometry one needs time series of indicators. A developing country may begin to gather them. We give a first idea, without pretending to be complete.

-Natural circumstances, like the yearly rainfall. The monsoon may be irregular.

-The saving-behavior. Investments are decisive for the long-term development. Interest rates.

-The data needed for a stable price level, like amount of money, cash reserves, price index. -The balance of payments with foreign countries, with a distinction between trade and investments. Exchange rates.

-Data around conjuncture like trade, confidence among the public, foreign influences. As development goes on, such a list may be extended.

APPENDIX

FISHER'S LAW

We will derive eq. (1) out of money circulation considerations. The active money m moves from the one owner to another in a time T. The money that flows is equal to all the products that are sold in an interval of time t, multiplied by the price of each product. We give each product a number i. The amount of products of kind i is n_i , the price is p_i and the amount of money involved is

$$n_1 \cdot p_1 + n_2 \cdot p_2 + n_3 \cdot p_3 + \dots = \sum_i n_i \cdot p_i,$$
 (a.1)

where Σ is nothing but a short way to denote a sum over all the products i. The whole trade activity is now described by a number of products dealt in a time t, with a money flow

$$\frac{m}{T} = \sum_{i} \frac{n_i}{t} \cdot p_i \quad . \tag{a.2}$$

Now we isolate the general price level P :

$$m = R \cdot P \tag{a.3}$$

where

$$R = T \sum_{i} \underline{n}_{i} \cdot \underline{p}_{i} \quad . \tag{a.4}$$

Here we have proved the basic formula (1). The result is known as Fisher's law. Note that in R the trade activity n_i/t is included and that all prices in R are insensible for changes in the general price level, by the division p_i/P : if each price increases by the same factor, the general price level does the same and p_i/P remains equal. In R also the circulation time T of the money is included. If this is constant, changes in R represent exactly the changes in the trade activity. Therefore we have called an increase of R the real change. It should not be forgotten however that in R the circulation time T may vary. So the growth of R may differ somewhat from the growth of the trade activity. Probably it would be better to call it the real part of the monetary growth.

Our calculation scheme with small percentages may be written shortly by

$$\Delta m/m \cong \Delta R/R + \Delta P/P \qquad (a.5)$$

where Δm only denotes a small difference $(m_2 - m_1)$. So $\Delta m / m = (m_2 - m_1) / m_1$ with $(m_2 - m_1) / m_1 \ll 1$.

MULTIPLIERS IN CONJUNCTURE POLICY

In our outline of conjuncture policy we argued that a government may set the activity going by additional investments. Of course government investments only apply to situations of unused production capacity: unemployment, empty factories and so on. During the great depression around 1935 J. M. Keynes founded a school by showing how a small additional investment may cause a much larger increase of the national income. We will try to explain in short how it works.



The national income Y is defined as the yearly sum of all incomes in a country: wages and yields from capital. This Y is equal to all the value generated by the total production, after subtraction of the losses by the aging of the production equipment (the losses by writing off). When the national income increases by an amount ΔY , a fraction f of it will be spent by an additional consumption ΔC , the increase of the consumption C. In formula:

$$\Delta C = f \cdot \Delta Y \cdot \tag{a.6}$$

Always f < 1. As the national income is the sum of consumption and investments, an increase ΔY will consist of an increase ΔC and an increase ΔI of the investments:

$$\Delta Y = \Delta C + \Delta I \,. \tag{a.7}$$

We combine (a.6) and (a.7) to $\Delta Y = f \cdot \Delta Y + \Delta I$ or $(1-f) \cdot \Delta Y = \Delta I$ so that

$$\Delta Y = \Delta I / (1-f) . \qquad (a.8)$$

Let ΔI be the additional investment during a recession. Then we see in (a.8) that the increase ΔY of the national income may be much larger than the government investment ΔI : if the increase in consumption is, say, 80 % of the increase in the national income, then f = 0.80, and 1 / (1-f) = 5. Now $\Delta Y = 5 \cdot \Delta I$. The factor 1 / (1-f) is called a multiplier. Our argument shows that a small additional investment by the government may lead to a multiple in the additional national income.

The multiplier may also be understood as follows. An investment with magnitude 1 will lead to an increase of 1 in Y. An additional consumption f will follow, which in its turn leads to a consumption f^2 . This causes a consumption f^3 and so on. Then, with $\Delta I = 1$, we obtain a geometrical series:

$$\Delta Y = 1 + f + f^{2} + f^{3} + \dots = 1 / (1 - f). \qquad (a.9)$$

In the whole argument it is assumed that the consumption may increase, or that the production capacity of the country is not used at its maximum. Therefore the families do not invest themselves. This assumption of unused production capacity is typical for a recession. When the productive resources of the country are fully utilized, an additional government investment may lead to wage demands, higher interest rates and so on. Then the production cannot increase anymore and every stimulation of the consumption, either by the government or by the public, will cause an equal decrease of the investments. The calculation as presented is a simplification. We mention only foreign factors. A real conjuncture fluctuation is the outcome of a multitude of causes. A complete description will require econometric methods.

CONTENTS

	preface	2	
1	the importance of savings and investments	3	
2	basic principles of central banking		
	the amount of money, the activity and the price level	4	
	the general price level	5	
	the active amount of money	6	
	monetary policy	6	
•	conjuncture: fluctuations in the activity	1	
3	social aspects	8	
4	financial markets	10	
	the money exchange rate	10	
	interest	12	
	insurances	13	
	bonds and shares	14	
5	unemployment	15	
6	more about stable exchange rates		
7	more about conjuncture		
8	econometry – a short description in words	19	
	appendix Fisher's law	21	
	multipliers in conjuncture policy	22	

Eindhoven, The Netherlands, J.M.M.J. Vogels.