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# MAGISTERARBEIT

Titel der Magisterarbeit

„Inheritance: An economical approach“

Verfasser

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angestrebter akademischer Grad

Magister der Sozial – und Wirtschaftswissenschaften  
(Mag. rer. soc. oec.)

Wien, im Oktober 2007

Studienkennzahl lt. Studienblatt: A 157

Studienrichtung lt. Studienblatt: Internationale Betriebswirtschaft

Betreuer: Ao. Univ. – Prof. Dr. Andreas Novak

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# 1. Introduction

The over-aging generation problem resounds throughout Europe nowadays. Fears of dying off peoples in Western Europe perambulated through out the continent and new ideas are searched for to encounter the development of decreasing birth rates. Since aging people and decreasing birth rates had been located as problems it is time to find a practicable solution. The economical fears of governments, mainly focused on the preservation of the social welfare states, had to be solved to ensure the high degree of wealth. The problem that occurred was the financing of such systems, which seemed to be pretty unlikely under present conditions. Governments are aware of the fact that such social systems can only be financed with higher tax income, which is strictly dependent on economic growth, although they do not know how to achieve such growth in a particular small time horizon.

A certain problem which was detected in Switzerland is the fact of aging bequest receivers. In 2007 the Basler Zeitung posted a thread where it discussed a change in inheritance tax system to reallocate wealth from the aging children generation towards the grandchildren generation of the bequest giving individuals. Although they did not identify the momentousness of this idea they had an intuitively right proposal which is about to be discussed in this paper. Since the amount of inheritances bequeathed each year is expected to be pretty high in modern economies it sounds kind of convincing that a reallocation might have a positive influence on economic growth, which is the financial basis of social welfare states.

The idea is an increase in GDP and economic growth by reallocation of wealth. Therefore the concept of Permanent Income Hypothesis by Friedman is used in this paper to explain consumption behaviour of different individuals and in consequence of different groups of individuals. To show the sensibility of an inheritance allocation from children towards grandchildren it is one of the main purposes to show differences in consumption behaviour. The other purpose is to show the effect of increasing consumption on GDP and economic growth. Therefore it is necessary to use well known economical theories of open economy models. Although this paper does not state any reasonable solution for over-aging problems it is supposed to offer a solution for the problem of decreasing financial resources of the social welfare state. The paper starts with a broad overview of economic growth theories and the behaviour of consumers with focus on Friedman's PIH in the second chapter, turns towards

the model suggested with all its consequences for consumption and economic growth in the third chapter and finally ends with suggestions for applications of the model for economies in the fourth chapter.

## **2. About economic growth and the behaviour of consumption levels**

### ***2.1. Theories and Thoughts about Economic Growth***

Economic Growth is the key for enrichment of countries. This statement sounds hardly convincing especially when there is no argumentation that proves the sentence to be true. But if someone observes the wealth inequalities and its emergence he will find particular indications that might encourage the above statement. Having a look at Asian countries like China and the Tiger-states and comparing them to modern economic societies like Europe, the United States or Japan one can see that wealth inequalities world wide are quite usual. Nevertheless the inequalities between those economies are about to decline. But what is the reason for such a development?

A country's wealth is judged by its GDP (Gross Domestic Product). The United States which is undoubtedly one of the richest countries worldwide experienced an average annual GDP growth rate of 1, 75 percent between 1870 and 1990<sup>1</sup>. Therefore the GDP increased from US\$ 2244 in 1870 up to US\$ 18258 in 1990. As one can see even small annual amounts of growth do have a heavy impact on final output over a long period of time. Now it is interesting to observe the time horizon. Observing India, which is one of the fastest growing economies nowadays, it can be said that India would need roundabout hundred years assuming a growth rate of three percent to reach the current US-GDP per capita level<sup>2</sup>. Taking into account that the United States has had only a growth rate of 1, 75% for a period of a hundred and twenty years, it seems obvious that India's economy must be relatively weaker than the US one's in the 19<sup>th</sup> century. But assuming a growth rate of 5, 5% for India's economy the time horizon to

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<sup>1</sup> Wei-Bin Zhang, *Economic Growth Theory*, Ashgate Adlershot (2005), p. 1

<sup>2</sup> Wei-Bin Zhang, *Economic Growth Theory*, Ashgate Adlershot (2005), p. 2

achieve today's level of GDP per capita will be halved. The conclusion of such an observation is that economic growth brings the wealth level of different economies closer together. Although economies of highly developed countries grow relatively smaller their wealth level is still increasing. But economic miracles as they could be observed in the development of the Tiger states adjust real GDP per capita measured by Purchasing Power Parity (PPP) rapidly. Kaldor who observed economic growth explicitly states six different facts for the progress of economic growth<sup>3</sup>:

1. Per capita output grows over time, and its growth rate does not tend to diminish
2. Capital-Worker ratio grows over time
3. The rate of return to capital exhibits almost the same over time
4. The ratio of physical capital to output is nearly invariant over time
5. The shares of labour and physical capital in national income change little over time
6. The growth rate of output per worker differs substantially across countries

Forecasting European economies under these assumptions might bring up heavily disappointing results, especially when the shares of labour and physical capital in national income are not about to be nearly constant. Another point that is mentioned by Kuznet is the transformation of economies regarding their main sector. Kuznet states that the transformation from agricultural into industrialized economies and the transformation from industrialized into service economies, which is the case for most developed industries, needs to be supported by a higher degree of education. Therefore governments play a substantially important role for economic growth by offering infrastructure and institutions which take care of such a necessity. To explain the phenomena from above it is likely the best to have a look on certain theories of economic growth:

#### *Adam Smith*

Adam Smith observed that there must be certain interplay between technological progress, division of labour and scale of market. By dividing labour and specialize labour force towards smaller highly skilled participants economic growth is possible. The activity level is about to decline but the efficiency level will increase. Each of the independent developing people is about to specialize in a certain way regarding his abilities and resources. Smith observed that industry and manufacturing requires highly skilled work forces and that therefore economic

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<sup>3</sup> Wei-Bin Zhang, *Economic Growth Theory*, Ashgate Adlershot (2005), p. 3

growth only occurs if exchange and prices exist. Although a lot of effort during the past decades was put into applicable models of human capital accumulation there is still no utilizable clarification for Smith's theory of division of labour found<sup>4</sup>. Smith related the division of labour and the gains from specialization to an extension of the market. Nevertheless it was not possible for Smith to recognize the relationship between specialization which means higher education and productivity.

#### *David Ricardo*

Ricardo who can be seen as the next most important economist was influenced strongly by Smith. Even though he did not specialize in skills of workers and population changes, he observed the relationship between income distribution and prices. His theory of comparative advantage mainly forces the specialization of individuals to receive a certain gain from trade. And relating that to Smith it is mainly an explanation for the division of labour and therefore for specialization and improvement of skills.

#### *Robert Malthus*

Robert Malthus is another economist that has to be taken into account, especially under the consideration of demographic changes. Malthus suggested that there is interdependence between resources and population. His main statement was that resources, especially food, are scarce. Therefore an increasing amount of population will lead to a decreasing amount of resources to be distributed between individuals. Consequently he suggested keeping the amount of population growth quite low to increase the amount of assets per capita. That theory is proven to be wrong by time. Even though he did not take technological progress into account, which is one of the main mistakes and accepted to be wrong in literature also, another mistake could have been the conclusion he draw from his theory. As it can be shown by the example of Germany it is not likely the case that higher income per capita forces population growth. At the latest in 1968 when the German birth rate started to decline, although the per capita income was rising, the Malthusian Theory of Development had been *ad absurdum*<sup>5</sup>. It could be said, as it was done by the next sociologist that is to be introduced, that birth rates decline with higher prosperity. Nevertheless the Malthusian Theory of Development might count for particularly poor countries where an increase of income per capita can not be achieved by increasing productivity, because of an obvious impossibility. Observing the worldwide overall population growth rate it is a fact that the growth rate

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<sup>4</sup> Wei-Bin Zhang, *Economic Growth Theory*, Ashgate Adlershot (2005), p. 5

<sup>5</sup> Herwig Birg, *Die ausgefallene Generation*, C.H.Beck oHG München (2005), p. 38

descends since the mid 1980's although the worldwide income level in terms of Purchasing Power rises<sup>6</sup>.

#### *Johann Peter Süßmilch*

The opposing opinion that is based on an idea of Süßmilch suggests that birth rates tend to decline with increasing resources per capita. The mechanism of opportunity costs is the basic idea behind this theory. Süßmilch states that individuals with increasing income tend to avoid children by realizing other possibilities<sup>7</sup>. That seems to be adoptable for nowadays societies which offer various opportunities to individuals that are not related to child-bearing. Accepting this idea to be true it is necessary that economic growth has to be influenced by productivity and not so much by income levels (such as GDP/capita as proposed by Ricardo who did not realize the effect of prices). To relate Malthus and Süßmilch together it can be said that both are not necessarily conflicting. Malthus, especially with the background of the French Revolution and his status of nobility, observed the increasing influence of poor people in most European countries and stated that resources do not increase infinitely and that an increase in prosperity can only be reached by lowering the amount of "mouths to be fed" (of course the poor one's). Süßmilch suggested an automatic decrease in population growth with higher income per capita, which could explain the fall of empires that achieved high prosperity but also high decadence and therefore did not focus on development anymore. The main difference is that Süßmilch assumes economy to grow automatically, which is a typical sociologist's point of view, whereas Malthus assumes population to grow automatically, which is a typical economist's point of view. Maybe the convergence of both assumptions draws a picture for better understanding.

#### *Joseph Alois Schumpeter*

Last but not least the definition of entrepreneurs is a point that is closely related to education and technology which are main factors for economic growth. Schumpeter introduced his idea of the entrepreneur in 1911, when he stated that the entrepreneur unites the available resources together and creates a new utility for them. Schumpeter named that event innovation. Therefore he states five different cases that are about to be innovative:

1. introduction of a new good or a new quality of an existing good

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<sup>6</sup> One should be aware that such a statement can only be seen as tendency since it is not telling anything about the distribution of wealth. The only point to show is that the Malthusian Theory must be wrong, not to show that overall wealth for each individual increased also.

Herwig Birg, *Die ausgefallene Generation*, C.H.Beck oHG München (2005), p. 24 ff.

<sup>7</sup> Herwig Birg, *Die ausgefallene Generation*, C.H.Beck oHG München (2005), p. 20

2. introduction of a new method of production
3. opening a new market for a product
4. conquest of a new source of raw materials or half-manufactured articles
5. carrying out of a new organization of an industry like the creation of a monopoly position or the breaking up of a monopoly position

That is only achieved by creative destruction which means that the whole process is spontaneous and a disturbance of the equilibrium that shifts it towards a higher level.

The relation between the Schumpeter entrepreneur and education or technology is knowledge. Innovation is mainly an idea. It is private first but it becomes knowledge as soon as it is published. Knowledge is a public good<sup>8</sup>. And knowledge has to be taught. Therefore knowledge is nothing more than education and education determines human capital, which finally influences productivity and therefore economic growth.

There are several growth models that take all kinds of different exogenous and endogenous variables into account. The most commonly used starting point is the Solow-Swan model which has had been modified with regard to the various impacts of conditions to be observed. But finally the ideas that had been considered above are some of the fundamental aspects of economic growth. Traditional growth models are subject to two well-known limitations. On the one hand economic growth models emphasize some aspects of economic reality but dismiss many others. But it is indispensable to realize that economic systems are an ensemble play of many factors that are not easily harmonized, because of complicated interactions. On the other hand economic models have got the problem that they are concerned with linear, static or equilibrium states of dynamic systems, which makes genuine dynamic system analysis quite unrealistic. Although there had been many attempts to create genuine nonlinear theories, it mostly ended up in being inappropriate to fit into the theoretical framework. But what so ever it is nevertheless useful to find explanations for economic behaviour even though it is not perfect.

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<sup>8</sup> Mankiw, Taylor Economics (2006, Thomson Learning), p. 517

## 2.2. Factors of economic growth: The definition of GDP and its participating factors

Economic growth is the source of prosperity as it is described above. It is a fact that economies with steady growth are about to prosper and offer an increasing standard of living towards its community. But what determines economic growth in particular?

First of all it has to be said that wealth or prosperity is measured in real GDP (Gross Domestic Product) per capita. Real GDP includes all income and spending in an economy per year. In business administration terms one could say earnings. Strong economies have a GDP around \$US 25.000 per capita<sup>9</sup>. The richest economy in that terms is the United States with more than \$US 34.000 per capita<sup>10</sup>. But observing weak economies one will find that most of them are not even close to a GDP such as the one of the United States achieved over a hundred years ago. A good example could be China which is an arising economy but in relation to its prosperity it is far away from being a rich country. Chinese GDP is around \$US 4000, which is only \$US 600 higher than the United States one's in 1870 with roundabout \$US 3400. But what is the main reason for such inequalities in prosperity? It is economic growth! Imagine a country like Japan having only a GDP of \$US 1.250 in 1890 compared to a GDP of \$US 4100 of the United Kingdom in 1870. Today Japan achieved a level that even exceeds the current GDP level of \$US 23.550 of the United Kingdom by almost \$US 3000 to a current GDP of \$US 26.460. The reason for such a development can be found in the economic growth rate. While the United Kingdom experienced a growth rate of 1,35% in average over the last a hundred and thirty years, the Japanese economy grew for 2,81% in average since 1890. One can say that the Japanese economy is much more productive than the British one, because productivity is the factor that explains economic growth. Productivity, or labour productivity, is the measure of output per worker (per hour) and can not be seen as a simple variable that can be influenced easily. It is determined by various factors that have to play together to allow for economic growth. In literature productivity is determined by four main factors:

1. Physical Capital
2. Human Capital
3. Natural Resources and

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<sup>9</sup> Source: Mankiw, Taylor Economics (2006), ThomsonLearning, p. 504

<sup>10</sup> Measured in real GDP per capita in 2000 US dollars

#### 4. Technological Knowledge

The variable's interdependency is a point that has to be figured out first. Therefore it is necessary to define the factors precisely.

##### 1. Physical Capital<sup>11</sup>

Physical capital is the stock of structure and equipment that is offered to an economy's participants. Tools make working and therefore production much easier. Physical capital is one of the factors of production which describe the inputs to produce goods. An important feature of capital is that it is a produced factor of production. That means that the amount of capital to be invested depends on the outcome of the former period. Invested capital under this consideration means an improvement of input materials, as for example a new transit highway to increase the logistics efficiency which hopefully reduces costs and therefore increases capital at the end of the period.

##### 2. Human Capital<sup>12</sup>

Human capital is defined by knowledge and skills which had been acquired by workers through out education, training and experience. Human capital has some quite similar effects and ways of handling like Physical capital. Although it is not a tangible good it influences productivity by raising an economy's ability to produce goods and services. It is also determined by investments in terms of teachers, schools, libraries and so on, which can raise the level of Human capital. Therefore it is dependent on past outcome of the economy to be influenced positively.

##### 3. Natural Resources<sup>13</sup>

Natural Resources are a factor that can hardly be influenced. Natural resources are material and structure that belong to a country and can be seen as a starting bundle of goods in an economy. Usually they are differentiated between renewable and non-renewable resources. Prehistoric materials, such as oil or different chemical elements, are not easily or even impossible to be renewed. It would take whether a lot of time, sometimes millions of years, or a lot of energy to reproduce such materials. Anything else that could be renewed quite simple, such as wood or food which can be re-cultivated, is called renewable resources.

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<sup>11</sup> Mankiw, Taylor Economics (2006), ThomsonLearning, p. 507

<sup>12</sup> Mankiw, Taylor Economics (2006) ThomsonLearning, p. 508

<sup>13</sup> Mankiw, Taylor Economics (2006) ThomsonLearning, p. 508

Natural resources are a factor that influenced economic development of nations quite strong in the past, like the strongest economy worldwide the United States with a high amount of natural resources. But with the advancements of international trade it becomes less and less important, which can be proven by economies like the Japanese and German ones that are scarce of resources, but still powerful economies by exporting manufactured goods made out of imported natural resources.

#### 4. Technological Knowledge<sup>14</sup>

Technological knowledge is a resource of understanding of the best way how to manage production and services most efficiently. Technological knowledge takes couple of forms. The most important one is the commonly available knowledge. Once an inventor finds a new way of increasing the efficiency of production, e.g. Ford with mass production, it becomes public knowledge. Therefore it is about to be adopted by other manufacturers and increases production efficiency significantly. Another type of knowledge is the private knowledge. Technology in that sense is the property of a member of the economy. Therefore it is not commonly available but still influences productivity by offering a certain good to society. A good example is Coca-Cola which owns the recipe for its drink and sells it worldwide without making its knowledge publicly available. Usually public knowledge is fixed in patents that guarantee the idea or inventions to be used exclusively by its owner for a certain time. After its expiration the knowledge becomes commonly available.

Technological Knowledge and Human Capital stick close together. But there is a slight but vital difference between both kinds of productivity factors:

“Technological knowledge refers to society’s understanding about how the world works. Human capital refers to the resources expended transmitting this understanding to the labour force.”<sup>15</sup>

After defining the determinants of productivity it has to be said that this broad overview should be seen as an easy introduction into economic understanding. Many of these components had been observed exclusively under different assumptions and in a much more realistic way to describe economic growth.

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<sup>14</sup> Mankiw, Taylor Economics (2006) ThomsonLearning, p. 508

<sup>15</sup> Mankiw, Taylor Economics (2006), ThomsonLearning p. 509

### **2.2.1. The production function**

The production function known as Solow-Swan Model describes the relationship of inputs and output in an economy. It is usually written as:

$Y = A F(L, K, H, N)$  with  $Y$  = quantity of output,  $F$  = input function which describes the dependence between the factors  $L$  (Labour),  $K$  (Physical Capital),  $H$  (Human Capital) and  $N$  (Natural Resources).  $A$  is supposed to be the technological level of production available.

Many production functions are assumed to offer constant returns to scale, which means that output  $Y$  increases by the same amount as the production function  $F$  does:

$$xY = Ax F() \text{ with } xY = A F(xL, xK, xH, xN)$$

Another important fact of production functions is the case of interdependency. Each outcome can be expressed in terms of input factors without changing the overall statement, e.g.:

$$Y/L = AF/L = AF(L/L, K/L, H/L, N/L)$$

As one can see, the above mathematical equation is nothing more than a summary of the theoretical explanation.

### **2.2.2. GDP and its determinants**

First of all I make some short remarks towards GDP in a closed economy. Afterwards the GDP in an open economy, which is usually the case for all Western economies is about to be observed.

#### **a) GDP in a closed economy**

“Gross Domestic Product is the market value of all final goods and services produced within a country in a given period of time.”<sup>16</sup>

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<sup>16</sup> Mankiw, Principles of Economics, The Dryden Press (1998), p. 480 ff.

This statement seems to be quite simple but calculating GDP in a sufficient way needs particular investigation. Therefore each part of this sentence has to be analyzed separately. “All” defines each single item produced and sold in a market, which is not necessarily only tangible but also anything else. Exceptions are made for illegal goods, e.g. drugs and self-caterer who do not participate in the market. “Final” in that way is to be understood as not treated anymore. Intermediate goods are not to be measured in GDP since their value is already covered in the final good. An exception is made for intermediate goods that enter the inventory of a company for example. Therefore it becomes a temporarily final good until it is treated again. “Goods” are defined as all tangible goods since “services” are defined as all intangible services. Both are included in GDP. Buying whether goods or services raises GDP. The term “produced” signifies that all goods and services are valued once beforehand their first acquisition by a customer. Used articles are not included in the GDP. “Within a country” is related to the geographic origin. If a good or service is purchased outside of the geographical origin it is not accounted for in GDP. Otherwise goods and services produced by foreigners are valued in the GNP (Gross National Product) which includes all items produced by citizens of their country of origin. Finally the term “in a given period of time” defines the length of a period which production is accounted for. Usually the period observed is defined as one year or a quarter of a year. Each kind of inflow and outflow of economic activity is measured in GDP for that period of time.

After explaining the concept of GDP it is useful to give some mathematical interpretation of this kind of measurement.

#### b) The components of GDP in a closed economy

The Gross Domestic Product is divided in three different variables:

I. Consumption (C)

II. Investment (I)

III. Government Spending (G)

The combination of these three components allows stating GDP (which is named  $Y^{17}$ ) as:

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<sup>17</sup> Here one can see the relation of Solow-Swan and the identity equation. As stated above in Solow-Swan terms the production of a country is defined as  $Y = A F(L, K, H, N)$  which is equal for the identity equation level of  $Y = I + C + G$ . Therefore  $A F(L, K, H, N) = I + C + G$ .

$$Y = C + I + G$$

This equation has to be seen as an identity which is always true in the way the variables are defined.

### Governmental spending (G)

The governmental spending G contains all expenditures of governmental institutions made on goods and services.

### Investment (I)

Investment contains the spending on capital equipment, inventories and structures. By definition it is not possible for individuals to invest into an economy except for financial investments in terms of capital equipment. The only exception that is made concerns spending on new housing opportunities which are not measured as consumption since their life-span is far too long to be consumed entirely. Usually Investment is measured by the amount of savings in an economy, since only national Saving (S), which contains resources not allocated for consumption, can increase Investment. Therefore it can be understood why investments are not possible for individuals and only for economic institutions such as companies, whereas national Saving is necessary for companies to allow for Investment. Companies in that way allocate accumulated savings of individuals towards Investment. To close the circle between Solow-Swan and the GDP identity it is easy to say that a decrease in Investment will decrease the technological development and also the level of Human capital which expresses mainly in education.

### Consumption (C)

Consumption is the most important point in this paper. Consumption is defined as spending by households on goods and services, except for housing which is included in national Saving as stated above. In a closed economy an increase in Consumption means a decrease in Saving. Since Saving is only possible out of national income it has to be the case that an increase in consumption decreases Saving and therefore Investment. But as stated above this kind of development will have a negative influence on GDP in the long-run, since Investment means development and consumption goods are outdated rapidly.

The relation of Saving and Consumption is particularly important for this paper since an increase in GDP is about to be reached by a different allocation of wealth in terms of

inheritance. Next I will give an introduction into GDP in an open economy, which will explain the concept of national Saving and Investment in relation to Consumption.

### **2.2.3. GDP in an open economy<sup>18</sup>**

The GDP in an open economy contains one additional element that is not taken care of in the upper equation. An open economy is determined by unlimited trade opportunities with other economies. Therefore the additional element that enters the equation is the net export.

The GDP relation therefore changes towards:

$$Y = C + I + G + NX$$

#### Net Exports (NX)

Net export is the difference between exports and imports, which means the difference between domestically produced goods purchased by foreigners and foreign produced goods purchased by domestic citizens of a country's economy. Net exports are also called the trade balance. The trade balance can be either positive or negative regarding the balance between imports and exports. If an economy has higher exports than imports the trade balance is positive, which is called a trade surplus. If an economy has higher imports than exports the trade balance is negative, which is called a trade deficit. Balanced trade is achieved if exports and imports average out. The trade balance is a particular important definition for this paper since the effect of an increase in Consumption and its consequences on Investment are explicitly different from the one in a closed economy as described above. Some factors that influence the trade balance are:

- The taste of consumers for domestic or foreign goods
- The price of goods in different countries
- The exchange rate between home and foreign currency
- The costs of transportation of goods between countries
- Governmental policy towards international trade (e.g. duty)

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<sup>18</sup> Mankiw, Principles of Economics, The Dryden Press (1998), p. 638 ff.

Individuals in Western economies are nearly always participating in international trade. In times of globalization products are produced all over the world and price competition arises between different companies of different countries. Even competition between domestic countries is carried out abroad by less pricy manufacturing opportunities in other countries than the domestic one. The consumer supports such a development by acquiring goods from abroad, sometimes even without knowing it. As an example it is quite common that brands are related as being domestic which never had been. Therefore it can be said that consumption of goods from other economies nowadays is quite usual and allows for higher consumption for each individual as Ricardo already pointed out in his “Theory of Comparative Advantage”.

### Net Foreign Investment (NFI)

Individuals are not only restricted towards the consumption of goods regarding foreign activities. Moreover it is possible for each of them to acquire foreign assets. The acquisition of assets is treated equally like an investment into an economy, since the acquisition of assets is always accounted for as investments. Net Foreign Investment is therefore the difference between foreign assets purchased by domestic residents and domestic assets purchased by foreign investors. Several components influence foreign investments:

- The real interest rate being paid on foreign assets
- The real interest rate being paid on domestic assets
- Perceived economical and political risks of holding assets abroad
- Governmental policies that affect foreign ownership of domestic assets

### Relation between Net Foreign Investment (NFI) and Net Export (NX)

Net Export measures the imbalance between exports and imports, whereas Net Foreign Investment measures the imbalance between foreign assets brought by domestic residents and domestic assets bought by foreign investors. An accounting effect states that both inequalities must average out each other in an economy. Therefore:

$$\text{Net Foreign Investment (NFI)} = \text{Net Export (NX)}$$

This equation is an identity that is valid for the defined variables. To support that identity it is easy to state that each sale of a good abroad increases domestic Net Export and also Net Foreign Investment since the good is paid in foreign assets.

#### Net Foreign Investment, Net Export and GDP

Reminding the former GDP equation of an open economy:

$$Y = C + I + G + NX$$

Since Investment (I) is national Saving (S) and national Saving is calculated in a kind of an “as if” closed economy brings out the following term:

$$S = Y - C - G, \text{ since } Y = C + I + G$$

Having a look at the open economy structure of GDP, where the Investment rate is not equal to national Saving, since foreigners are able to invest into domestic assets brings the following relation:

$$Y - C - G = I + NX, \text{ which means}$$

$$S = I + NX$$

Since Net Export is equal to Net Foreign Investment:

$$S = I + NFI$$

This upper relation is quite important for this paper, which suggests an adjustment of the inheritance tax to increase Consumption (C). As it can be seen it is possible to increase Consumption without decreasing Investment, because such a decrease will be covered up by an increase Net Foreign Investment (NFI), which is mainly determined by the development of exchange rates and a priori of the interest rate that is offered by the concerned country.

### The change of interest rates

Interest rates are a useful tool to control money demand and money supply. Since increasing Consumption, decreases Investment it might be useful to adjust the interest rate that is offered to investors. Increasing domestic Consumption reduces national Saving. The reduction in national Saving should be covered up by Net Foreign Investment, since:  $S = I + NFI$ . Therefore  $I = S - NFI$ . To keep Investment (I) constant it is necessary to motivate investors from abroad to invest into the domestic economy. In that case NFI turns to be negative since foreign investments into domestic assets are higher than domestic investments into foreign assets. This can be achieved by offering higher interest payments to investors, which would increase the demand for domestic assets and may in fact increase GDP overall. The question is how to adjust the domestic interest rate to assure an increase in foreign investments?

The relation between Net Exports and Net Foreign Investment ( $NX = NFI$ ) is explained by the real exchange rate. Net Export determines the quantity of money demanded for the purpose of buying foreign goods, since Net Foreign Investment represent the quantity of money supplied for the purpose of buying assets abroad. The real exchange rate balances the supply and demand. The higher the real exchange rate the lower will be the demand for domestic goods. Therefore NX declines and NFI stays constant since it is not related to the real exchange rate. Net Foreign Investment (NFI) links the loan able funds market with the foreign currency exchange market. The key determinant is the world interest rate which would be applicable for small open economies as being domestic. In the market for loan able funds NFI is a portion of demand. In the market for foreign currency exchange it is the source of supply. Since the market for loan able funds and the foreign currency exchange market determine the real exchange rate, national Saving, domestic Investment and the size of Net Foreign Investment one can see that the world interest rate has a pretty important influence on GDP. A decrease in national Saving would therefore decrease Net Foreign Investment and also Net Export since the supply of money decreases and the foreign exchange rate also. But what so ever, it does not decrease the national Investment rate necessarily. In turn of lower exports and lower NFI foreign investors do have more opportunities for investment. Decreasing Net Export does also mean increasing imports which are cheaper now and therefore more domestic money is sold to foreign investors, which keeps I constant although S decreases. Since the national Investment rate I is the main measure for this purpose since  $Y = C + I + G + NX$  it might be harmless to decrease S since I is not affected by such an allocation as stated above. As long as  $I = S - NFI$  it should be possible to decrease S by decreasing NFI for at

least the same amount which in turn would keep  $I$  constant but offers opportunities for consumption out of  $S$ . The effect for domestic goods might be critical for the whole domestic economy, if  $NFI$  falls below zero which implies  $Export < Imports$  and only foreign investors enter the domestic market which leaves domestic investor aside for competition reasons. Taking all possibilities into account which could occur from a reduction in savings is quite complicated.<sup>19</sup>

After describing the connection of GDP, consumption and all its related variables that turn out to be important for this paper I will introduce you to three main consumption theories which are basically required to understand the behaviour of consumption. I will start with the “Absolute Income Hypothesis” (AIH) of Keynes, turn to the “Life Cycle Hypothesis” (LCH) of Modigliani and finally end up in Friedman’s “Permanent Income Hypothesis” (PIH). This paper is related to the “Permanent Income Hypothesis” (PIH) of Friedman, which is about to be the basic theory to explain consumption behaviour in case of different wealth allocation.

### 2.3. An Introduction into consumption theories

The first economist who initiated the macroeconomic research towards aggregate consumption was John Maynard Keynes in 1936. Keynes developed the Absolute Income Hypothesis (AIH) which is a stable consumption function that relates income and consumption expenditures and is still one of the basic theories, especially because of its simplicity, to explain consumption behaviour. The next big step in consumption theory is the development of the Life Cycle Hypothesis (LCH) of Modigliani in 1949. Modigliani assumes forward-looking consumers who allocate their consumption regarding their expected lifetime income to maximize utility. The main point of Modigliani is the finite life expectation, which he took into account. Therefore he considered changing circumstances as retirement, changing family size and their influence on consumer’s needs. The third consumption theory which is the fundamental theory of this paper is the Permanent Income Hypothesis (PIH) of Friedman from 1957. Friedman observed the permanent income of consumers with a forecast possibility of three years for each individual. This is one of the main differences between Modigliani and Friedman, since Modigliani assumed a forecast possibility which contained the whole lifetime

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<sup>19</sup> I will give a more detailed explanation of decreasing  $NFI$  and its influence on national economy in the “model” section. But I will tell so far that the effects of trade surplus or trade deficit are not quite clear in economic literature.

period. Friedman therefore allowed for changes in income behaviour regarding to changes in permanent income.

### **2.3.1. The Keynes Absolute Income Hypothesis (AIH)<sup>20</sup>**

The most important consideration of economic growth which is concerned about in this paper is an idea of Keynes who developed a theory which describes the relation between consumption levels and income. The so called Absolute Income Hypothesis from 1936 explains the behaviour of individual consumption expenditures and total disposable income<sup>21</sup>:

$$c_t = \alpha + \beta y_t$$

With  $c_t$  and  $y_t$  being personal consumption expenditures and total disposable income at time  $t$ . The letter  $\beta$  describes the marginal propensity to consume (MPC) which is expected to be constant and close to one. The variable  $\alpha$  is the autonomous component of consumption which is assumed to be small but positive. Keynes argued that the average propensity to consume which is  $APC = c/y$  exceeds the MPC by the value of  $\alpha/y$ . Therefore the Income Elasticity of Consumption that is defined as  $MPC/APC$  would be less than unity which implies an inelastic consumption with increasing income, hence in the long-run it would equal unity with an increasing share of income.

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<sup>20</sup> Emilio Fernandez-Corugedo, Consumption Theory, Handbook in Central Banking (No. 23), Centre for Central Banking Studies, Bank of England (2004), p. 2

<sup>21</sup> Emilio Fernandez-Corugedo, Consumption Theory, Handbook in Central Banking (No. 23), Centre for Central Banking Studies, Bank of England (2004), p. 2

### 2.3.2. The Modigliani Life Cycle Hypothesis (LCH)<sup>22</sup>

Modigliani considers forward-looking consumers who maximize their lifetime utility under consideration of changes in income and consumption depending on their status quo in life cycle evolution. Therefore Modigliani assumes:

- a. a homogeneous utility function
- b. no bequest motives
- c. perfect capital markets
- d. all households have the same utility function and use the same discount rate
- e. age distribution, age distribution of income and age distribution of net worth are constant
- f. expected income is proportional to current income
- g. allocation of consumption is not affected by changes in the degree of uncertainty regarding expectations about future earnings
- h. the planning horizon of individual households is the whole life-span
- i. the rate of time preference is constant
- j. actions of individuals conform to their lifetime plans of consumption

After setting up the conditions Modigliani offers the following solution for consumption theory (the aggregate estimable consumption function):

$$c_t = \alpha_1 y_t + \alpha_2 y_t^e + \alpha_3 A_{t-1},$$

with  $c$  representing aggregate consumption,  $y$  representing current non-property income,  $y^e$  representing expected annual non-property income and  $A$  representing net worth (the subscript  $t$  indicates the period of time). The problem of Modigliani's assumption is the fact, that lifetime income is known in advance so that the consumer arranges his consumption over the whole lifetime income ( $1/T$ ) for each period. That implies that  $T$  is known and that an adjustment for consumption is unnecessary. The logic behind the formula from above lies in the context of the developed consumption function:

$$c_t = 1/T [y_t + (n-1)y^e + A_{t-1}]$$

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<sup>22</sup> Emilio Fernandez-Corugedo, Consumption Theory, Handbook in Central Banking (No. 23), Centre for Central Banking Studies, Bank of England (2004), p. 5

Since Modigliani argues that expected future labour income is proportional to current income the function could be reduced to:

$$c_t = (b_1 + b_2\beta)y_t + b_3A_{t-1},$$

with  $\beta$  being the fraction of future expected income. The implications of LCH have various impacts on the idea developed in this paper. Modigliani suggests that changes in income do effect consumption only if the expected lifetime income changes. That implies for an arrangement of the inheritance tax, that changes will not be efficient since it is a matter of time until the inheritance is received. Therefore inheritance is included in lifetime income no matter when it is about to occur. A change in inheritance allocation from the middle generation towards the young generation is therefore useless since it is already considered in the young ones lifetime income. Perfect rational behaviour would not leave any bequest at the end of an individuals lifetime since everything is about to be consumed. Fortunately this is the point of his income hypothesis that is criticized most. Modigliani does not consider liquidity constraints which are quite important for consumption behaviour and which are adopted by Friedman who proposes a three year time horizon as foresight for consumption behaviour depending on permanent income changes.

### ***2.3.3. Friedman: The Permanent Income Hypothesis (PIH)***

One of the main purposes of this paper is the changing consumption behaviour of individuals with respect to their income. Friedman therefore suggests a consumption theory, based on the theoretical foundations of Keynes' "The General Theory" that differs in its outcome dependent on the amount and the distribution of income, in a way of a transitory and a permanent component. Friedman also faced the problem of inheritance allocation, since it is not quite obvious where it is accounted for. Regarding his theory transfer components are about to be accounted towards the overall wealth or towards a higher permanent income component. The effects of such an allocation are supposed to be the same surprisingly, but this will be explained later. In his Permanent Income Hypothesis Friedman states that the average propensity to consume decreases with an increasing amount of permanent income, which is a pretty important assumption for this analysis as it allows for higher overall consumption in case of inheritance allocation towards low income classes. Inheritance is

about to be consumed by those classes and as long as young couples are about to receive a relatively low permanent income in relation to middle age couples it should end up in a higher overall consumption for that kind of group. Therefore an adjustment of inheritance tax which prefers grandchildren towards children should end up in a higher overall consumption which increases demand and finally GDP. The introduction into Friedman's Theory of a Consumption Function is the basic theory that has to be covered to guarantee a sufficient knowledge of consumption behaviour:

### The Pure Theory of Consumer Behaviour

Friedman develops his permanent income hypothesis from the Pure Theory of Consumer Behaviour. Therefore he observed the consumption behaviour of individuals under the condition of complete certainty about:

- future receipts
- future interest rates
- future prices, etc.
- saving is a result of the wish to reduce fluctuations in expenditures
- people live for perpetuity or (which is quite important) they leave bequests

As it is always the case Friedman also considers individuals to be utility maximizing with utility from consumption being defined as:

$$u_t = u(c_t, c_{t+1})$$

Friedman assumes positive but diminishing returns, positive cross partials and a utility ( $u$ ) being homogeneous of degree one. His budget constraint is defined as (under complete certainty):

$$C_t + 1/(1+i)c_{t+1} = r_t + 1/(1+i)r_{t+1} = W,^{23}$$

with  $r_t$  and  $r_{t+1}$  being the planned receipts from human and non-human wealth in each period,  $c_t$  and  $c_{t+1}$  being planned consumption for each period respectively,  $W$  being expected wealth and  $i$  the interest rate. In optimal case it will end up in a consumption decision that depends

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<sup>23</sup> A corresponding graphic from Friedman, consumption levels and indifference curves and budget lines can be found in the appendix of this paper. The graphic shows a hypothetical assumption of Friedman to describe an individual's utility level and consumption decision.

on  $i$  which is expected to be known and as it can be seen from above finally in the amount of wealth expected to be acquired. Therefore Friedman suggests for the optimal consumption decision a level of:

$$c_t = f(i, W_t)$$

with  $W_t$  being the amount of wealth acquired till  $t$  and  $i$  being the interest rate, which is also the discount rate of future consumption as it is shown in the above formula. Here one can see the first consideration of Friedman. He states that consumption does not change necessarily because of a change in receipts ( $r$ ), since  $r$  may be less in the first period but therefore higher in the following period, which would not affect  $c$  at all. The fact is that  $c$  depends on a combination of  $r$  and  $i$ , which is  $W$  and is only influenced in its behaviour regarding changes in  $W$  and  $i$  respectively. A consumer would adjust his consumption rather to changes in current receipts than in normal receipts. That in turn would imply that savings do depend on current receipts since they are defined as the difference between current receipts and current consumption:

$$s_t = r_t - c_t = r_t - f(i, W_t)$$

Friedman states that the definition of income as current receipts is very vague and enforced by limitation of data. Theoretically it is defined as possible consumption while maintaining wealth intact. In Friedman's consumption theory it is allowed to borrow money in the case of a shortfall from current receipts restricted by the assumption that wealth will not fall below initial level in later periods<sup>24</sup>. Therefore consumption is a function depending on income defined as possible consumption without any wealth reduction. Friedman defines consumption as value of services planned to be consumed. In case of complete certainty the amount for each period should be equivalent. Finally Friedman called his definitions for income and consumption as stated above  $y_p$  and  $c_p$  with  $p$  referring to permanent. Therefore the consumption function takes the following form for  $t = 1$ :

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<sup>24</sup> Friedman offers the following example to state his definition of income. As seen beforehand  $W_1 = r_1 + r_2/(1+i)$ . In case of a shortfall of income in period 1, which is  $r_1$ , the relationship of  $W_1 = W_2$  has to stay constant. Under the assumption that receipts are received at the beginning of the period and consumption is made at the end of the period. Therefore  $r_1$  will have grown until the end of the period from  $r_1$  to  $r_1(1+i)$ . Since  $w_1$  has to stay constant the depreciation allowance is:  $r_1(1+i) - iW_1$ , which is:  
 $r_1(1+i) - i(r_1 + r_2/(1+i)) = r_1 - ir_2/(1+i)$  Since wealth at  $t=2$  is the amount of wealth at the end of  $t=1$ :  $W_2 = r_1 - ir_2/(1+i) + r_2 = r_1 + r_2/(1+i) = W_1$ . Friedman states his definition of income to be true since he proofs borrowing and lending to be allowed.

$$c_{p1} = f(y_{p1}/i, i) = g(y_{p1}, i) = g(iW_1, i),$$

since  $y_{p1} = iW_1$

The special case of  $i$  being 0 was considered by Friedman also. But as he states convincingly it is just a matter of mathematical reason that forces to consider that specific case. It does not matter so much for his theory. Still the indifference curves are restricted towards a downward sloping behaviour for consistency reasons that individuals would not give up wealth unforced and towards a convex form with respect to the fact that individuals do not tend to consume their whole wealth in one period<sup>25</sup>.

The next assumption of Friedman made is “time preference proper”, which means that consumption between two periods is interchangeable under the assumption that factors like demographics do not occur to the consumer and would not change the level of the indifference curve. Therefore the slope of each indifference curve at the bisector of the angel is similar to the value of  $(-1)$ . That in turn will force individuals to give up more than average for preferred consumption, which requires less consumption for second period consumption. The consequence from this statement is that  $r_1 = r_2$  and consumption depends on  $i$ , with being higher for the first period if  $i$  is negative, equal if  $i = 0$  and lower if  $i$  is positive.

But Friedman does not only assume symmetry between indifference levels but also homogeneity. He argues that the indifference of consumption at the level of  $i = 0$  should apply for all other interest levels also so that the willingness to substitute consumption should not depend on the absolute level of consumption but on the ratio of consumption in the two periods. The mathematical explanation requires an additional element for the consumption function from above to fulfil this assumption. Therefore it takes the following form:

$$c_{p1} = k(i,u)y_{p1} = k(i,u)iW_1,$$

with  $k$  depending on the interest rate  $i$  and all other kind of variables, covered in  $u$  that may influence the shape of the indifference curve ( $u$  = utility factors). Since  $u$  contains all kinds of

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<sup>25</sup> see footnote 23

factors that may influence the indifference curve it is possible to accept the proposed formula as being generalized<sup>26</sup>.

The above consumption function only holds for complete certainty. To take uncertainty into account it is necessary to have a look at the motivation for wealth acquisition. Friedman suggests that individuals tend to hold wealth for the reason of possible fluctuations in future consumption. Therefore the amount of wealth held by consumers must influence his consumption decision and also his ratio of consumption. Friedman states that wealth is not equally satisfying. He differentiates between human and non-human wealth. Non-human capital is therefore a basic requirement for consumption decisions since slavery is not allowed. That in turn would force individuals saving a certain amount of income to ensure its current consumption level. Therefore the consumption level which is namely  $k$  has to depend on the amount of non-human wealth to permanent income to avoid uncertainty. The consumption function therefore is changing only slightly:

$$c_p = k(i, w, u)y_p = k(i, w, u)iW,$$

with all variables referring to the same point in time and  $w$  being the ratio of non-human wealth to income.

The generalization of the individual consumption function towards a general consumption function for all groups of individuals gives the following result:

$$c_p^* = k^*(\quad)y_p^*$$

That logic behind this equation is argued by the fact that levels of  $i$ ,  $w$ ,  $u$  and  $y_p$  differ between individuals. Therefore it is the case that aggregate consumption does not only depend on the individual consumption function of each consumer but also on the distribution of consumer units. The distribution function for consumers is defined by:

$$f(i, w, u, y_p)di dw du dy_p$$

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<sup>26</sup> It also allows to drop the assumption made from  $i = 0$  to explain the importance of consumption levels rather than absolute consumption. Also the assumption of equal consumption for the two period case in each period which is a result of the assumption made from  $i = 0$  can be dropped out now.

and contains the distribution of all consumer units which are settled between  $i$  and  $i + di$ ,  $w$  and  $w + dw$ ,  $u$  and  $u + du$  and finally  $y_p$  and  $y_p + dy_p$ . The aggregate consumption function therefore turns out to be:

$$c_p^* = \int_i \int_w \int_u \int_{y_p} f(i, w, u, y_p) k(i, w, u) y_p di dw du dy_p$$

Under the supposition that the distribution of consumers regarding  $y_p$  depends on the distribution of  $i$ ,  $w$  and  $u$  of each consumer<sup>27</sup> with

$$f(i, w, u, y_p) = g(i, w, u) h y_p,$$

the aggregate consumption function results in

$$c_p^* = k^* ( \quad ) y_p^*$$

with  $c_p^*$  being the aggregate permanent consumption,  $y_p^*$  being the aggregate permanent income and  $k^*$  defining the marginal propensity to consume depending on  $i$ ,  $w$  and  $u$ :

$$k^* ( \quad ) = \int_i \int_w \int_u g(i, w, u) k(i, w, u) di dw du$$

As an approximation one could take the average values for  $i$ ,  $w$  and  $u$  to calculate  $k^*$ . Nevertheless Friedman kept the brackets blank since it is not possible to keep the level of generality by filling the brackets with a limited number of variables. The variable  $k^*$  can be calculated only ex post by the observation of  $c_p/y_p$ .

After defining the pure theory of consumer behaviour it is time to enter Friedman's Permanent Income Hypothesis:

### The Permanent Income Hypothesis

I already introduced the parameter permanent consumption and permanent income in the preceding chapter. Now it is time to explain the Permanent Consumption Function and its functionality for consumption behaviour prediction. The theoretical construct of the

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<sup>27</sup> Friedman states that this assumption can not be taken as completely accurate in a descriptive way since there is interdependence between variables as e.g. age, family size and education which are covered by  $u$ . Nevertheless the formula can be seen as approximation since those interdependences only occur in second degree which makes them less important than the rest of the variables influencing the consumption function.

consumption theory has ex ante character since the data which Friedman uses to show consistency with the theory is ex post. To fit the theoretical construct with the observed data Friedman constructs estimates of permanent consumption and permanent income which where treated as if ex ante magnitudes. The problem that arises from this point of view is the consistency of the permanent consumption function and the statistical results that occur from regression. Measured consumption turns out to be a smaller fraction of measured income with increasing incomes even for consumer groups who apparently have the same marginal propensity to consume which is measured by  $k$ . Therefore it seems reasonable to Friedman that measured consumption is not a good index for permanent income so far as it is affected significantly by fluctuations in itself. Friedman suggests that the measured income is a combination of a permanent component  $y_p$  and a transitory component  $y_t$ :

$$y = y_p + y_t$$

The permanent component therefore reflects all factors that determine the individual's wealth or capital value which can be seen as the expected value of a probability function. The transitory component reflects all other factors influencing the measured income and which occur randomly or by chance. One could say it is a kind of variance regarding the expected value of measured income. One of the main points in Friedman theory is the assumption that individual transitory components of a consumer group observed tend to average out, which equalizes the mean measured income to the mean permanent income<sup>28</sup>.

The same attributes that where allocated to the income formula has to be adapted to the consumption formula:

$$c = c_p + c_t,$$

with  $c_p$  being permanent consumption and  $c_t$  being transitory consumption. The interpretation leads to the same result as for the income function. Permanent consumption  $c_p$  can be seen as an expected value of a probability function, since transitory consumption depends on chance,

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<sup>28</sup> Friedman also states that it has not to be the case necessarily. It is possible that a positive influence e.g. a pretty harvest for farmers as a group may influence the transitory component in a positive way as long as they affect the group as a whole. Individual factors such as illness e.g. tend to average out. Therefore it can be recorded that positive influences for the whole group raise the transitory component and negative influences for the whole group decrease the transitory component.

e.g. special offers and therefore particular favourable opportunities to purchase<sup>29</sup>. But as it is said before any condition that influences the whole group will affect the transitory component either in a positive or in a negative way.

Friedman differentiates between permanent and transitory component to interpret actual consumption behaviour. Therefore he treats consumer units as if they would observe their income as a permanent and a transitory component and as if the relation between the permanent components is the way Friedman's theory suggests. Another important point of Friedman's theory is the fact of interdependence between income expectations made in different ages<sup>30</sup>. Friedman states that the expectations vary over time depending on experience made in the past. This kind of experience does not necessarily represent personal experience. It may well be the case that individuals are influenced by experience made from individuals within its observed group. Friedman states that such empirical income data is not very useful since it does not appear as the permanent income itself, especially because of a rather short or a particular long time horizon observed.

After explaining Friedman's train of thought towards his Permanent Income Hypothesis it is time to stick the pieces together and show the three components that result in the PIH:

$$(1) c_p = k(i, w, u)y_p$$

$$(2) y = y_p + y_t$$

$$(3) c = c_p + c_t$$

Equation (1) defines the relation between permanent income and permanent consumption, with  $k$  being the marginal propensity to consume depending on the interest rate  $i$ , the non-human wealth to income ratio  $w$  and the portmanteau variable  $u$  defining all other components determining a consumer unit's taste and preferences for consumption towards other opportunities. Equation (2) and (3) define the relation between permanent components of consumption and income towards measured magnitudes.

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<sup>29</sup> Again Friedman states that the transitory component can be either positive or negative. Circumstances that influence the group as a whole tend to influence the transitory consumption component since individual circumstances tend to average out within a group.

<sup>30</sup> Milton Friedman, *A theory of the consumption function*, Princeton University Press, Princeton 1957, p. 24

### Model assumptions

Friedman states three different assumptions for his permanent income hypothesis to fit:

$$\varphi_{ytyp} = \varphi_{ctcp} = \varphi_{ytct} = 0$$

The letter  $\varphi$  stands for the correlation coefficient between the variables in the subscript.

The first assumptions state that the permanent component and the transitory component of consumption and income respectively are uncorrelated. Friedman's argument towards such assumption made is simply that this assumption only completes the differentiation between transitory and permanent. It also declares that the averages of transitory and permanent components are uncorrelated. It may well be the case that transitory and permanent components may correlate with each other for single individuals but summa sum arum a fluctuation around the permanent component in negative and positive direction (which is the behaviour of variances by the way) will result in an offset situation for the whole group. The only statement regarding the behaviour of the components can be made about the average absolute value which is directly proportional to the permanent component. Friedman proofs his assumption by the example of groups considered; e.g. the group is defined by measured income, the correlation between transitory income and permanent income must be negative since a high permanent income with respect to measured income for a group is only possible if transitory income is particularly low and vice versa.

The third assumption of Friedman which states that transitory income and transitory consumption are uncorrelated seems much more unsatisfying. Friedman argues that transitory income will end up in savings which are caused by the common notion of savings being residuals. That means that consumption decisions are mainly influenced by long-term changes of income which are not dependent on changes of the transitory component since those are random and not long-term considerable. Therefore changes in transitory income may flow into assets rather than consumption.

Friedman also states the example of bequest where it seems quite obvious to him that a windfall might not be saved entirely. More likely it might be used to replace durable goods. It is one of the biggest problems Friedman is faced: The definition of consumption. Friedman admits that the definition of consumption is not quite easy for his theory and after defining consumption as purchasing, including durable goods, he reclassified couple of them later in

his regression as savings. Therefore he suggested that the replacement of durable goods may coincide with windfalls. Nevertheless we now reach one of the most important points of Friedman's theory this paper is concerned about. Bequests as either wealth increasing or permanent income increasing component:

Friedman's assertion contains the classification of bequest or inheritances as whether

- a) wealth increasing or
- b) permanent income increasing.

- a) Inheritances as wealth increasing parameter of  $k$

The logic of Friedman declaring inheritances as parts of  $w$  which is the component of non-human wealth to income comes from the assumption that inheritances may be well known. Since the individual plans its consumption regarding its life-time income, although it is adjusted in a three year period time measure, the inheritance will be included in  $w$  since it is known to occur one time or another. Therefore consumption behaviour is not about to change since consumption out of permanent income is already adjusted. If that is the case inheritance is contained in  $w$  the ratio of non-human wealth to income, which simultaneously adjusts  $k$  the marginal propensity to consume is also, allowing for higher consumption. Consequently the individual may reduce its saving rate and increase its marginal consumption in expectation of a later bequest, which is nothing else than an increase in  $k$ .

- b) inheritance as income increasing parameter of the consumption function

If an inheritance is unexpected unlike in the case above, the inheritance component will influence permanent income  $y_p$ . The logic behind that assumption is that in case of bequest the individual's permanent income increases at the specific point in time when the inheritance is received. That in turn will influence his consumption in an increasing way since the marginal propensity to consume is not affected directly and stays at its current level. But the permanent income rises whereas the individual's utility for consumption (which is measured by  $k$ ) stays constant and as proposed by the permanent income hypothesis the consumption level increases.

Friedman proves by his considerations regarding inheritance that this specific factor of wealth or income increasing components should be observed as permanent and not as transitory

which might be assumed intuitively. The transitory component in his assumption is only the excess of the bequest which is argued in the upper two paragraphs. For this paper and the allocation of bequest in a later chapter it does not make any considerable difference in which way an inheritance is allocated as it is proofed above. Although it seems much more realistic to assume foresight regarding inheritance to occur since it is protected by law at least partly. On the other hand it is also the case that borrowing in advance of an inheritance might be quite difficult since borrowing at financial institutions always requires security which is rarely available to young individuals. Therefore an increase in  $k$  or marginal propensity to consume seems quite realistic as main assumption for the later observation<sup>31</sup>.

Coming back to the assumption of Friedman that:

$$\varphi_{ytet} = 0$$

There is one intuitively correct interpretation of the uncorrelated behaviour between transitory income and transitory consumption since an increase in transitory income may be achieved by longer working hours for example. If that is the case time for consumption is about to decrease which causes lower consumption opportunities and seems to be quite plausible<sup>32</sup>. After showing that the relation between transitory and permanent components are uncorrelated Friedman's Permanent Income Hypothesis is about to be accepted as the basic consumption theory for the purpose of this paper. Especially since the case of inheritances is particularly considered by Friedman a general acceptance of this theory is possible. It may well be the case that there exist couple of other consumption theories who explain consumption behaviour but for the main idea of this concept it does not require more explicit theories since those are mostly based on the three consumption theories introduced in this chapter<sup>33</sup>.

### Consistency with observations regarding permanent income

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<sup>31</sup> What so ever I will take both possibilities of inheritance transfer into account in the later model to show the sensibility of the indifference of adjustment.

<sup>32</sup> Friedman does not necessarily assume zero correlation between these two components. He states that it might be possible to assume correlation between zero and one but this would weaken his hypothesis. He did not take this case into account since there is no explicit contradiction observable.

<sup>33</sup> A proof of Friedman's permanent consumption theory and the relation between measured income and consumption is given in the appendix f this chapter.

### Temporal Changes in Inequality of Income:

Friedman states that the statement of classical regressions from consumption on income results in the well known fact of: “poor getting poorer and rich getting richer<sup>34</sup>”. This statement is to be neglected under the assumption that income should not be seen as a temporal variable but moreover as a function of income over the expected lifetime. Friedman argues that negative savings in one state caused by negative transitory components are to be explained by higher expected future income that outdoes the above average consumption in period  $t$  and generates higher savings in  $t+1$ . Vice versa this implies a lower marginal consumption for higher permanent income of each individual caused by transitory components in expectation of future lower permanent income. Income is therefore not a measure of wealth. The gap between rich and poor which is suggested by the classical regressions does not exist in that way. Much more it is about to decrease under Friedman’s assumptions<sup>35</sup>.

### Differences among regressions:

Friedman compared the income and consumption behaviour of United States, Great Britain and Sweden. Therefore he observed the income elasticity of consumption, which is the ratio of marginal propensity to consume to average propensity to consume<sup>36</sup>. The observation shows that income elasticity lies constantly below unity, which implies consumption to decrease with increasing income relatively. As a matter of fact Friedman observes only the permanent income assuming transitory components to affect all classes at the same kind. Therefore and under the assumption that permanent income does not equal average income, he suggests that permanent income for low income groups with a high propensity to consume must be higher than average income and vice versa<sup>37</sup>. His statement suffers from two different definitions of income groups. First he states that low income groups do not contain relief individuals, which would make the observed group belonging to a higher income group. Second he states that transitory components for individuals may not affect necessarily their consumption behaviour. It can be the case that the refusal rate is higher for individuals who received a transitory income because of its adopted behaviour from environment rather than from income groups. People who live in a certain surrounding do not change their expenditures only because of higher income. That explains why individuals with high income

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<sup>34</sup> Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 39

<sup>35</sup> Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 40

<sup>36</sup> Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 43

<sup>37</sup> Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 49

tend to save more and consume less than the average propensity to consume of the whole class suggests. This point could be discussed more precisely since for example winners in lottery tend to spend the money received quite fast over time and end up even worse at the end, even though they do not spend the money punctually when it is received. Maybe one should take Maslow's pyramid of needs into account, which could explain different consumption behaviour, also.

Another important point is the elasticity of consumption with respect to income. Elasticity of consumption at all measures the influence of transitory components, by observing the relation of measured income towards permanent income. An increasing elasticity as it is observed by Friedman would therefore decrease the influence of transitory components. Friedman states that transitory components for income determination account for roundabout 15%<sup>38</sup> of the variation in income in peacetime for his observed time horizon.

By observing the differences among countries Friedman declares that a higher elasticity of consumption can be observed in European countries. He especially observed the United Kingdom and the United States for a matter-of-fact reason because of an easy comparison of data. The high elasticity of consumption and therefore the lower influence of transitory components in Europe may be caused by a lower necessity for reserves. Therefore it occurs that the Marginal Propensity to Consume (which means a higher value of  $k$ ) is much higher for the United Kingdom than for the United States. He states that a higher propensity to consume may be caused by (a) "the more extensive provision of security through governmental channels in the United Kingdom" and (b) "the absence of a capital gains tax and the associated stimulus to investment by corporations"<sup>39</sup> which is counterproductive for private savings<sup>40</sup>. In my eyes the argument of social security does not seem to be a sufficient explanation. Regarding Baranzini who observed the saving behaviour of individuals for

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<sup>38</sup> Milton Friedman, *A theory of the consumption function*, Princeton University Press, Princeton 1957, p. 53

<sup>39</sup> Milton Friedman, *A theory of the consumption function*, Princeton University Press, Princeton 1957, p. 57

<sup>40</sup> Friedman also differentiates between farm and non-farm units which is not about to be explained in this paper because of missing relevance. The division between Negro and native white population is not to be discussed since they are holding quite similar results which are not that important for this analysis. Friedman considers a couple of other variables and differences in groups which would get out of hands to be analyzed sufficiently. Technical terms as a measured income, named marginal income, in this term are taken into account and may influence the accuracy of the model in the way that measured income does not reflect consumption behaviour consistently. Friedman suggests using the term of expected permanent income to describe consumption behaviour sufficiently.

inheritance it is not the case that individuals tend to save less because of a governmental pension system<sup>41</sup>.

Another interesting relationship between savings and consumption is the age component which is about to play a major role in this concept. Concerning Friedman's observations it has to be said that saving by an individual depends on its expected permanent life-time earnings, which yields the result of increasing low savings in initial state up to retirement, which in turn influences the individual's consumption behaviour<sup>42</sup>. The question that arises for this paper is whether inheritances do influence the consumption decision by age groups. Nevertheless it can be said that young individuals up to mid 30s are about to consume more than average income allows to, but regarding their expected life-time permanent earnings the fraction of consumption decreases consistent with an increase in savings. Savings tend to decrease in the terminal years which could be interesting for this paper since inheritance is made by the grandparent's generation towards the grandchildren. Assuming the age group of 25-34<sup>43</sup> years of age having a consumption ratio exceeding its average permanent income it seems to be interesting whether this age group will be affected by inheritance in terms of consumption behaviour. For the middle generation it is a fact that they offer the highest saving propensity which seems to alter the assumption of inheritance towards the grandchildren generation for economic growth. An interesting point for further research could be the fact of increasing working age, which should shift the saving propensity upwards and therefore change the fraction of consumption.

The effect of changes in measured income as denoted above is one of the main aspects of Friedman's theory. As it is pointed out beforehand, Friedman suggests using the term of permanent income for his analysis. Therefore he differentiates between permanent changes and abnormal changes of measured income. Abnormal income changes are not about to change the individual's consumption behaviour, whereas permanent changes will shift the individual towards a different income group. Therefore individuals who enter a higher income

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<sup>41</sup> Baranzini observed reasons for inheritances. In his study he states that the amount of inheritances do not depend on social security offered by governmental institutions. The main point for inheritances and therefore savings is the uncertainty about lifetime expectations which tends influence individuals much more than social security. That by the way is congruent with Stigler's theory of information where he states the behaviour of individuals in case of lack of information and therefore uncertainty. Couple of research was made in that direction, especially in financial sectors which makes it quite hard to explain each theory.

Mauro Baranzini, *A Theory of Wealth Distribution and Accumulation*, Clarendon Press, Oxford 1991

<sup>42</sup> Milton Friedman, *A theory of the consumption function*, Princeton University Press, Princeton 1957, p. 90 ff.

<sup>43</sup> Based on the data and the theory used by Friedman with  $k = 0.9$ , and estimated mean lifetime income ratio, table 8, p. 91

group are not about to spend as much as individuals who had been already there and individuals who enter a lower income group are about to spend more than the already existing individuals.

Finally it has to be mentioned that Friedman observes a correlation between consumption and family size. He states convincingly that increasing family size and the fraction of consumption from income are positively correlated, which means higher expenditures and therefore lower savings with increasing family size. He argues that it could account for a kind of wealth accumulation under the supposition that children represent human capital, which is not accounted for in his theory<sup>44</sup>. That means that consumption in that sense is some kind of capital accumulation comparable with savings made by families with fewer children and therefore less security in pension age, under the assumption of children to be insurance for old age.

This should be enough information regarding the permanent income hypothesis of Friedman, so far. In the following chapter I will explain the theory of adjusted inheritances and its impact on economic growth. The basis for consumption behaviour will be the PIH of Milton Friedman. The explanation of economic growth follows from usual economic theories of GDP and its measures.

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<sup>44</sup> Milton Friedman, *A theory of the consumption function*, Princeton University Press, Princeton 1957, p. 122

## *Appendix (Mathematical explanation of PIH)*

This chapter offers a logic explanation of Friedman's consumption theory. It is a mathematical model to describe the relation between permanent income, permanent consumption, measured income and measured consumption. This case is only hypothetical and offered by Friedman in his book "A theory of the consumption function"<sup>45</sup>. All graphics are taken from his book.

The consumer unit's consumption function is defined as:

$$(1) c_p = k y_p$$

$$(2) y = y_p + y_t$$

$$(3) c = c_p + c_t$$

The observed consumer group is supposed to have a marginal propensity to consume  $k$  which is numerically the same. The relation of income and consumption is assumed to be linear with:

$$(4) c = \alpha + \beta y$$

with  $c$  being the mean value of consumption for a given  $y$ . The consumption of individual units from this value differs by chance. The least squares estimates of  $\alpha$  and  $\beta$  (called  $a$  and  $b$ ) computed from the regression of income  $y$  on consumption  $c$  are:

$$(5) b = \frac{\sum(c - \hat{c})(y - \hat{y})}{\sum(y - \hat{y})^2}$$

$$(6) a = \hat{c} - b\hat{y}$$

with  $\hat{c}$  and  $\hat{y}$  being mean consumption and mean income. The summation appears over the group. Variables  $y$  and  $c$  of the numerator of  $b$  are replaced by the expressions for  $c$  and  $y$  from (2) and (3). Variables  $\hat{c}$  and  $\hat{y}$  are replaced by the corresponding values from (2) and (3) by logic.

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<sup>45</sup> Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 31 ff.

This gives:

$$\begin{aligned}
 (7) \quad \sum(c-\hat{c})(y-\hat{y}) &= \sum(c_p + c_t - \hat{c}_p - \hat{c}_t)(y_p + y_t - \hat{y}_p - \hat{y}_t) \\
 &= \sum(c_p - \hat{c}_p)(y_p - \hat{y}_p) + \sum(c_p - \hat{c}_p)(y_t - \hat{y}_t) \\
 &\quad + \sum(c_t - \hat{c}_t)(y_p - \hat{y}_p) + \sum(c_t - \hat{c}_t)(y_t - \hat{y}_t)
 \end{aligned}$$

Inserting (1) in (7) yields:

$$\begin{aligned}
 (8) \quad \sum(c-\hat{c})(y-\hat{y}) &= k\sum(y_p - \hat{y}_p)^2 + k\sum(y_p - \hat{y}_p)(y_t - \hat{y}_t) \\
 &\quad + 1/k\sum(c_p - \hat{c}_p)(c_t - \hat{c}_t) + \sum(c_t - \hat{c}_t)(y_t - \hat{y}_t)
 \end{aligned}$$

Since:

$$(9) \quad \phi_{ytyp} = \phi_{ctcp} = \phi_{ytct} = 0$$

The final three terms of equation (8) differ from zero only by sampling fluctuation. Therefore:

$$(10) \quad b = k\sum(y_p - \hat{y}_p)^2 / \sum(y - \hat{y})^2 = kP_y$$

With  $P_y$  being the fraction of the total variance of income in the group contributed by the permanent component.

Interpreting  $b$  results in the fact that the regression coefficient measures the difference in consumption associated on the average with a one dollar difference of measured income for consumer units. By definition the size of consumption depends only on the amount of difference in permanent income rather than in measured income and on the marginal propensity to consume or in other term of how much of permanent income is spend on consumption.  $P_y$  therefore measures the difference in permanent consumption since  $k$  measures the marginal propensity to consume. Consequently if  $P_y$  is unity transient factors are absent or affect the members of a group equally; which means an increase in measured income is an increase in permanent consumption for the same amount; which changes  $k$ ; so that  $b = k$ . If  $P_y$  is zero there is no change in consumption since  $b$  is zero; an increase in income is therefore an increase in the transitory component of income which is uncorrelated with consumption.  $P_y$  can be interpreted as the fraction of any difference in measured income contributed by a difference in permanent consumption on the average.

Substitute (10) into (6), replacing  $\hat{c}$  and  $\hat{y}$  in the sense of (2) and (3) results in:

$$(11) \quad a = \hat{c}_t - kP_y\hat{y}_t + k(1 - P_y)y_p$$

The consumption elasticity with respect to income at  $(c/y)$  is:

$$(12) \quad \eta_{cy} = dc/dy * y/c = b * y/c = kP_y * y/c$$

Suppose  $\hat{c}_t = \hat{y}_t = 0$ , so that  $\hat{c} = \hat{c}_p$  and  $\hat{y} = \hat{y}_p$  than  $P_y = 1$  with:

$$(13) \quad \hat{y}/\hat{c} = 1/k$$

Therefore the income elasticity for the mean sample is:

$$(14) \quad \eta_{cy} = P_y$$

Changes of the regression of  $y$  on  $c$  change the calculation slightly. Assume the following income function:

$$(15) \quad y = a' + b'c$$

For the same reason as for the consumption function, the function of gradient  $b$  results in:

$$(16) \quad b' = 1/kP_c,$$

with  $P_c$  being the fraction of the variance of consumption contributed by permanent income.

Consistent with equation (11) by logic the parameter of the transitory variable  $a'$  delivers the following result:

$$(17) \quad a' = \hat{y}_t - 1/kP_c\hat{c}_t + 1/k(1 - P_c)\hat{c}_p$$

The elasticity of consumption with respect to income will be:

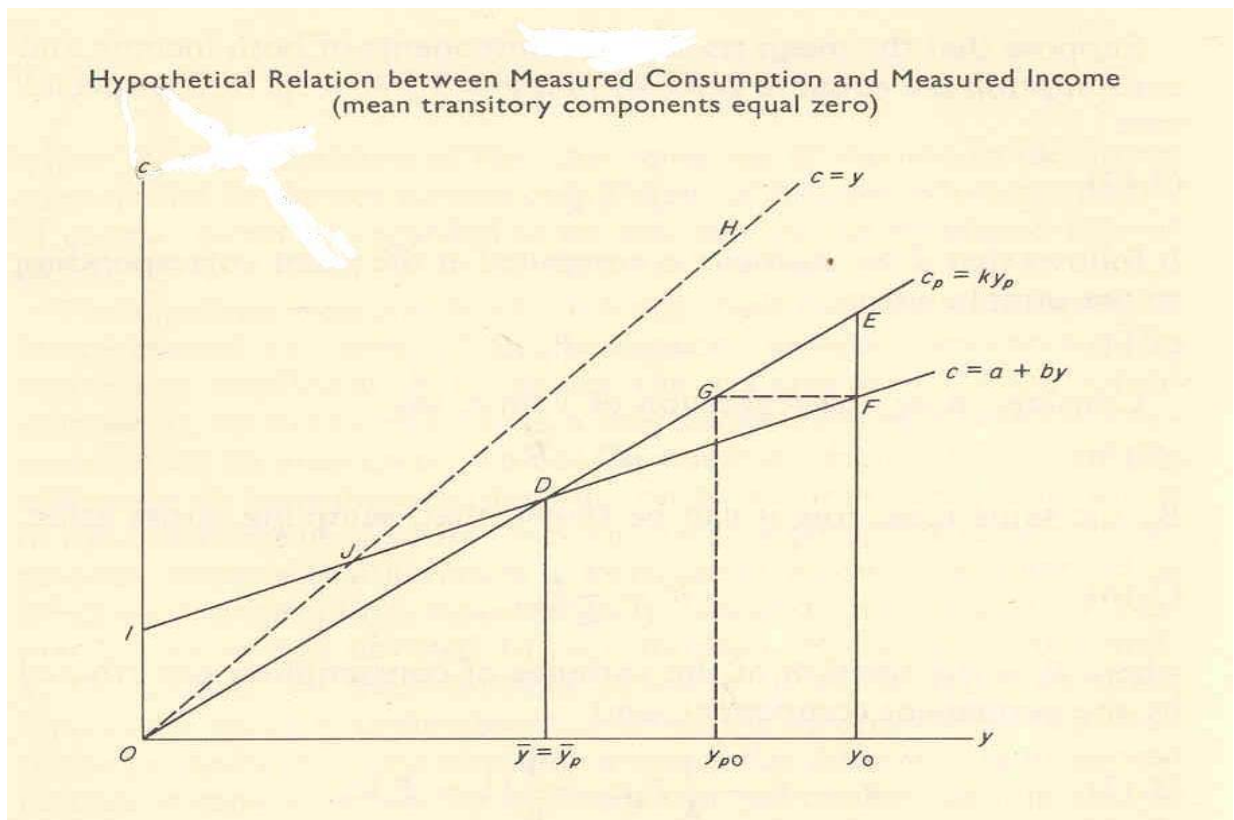
$$(18) \quad \eta'_{cy} = dc/dy * y/c = 1/b' * y/c = k/P_c * y/c$$

As above it is assumed that  $\hat{c}_t = \hat{y}_t = 0$  so that:

$$(19) \quad \eta' = 1/P_c$$

for the point corresponding to the mean sample.

As one can see the difference between the values for income and consumption differ only slightly. Which is quite reasonable since the regression are both reciprocal to each other. After showing the mathematical background behind Friedman's assumptions it is necessary to explain the developed formulas and its implication. Therefore Friedman offers a graphical solution which makes it much easier to understand the systematic behind the developed theory and the behaviour of consumer units.



source: Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 34

The special case observed in the upper equations is  $\hat{c}_t = \hat{y}_t = 0$ :

First Friedman considers consumer units with measured income of  $y_0$  which is supposed to be above the mean measured income for the whole group. Since  $\phi_{y_t y_p} = 0$ , the average

permanent income of these units is less than  $y_0$ . Therefore the average transitory component is positive. The absolute higher average income of  $y_0$  must be influenced by transitory income. In other terms: The positive transitory component is positively correlated with income itself and uncorrelated with permanent income for these units. To determine the group of measured income  $y_0$  the transitory component of income must be positive for this group. Given that  $\phi c_t y_t = 0$  a classification of income groups with respect to transitory consumption  $c_t$  is random. Therefore the transitory component of consumption averages out to the average transitory consumption of the whole group which is zero by definition. In consequence the average consumption for the observed income group of average income  $y_0$  is equal to their average permanent consumption which is  $k$  times their average income. If  $y_0 = y_p$  for the observed group their permanent consumption lies at the level of  $ky_0$  or graphically at  $y_0E$ . Since  $y_t$  is positive for this group their permanent income lies below their measured income so that average consumption lies at the level of  $a + by_0$  or  $y_0F$ . The same logic applies for consumer units with income  $\hat{y}$  and  $\hat{c}_t = \hat{y}_t = 0$ . The regression line OE shows this particular situation since it is drawn for permanent income and permanent consumption. For units with either negative transitory components or positive transitory components the consumption level lies, either to the left of the intersection (D) of OE and IF or to the right of the intersection (D) respectively.

Coming back to the considered income group with measured income  $y_0$  it is now possible to show the amount of permanent consumption by drawing a horizontal line from  $y_0F$  towards  $y_{p0}G$  since G lies on the OE line which describes the permanent consumption on permanent income regression. This in turn describes the average permanent income component of the observed income group with average income  $y_0$ . Therefore the average transitory component of income is shown by  $(y_0 - y_{p0})/(y_0 - \hat{y})$ . If this fraction is the same for all income groups the transitory component of the IF line is  $1 - P_y$ . The higher the transitory component  $1 - P_y$  the flatter is IF and conversely. That in turn means if  $P_y = 1$  the transitory component is zero and IF equals OE. If  $k$  is less than unity, which is mostly the case, permanent consumption is always less than permanent income but and that was to be shown it does not necessarily mean that average consumption is less than average income. The line OH describes the relation  $c = y$  and shows in relation to IF the savings of consumer units. The intersection point J is the break even point which is characterized by the fact that left-handed of this point average measured savings are negative and vice versa. The amount of measured savings increases therefore with the amount of measured income. The marginal propensity to consume which is

represented by  $k$  could be computed this way from measured income and consumption, since both equals permanent average income and permanent average consumption at the point when OE intersects IF which is D. Since D measures mean income and consumption the variable  $k = \hat{c}/\hat{y}$ .  $P_y$  could then be computed from regression  $c$  on  $y$  and  $c_p$  on  $y_p$  which is the relation between IF and OE.  $P_c$  therefore could be computed by the regression of  $y$  on  $c$ , which is not shown on the graphics, and  $\hat{c}$  on  $\hat{y}$  which is OE. If the mean transitory is not about to average out for the whole group, which is assumed for the upper explanation, but is negative or positive respectively the IF line is going to shift to the left or to the right correspondingly.

### 3. Inheritance: An economical approach

Inheritance and inheritance taxes in particular had been discussed couple of times in almost each highly economical developed country. The debates had their focus mostly on the allocation of wealth and its socio-economic distribution. Especially the argument of equivalent starting bundles for each individual at the beginning of their lifecycle, to ensure highest economic growth, since each individual strives to reach best individual circumstances possible, which in turn helps all other individuals since those profit from the individual's achievements as proposed by Adam Smith, was one of the main arguments. On the other hand it was also considered that already obtained wealth should stay in single hands since this is the basis for the foundation of corporations which in turn would allow for better resource allocation since those assets hold are used more efficiently. Finally it can be said that increasing individual wealth for the majority of a country's population turned to result in an abolition of inheritance taxes. Nowadays inheritance tax in most developed countries is nothing else than a discussion point since nearly any individual is affected by inheritance tax although most of them are in favour of an abolition, which is quite surprising. Nevertheless the topic of this paper and especially this chapter is not concerned about inheritance tax and its meaningfulness. The point that is observed over here is not dedicated to socio-economic inequalities or empire building. The aim of this paper is to show whether a reallocation of inheritances and therefore of wealth makes sense in an economical way. Therefore I will observe the consumption behaviour of individuals if wealth is allocated differently than usually proposed and its consequence for economic growth measured in GDP.

#### 3.1. The adjustment of inheritances and the change in consumption behaviour

As explained on the previous chapter consumption decisions of individuals are influenced by their income and their marginal propensity to consume. The marginal propensity to consume measures the amount of income dedicated to consumption. The difference between consumption and income is known as savings. Inheritances in this model are observed as savings. Therefore an inheritance in an economically spoken way is included in an economy's saving rate. More about that and the relation towards GDP is taken care of in a later section. Nevertheless the model used is Friedman's Permanent Income Hypothesis that applies

basically to aggregate consumption levels, which are about to be observed. Therefore any assumptions made by Friedman, which are explained in the previous chapter, apply also for this approach.

Friedman's PIH states:

$$(20) \quad c_p = ky_p$$

$$(21) \quad y = y_p + y_t$$

$$(22) \quad c = c_p + c_t$$

Since permanent income can not be measured directly it is useful to use measured income as income for each individual. As one can see it is the case that permanent consumption which is the only consumption ratio considered since only consumption with lasting effect for a nation's economy depends on the marginal rate to consume and permanent income. Transitory consumption is not considered since it affects a nation's economy in a random way which is not to be specified. Especially under the consideration that inheritance influences only the permanent parameters.

Assumptions for consumption behaviour:

1. All assumptions made by Friedman regarding his Permanent Income Hypothesis
2. Inheritance is random
3. Inheritance is expected

The assumptions made by Friedman regarding Pure Theory of Consumer Behaviour and Permanent Income Hypothesis apply to this approach since it is based on his theories:

First:  $c_p = k(i, w, u)y_p$ , with  $k$  being the marginal propensity to consume,  $y_p$  being the fraction of permanent income,  $c_p$  is the fraction of permanent consumption,  $i$  is the interest rate,  $w$  the proportion of non-human wealth to income and  $u$  being a variable containing all other factors related to consumption decisions. Mean transitory components average out and turn zero. Transitory and permanent components are uncorrelated. Transitory income and transitory consumption are uncorrelated.

Second: Inheritance is random means that the fraction of inheritance received is not known to the individual. Therefore inheritance influences the permanent income variable in case of occurrence.

Third: Inheritance is known states that the fraction of inheritance which is about to be received is covered in the ratio of non-human wealth to income and influences the Marginal Propensity to Consume.

As stated in the outlook of this paper, the idea is an adjustment of inheritances to influence consumption and therefore GDP. Regarding Friedman's consumption theory it is a fact that transitory components do not affect consumption behaviour of individuals directly. Lower income classes containing young generations, as the 25 – 34 year ones, are about to spend more than they receive in permanent income terms. To find a relation between traditional economic theory and business administration basics I will have a look at Maslow's pyramid of needs which defines certain groups and their level of needs. I will offer an explanation for the represented theory which introduces various economic advantages for the case of inheritance adjustments. I will try to relate five main points to Friedman's consumption theory and its implications for the model to be developed:

1. Reasons for changing consumption (a psychological approach)
2. Consumption behaviour and level of needs

The first two points considered will be observed in section 3.1., since they do not offer any mathematical explanation for the model of an inheritance allocation as suggested. The main purpose is to offer some fundamental background which allows for an easier understanding of the intention which lies in a reallocation of inheritances. The second three points are mentioned in chapter 3.2., since those are mathematical basics of the model which have to be fulfilled.

3. The relation between consumption and savings in an open economy
4. The change in saving rates and the national investment equilibrium in an open economy
5. The influence of a change in inheritance allocation on saving rate and consumption by age-groups (a comparison of MPC levels)

### 1. Reasons for changing consumption (a psychological approach)

In this section I will allocate consumption behaviour to Maslow's pyramid of needs to show a significant development in consumption behaviour of individuals. Therefore it is assumed that basic needs are not fully covered and have to be fulfilled in case of higher income. That in turn will allow for higher consumption and does influence the consumption behaviour of individuals significantly even though the time horizon is assumed to be three years as proposed by Friedman.

### 2. Consumption behaviour and level of needs

In this section I will explain the relation between consumption behaviour of the observed age groups and the hierarchy of needs. I will point out the effect of inheritance allocation towards young individuals instead of middle individuals and its consequences for consumption behaviour. This section is about to argue in favour of an allocation which seems to be quite reasonable to me and shows the relation between Friedman's Marginal Propensity to Consume  $k$  and Maslow's levels of needs.

### 3. The relation between consumption and savings in an open economy

To show the connection between decreasing savings and increasing consumption I will show the relation of Saving or Investment and Consumption in an open economy. The main aim is to show that Consumption increase does not necessarily mean a decrease in national Investment.

### 4. The changes in Investment rates and its equilibrium in an open economy

In the previous chapter I introduced the concept of an open economy model. Therefore I showed the effect of increasing consumption on GDP. I observe a certain change in income levels and a systematically decrease of savings. The effect of a saving decrease and possible improvements in GDP will be considered detailed.

### 5. The influence of a change of inheritance allocation on saving rate and consumption by age groups (a comparison of MPC levels)

Since bequests are mainly made from parental towards children generations, there should be a different saving and consumption behaviour for the children and grandchildren generation, in case of inheritances adjusted from the grandparental generation towards the grandchildren generation. The main point that has to be observed to give reason for the proposed allocation

is the difference in MPC level of individuals by age groups. It is the main subject to observe the difference in MPC level between the middle generation and the young generation. The higher MPC should be preferred in case of inheritance allocation since those individuals tend to spend more for consumption which is the desired effect of a new distribution.

### ***3.1.1. Reasons for changing consumption behaviour***

Friedman observed a higher marginal propensity to consume for lower income classes. The reason for such higher consumption levels can be found in Maslow's hierarchy of needs. The hierarchy of needs concept is based on motivation principles for individuals and was developed mainly as psychological tool to observe human being. It is a known marketing tool which is pretty important since a relation between consumption and marketing can not be denied so far as marketing is defined as stimulation of needs fulfilled by consumption. Therefore it is partly adoptable to explain consumer utility of consumption without losing generality. Anything Maslow developed in his model can be related to Friedman's theory of consumer behaviour since motivation factors are covered in the marginal propensity to consume which is marked as  $k$ . But to understand the reasons for different consumption propensities it might be useful to have a closer look at the hierarchy of needs.

Maslow defines five different levels of needs:

- I) physiological
- II) safety
- III) social (love/belonging)
- IV) esteem
- V) self-actualization

The first four levels are known as deficiency needs, which means that individuals do not care about as long as they are fulfilled but are very concerned in case of losing one of those factors. The last level is exclusively motivating since those needs fulfilled are not felt lacking anymore if missed rather than motivating much more.

## I) physiological needs

Physiological needs are prerequisites to survive. The physiological level covers all main needs such as food, breathing, water, sex, sleep, homeostasis and excretion. Those factors are required by all kind of creatures. Individuals do not cover more than any animal would do instinctively. Regarding consumption behaviour it can be said that such level of needs are covered by all kinds of income groups in western economical countries even for the ones who depend on social security. Therefore it is a factor that influences all individuals at the same kind and is clearly covered by the marginal propensity to consume. In my opinion it is a fact that starvation is nearly eliminated and mostly caused by self-exclusion of individuals. The influence on Friedman's  $k$  seems quite reasonable but does not concern this paper since those needs are covered by all individuals at the same kind which would not explain a difference in marginal consumption propensities.

## II) safety

Safety is the next highest level of motivation for individuals. This level is the first that applies only to human beings since it is not regarded to instinct. Safety is defined as security of body, of employment, of resources, of morality, of the family, of health and of property. As one can see there is one specific factor that had been taken into account by Friedman also. Friedman states that safety of property is pretty important to individuals. Assuming that property is defined as wealth it might be related to  $w$  the non-human wealth to income ratio. Individuals try to protect their wealth level and therefore allocate their consumption behaviour even though it does take time to allocate substantially. Here one can see that there is a relation between Maslow and Friedman under the assumption of wealth being non-human wealth and that both go into the same direction. An interesting contradiction occurs since the other factors of security depend highly on the consumption propensity  $k$ : Security of body, of family, of morality and of health has to be consumed nowadays. Although it is quite vague to state such proposition it seems to be quite reasonable to me since security has to be paid even if it is covered by governmental institutions. A pretty good example might be physical security of the family. Families and family members might be protected by bodyguards which will not be the case for most of them. Much more it is a fact that security of family depends on the region of living. Families in modern "ghettos" are protected much weaker than families in middle class regions. Therefore individuals tend to consume more of their income for such security. The contradiction occurs between the security of property and all other kinds of security. A protection of wealth levels is not possible in case of increasing expenditures for other

securities without increasing income. It might be the case that property in terms of wealth does not occur in that state so that the relation between Friedman and Maslow is quite unclear. Nevertheless it is not the purpose of Maslow to explain economical behaviour rather than psychological motives. Therefore I assume property to be defined as wealth so that a relation between Friedman and Maslow comes clear.

### III) social (love/belonging)

Intuitively social needs are also influencing the consumption behaviour. Supporting a family is clearly costly. Therefore the social needs tend to be fulfilled completely which requires further investments. Even Friedman states that families tend to spend more money which is quite realistic since children have to be raised which will not be covered by “love and air”.

Concerning consumption theory one could say that consumption for family business is accounted for as investments into the future since raised children might be seen as insurance for retirement. Those needs are covered only in  $u$  which is a variable of  $k$  independent of income. It is hard to calculate the real value but in my eyes it is pretty plausible to assume increasing consumption with increasing family size. This is a point that Friedman observed in his regression of income on consumption, too.

### IV) esteem

Esteem needs cover the motivation of self-esteem, recognition and status. The important point for consumption theory is the motivation for consumption to achieve a certain status. Individuals who try to satisfy those needs are already belonging to a certain group. I suggest that status and recognition is restricted within the groups individuals belong to. Therefore an increase in status will change their income class but not necessarily their social group they belong to. Since income is directly connected with consumption, as Friedman states, this point might be important for consumption behaviour which may be influenced in a positive way since status needs may be covered by higher expenditures. On the other hand it seems quite usual that esteem needs occur at the end of an individual's working life so that those needs do not need to be fulfilled by consumption rather than other things. Since belonging to certain classes requires different consumption behaviour it is the first need that is not fully covered by consumption theory and an allocation of wealth. It is sometimes the case that individuals tend to decrease their consumption even though they are able to consume much more and to achieve higher status in society. It might be possible that individuals develop a kind of antipathy against consumption as it was observed by Friedman also. He stated that particular

groups of individuals which are mostly survivors of the world war tend to decrease consumption. That in turn would fix their status quo of group identification which is quite possible for other individuals also. The main point of those needs is that they do not need to be fulfilled completely. In other terms it is not necessary that individuals tend to enter different classes as they belong to at the particular point in time. Therefore the consumption level might be influenced in a negative direction since protection of wealth is much more important regarding Maslow.

The four points of motivation from above linked with consumption theory are named “D-needs” by Maslow with D meaning deficiency. Those needs are not highly regarded by individuals as long as they are present but if they are missing individuals tend to feel anxious. In my eyes it is the case that most of those needs are directly connected with consumption except for “esteem needs” which might be covered only partly. Therefore it is possible to say that consumption behaviour is strongly influenced by the level of needs which has to be satisfied. Maslow’s hierarchy of needs is constructive so that the lower level of needs have to be satisfied before the upper level can be taken into consideration. I suggest that consumption behaviour is decreasing with an increasing level of needs. Therefore consumption is correlated negatively with needs.

#### V) self-actualization

The last point that Maslow mentions in his theory<sup>46</sup> is the level of needs for self-actualization. Those kinds of needs are called B-needs which comes from “being values”. Those needs are purely intrinsic and therefore not correlated with consumption. Self-actualization in the sense of Maslow is problem solving, lack of prejudice, acceptance of facts, spontaneity and so on. Here one can see that those kinds of needs can hardly be satisfied by consumption. As far as I can see there is no relation to consumption at this level which is not very surprising since I stated above that even the esteem needs can not be fully adapted to consumption theory. But anyway there is no problem occurring for this paper since the observed consumer groups nearly reach a level of satisfaction for needs that is not influenced by income and consumption.

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<sup>46</sup> In 1970 Maslow revised his pyramid of needs and added two more level of needs. The cognitive needs level describes the need for knowledge and the understanding of knowledge and is settled above the D-needs but below needs for self-actualization. The second level of needs that Maslow added is the aesthetic needs level which describes the need for creation, experience, beauty, etc and is settled at the top of his hierarchy of needs. Those two need levels do not create a lack of generality since they are only more detailed suborders.

### **3.1.2. Consumption behaviour and level of needs<sup>47</sup>**

In the upper section I introduced a model of Maslow to explain motivation for individuals satisfying certain needs. As I pointed out already it is the case that consumption behaviour is related opposing to level of needs. In this paper I observe a three generations model that is divided into young, middle and old generation. The allocation of inheritances shall be rearranged by transferring inheritances towards the young generation instead of the middle generation. Therefore it seems to be interesting to have a look at the marginal propensities to consume of those two groups which reflect indirectly the level of needs of the concerned individuals. It is a matter of fact that young individuals do have a higher marginal propensity to consume as Friedman states.<sup>48</sup> The MPC is declining with age and income since young individuals take into account how much they are about to earn during their working life. Therefore and with the ability of borrowing in advance they tend to spend more than they actually earn. The reason of such behaviour can be explained by Maslow's hierarchy of needs. Since young individuals are not able yet to cover the so called deficiency needs which are correlated with consumption they are about to spend more money to fulfil their need levels. Therefore the marginal propensity to consume describes indirectly the psychological status quo of an individual so that the hierarchy of needs can be described by  $k$  and  $k$  can be described by the hierarchy of needs vice versa.

This is a point that Friedman covers in his consumption theory by  $u$  which is a parameter of  $k$  and describes the utility level of individuals for all other things than interest rate and non-human wealth to income ratio regarding marginal propensity to consume. The relation between consumption and level of needs is therefore self-evident since Maslow describes motivation and needs which in economical turns would be utility. Consequently it seems to be useful to change the allocation of inheritances towards the young generation since the middle generation offers the lowest marginal propensity to consume. The reason can be found in Maslow also. The middle generation tend to spend less income on consumption because of a higher level of needs. It might be the case that those individuals already satisfied deficiency needs which allows for a satisfaction of self-actualization needs or if not that developed the esteem needs. As I pointed out beforehand it is the case that self-actualization needs and esteem needs are partly requirements of intrinsic motivation also. Therefore consumption

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<sup>47</sup> [http://pubdb3.census.gov/macro/032006/perinc/new08\\_000.htm](http://pubdb3.census.gov/macro/032006/perinc/new08_000.htm)

<sup>48</sup> Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 94, table 9 for Great Britain

theory might not apply for those individuals except for giving explanation of psychological conditions of individuals. Consequently the demand for consumption decreases with age and level of needs which changes the utility of consumption at the expense of intrinsic utility which is not covered in  $k$  anymore.

A reallocation of inheritances seems to be useful under this consideration since the marginal propensity to consume dependent on the level of needs already achieved is much higher for young individuals than for middle ones. It seems quite reasonable to me to assume the marginal propensity to consume being always higher for the young generation than for the middle so that an allocation of inheritance whether to increase income or marginal propensity to consume towards the young generation always ends up in higher overall consumption. The previous two sections described the meaningfulness of a reallocation of inheritances towards different generations. The mathematical explanation and its relation to Friedman's permanent income hypothesis are described in the next chapter. It seems much more important to me to show the logic behind such a reallocation and its consequences for consumption behaviour. The following section describes the effect of changing consumption on GDP and will finally proof that GDP growth can be achieved by an alternative allocation.

### 3.2. Basic idea for a change of inheritance allocation to increase GDP

#### **3.2.1. The relation between Consumption and Saving in an open economy**

Consumption and Saving are parts of the trade balance sheet of each economy since GDP is defined as:  $Y = C + I + G + NX$

As explained in the second chapter investments  $I$  are accounted for as Saving and consumption is defined by  $C$ . Governmental spending are not taken into considerations since the relation between private consumption and private savings is the main purpose. The assumption regarding inheritance in this chapter is made as inheritance being accounted for as Saving. The idea of adjusting inheritance towards the young generation results in a decrease in Saving since inheritances are accounted for as Saving at that point in time when it is transferred from the bequeathing generation, which is of course not able to consume anymore since it is dead. Since the upper equation is an identity the increase in consumption  $C$  aiming

an increase in GDP (Y) must be covered by other factors influencing GDP. As I said before the governmental spending G is not affected directly by an increase in consumption although I am aware of an increase in tax income. Governmental spending is assumed to be constant over time. Consequently an increase in consumption C must have an influence on investments I which are equally to Saving.

As explained above it would be the case in a closed economy that an increase in Consumption and a decrease in Investment average out. Moreover the impact on GDP would be negative since Investment is the basis for future consumption as stated in the previous chapter. Fortunately most economies are open economies so that the last term (net exports NX) of the upper equation plays a particular role in the explanation of Saving and Investment.

For this model an adjustment of inheritance tax towards the young generation would shift the relation of Consumption and Saving significantly. Since young generations tend to dedicate more of their permanent income towards consumption than the middle generation, for the reasons from above, the saving rate declines since inheritance is accounted for as Saving. The consequence out of such a development would be an increase in C and a decrease in I but an open economy allows for foreign investments so that the decreasing national Investment component of GDP can be covered up by foreign investments. Foreign investments depend largely on the offered interest rate for investments and those are about to change dependent on the allocation of inheritance towards income or wealth. The relation of national Saving, decreasing Investment and increasing GDP under my assumptions will be explained in the next section.

### ***3.2.2. The changes in saving rates and its equilibrium in an open economy***

From chapter two where I explained the relation between Net Export (NX) and Net Foreign Investment (NFI) follows that:

$S = Y - C - G$  and  $Y = C + I + G + NX$ , with S being national Saving, I being domestic Investment, C being Consumption and G being Governmental spending, which are assumed to be constant or 0.

Therefore  $S = I + NX$  which is  $S = I + NFI$ .

As stated above the assumption is that inheritance is Saving measured in domestic Investment I and Net Foreign Investment. To see the relation between I and GDP recognize the following equation:

$$I = S - NFI$$

Remember that Net Foreign Investment measures the difference between domestic investment into foreign assets and foreign investments into domestic assets. The difference occurs to be negative if foreign investment outdoes domestic investment, which in turn alters overall Investment I. One can see that a reduction in national Saving S can be covered up by foreign investment into domestic assets. To achieve such a development it is necessary to have a look at the behaviour of interest rates regarding foreign investments. As described above a reduction in S has several effects:

- a) decrease in NFI
- b) decrease in Net exports
- c) appreciation of the currency
- d) increase in foreign investment into domestic assets
- e) increase of imports

This model states the assumption that national Investment I is about to stay constant, since only national Saving S is affected by a different wealth allocation, because of the impossibility of private national Investment. Since inheritances are covered in national Saving S there must be a scenario that allows for a constant I even if S declines. As stated above an allocation of inheritance tax would decrease national Saving and increase national Consumption since the Marginal Propensities to Consume of different age groups vary widely. The young generation tends to allocate more income towards Consumption and is supposed to spend the money received from inheritance on Consumption. The saving rate of the generation observed must be lower than the saving rate of the middle generation. Therefore the overall amount of national Saving declines. The decline in national Saving results in a reduction of Net Foreign Investment. That in turn balances national Investment since  $I = S - NFI$ . If S declines and NFI declines simultaneously the effect could average out and national Investment I stays constant.

The effect of a decline in NFI is a reduction in domestic money supplied for exchange into foreign currency. That in turn causes the real exchange rate to appreciate. But what so ever an increase in real exchange rate does also mean an increase in imports which concerns the trade balance of foreign investors since those are able to offer cheaper products and receive domestic currency, which is nothing more than an investment into domestic assets. Therefore it might be useful to adjust the inheritance tax towards the young generation since the national Investment rate  $I$  stays constant and allows for a higher GDP at the end, caused by a higher fraction of consumption. In a best case scenario it would be possible to catch up the lack of exports by higher domestic consumption of domestic goods.

### ***3.2.3. The influence of a change in inheritance allocation on saving rate and consumption by age-groups (a comparison of MPC levels)***

In this section I will show the effect of an inheritance allocation on saving rate and consumption by age-groups. Therefore I will take the United States income and consumption data for 2005 which will be the basis for this analysis. The object is to compare the marginal propensity to consume for different age-groups and show the possible effect of an inheritance allocation towards the young generation for national consumption and national saving.

Data source: <http://www.bls.gov/cex/2005/Standard/age.pdf>

The data used are average values for each income group:

| age-group   | under 25 | 25 - 34 | 35 – 44 | 45 - 54 | 55 - 64 | 65 - 74 | 75 +   |
|-------------|----------|---------|---------|---------|---------|---------|--------|
| income $y$  | 27120    | 53257   | 69619   | 71442   | 61068   | 43976   | 11342  |
| consumption |          |         |         |         |         |         |        |
| $c$         | 27776    | 45068   | 55190   | 55854   | 49592   | 38573   | 27018  |
| $APC = MPC$ | 1,0241   | 0,8462  | 0,7927  | 0,7818  | 0,8120  | 0,8771  | 2,3821 |

The assumption that marginal propensity to consume (MPC) equals average propensity to consume (APC) comes from Friedman's Permanent Income Hypothesis since transitory

components within a group tend to average out which makes consumption allocated in any case to average propensity to consume<sup>49</sup>.

As one can see the MPC for concerned age-groups, which inheritance is allocated to, tends to decrease. For individuals below the age of twenty five the MPC is higher than 1 which implies that individuals belonging to this group tend to spend more than their income would allow for. Therefore an increase in permanent income would increase overall consumption significantly, since all income received will be consumed. National saving would decline since inheritance which is assigned for as saving would be devoted to consumption for the whole amount. The first group is quite an exception which may be justified by a quite small amount of workers in that group<sup>50</sup>. The definitely lower income with respect to the other groups is a good explanation and proof Keynes' and Friedman's statement that MPC tends to decrease with higher income y. Comparing different MPC levels result in an increasing fraction for consumption if wealth is allocated differently. Inheritances by logic come from the age-group of 75+. Therefore the marginal propensity to consume is not relevant for this paper because this age-group is not about to receive inheritances anymore since it is the last age-group observed and life-expectancy for the United States accounts for 77.8 years<sup>51</sup>. The second last group is also not considered regarding its consumption behaviour. The group of 64 – 75 year ones accounts as seniors and does not receive any inheritance since a bequest might have appeared in earlier years as the average age of women at first birth is around 25 years of age<sup>52</sup>. Consequently the comparison of MPC levels occurs between the age-groups of 0 – 34 year ones and 35 – 64 year ones. The MPC levels of 0 – 34 year ones is significantly higher than the MPC levels of 35 – 64 year ones. Therefore an allocation of wealth in form of inheritance towards the younger generation seems quite reasonable since it increases consumption because of a higher Marginal Propensity to Consume.

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<sup>49</sup> It is the case that Friedman would not take measured income values. It does not make any considerable difference for the calculation of income adjustments for this paper, since inheritance is always accounted for in permanent components. Therefore it is possible to take the measured values since the change in wealth allocation is always positive without any doubt.

<sup>50</sup> This is also a point Friedman was confronted with also when he excluded receivers of social welfare from his PIH. The point is that only working individuals should be taken into account.

<sup>51</sup> [www.cdc.gov/nchs/products/pubs/pubd/hestats/finalsdeaths04/finalsdeaths04\\_tables.pdf#1](http://www.cdc.gov/nchs/products/pubs/pubd/hestats/finalsdeaths04/finalsdeaths04_tables.pdf#1), National Center for Health Statistics, 3311 Toledo Road, Hyattsville, Maryland 20782

<sup>52</sup> <http://209.85.135.104/search?q=cache:Cy5uE5YgnMEJ:www.cdc.gov/od/oc/media/pressrel/r021211.htm+average+age+women+first+child&hl=de&ct=cln&cd=1&gl=de> Although the age was lower in former years, e.g. 21 years of age in 1970 it does not seem to be reasonable to assume the seniors group as inheritance receivers since they might be only randomly bequest receivers for age-reasons in relation to life-expectancy.

Regarding Friedman who states  $c_p = k y_p$ , with  $y_p$  being measured income,  $c_p$  being measured consumption and  $k$  being MPC, an allocation of inheritance towards the young generation will end up in higher consumption in any case. Either it increases  $k$  which is the MPC or it increases  $y_p$  which is the permanent income. The effect will be the same for both kinds of allocation: Consumption increases. The same vice versa is valid for Average Propensity to Save (APS) and Marginal Propensity to Save (MPS). Since APS is  $1 - APC$  and MPS is  $1 - MPC$  respectively, the amount of savings decreases with increasing income in case of inheritance allocation the way proposed. As defined inheritance occur from national saving and since national saving is allocated for an increasing fraction towards consumption because of a higher MPC saving is expected to decrease because of a lower APS and therefore a lower average MPS for all age-groups.

I offer a detailed observation of MPC and corresponding MPS levels and its effect on consumption and GDP in the next section where the whole model is developed. This part of the paper is only supposed to give a broad overview of the topic and its implications for economic development.

### 3.3. Alternative Inheritance Allocation: Model Setup

#### 3.3.1. **Assumptions**

- a) Three different age-groups: young, middle and senior generation
- b) Equal distribution of age-groups (constant birth rate)
- c) Inheritance is accounted for in national savings
- d) Inheritance contains all kind of non-human wealth
- e) Donations are treated equivalently to inheritances
- f) Consumption behaviour is based on Friedman's Permanent Income Hypothesis and its assumptions
- g) Open economy GDP identity holds
- h) GDP: Governmental spending is assumed to be constant or zero

The upper assumptions and their reasonability are explained in this section, except for Friedman's consumption theory and the GDP definitions since those are already explained in Chapter one.

a) This paper defines three different age-groups<sup>53</sup>:

1. young generation (0 – 34 years of age)
2. middle generation (35 – 64 years of age)
3. senior generation (65 – 75+ years of age)

Those definitions are not random since they are related to the marginal propensity to consume for the concerned age-group. It seems pretty unrealistic to consider the age-group of sixteen years and below since those individuals mostly do not have property rights regarding received inheritance payments. Nevertheless this paper is completely hypothetical and assumes that even those individuals are allowed for private consumption without any restrictions. The argument behind such an assumption is that the data used, already takes such restrictions into account as long as these values are observed by the United States Department of Labor. The problem that occurs is that the MPC level of the youngest group <25 years of age is a maverick in relation to the rest of the observed age-groups. Nevertheless it seems pretty realistic that this group might receive a newly allocated inheritance and has to be considered also. Therefore I define the young group as the 0 – 34 year ones since those age-groups are both concerned with inheritance although the amount donated to each individual is quite unclear. The main difference between the group of 25 years of age and below and the 25 – 34 years of age ones is the measured income which influences MPC widely. Nevertheless this model is only hypothetical and might be adjusted if data for each individual is available.

The middle generation is defined as being between 35 – 64 years of age since this is the period of life where families are founded and children are raised. Although the age of women bearing a first child lies around 25 years nowadays it seem reasonable to me to assume the middle generation in that way since the age of women bearing a first child is increasing and the MPC levels of those age-groups observed fit pretty good together. Another point that is in favour of such an assumption is the fact that nearly all individuals belonging to that group are employed which influences their consumption and saving decisions. The senior generation is

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<sup>53</sup> All data used applies to the United States and is either taken from an upper page of this paper or separately marked by a hint.

not considered in a comparison of MPC levels since those are not affected by inheritances in terms of consumption. The senior generation is supposed to bequeath but not to receive any inheritance. To support such an assumption I will consider the senior age-group to be past their working-life horizon which seems to be intuitively right to me. The age of birth for women is also a fact that should be considered. As stated above the average expected lifetime lies around 78 years. The age of women who gave birth to their first child lies around 20 years for the senior generation. Therefore an inheritance might have occurred already since an inheritance made by an individual with average life expectancy would have been made to an individual of the middle generation with average age of 58 years.

b) Equal distribution of age-groups (constant birth rate)

An equal distribution of age-groups is a pretty strong assumption of this paper. Since reality shows that the amount of individuals belonging to the young generation is about to decline and the amount of individual belonging to the senior generation is about to increase it might well be the case that the distribution shifts in a way that inheritance allocation might become useless. Assume that the amount of individuals of the middle generation is about to double and the amount of individuals of the young generation is about to halve. Assume also that inheritances are allocated towards the middle generation as it is mostly the case nowadays. Therefore a reallocation of inheritance towards the young generation might have a negative effect on consumption since individuals belonging to the young generation do have a higher MPC but the amount of people receiving an inheritance is too small to cover up the difference in MPC levels in relation to the middle generation. The phenomenon of decreasing birth rates which can be observed all over the modern world might have a negative influence on GDP in terms of consumption. Therefore the assumption of equal distribution is necessary for this paper although it might be the case that the amount of inheritance received by the young generation is higher overall for each individual. This may affect their wealth or income level but it also may shift their income group and MPC level. Consequently their consumption behaviour changes also. The level of consumption decreases particularly if strong inheritances are made which allow individuals of the young group to cover their needs quite fast.

c) Inheritance is accounted for in national saving

This assumption implies that all kind of inheritance made is a fraction of national saving. This seems to be quite realistic in my eyes since the bequest giving generation is not integrated in the employment market anymore which presumes that consumption of this group is made

only from saving. Therefore inheritances which occur are covered in national saving and reallocated towards consumption.

d) Inheritance contains all kind of non-human wealth

This assumption is not quite usual in practice. Especially estates are treated separately in most modern economic countries. Estates as inheritance do have different taxation levels and an overall different treatment as cash components for example. Nevertheless I assume any kind of non-human wealth to be a marketable security which means that only cash values are considered. For the model used it does not make any difference which kind of inheritance is suggested since it is based on Friedman's Permanent Income Hypothesis that does not differentiate between values except for human and non-human wealth<sup>54</sup>.

e) Donations are treated equivalently to inheritances

Most legal frameworks treat donation and inheritance differently. The only difference is tax implications. Since I do not observe tax systems rather than economical consequences of wealth allocation it does not make any difference in which way wealth is allocated. Moreover it is assumed that all kind of wealth transfer between senior generation and middle or young generation are treated as if inheritances. That allows for a calculation which takes all kind of wealth transfer into account and could make a practicable application more possible. It is pretty hard to find data on inheritances but it is even harder to find data on donations since those are not registered anywhere. Whatsoever this paper is hypothetical and does not consider any differences in wealth disposition. I will not explain the assumptions regarding Friedman's Permanent Income Hypothesis and GDP statements since those are explained in chapter 1. The only point I would like to give details about is the assumption of constant governmental spending in the GDP formula. This assumption is made only for simplicity reasons. It might well be the case that governmental spending does change in case of a different inheritance allocation. Particularly since tax revenues may differ from a new allocation and also the influence on the interest rate might have an impact on governmental spending. Nevertheless the change in interest does also have an impact on the MPC of individuals but since it is the purpose to show that a reallocation increases consumption and

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<sup>54</sup> I am aware of the empirical problems Friedman was faced and his redefinition of consumption. It might well be the case that those implicit definitions do have an impact on this model developed. Nevertheless the model stated in this paper is supposed to offer a high degree of generality and a different definition of inheritance will cause mainly a loss in generality without denying the idea anyway. Another practical problem I am aware of is the bequest of companies, because it is not always possible to account companies as being marketable securities. The point is to assume inheritance as if being marketable securities.

therefore GDP, the adaptation of MPC of individuals of one of the groups regarding a change in interest may well happen after the reallocation since increasing consumption is a condition for changing interest rates.

### ***3.3.2. Consumption behaviour and overall consumption in case of different inheritance allocation***

First I observe the consumption behaviour of individuals in case of a reallocation of inheritance towards different groups. Therefore I will use Friedman's Permanent Income Hypothesis to show the effect of either a changing wealth level or a changing permanent income level.

I will start this model by assuming an increase in permanent income:

Friedman's formula of permanent income states:

$$c_p = ky_p,$$

with  $c_p$  being permanent consumption,  $k$  being Marginal Propensity to Consume and  $y_p$  being permanent income.

The assumption of Friedman suggests that transitory components average out for a particularly observed group. Let us assume a certain increase  $h$  in  $y_p$  caused by an inheritance received. The effect would be the following:

$$c_p = k(y_p + h)$$

The argument that inheritance is added to the permanent income component comes from the assumptions made from unexpected inheritance. Since it is not observable for the individual when to receive the bequest it is useful to account inheritance for permanent income since it increases the receipts of the individual for the next period. Nevertheless one could expect an inheritance which was unexpected might influence the transitory component. In that case there would not be any effect observable of inheritance on consumption levels since transitory components and consumption are uncorrelated as proposed. But it is also not useful to assume inheritance to be transitory income since transitory components tend to average out which is

clearly not possible for inheritance although it is unexpected. The characteristic of transitory components to average out might be explained by the following example. Higher transitory income might be received from longer working hours which mean less time for consumption, which is an offsetting effect, and therefore no influence on the permanent consumption component. Since inheritance is not related to any offsetting effects it must influence the permanent income component. Only the excess over the inheritance received is accounted for as transitory. We assume that the individual's consumption decisions depend only on two periods:

- a) before inheritance received and
- b) after inheritance received

In the period before the inheritance is received the individual has a certain marginal propensity to consume  $k$ . Regarding Friedman the marginal propensity to consume does not depend on the size of permanent income but on the ratio of non-human wealth to income, interest and other factors. If the individual does have a certain marginal propensity to consume which is  $k$  and if this factor does not change, since a change in permanent income does not change the individual's marginal propensity to consume, the individual does not change its consumption preference towards asset acquisition for the second period. Therefore an increase in income  $y_p$  by a fraction of  $h$  will increase consumption by the same amount since:

$$c_p = k(y_p + h)$$

$$c_p = ky_p + kh$$

The effect of an increase in  $y_p$  is therefore the same for  $c_p$  since they are uncorrelated to  $k$ , which makes  $k$  constant. Therefore an increase in permanent income results in an increase in permanent consumption since there is no need for the individual to change its consumption behaviour. The amount of permanent income allocated towards consumption depends on the Marginal Propensity to Consume  $k$  which is not affected by a change in permanent income, although overall consumption clearly depends on the amount of permanent income available. It must be intuitively right to allocate inheritance towards permanent income groups with higher marginal propensity to consume which is clearly the young generation as stated in the comparison of marginal propensities to consume in the upper section.

The assumption of only two different periods seems quite unrealistic and is only stated to show the relation between consumption and inheritance.

Next I will assume a well known inheritance to be received in the future for sure. Friedman assumes borrowing in advance on the strength of the inheritance being possible which seems pretty realistic if the inheritance received is for sure. Therefore an inheritance has a particular effect on Friedman's consumption theory:

$$c_p = ky_p$$
$$k = k(i, w, u)$$

Assumed is a two period scenario as stated above. The difference between an allocation of inheritance occurring randomly and being accounted for as permanent income and a certain inheritance to be received is different consumption behaviour in its development. An expected inheritance influences the marginal propensity to consume  $k$  which is not affected in case of a random inheritance. The marginal propensity to consume depends on the ratio of non-human wealth to income which reflects also an expected inheritance since it is accounted for in non-human wealth. Therefore the marginal propensity to consume increases since the ratio of non-human wealth to income increases which requires less additional assets. The effect will be increasing consumption for the first period in which the inheritance is not received yet but any change in consumption for the second period after the reception of income since inheritance is already accounted for in the first period. Since  $k$  is not defined precisely it is not possible to show the effect of inheritance allocation towards  $w$  directly. I will proof this proposition indirectly by comparing an increase in non-human wealth and an increase in permanent income at the end of this page. But what so ever the effect of an allocation towards non-human wealth  $w$  in the first period or permanent income  $y_p$  in the second period is pretty the same. It results in an increase in consumption which is higher for groups of individuals with a higher marginal propensity to consume. An increasing marginal propensity to consume  $k$  does have a higher impact on low income groups than on high income groups. Therefore an allocation of inheritance towards young individuals seems sufficient to increase overall consumption since the marginal propensity to consume is higher for such groups of individuals, since permanent income is lower.

Assume  $x$  to be the fraction of non-human wealth:

$$k(w) = (w + h)/y_p^{55}$$

Assume  $i$  and  $u$  of  $k$  being constant and the same for both cases, therefore only the change in  $w$  and  $y_p$  by a fraction of  $h$  and its influence on consumption are considered.

For random inheritance:

$$c_p = k(y_p + h) \text{ with } k \text{ being } w/y_p$$

Therefore

$$c_p = (w/y_p)(y_p + h)$$

$$c_p = w + wh/y_p$$

For expected inheritance:  $c_p = (w + h)/y_p * y_p$

$$c_p = w + h$$

If  $x$  and  $y_p$  are similar in amount the effect of income increase will be the same for both allocations. Otherwise the effect depends on the function of  $w$  which describes the non-human wealth to income ratio.

As one can see it does not matter whether the allocation occurs randomly or under certainty regarding the positive influence on consumption. The allocation towards permanent income or wealth does not make any difference for consumption tendencies. Both affect consumption in a positive way. The proof is made that consumption levels do not depend on the allocation of inheritance either towards permanent income which is  $y_p$  or non-human wealth  $x$ . Therefore it does not make any difference if the inheritance is unexpected or known which is pretty important for this study and shows that a reallocation of inheritance does not have any considerable negative effect on consumption. It states that only marginal consumption propensities of considered groups of individuals are important. Therefore I will observe different MPC levels of different age-groups to show the significant improvement of GDP in case of different allocation.

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<sup>55</sup> It is a pretty simple assumption to define the function  $k(w)$  as being a combination of a constant amount of wealth denoted as  $x$  and permanent income  $y_p$ . It might well be the case that the function of  $k$  is much more complicated. Nevertheless the main purpose is to show the positive influence of an increasing amount of wealth on permanent consumption  $c_p$ , not develop highly complicated mathematical equations.

### 3.3.3. *Changes in GDP in case of different inheritance allocation*

As I pointed out in the preceding section the allocation of inheritance either towards permanent income  $y_p$  or non-human wealth to permanent income  $w$  affects consumption behaviour only in the amount. But it causes an increasing total consumption for all groups. The main purpose of this paper is to increase total consumption by allocating inheritance towards different age-groups. Therefore the upper section does not tell us anything about changes in GDP since it does not consider different age-groups. In this section I will show the sensibility of adjustments of inheritances from the middle generation towards the young generation.

Assume three generations of consumers:

- a) the young generation
- b) the middle generation
- c) the senior generation

The senior generation is not considered in the following definitions and explanations since those individuals are not about to receive an inheritance rather than giving bequests to the other generations. For completeness reasons I take this generation into account although it is not observed directly. Assume further  $MPC_y > MPC_m$ , which is intuitively right as I proofed in the preceding chapter, with  $MPC_y$  being the Marginal propensity to consume for the group of young individuals and  $MPC_m$  being the marginal propensity to consume for the group of middle individuals.

#### The closed economy

I will first observe the behaviour of changing consumption in a closed economy to show the logic behind this proposition. Afterwards I will adjust this observation to an open economy model which is much more realistic and necessary for my model to hold.

Assume  $GDP = Y$  and  $Y = C + I + G$

Since this equation is an identity GDP growth from consumption occurs if  $C$  is increasing. Assume three different groups young, middle and senior with the coefficients  $y$ ,  $m$  and  $s$ . The

theory of a closed economy model states that  $I = S$  which means that investments occur from national savings. My assumption states that inheritance is covered in savings which seems pretty plausible to me since wealth of inheritance can hardly occur in consumption because of the impossibility of dead consumers except for burial costs maybe. Let us split consumption and savings in between the three different groups<sup>56</sup> which results in:

$$Y = C_y + C_m + C_s + I_y + I_m + I_s$$

With:

$$C = 1/3C_y + 1/3C_m + 1/3C_s$$

$$I = 1/3I_y + 1/3I_m + 1/3I_s$$

$$C = 1 - I$$

$$y_{pi} = C_i + I_i$$

$$y_p = 1/3y_{py} + 1/3y_{pm} + 1/3y_{ps}$$

$$C_i = k_i y_{pi}, I_i = (1 - k_i) y_{pi} \text{ and } S_i = I_i, i \text{ being } y, m \text{ or } s$$

With equal distribution of groups  $y, m$  and  $s$  and  $k$  being MPC and  $(1 - k)$  being MPS

Assume further that governmental spending and governmental saving are zero<sup>57</sup> since they are not affected by this model in a direct way. Assume further  $C_s$  to be zero and  $I_s$  to be one since this group does not receive any inheritance rather than giving bequest itself. Use Friedman's consumption equation and replace  $C$  and  $I$  by the corresponding variables:

$$Y = 1/3k_y y_{py} + 1/3k_m y_{pm} + 1/3k_s y_{ps} + [1/3(1 - k_y) y_{py} + 1/3(1 - k_m) y_{pm} + 1/3(1 - k_s) y_{ps}]$$

As one can see the marginal propensity to consume is now introduced into the GDP equation. Reconsider that  $k = \text{MPC}$  and that  $\text{MPC}_y > \text{MPC}_m$ , simplify by assuming  $k_s$  to be 0.

$$Y = 1/3k_y y_{py} + 1/3k_m y_{pm} + [1/3(1 - k_y) y_{py} + 1/3(1 - k_m) y_{pm} + 1/3y_{ps}]$$

Now assume an equally distributed wealth transfer from the senior generation's savings  $I = y_{ps}$  towards the income of the other generations with  $k_y$  being 0.9 and  $k_m$  being 0.8. This will

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<sup>56</sup> The model developed assumes an equal distribution of generations, with each generation being a third of the whole.

<sup>57</sup> Tax payments from income are not taken into account neither since they do not change the model. The only consequence of tax payments considered is a complicating moment for the GDP explanation.

cancel out the senior generation which is quite logic since they only give bequest in case of death which abandons them from the market.

$$Y = 1/3 * 0.9[y_{py} + 0.5 * (1 - k_s)y_{ps}] + 1/3 * 0.8[y_{pm} + 0.5(1 - k_s)y_{ps}] + 1/3[(1 - 0.9)(y_{py} + 0.5(1 - k_s)y_{ps})] + 1/3[(1 - 0.8)(y_{pm} + 0.5(1 - k_s)y_{ps})]$$

With  $k_s$  being 0.

Summing everything up holds:

$$Y = 1/3[0.9(y_{py} + 0.5y_{ps}) + 0.8(y_{pm} + 0.5y_{ps})] + 1/3[(1 - 0.9)(y_{py} + 0.5y_{ps})] + 1/3[(1 - 0.8)(y_{pm} + 0.5y_{ps})]$$

$$Y = 1/3[0.9y_{py} + 0.45y_{ps} + (1 - 0.9)(y_{py} + 0.5y_{ps}) + 0.8y_{pm} + 0.4y_{ps} + (1 - 0.8)(y_{pm} + 0.5y_{ps})]$$

$$Y = 1/3y_{py} + 1/3y_{pm} + 1/3y_{ps}$$

which is:

$$Y = 1/3k_y y_{py} + 1/3k_m y_{pm} + 1/3[(1 - k_y)y_{py} + (1 - k_m)y_{pm} + y_{ps}]$$

under the assumption of  $k_s y_{ps}$  being zero and  $(1 - k_s)y_{ps}$  being 1.

The purpose is not to show an increasing GDP which is quite impossible with one generation expiring, but to show that a reallocation of inheritance does not make any sense for the economy as a whole since an increase in Consumption caused by higher income is covered by decrease in Saving which ends up in an offsetting situation.

As one can see an increase in consumption is averaged out by a decrease in savings. Adjusting income  $y$  by enlargement does not change the GDP in a closed economy model since an increase in consumption can only be achieved by decreasing investments and therefore savings. This is quite logic since by definition  $C = 1 - S$  under the assumption of Governmental Spending and Governmental Saving being zero. It is intuitively right that consumption depends on the marginal propensity to consume as you can see in the upper equation since  $0.45 > 0.4$ , therefore it does make sense to allocate wealth differently between generations to increase total consumption although it is not the case that GDP increases also

in a closed economy model. The relation between savings and consumption can only be explained in an open economy model which suggests savings being dependent on foreign investments also, so that the equilibrium state which is suggested by the closed economy model must be reached differently. If the adjustment of inheritance occurs towards the amount of wealth for each generation which increases  $k$  the effect for consumption will be the same since  $k$  influences  $S$  in the same way as it influences  $C$  so that the offsetting relation between  $C$  and  $S$  being  $C = 1 - S$  will not change the overall result for GDP. This section was only introductory to the open economy model to show the logic of the developed model. Next you will see the effect of such an allocation with foreign investors in the concerned economy.

### The open economy

Assume the open economy equation for GDP.

$GDP = Y$  and  $Y = C + G + I + NX$ , with  $C$  being consumption,  $I$  being Investment,  $G$  being governmental spending and  $NX$  being net exports.  $G$  is considered to be zero since it is not influenced directly by my proposition. Assume further three generations of consumers equally distributed. GDP splits therefore into:

$$Y = 1/3C_y + 1/3C_m + 1/3C_s + 1/3I_y + 1/3I_m + 1/3I_s + NX, \text{ with } G \text{ being zero}$$

$$C = 1/3C_y + 1/3C_m + 1/3C_s$$

$$I = 1/3I_y + 1/3I_m + 1/3I_s$$

$$I_i = S_i - NFI_i, \text{ with } i = y, m \text{ or } s$$

Furthermore to show the relation to Friedman's Theory of a consumption function:

$$C_{pi} = ky_{pi},$$

$$C_i = C_{pi}$$

with  $k$  being MPC and  $y_p$  being permanent income

which follows that:

$$Y = 1/3C_{py} + 1/3C_{pm} + 1/3C_{ps} + 1/3[(1 - C_{py}) + (1 - C_{pm}) + (1 - C_{ps})] + NX, \text{ with } NFI = NX$$

and  $I = S - NFI$  and  $(S_i - NFI_i) = (1 - C_i)$

Therefore:

$$Y = 1/3k_y y_{py} + 1/3k_m y_{pm} + 1/3k_s y_{ps} + 1/3[(1 - k_y)y_{py} - NFI_y] + ((1 - k_m)y_{pm} - NFI_m) + ((1 - k_s)y_{ps} - NFI_s)] + NX, \text{ with } NFI = NX \text{ and } NFI = 1/3 \sum NFI_i \text{ with } i \text{ being } y, m \text{ or } s$$

Since  $MPC_y > MPC_m$  and  $MPC_s$  is zero since the fractions of  $I$  is  $y_{ps}$  and  $C$  is zero for this group in the moment of transfer payment of inheritance. As I stated above it is not relevant whether inheritance is received randomly or expected the effect on consumption will have the same direction. Therefore inheritances received will increase the fraction of consumption for each group observed. The main point is the MPC assumption of  $k_y$  being larger than  $k_m$ , which is stated in the previous chapter as a matter of fact. Lets say  $k_y = 0.9$  and  $k_m = 0.8$ . Therefore considered consumption after reallocation and drop out of senior generation as consumers is:

$$C = 1/3 * 0.9 y_{py} + 1/3 * 0.8 y_{pm} + 1/3 y_{ps} * 0$$

Consider private savings:

$$S = 1/3(1 - k_y)y_{py} + 1/3(1 - k_m)y_{pm} + 1/3 y_{ps}$$

$$\text{Since } S_s = y_{ps}, S = 1/3(1 - 0.9)y_{py} + 1/3(1 - 0.8)y_{pm} + 1/3 y_{ps}$$

Now assume transfer payments from  $S_s$  towards the group of  $y$  and  $m$ . Therefore assume  $S_s$  to decline for a fraction of  $h$  and allocate  $h$  equivalently towards  $y$  and  $m$ .

Therefore private saving develops into:

$$S = 1/3[(1 - k_y)(y_{py} + 0.5h)] + 1/3[(1 - k_m)(y_{pm} + 0.5h)] + 1/3*(y_{ps} - h)$$

$$S = 1/3 * 0.1(y_{py} + 0.5h) + 1/3 * 0.2(y_{pm} + 0.5h) + 1/3*(y_{ps} - h)$$

$$S = 1/3 * 0.1 y_{py} + 1/3 * 0.05h + 1/3 * 0.2 y_{pm} + 1/3 * 0.1h + 1/3 * y_{ps} - 1/3 * h$$

$$S = 1/3 * 0.1 y_{py} + 1/3 * 0.2 y_{pm} + 1/3 * y_{ps} - 1/3 * 0.85h$$

For consistency reason, since  $I = S - NFI$ ,  $I$  develops into:

$$I = 1/3(0.1 y_{py} - NFI_y) + 1/3(0.2 y_{pm} - NFI_m) + 1/3(y_{ps} - NFI_s) - 1/3 * 0.85h$$

Same accounts for consumption the other way around

$$C = 1/3 k_y (y_{py} + 0.5h) + 1/3 k_m (y_{pm} + 0.5h) + 1/3 y_{ps} * 0$$

Remember  $k_y > k_m$

$$C = 1/3k_y(y_{py} + 0.5h) + 1/3k_m(y_{pm} + 0.5h) + 1/3y_{ps} \cdot 0$$

$$C = 1/3 \cdot 0.9(y_{py} + 0.5h) + 1/3 \cdot 0.8(y_{pm} + 0.5h)$$

$$C = 1/3 \cdot 0.9y_{py} + 1/3 \cdot 0.45h + 1/3 \cdot 0.8y_{pm} + 1/3 \cdot 0.4h$$

$$C = 1/3 \cdot 0.9y_{py} + 1/3 \cdot 0.8y_{pm} + 1/3 \cdot 0.85h$$

As one can see it is much more useful for consumption to allocate inheritance towards the group with the highest propensity to consume although it causes a decline in private savings<sup>58</sup>.

Allocate  $h$  towards the young generation:

$$C = 1/3 \cdot 0.9(y_{py} + h) + 1/3 \cdot 0.8(y_{pm})$$

$$C = 1/3 \cdot 0.9y_{py} + 1/3 \cdot 0.8y_{pm} + 1/3 \cdot 0.9h$$

Allocate  $h$  towards the middle generation:

$$C = 1/3 \cdot 0.9(y_{py}) + 1/3 \cdot 0.8(y_{pm} + h)$$

$$C = 1/3 \cdot 0.9y_{py} + 1/3 \cdot 0.8y_{pm} + 1/3 \cdot 0.8h$$

Therefore  $\Delta C$  is:

$$\Delta C = 1/3 \cdot (0.9y_{py} + 0.8y_{pm} + 0.9h) - 1/3 \cdot (0.9y_{py} + 0.8y_{pm} + 0.8h) = 1/3 \cdot 0.1h \text{ and}$$

$$\Delta S = - 1/3 \cdot 0.1h \text{ equivalently}$$

As one can see the result for consumption is the same as proposed by the closed economy model. The fact that  $NFI = NX$  cancels out any influence of savings  $S$  regarding national investment  $I$ . An allocation of wealth towards the permanent income of the young generation is much more useful for consumption to increase than towards the middle generation. The purpose is rather to show that consumption can be increased by allocating wealth differently but GDP to increase because of different allocation. Therefore I will have a look at national savings and its development in case of increasing consumption.

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<sup>58</sup> Since I do not take governmental spending into account I will not consider governmental savings neither. I am aware that this holds a failure in reality but because I show the effect of different allocation of inheritance towards individual consumers I will not consider those developments.

### ***3.3.4. Changing GDP allocation in an open economy caused by different inheritance allocation***

Since by definition  $G = 0$  only private  $S$  and therefore  $I$  is considered.

$$GDP = C + I + NX$$

Private savings  $S$  decrease by  $0.85h$  and  $C$  increases by  $0.85h$ , regarding result from the previous page, since  $S = 1 - C$  and it is not quite obvious that the reallocation does have a positive influence on GDP, since it seems to be an equilibrium which is proposed by the equation. But remember that modern economies are open economies so that  $I$  can be kept constant by reallocating  $NX$  or better  $NFI$ . The concept of  $NFI$  is explained in the second chapter so that I will skip explanations and turn to the important facts.

$$S = I + NFI$$

Therefore

$$I = S - NFI$$

This under the proposed changes in  $S$  is:

$$I = (S - 1/3 * 0.85h) - NFI$$

As one can see national investment  $I$  is about to decline. Nevertheless in turn  $NFI$  is about to decline which will keep  $I$  constant. The conclusion that can be drawn from this purpose is that:

$$GDP = (C + 1/3 * 0.85h) + ((S - 1/3 * 0.85h) - NFI) + NX$$

Since  $NFI = NX$

$$GDP = (C + 1/3 * 0.85h) + (S - 1/3 * 0.85h - NFI) + NX$$

$$GDP = (C + 1/3 * 0.85h) + (S - NFI - 1/3 * 0.85h) + NX$$

As one can see an allocation of NFI is not a sufficient solution for economic growth since the upper equation does not give any reasonable solution. Since  $NFI = NX$ , there is no way in increasing consumption from the upper equation. It seems to be necessary to have a look at national Investment, which needs to be manipulated to offer economic growth.

The principle of NFI has to be compared with the Import-Export relation of a countries economy. A positive NFI in that case means that exports outdo imports which reduce domestic investment in favour to foreign investment. This equation is hardly to be influenced. To achieve a situation which offers economic growth by an Increase in Investment it has to be noticed that an increase in consumption and a decrease in savings necessarily raises demand for domestic currency since the national Investment level is supposed to stay constant. Since domestic currency is a scarce resource, because of a lower national Saving rate, it might well be the case that deflation occurs. This seems to be pretty unfavourable for domestic economy since it raises the price for exports and decreases the price for imports. That in turn changes the relation between exports and imports which is measured in net exports NX towards a lower NX. Since  $NX = NFI$  the investments abroad decrease and domestic companies tend to invest more into domestic economy than abroad. If NFI turns to be negative it is the case that imports outdo exports and foreign investments into domestic economy are the consequence<sup>59</sup>. But how is it possible that national Investment adjusts and allows for a GDP increase in case of different wealth allocation?

The answer can be found in monetary policy. Since increasing Consumption is financed out of decreasing Saving and therefore decreasing Investment there must be a way to offer financial resources to investors for certain economic scenarios without disturbing the equilibrium of Saving and Investment, except the disturbance is already acute.

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<sup>59</sup> Modern international economic theories are not quite agreed with the influence of a changing net export relation for export oriented economies. The current account balance or the balance of trade which is net exports can be either a deficit or a surplus. As I stated above it may well be the case that a current account deficit may occur. But theory says that the balance of trade equals the balance of payments and the balance of payments or net foreign investments may be a deficit also which in turn means higher investments of foreign investors into domestic economy. It is not quite clear which forces, either exchange of goods or exchange of money, may influence GDP directly. Since  $NX = NFI$  is an identity it can not be said that a surplus or a deficit of one of the parameters is either good or bad for an economy. In reality there exist economies with negative balance of trade, such as Australia, which have a constant economical growth rate, but also economies with a positive balance of trade such as Germany that offer constant economical growth rate also. Therefore it is not quite clear if such an allocation of wealth as I suggested must have a negative influence on GDP since negative NFI does not necessarily mean less GDP income as long as Net exports decrease also. There should be a relationship between NX and NFI which is different from equivalent behaviour because different interest rates cause different investments and different investments cause different economic growth. What can be said is that both parameters depend on the real interest rate, which is therefore pretty interesting to be observed. Therefore monetary policy has to be considered which will take place in the next chapter.

### 3.4. Monetary policies

First of all it has to be said that monetary policies and its effects are not undisputed. Keynes for example advocated his theory of deficit spending. In his “General Theory” he stated that a depression or recession should be fought by increasing governmental intervention, which should apply anti-cyclical. The intention behind such an intervention lies behind the assumption that recessions occur from a lack in consumption which has to be covered by governmental intervention in fiscal and monetary terms. The state therefore acts like a company and invests into the market. Keynes theory is regarded to be wrong since the recessions caused by the oil crisis in the 1970’s, where an increase in the employment rate was supposed to be reached by inflation failed.

A different approach is offered by the neoclassical economists who expect recession to occur from an inadequate allocation of resources by companies, which in turn is caused by weak financial policy from central banks. Since governmental deficits possibilities are quite limited nowadays it seems much more useful to apply to the neoclassical considerations of economic growth. The model to be used is based on the “Theory of the Business Cycle” by von Mises and Hayek, therefore. This chapter is about to give an idea about monetary policy and its implications for different inheritance allocation, an increase in national Investment and therefore the desired economic growth.

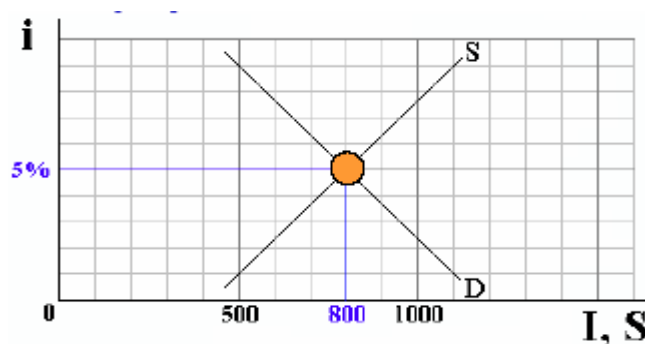
The efficiency of monetary policy is not quite clear. Central banks influence the supply side of money in an economy. Therefore it is not possible for them to increase consumption or other factors influencing GDP. As stated in the last chapter it is possible to increase consumption by different wealth allocation, although as it turned out it is not quite clear, which is the influence of such a reallocation on economic growth. Therefore I found out that it is necessary to increase national Investment to assure economic growth. Since national Investment is strictly depending on national Saving, which is about to decline and offsets the effect of increasing consumption, there must be another possibility to manipulate money supply to force economic growth. Central banks try to fight recessions and overheating economies to assure stable growth. Central banks often influence money supply and therefore investments into national economy. The most common way is the adjustment of the discount rate to influence money supply and therefore money demand, although it is not considered to be the most efficient way.

As stated before central banks are not in the position to influence consumption but they are in the position to influence investments which is pretty important for the intention of this paper which suggests economic growth in case of different inheritance allocation.

To avoid recessions is one of the main goals of central banks. During my work on this essay the German High Court decided that a change in inheritance legislation has to occur. Therefore I decided to have a look at the specific situation of an economy in recession. The German economical and socio-demographic situation seems quite fitting to observe the impact of consumption increase, investment decrease and monetary policy possibilities in such an economy. I will start this section with an introduction into capital-based macroeconomics.

### 3.4.1. Capital-based macroeconomics<sup>60</sup>

National Saving  $S$  and Investment  $I$  are closely related to each other. Both are named loanable funds. The main difference between the defined variables lies in their purpose. National Saving  $S$  defines the supply side of money in an economy, since national Investment  $I$  defines the demand side of money, which is borrowing by the business community. Both sides are governed by the rate of interest which is set by the central bank.

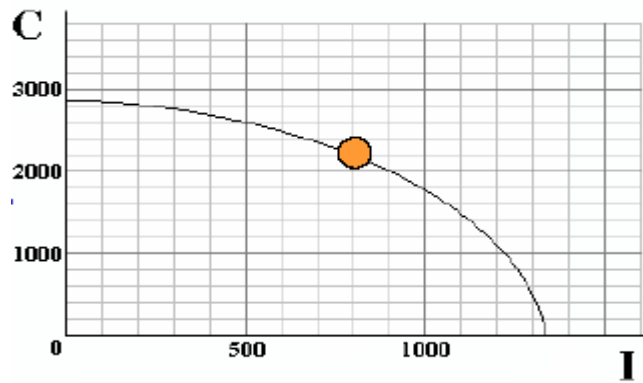


The market clearing interest rate which measures the price for borrowing lies at five percent and an amount of 800 in this picture.

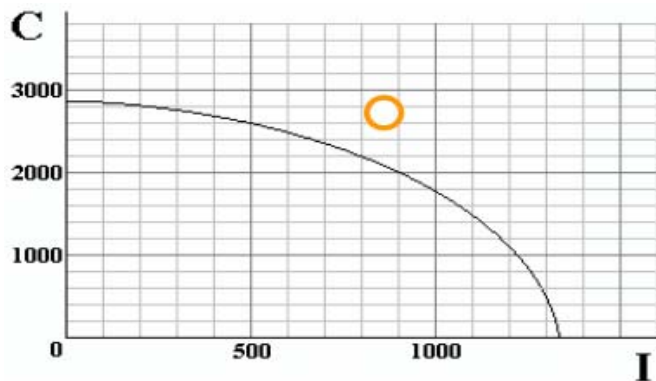
The relation between the alternative way of resource allocation of Consumption or Investment is defined as the **Production** Possibility Frontier (PPF)<sup>61</sup>.

<sup>60</sup> Theory of the whole chapter adopted from Roger W. Garrison, Time and Money, Routledge 2001

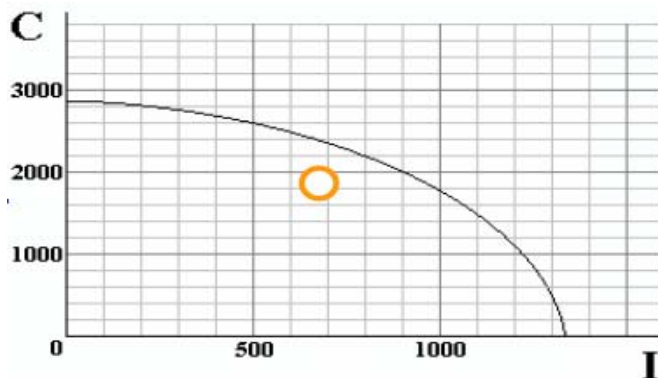
<sup>61</sup> The PPF is shaped as a curve since it describes the opportunity costs appearing if consumption is replaced by investment or vice versa. For nearly similar products one could assume the PPF to be a straight line.



The PPF shows the maximum level of output represented by possible combinations of Consumption C and Investment I. Any particular point on the line, defining a combination of C and I, represents a fully employed economy (with unemployment rate between 5 – 6%) and sustainable growth, which can be seen as an economical equilibrium. Any point above the PPF represents an overheated economy with an unemployment rate below 5%. Any point below represents an economy in recession with an unemployment rate above 6%. Both possibilities are disequilibrium points of course.

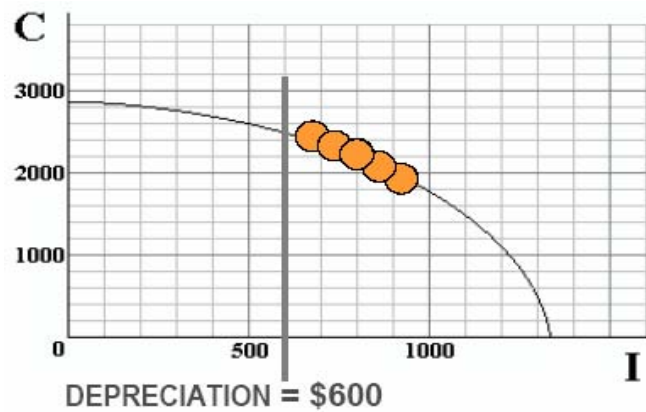


An overheated economy



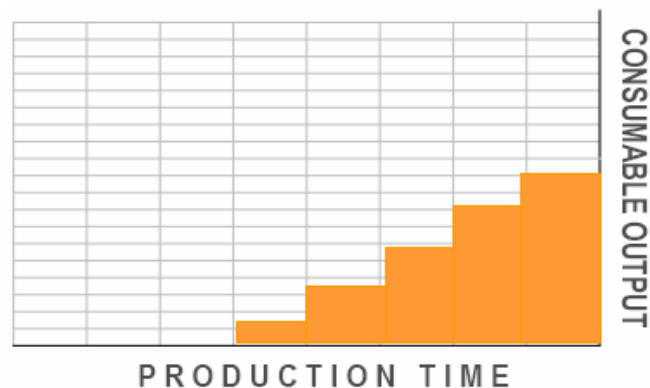
An economy in recession

The PPF (Production **Possibility** Frontier) implies that a movement along the frontier is possible in both directions:

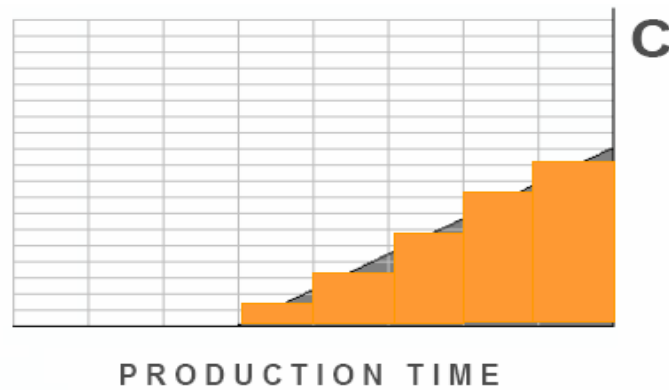


Investment in an economy signifies the replacement costs for assets caused by capital depreciation. Therefore it can be said that any Investment above capital depreciation is Net Investment. An increase in saving is therefore a clockwise movement along the PPF directed to Investment. Any Investment in the picture depicted is defined as Gross Investment. As long as Gross Investment is higher than capital depreciation economic growth occurs.

Capital based macroeconomics also observes the intertemporal allocation of available resources. Therefore it is time to introduce the Hayekian triangle:



Production time is measured along the horizontal axis and value of goods is measured at the vertical axis. The value at the end of the production time is the value of consumable output since only this value enters the GDP equation from the former chapter. Hayek imagines different stages of production, each with its own time and value dimension (the stages are not clearly defined but imagine it could be mining, refining, manufacturing, distributing and retailing in chronological order). The value dimension of each stage reflects the discounted value of the future consumable good and is the basic input value for the next stage. The characteristic of an ongoing production process is a simultaneous activity in all stages.



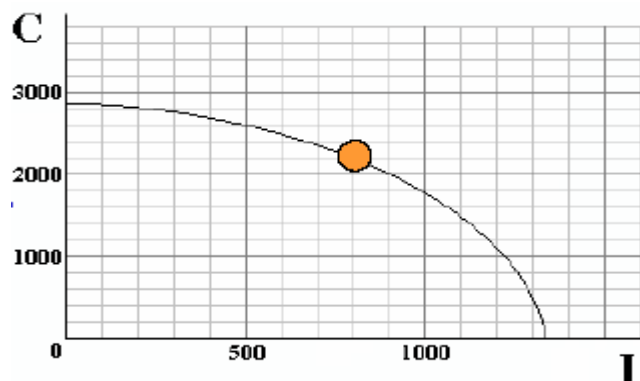
Garrison suggests a continuum of stages for analytical reasons, which is the so called Hayekian triangle (the grey line in the back) and symbolizes the movement of a good throughout the stages. The triangle symbolizes a continuous-input and point-output relation with value added from the further inputs and the time-movement towards the final good.

The Hayekian triangle has two mutual interpretations. First it depicts the continuous production process (continuous input). Second it depicts the completeness of stages at a given point in time (point-output), which suggests that resources can be allocated in both directions between stages and affects the temporal pattern of consumable goods.

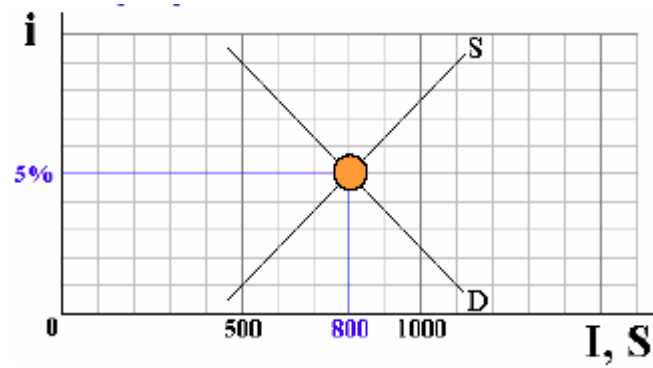
### 3.4.2. Forcing economic growth in an equilibrium economy

Now it is time to put the pieces together and show the development of economic growth. Consequently it is useful to show the impact of interest, Investment and Saving which is pretty important to explain economic growth.

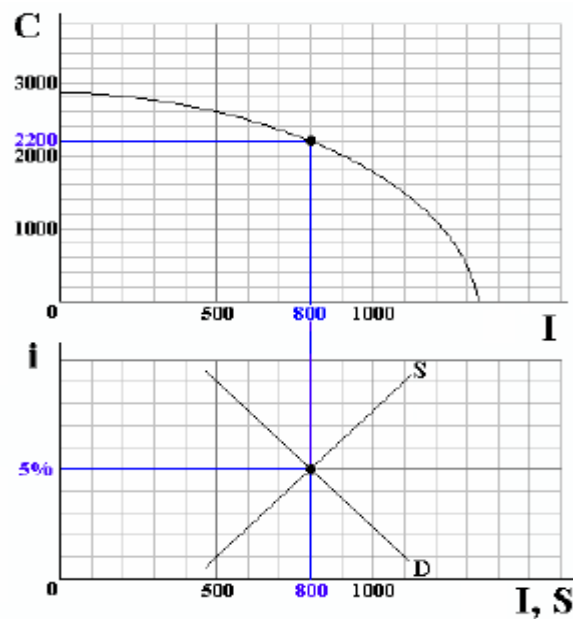
Let us go on with an economy in equilibrium:



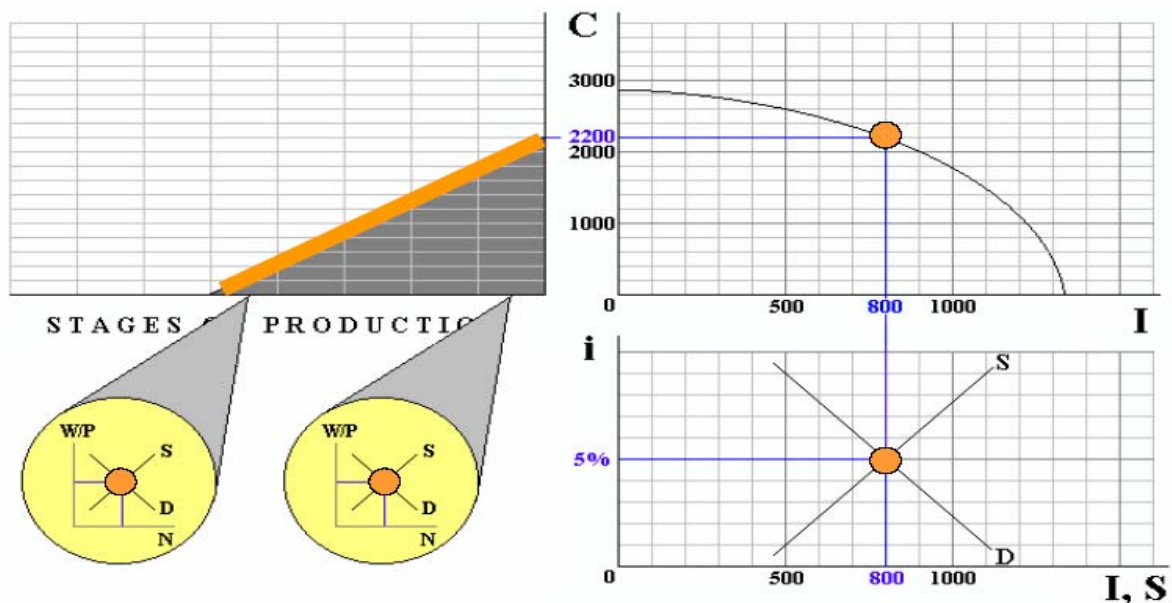
The corresponding interest rate is therefore:



The economy is committed to invest 800 with a market clearing rate of 5% at which Saving and Investment are in equilibrium, so that 2200 is left. This is allocated towards consumption:

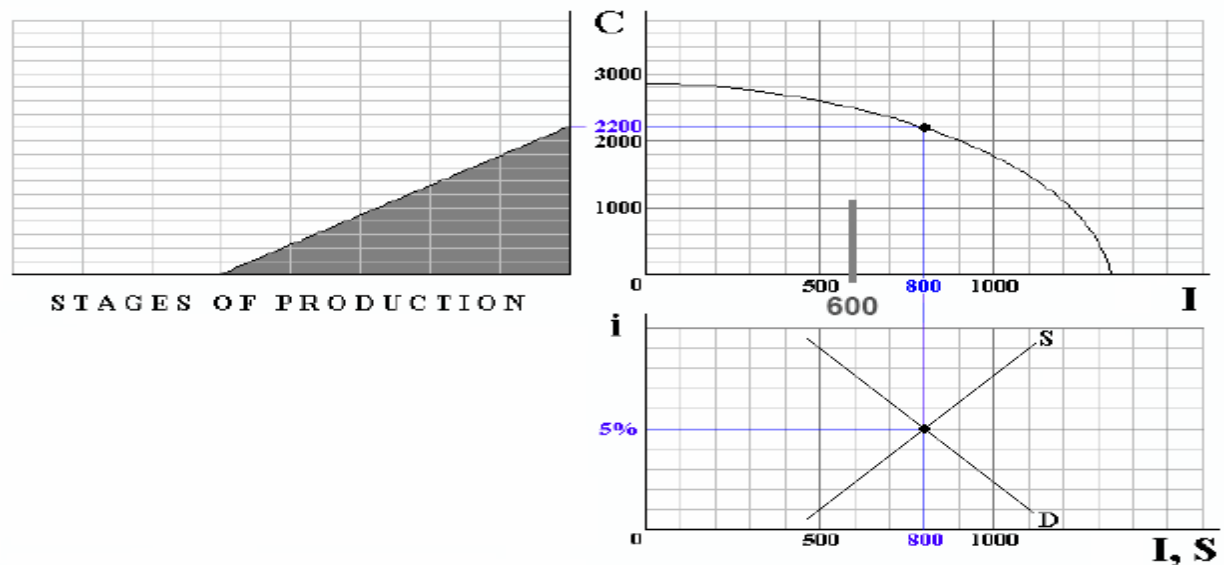


The hypotenuse of the Hayekian triangle reflects a rate of interest consistent with the rate in the loanable funds market, which governs the allocation of resources among the stages. It also reflects the level of current consumption as output of the economy's production process:

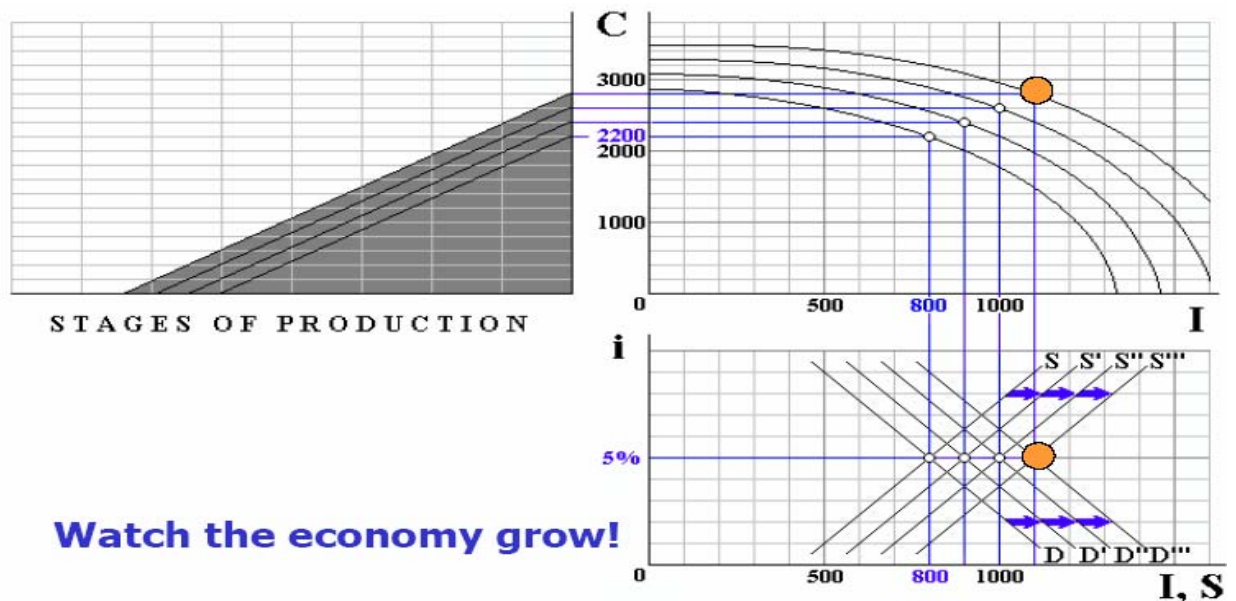


Hence an economy with initial full employment (unemployment rate between 5 – 6%) is defined as a combination of PPF, loanable funds market, Hayekian triangle and the stage specific labour market<sup>62</sup>.

If the replacement rate for capital depreciation accounts for 600, as said before, the economy experiences 200 Net Investment, which is distributed among the stages of production according to an unchanged rate of interest. That in turn increases productive capacity and therefore output, which shifts the PPF outward in accordance with a shift in the loanable funds market:



Therefore economic growth occurs with the following pattern:



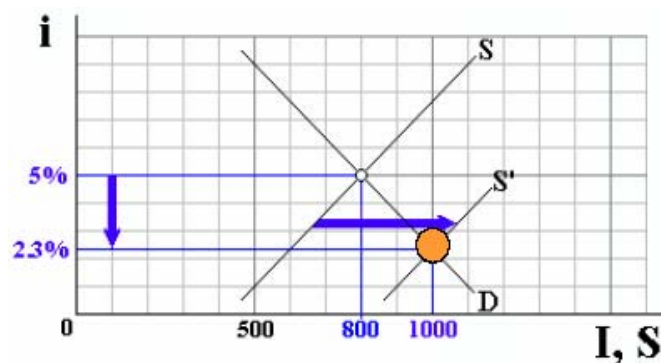
<sup>62</sup> The labour market is described by supply and demand graphics of labour depending on amount of workers available and wage paid. Supply and demand of workers is constant for any economy in equilibrium in any stage of production.

The economy experiences sustainable growth. The effect of increasing Investment over Consumption comes from the fact that increasing wealth and increasing income cause a relatively lower increase in consumption, which is also proven by Friedman in his consumption theory and which is also taken into account for a difference inheritance allocation. The Saving Propensities tend to increase with higher income and the Consumption Propensities tend to decrease with higher income, which is explained in the previous chapters and is based on observations.

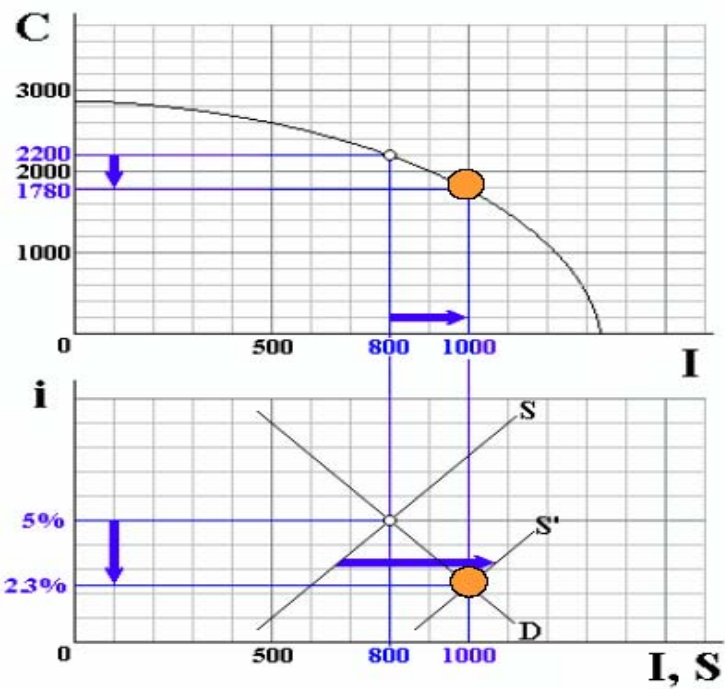
The conclusion that I can draw from this picture is not very good for the proposed reallocation of inheritances, since Investment and Saving force economic growth much more than current consumption in equilibrium. Nevertheless there is a scenario that will correspond to such a reallocation and which might be used at this particular point in time, since such a reallocation may be only a unique effect.

### 3.4.3. The influence of increased Saving on economic growth

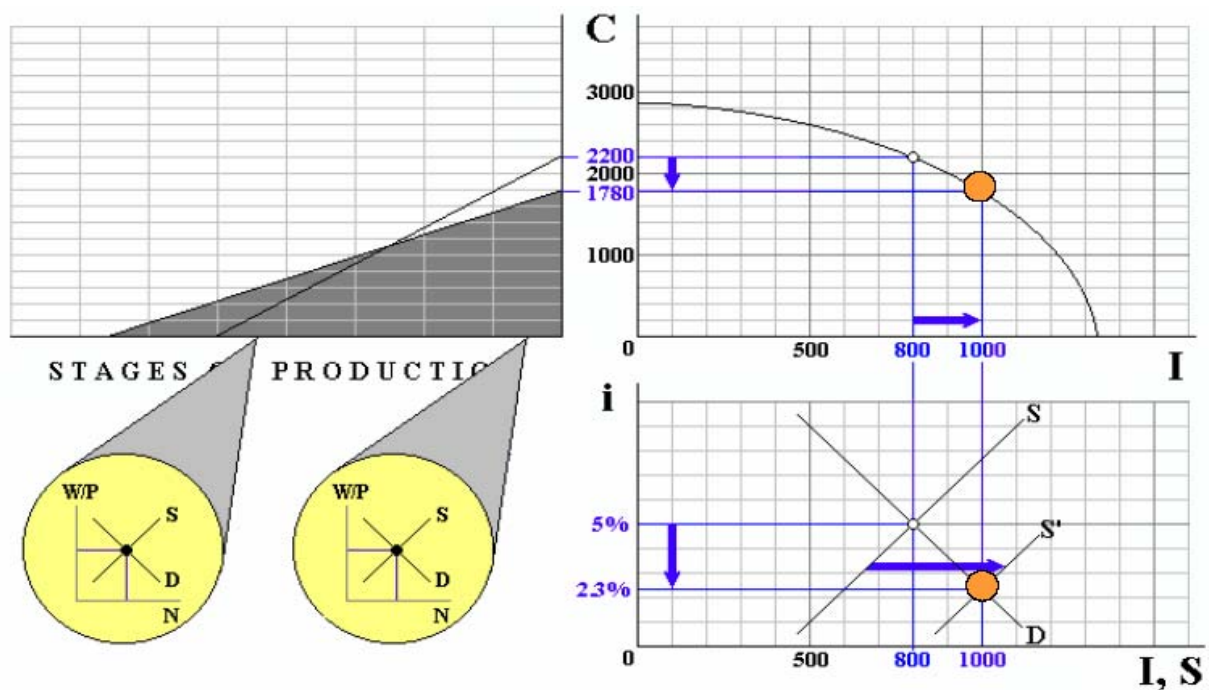
Suppose people decide to save more. The supply of loanable funds shifts to the right, the interest rate falls:



The business community which represents the demand side decides to invest more, since loanable funds are cheaper available. The new equilibrium in the loanable funds market lies now at 1000 and an interest rate of 2.3%, which affects the PPF since increased Saving means decreased Consumption:

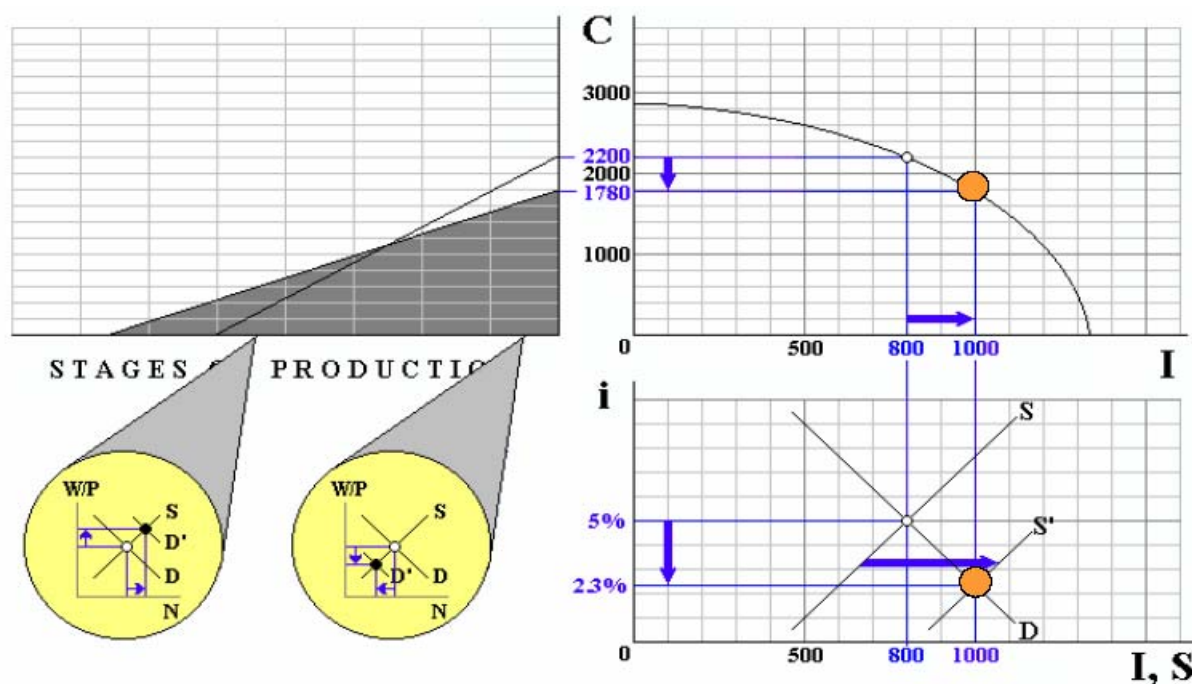


The new equilibrium on the PPF lies at 1780 for Consumption and 1000 for Saving or Investment, which means nothing more than a shift of resource allocation from the present to the future, since investments into late-stage production are not necessary, because of lower demand for goods or decreased consumption. This effect can be depicted by a shift in the Hayekian triangle:

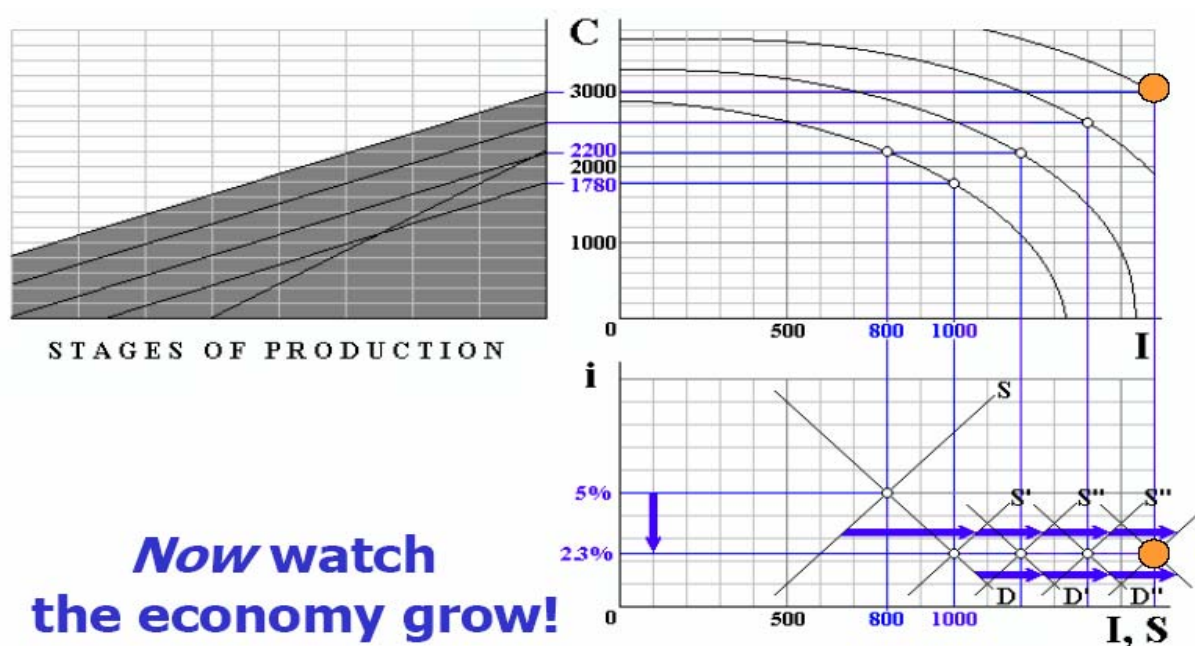


The requirements for labour and other factors of production is also shifted to earlier stages, since decreased Consumption does not request for so much output anymore and therefore for

fewer late-stage production. Labour force shifts towards fewer-stage production, because of wage differential caused by lower demand for late-stage workers:



The logic behind a higher economic growth because of increased Saving and decreased Consumption comes from the fact that people who save do save for something. That means lower consumption is only temporarily and adjusts after transition to a new growth path. The increased early-stage Investment allows to respond to future demand for Consumption in advance, which makes the economy grow faster:

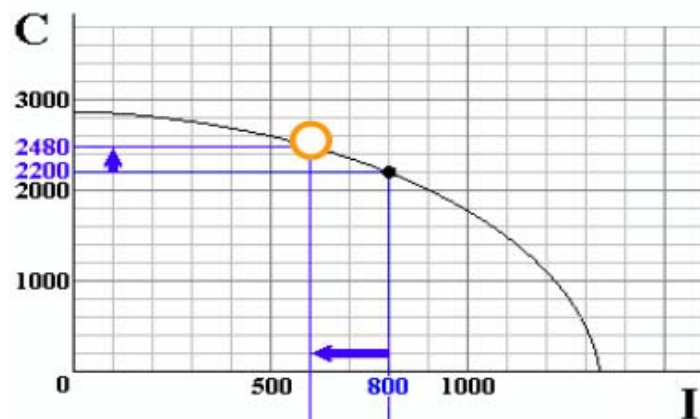


The consequence out of an increase in Saving for economic growth is a higher growth rate than it could be achieved by normal sustainable growth as stated in the previous chapter.

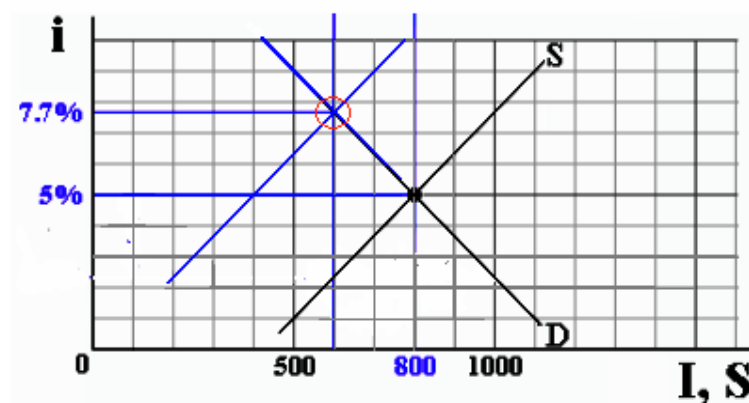
Nevertheless there exists a scenario that allows for a reallocation of inheritance and therefore for wealth to increase economic growth also. First consider an economy in equilibrium which allocates consumption as proposed by this paper:

### 3.4.4. The influence of increased consumption on economic growth

Assume consumption to increase, caused by a different wealth allocation as proposed:



The effect on the loanable funds market will be the following:

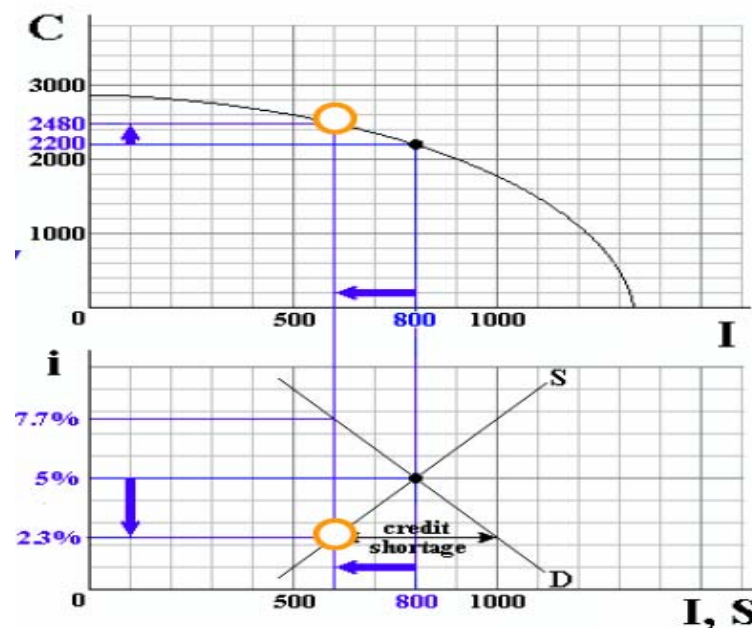


The problem arises from a credit shortage, which raises the equilibrium interest rate to 7.7% under the assumption of zero growth, which comes from the fact that the capital depreciation has to be covered, which is 600. The problem is that investments will not occur in such a state since demand for loanable funds is low for an interest rate of 7.7%. As stated above it is a fact that economical growth is influenced more positively from Investment and Saving than from Consumption. Therefore governments have got to different possibilities to increase Investment. They could force an act by law, which could be a limit of the interest rate for

loanable funds or they could let the central bank handle the situation with a manipulation of money supply. Let us first consider an adjustment of the interest rate by law.

### 3.4.5. The influence of interest adjustment to increase Investment

Consider an interest rate of 2.3% for loanable funds with increased consumption as proposed above:

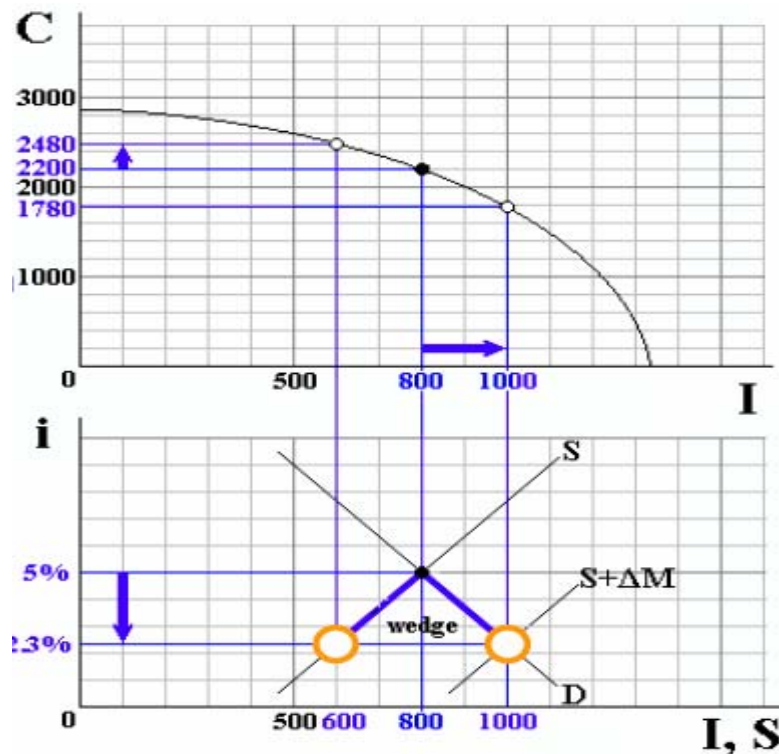


Increased consumption as proposed will shift the equilibrium on the PPF towards the consumption side and decrease Investment. To avoid such a situation a central bank may force Investment with lower interest to manipulate economic growth. The economy reacts with a credit shortage, since the amount of loanable funds supplied should be 1000 instead of 600 for such an interest rate. There is a gap between the yield for financial assets and real assets, which is the difference between 7.7% for real assets and 2.3% for financial assets held.

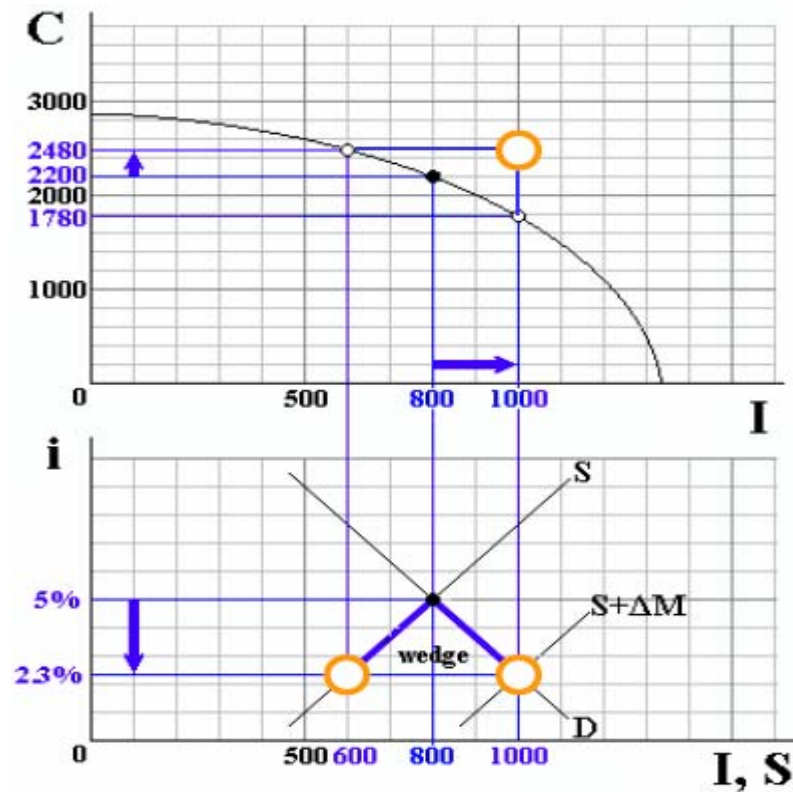
The effect of increased consumption and adjusted interest rate is a premium on producing goods for the present which shifts the resource allocation towards late-stage production. The value added at each stage reflects the yield on real assets. Therefore the Hayekian triangle shifts:



2.3% is forced to increase Investment. The problem occurring from a fixed interest rate is stated above. Therefore the central bank has got the possibility to avoid the credit shortage by increasing money supply:



The increased money supply covers the shortage in credits. The effect of increased consumption is a counter clockwise movement along the PPF, whereas the increased amount of money supplied results in the opposite movements by the investors. The result of this conflicting behaviour of investors and consumers shift the equilibrium outside the PPF and creates an artificial economic growth:



But cum granu salis there is no artificial growth achievable without any complications. Until now it seems to be possible to increase economic growth by increasing Consumption. The problem arises from sustainability. The economic growth that occurs from such an increase in money supply is only short term and shifts the problems occurring from a fixed interest rate into the future, since it is not the case that the interest rate pedals economic growth but the amount of Saving does.

The proof for unsustainable growth comes from the Hayekian triangle which experiences a break in the middle, since resource allocation is divided between early-stage and late-stage production. The early-stage investment comes from the fact that the interest rate is pretty low and credits are cheap so that long term investments are executed. The late-stage investments are forced by increased demand for consumption goods, so that the middle-stage production experiences a lack of investment:

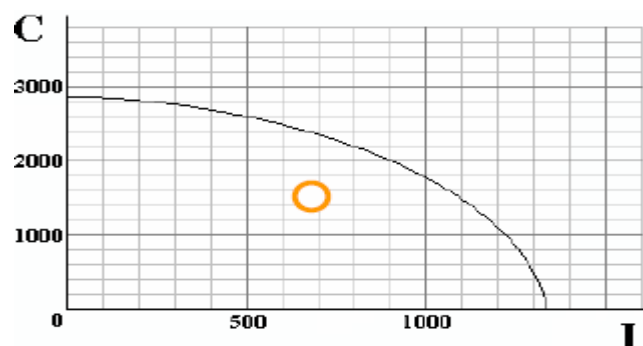


The consequence from the former analysis for the proposed reallocation of inheritance has to be seen as a disappointing result. Increasing Consumption in equilibrium is not a very useful tool for economic growth, since Investment force economic growth much more than Consumption. Therefore it is not useful to apply to such a reallocation in equilibrium. Anyway it might be possible to use such a model in case of an economy in recession.

### 3.4.7. Inheritance allocation for an economy in recession

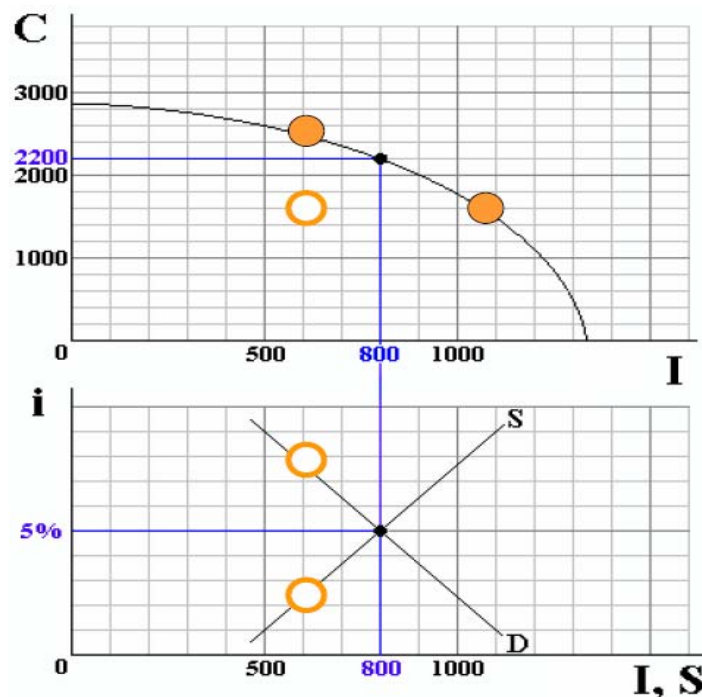
The impact of central banks is not quite clear in case of recession. Consider the recession in Japan for example. The Japanese central bank tried to motivate investors by decreasing the rate of interest until it reached a level of zero in 1991. Nevertheless the efficiency of such a decrease did not have any sufficient impact on the Japanese economy. That would not account for the allocation of inheritance, since it is not an intervention into the supply side of money. Much more it is a governmental intervention by a change in law as proposed, which influences the supply side of money only indirectly since it increases Consumption and lowers Investment. The problem which occurs for central banks is the impossibility to force consumption. Since the Hayekian triangle suggests that production and economic growth strictly depends on consumption. If there is no willing for consumption it is impossible to force economic growth, since a delay in production can not be achieved for infinity. Therefore it is unavoidable for the economy to turn into recession, since it is a matter of time when goods have to be consumed.

As stated above the purpose is to observe an economy in recession, therefore:



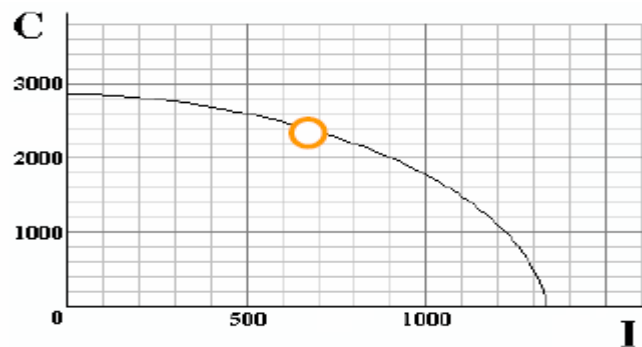
The upper graphic shows an economy in recession since it does not allocate Consumption and Investment efficiently. The economy produces fewer consumption goods and / or investment goods, which is described by the distance between the PPF and the point in the graphic that describes the economical situation. Therefore the unemployment rate lays above

6%, which is pretty the case for the German economy which offers an unemployment rate roundabout 10%. The money supply and money demand relation would look the following way:

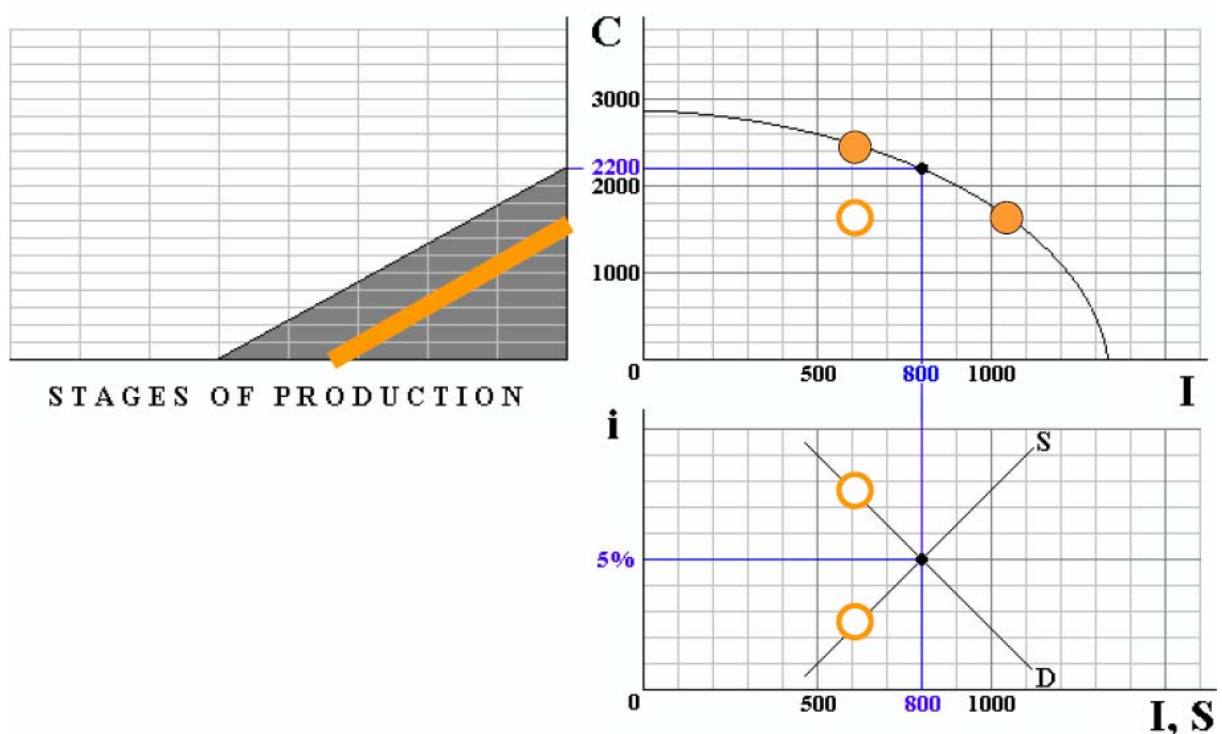


As one can see there is disequilibrium between supply and demand of loan-able funds and there is a gap in consumption. For any reason, which could come from distrust in economy which keeps savers to stay cash, there is a credit shortage to be observed and consumption could be much higher. Therefore there are two possibilities to reach equilibrium again. One solution could be an increase in money supply by the central bank since it would shift the supply curve rightwards and find a new equilibrium. The problems which occur from such a shift are stated in the upper section and the effect is quite insecure. Influencing the interest rate is not a good possibility since this may have caused the disequilibrium. The other possibility is a reallocation of savings, which would be inheritance towards consumption as proposed. The effect is more indirectly than directly. The shortage in loan-able funds does also mean a credit shortage for young individuals since those are not able to satisfy their consumption requirements as proposed by the MPC. Therefore a reallocation of inheritance may not reduce national Saving necessarily since cash reserves available are not hold by young individuals (as proposed by their MPC) but by middle and old individuals, which means that inheritance may occur in cash-terms also. Therefore a shift in consumption towards equilibrium should be possible without any negative influence on national Saving.

Reconsider the increasing consumption effect of an alternative inheritance allocation. Therefore the point shifts upwards:

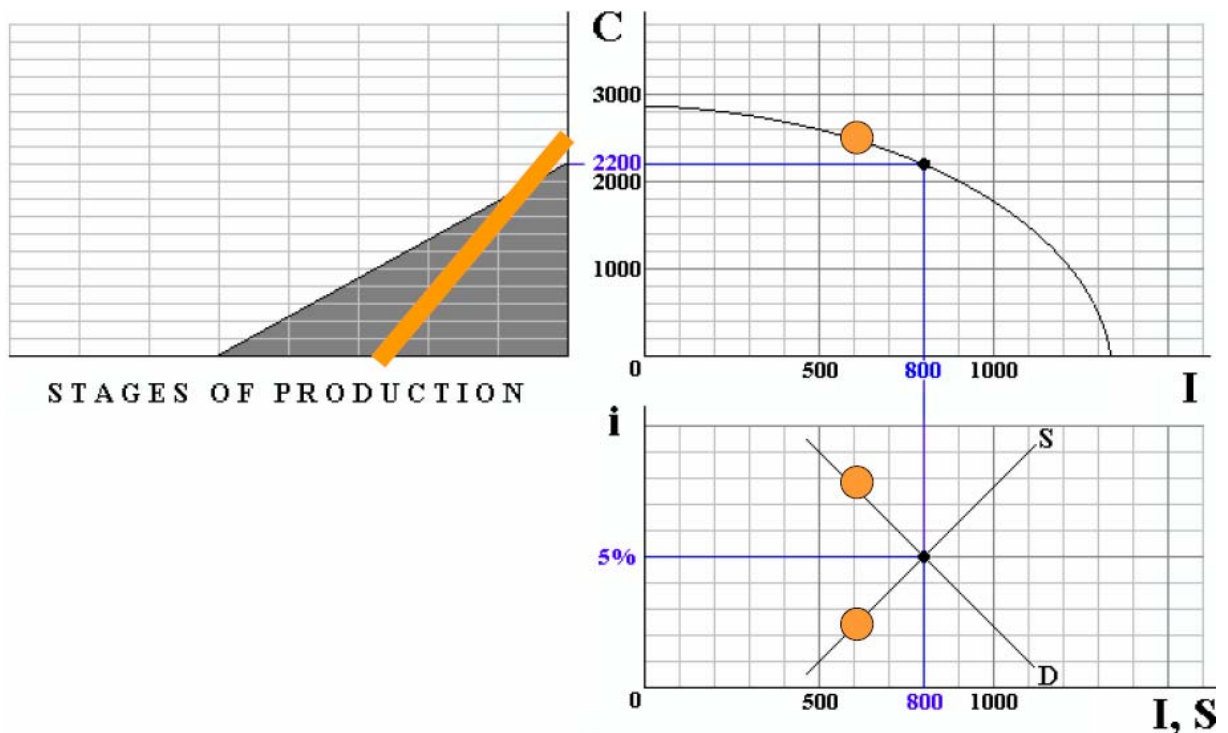


Let us consider the Hayekian Triangle:

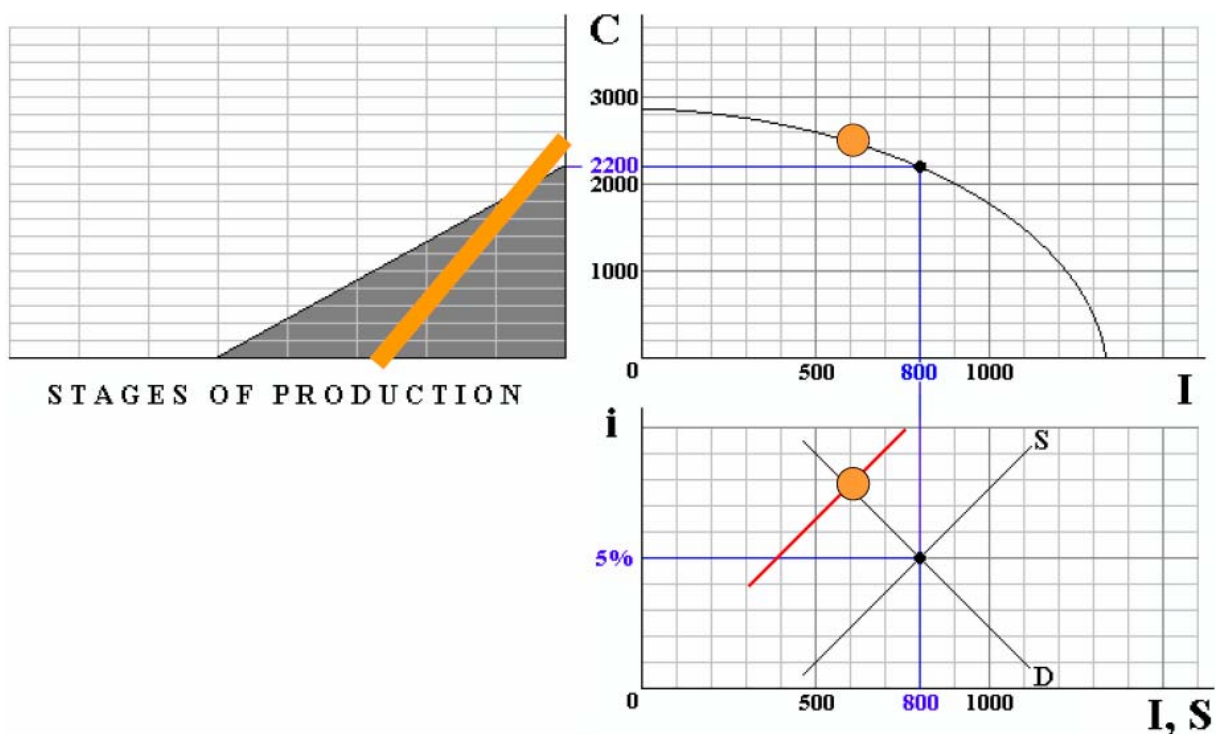


The Hayekian Triangle shows that there is more production of consumption goods possible. The economy does not allocate enough resources towards production. Late-stage and early-stage production are affected. Late-stage production is concerned since demand is not high enough to justify a higher resource allocation. Early-stage production is affected since the credit shortage does not offer any possibility to acquire resources for investment into future consumption goods. The unemployment rate is affected in all stages.

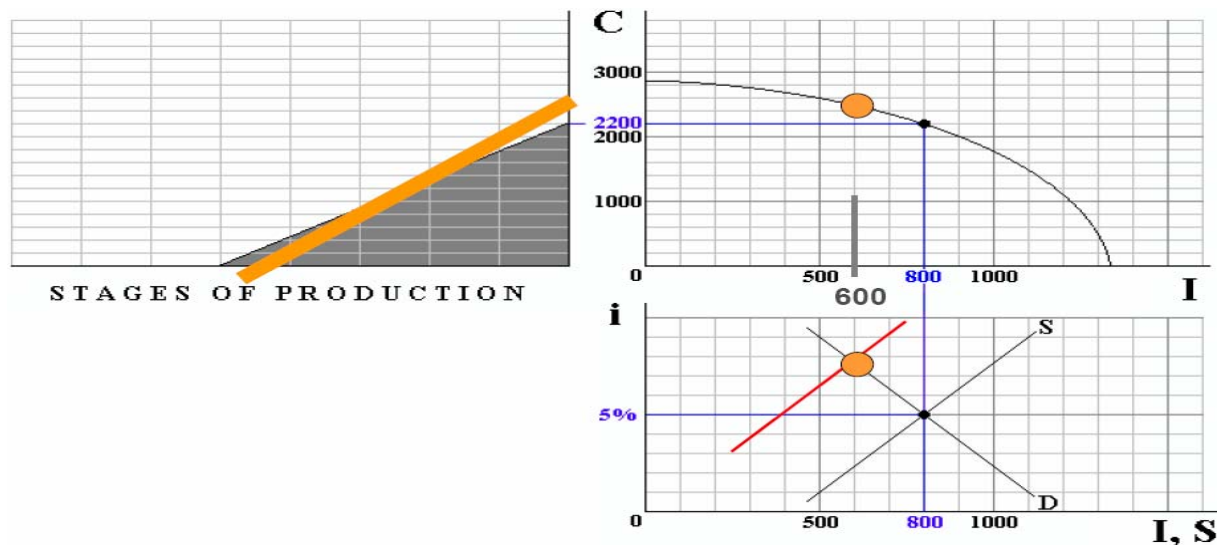
Now consider an increase in consumption:



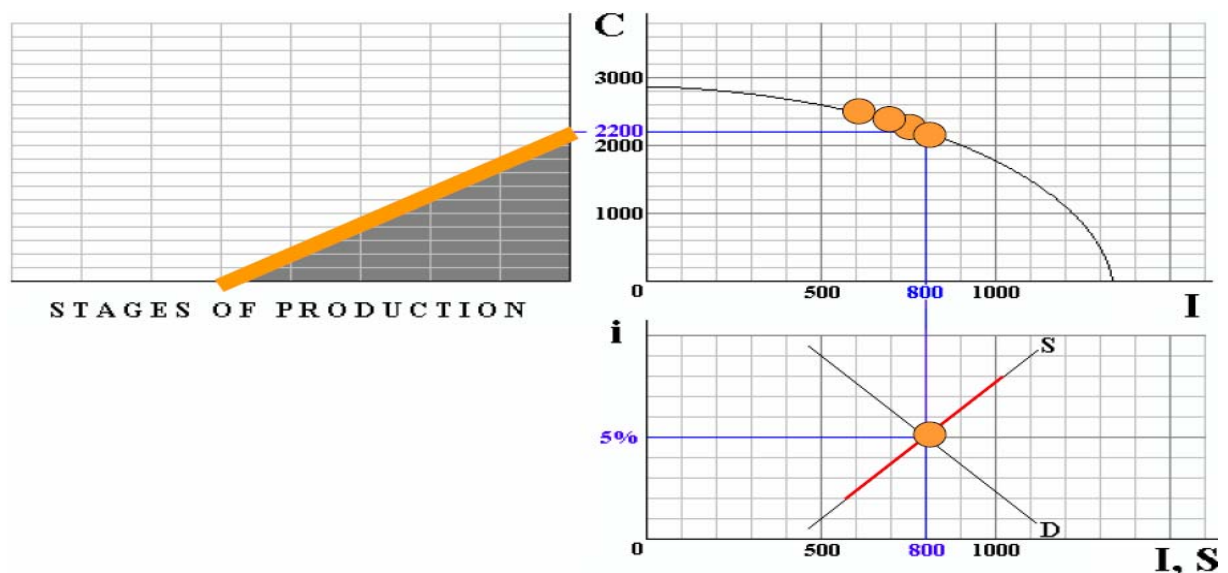
The Hayekian triangle shifts towards late-stage production since demand has to be satisfied and the unemployment rate in late-stage production turns to be lower, which increases either demand for consumption even more or national Saving since income raises. Although the interest rate for loan-able funds rises it is possible to achieve an equilibrium situation between Saving and Investment since the increase in Consumption is mainly financed from cash reserves:



Therefore it seems reasonable to assume that consumption needs are satisfied by the time which would rise national Saving and shift the equilibrium along the PPF in direction of Investment and Saving. An economy in equilibrium should give back trust into the economy and allow for an efficient resource allocation, which also allows for higher investments into early-stage production:



Since it takes time to reallocate the supply of loan-able funds by increasing national Saving it might well be the case that an economic growth will not occur and the shift along the PPF only adjusts the resource allocation towards early-stage production. The Hayekian triangle therefore shifts only step by step towards the earliest stage since national Saving is not available suddenly. As long as consumption is about to be satisfied during the same time the equilibrium shifts along the PPF and the Hayekian triangle becomes flatter and the interest rate reaches a level that makes it attractive for further investors to invest into the economy and shifts investments above the capital depreciation level, which ends up in economic growth. Finally it is possible to achieve an economic growth as it is proposed by Garrison:



As one can see it is possible for an economy in recession to shift its Consumption level upwards by a different allocation. In consequence real economic growth occurs, but economic growth still lies below the sustainability level, which would keep the economy in equilibrium. That is a phenomenon that can be observed in the German economy also. The growth rate of the German economy reached a level in 2004 which was only slightly higher than the inflation rate.

Regarding the German economy it could be said that there is a correctional effect possible that adjusts the economic development closer to the equilibrium. Although the previous chapter states that Investment rate and Saving rate are in equilibrium it does not have to be the case in an economy in recession, since there is a credit shortage which could be explained by high cash amounts held which are not accounted for national Saving and therefore not available to investors. Therefore it seems to be reasonable that an increase in Consumption does not need to reduce Investment necessarily. Nevertheless this is only possible if there are resources available that are not in use already. The consequence from such a reallocation is the advantage that problems occurring from monetary policy do not affect the economy. Therefore it might be useful to reallocate inheritances for an economy in recession to force Consumption and therefore late-stage production which might reduce the unemployment rate. But it has to be said that the assumption of inheritance being covered in national Saving is impossible to hold for a model application in recession.

### *3.5. Implications of the model*

The implications of the model stated above are not very obvious. A reallocation of wealth from the middle generation towards the young generation increases domestic consumption under my proposition. The positive effect of such a reallocation can not be observed for an economy in equilibrium. Much more it is the case that Investment forces economic growth more than Consumption. Therefore it is not useful to apply to such a reallocation in that case. Anyway it might well be the case that economic growth can be forced in case of recession, since negative effects occurring from monetary policy could be avoided. The problem which might occur is the assumption that all kind of inheritance is treated as if marketable securities which might not be the case in reality. Also it is not the case that the assumptions from the model made to account inheritance as national Saving holds in equilibrium. This was a

requirement to show the effect of a reallocation on GDP. For the application of the model in recession it is unavoidable to assume inheritance also to occur in cash terms since only this would explain the credit shortage in such an economy. Therefore it is not perfectly satisfying although it does not influence the consumption behaviour and the MPC levels. Anyway it does not change so much since the MPC level is an indirect measure of the wealth level and therefore of the distribution of cash reserves, which are held by the middle and the old generation since they offer the lowest MPC levels. Nevertheless it is well known that domestic consumption is a strong driver of economic growth, although it is not stronger than Investment, and should therefore be forced even though the current account balance may turn negative. The most important point which comes from the current account is not the fact of a decreased export-import relation, but investments into domestic economy which have to be higher than the capital depreciation rate, no matter where investments come from. Governmental spending and Governmental saving are also affected by such a reallocation since a practicable solution for application may be a change of the inheritance tax system which influences tax income and therefore governmental behaviour as well as consumption behaviour of individuals. Nevertheless if MPC levels are compared and MPC levels of young individuals are significantly higher than MPC levels of individuals belonging to the middle generation it is pretty plausible for this model to hold. It is a matter of fact that MPC levels differ and those MPC levels of young consumers are higher than MPC levels of “middle” consumers. Adjusting inheritance as proposed is therefore plausible also and should be taken into account by economies in recession.

Another point that is pretty sensible in this analysis is the assumption of uniformly distributed groups of consumers which implies that the middle generation may not exceed the young generation. That could influence the effect in a negative way since the amount of individuals belonging to the middle generation may be so much larger that the effect of different MPC levels cancels out and an allocation of inheritance in the proposed way may turn negative since overall consumption of the young group becomes smaller caused by a lower amount of young individuals relatively to the middle generation. Unfortunately this is a tendency that can be observed in most European economies so that an application of the model may be useless for those economies.

What so ever it is also a fact that many young people relate their ability of child raising with their income abilities so that a reallocation of inheritance may influence their willingness of

raising a child. Regrettably I do not see any evidence between raising a child and income since there are several other factors that influence such a decision so that I can not say that it will have a positive influence on birth rates. Nevertheless and finally I can say that such a reallocation might have a positive influence on economic growth for economies in recession since it shifts the economy closer to the PPF.

## **4. Suggestions for application**

### **4.1. Changing the inheritance tax system**

Most inheritance tax systems relate the amount of taxes paid for a bequest received by degree of relationship. That means that the closer a person is related towards the bequest giving individual the less are the taxes on bequest to be paid. That means that the middle generation which are the children of the senior generation does have to pay the least taxes. The young generation which is the grandchildren generation does have to pay higher taxes than their parents which are the middle generation in case of bequest. Therefore a bequest is given usually towards the middle generation instead as proposed towards the young generation. Inheritance tax system should therefore be adjusted in a way that the young generation is in favour towards the middle which implies a lower tax burden for young individuals. An efficient reallocation can only be achieved if the middle generation has to pay higher taxes than the young generation. The argument of tax free bequests being a good choice does not hold for this model since the allocation can not be forced by tax free bequests. Tax free bequests will not change the bequest giving individuals behaviour in favour of the young generation since they are tax free for all groups of individuals.

#### **a. Further ideas regarding inheritance tax**

I would like to state an idea that came up into my mind since I wrote this paper is mainly based on my understanding of social justice. In the beginning section of this paper I stated couple of socio-demographic theories and thoughts such as Süßmilch or Malthus. I mentioned those scientists because of the problematic decrease in birth rates in most European countries. Since I am from Germany I would like to refer to some demographic facts regarding birth

rates in Germany which can be taken to be true for most other European countries. It is a fact that Germany does have a negative birth to death rate relation. It is also a fact that the equilibrium between young and senior individuals shifts towards a higher proportion of senior individuals. The challenge that the German welfare state is faced is the financing of such disequilibrium. Therefore I suggest allocating tax income from inheritance tax towards a particular subject:

The education of children!

To apply such a model as proposed efficiently it is necessary to adjust the inheritance tax system as stated above. Therefore it seems reasonable to increase the tax burden for the middle generation. This will have two different effects:

1. An increase in tax income from childless individuals as bequest receivers
2. A possible incentive of raising a child

The idea for the first effect comes from a verdict made by the German Federal Constitutional Court which stated in 2000 that it is an injustice that childless individuals profit from the German pension system in the same way as individuals with children do. That is based on the pension system which intends to assure financing of active pensioners through working individuals that pay social insurance. Therefore the court decided that it can not be the case that some individuals do bury the burden of raising a child and paying social insurance simultaneously since childless individuals only pay social insurance. This inequality could be neutralized if childless individuals have to pay high taxes in case of bequest since they do not have any children that could profit from a tax system the way suggested above. Now I will relate the higher tax income towards the allocation. The tax income generated from childless individuals should be invested into the education of current children since economic growth may occur either from low costs or from productivity and it is a well known fact that higher education goes hand in hand with higher productivity. The effect would be social justice as requested by the Federal Constitutional Court.

The second point suggested, although I am aware that it is pretty vague, might be an incentive to raise a child. Particularly under the consideration that individuals tend to have an increasing lifespan it might be a good incentive for couples to decide for children since couples

considered are not that young any more in case of a bequest received. Therefore and under the consideration of increasing age for the first child an inheritance may well influence their decision since it is not that randomly anymore as it occurred to be in former times and may well be influenced by each individual's economic situation. What so ever the upper lines had been only some thoughts for further research. I am not quite sure about the particular effects but it might be interesting to start some research into that direction especially under the changing demographic relationships which can be observed throughout Europe.

## 5. Conclusion

The purpose of this paper is to show that a different wealth allocation between different generations may increase GDP and therefore economic growth. The idea for this paper was born against the background of an over-aging generation of bequest receivers in Switzerland. The Swiss authorities proposed that the generation of children of current seniors should be skipped in case of bequest in favour of the grandchildren generation. That is based on the fact that not even half of wealth bequeathed is allocated towards individuals below fifty years of age in average<sup>63</sup>. The problem that occurs from such a shift in wealth allocation towards aging individuals who enter senior and pension state close after the reception of bequest lies in an increasing saving rate and decreasing consumption since those individuals offer the lowest marginal propensity to consume and the highest marginal propensity to save. Especially under the consideration that those individuals concerned are saving a high amount of their income already, which lowers the necessity of wealth acquisition even more.

Therefore I suggested a reallocation of wealth from bequests towards the grandchildren generation to increase consumption and decrease national saving. To explain consumption behaviour and its dependent parameters I used Friedman's Permanent Income Hypothesis (PIH), which is the basis for consumption behaviour, which I compared. Friedman's main proposition states that consumption depends on the marginal propensity to consume (MPC) and the permanent income received by each individual over his lifetime. As a matter of fact he states that young individuals who are supposed to be the grandchildren tend to have a higher

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<sup>63</sup> This consideration was published in Switzerland by Basler Zeitung and can be discussed under <http://baz.ch/forum/list.cfm?forum=819>

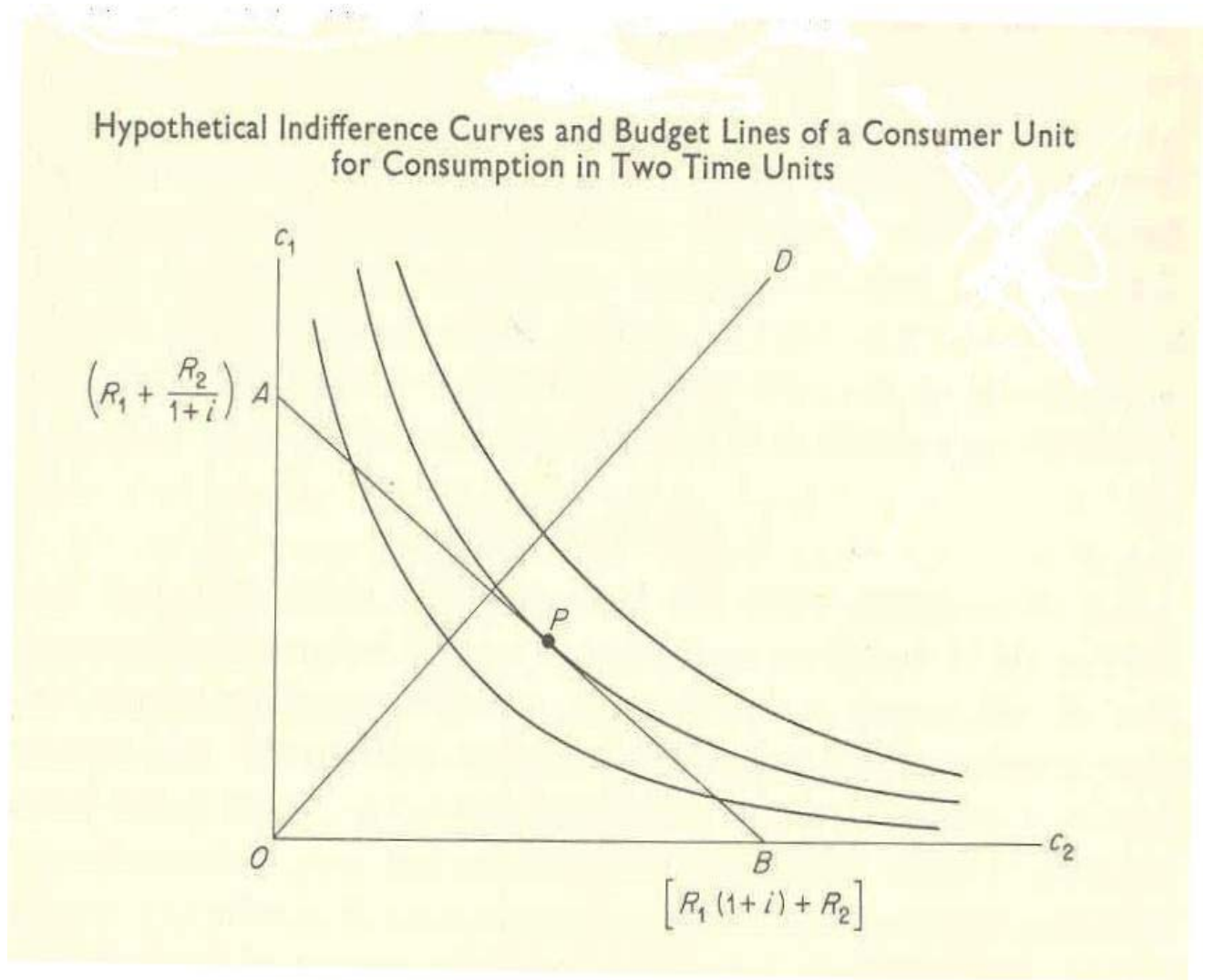
marginal propensity to consume and a lower permanent income than the middle generation, who is the children generation of the bequest giving generation. Therefore it seemed to be intuitively right to assume that a reallocation of wealth from the grandparental generation towards the grandchildren generation might increase overall national consumption. Using the PIH of Friedman showed that an increase in MPC or in permanent income for the young generation ends up in higher consumption for the observed group. Although I did not take absolute numbers into account, since it is not possible to receive reliable data of amounts of bequests made in several years, it can be said that the difference in MPC levels in between the generations observed times inheritance received is the amount that overall consumption will be increased. To show the influence of consumption on GDP I used the established theories of GDP models in an open economy. Therefore it could be observed that a decreasing saving rate which is the consequence of increasing consumption will cause lower investments. Inheritance was covered in savings under my assumptions. The decreased saving rate does have a negative influence on Investment in equilibrium and therefore on economic growth. Consequently I used the concept of balance of trade and balance of payments to show the advantage of higher domestic consumption towards lower domestic savings. The result is indifferent since it is not quite sure in economical literature if lower domestic savings and a trade balance deficit may have the same positive influence on an economy as it can be observed in case of increasing domestic savings and a trade balance surplus which means lower foreign investments into domestic economy. Nevertheless it is a matter of fact that there exist both types of economies which are pretty successful. Therefore I do not see any telling argument that would deny a reallocation of wealth towards young individuals with higher MPC. The only point that has to be considered is the assumption of equally distributed amounts of individuals in between the observed generations. Therefore it might become problematic if the amount of individuals belonging to the middle generation exceeds the amount of individuals belonging to the young generation. The positive effect of higher MPC levels of young individuals may turn negative since the amount of individuals with lower MPC levels is that high that overall consumption of the middle group is higher than overall consumption of the young group. This indifferent result comes from the assumption of economies in equilibrium. It seemed quite interesting to have a look on monetary policy and economic growth in disequilibrium. The result of the observation states the possibility of different wealth allocation in case of recession. It is possible to increase Consumption, without decreasing Investment since the production of investment goods and consumption goods is too low. This weak production can be raised by forcing demand for consumption

goods and consequently forcing production of consumption goods. The Investment rate depends strictly on money supply which is influenced by national Savings. The production of investment goods is too low because of credit shortage. Therefore it might be possible to increase consumption without decreasing Investment, since only Saving is affected directly by a consumption increase and it is possible to increase consumption out of cash reserves, since those are also mostly distributed between the middle and the senior generation and are shifted in case of inheritance from the old generation towards the young generation also. Therefore the young generation increases consumption from cash reserves received from the senior generation, since the young generation is affected directly by the credit shortage also and inheritance is required to satisfy consumption demanded. As a result it could be said, that a reallocation of inheritance for an economy in equilibrium does not make any sense, but a reallocation for an economy in recession should be forced since it does not have any observable negative effects such as those occurring from monetary policy.

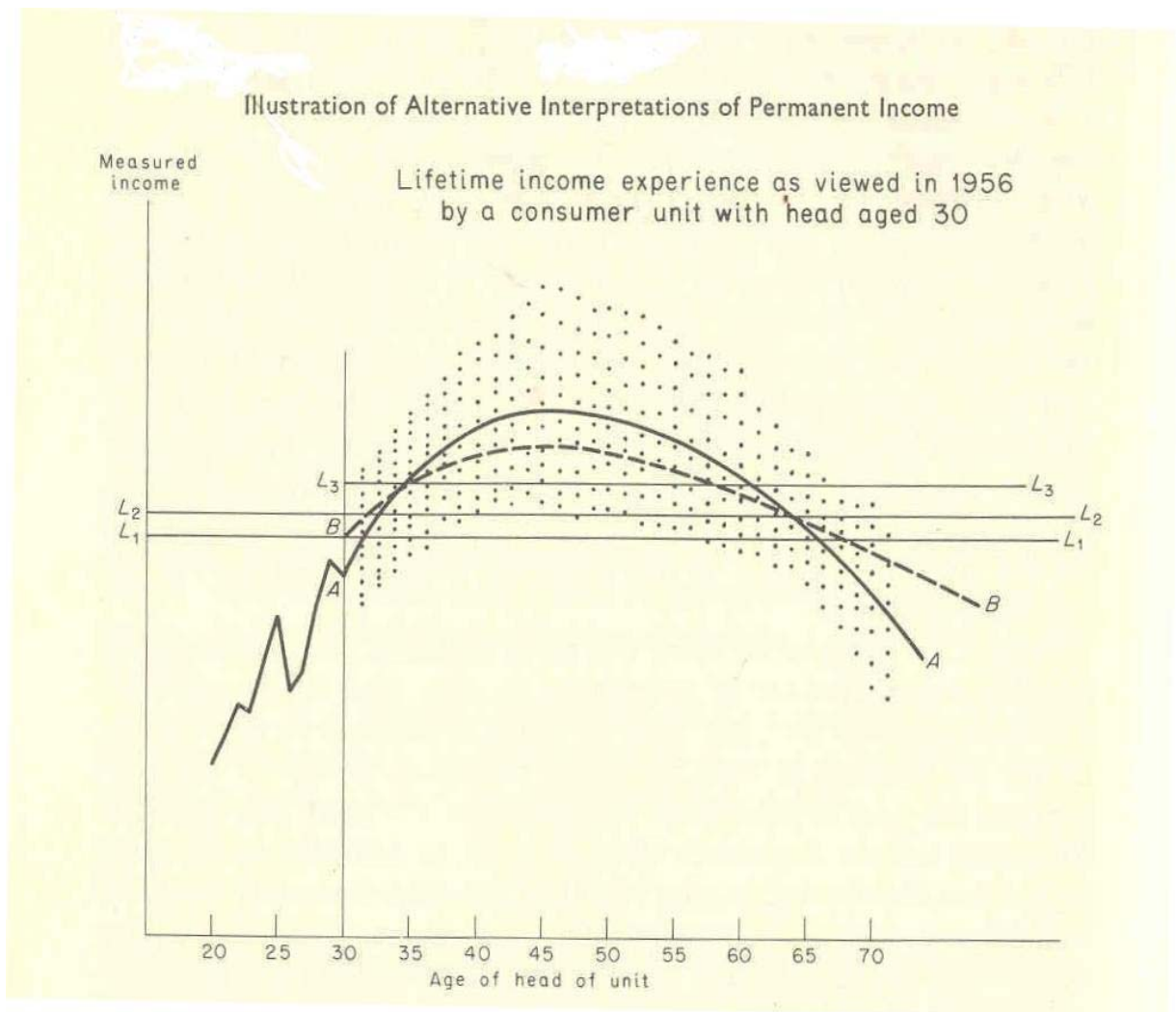
Finally I suggested that it might be interesting to observe the influence of higher permanent income of young individuals on their willingness to raise a child. It may be the case as Friedman already stated that children are seen as investments into the future which would be saving in such a model. Therefore the effect of increasing current consumption might cancel out in favour of higher future consumption. Whatsoever this is only an idea which might be interesting for future research particularly since the over-aging problem can not be solved by the model suggested in this paper. But as long as the purpose is to show that a reallocation of wealth might well increase consumption and GDP I think that it is quite an interesting thought of changing inheritance law in the way proposed.

## Graphics

footnote 23



source: Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 8



source: Milton Friedman, A theory of the consumption function, Princeton University Press, Princeton 1957, p. 24

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## **ANHANG:**

### Zusammenfassung der vorhergehenden Arbeit „Inheritance: An economical approach“

Thema der vorhergehenden Arbeit ist die Untersuchung einer möglichen Erhöhung des Bruttosozialprodukts einer Volkswirtschaft durch eine Anpassung der Erbschaftssteuer. Die Idee dazu basiert auf einer Untersuchung der Vermögensverteilung in der Schweiz bei der sich herausstellte, dass die Erbschaftssteuer in ihrer aktuellen Form eine überdurchschnittlich hohe Sparquote forciert. Grundsätzlich erfolgt eine Vererbung steuerlich begünstigt an den nächsten Verwandten, welcher in der Regel das Kind des Erblassers ist. Da das Durchschnittsalter der Erblasser permanent steigt ergibt sich im Erbfall, dass der Erbe ebenfalls überdurchschnittlich alt ist. Das führt soweit, dass der Erbe teilweise schon das Rentenalter erreicht hat oder zumindest ein eigenes Vermögen angespart hat, welches zu seinem Auskommen im Regelfall mehr als ausreichend ist. In der Konsequenz wird der Erbe das ihm vererbte Vermögen nicht konsumieren sondern sparen. Es ist weitläufig bekannt, dass nationaler Konsum eine Erhöhung des Bruttosozialprodukts nach sich zieht, welches eine der Grundvoraussetzungen für das obrige Modell darstellt.

Mit Hilfe der Friedmanschen Konsumtheorie, die das Konsumverhalten verschiedener Individuen beschreibt, wird ein Modell aufgestellt, dass eine Erhöhung des nationalen Konsums zum Ziel hat. Hierbei zeichnet sich ab, dass jüngere Individuen eine höhere Konsumneigung haben, während ältere Individuen eher zum Sparen tendieren. Der Grund liegt in der Gehaltsstruktur für Arbeitnehmer, die in der Regel bei einem geringen Einstiegsgehalt anfängt und im Laufe der Lebensarbeitszeit eine sukzessive Steigerung erfährt, die mit einem maximalen Einkommen zwischen 45 – 55 Jahren ihre Spitze erreicht. Wie auch Maslow in seiner Bedürfnispyramide schon erkannt hat, gibt es eine klare Hierarchie bezüglich Konsum, die sich nach dem jeweiligen sozialen Status richtet und sich damit indirekt mit dem jeweiligen Einkommen deckt. Jüngere Individuen sind damit einem höheren Konsumverlangen ausgesetzt, da sie sich erst einen Status aufbauen müssen, der längst von älteren Individuen erreicht wurde. Damit ergibt sich für ältere Individuen eine geringere Konsumneigung und ein Sparverhalten bezüglich ihrer Altersvorsorge, dass aus Gründen der Unsicherheit meist die Bedürfnisse des Alters übersteigt.

Die Idee dieser Arbeit liegt nun in der Anpassung der Erbschaftssteuer und einer Vermögensumverteilung von der erbenden mittleren Generation, also den Kindern des

Erblässers zugunsten der jungen Generation, sprich den Enkeln des Erblässers. Da die junge Generation eine höhere Konsumneigung hat, ergibt sich für die Volkswirtschaft eine höherer nationaler Konsum, der in den hohen Grundbedürfnissen der jungen Generation seinen Ursprung hat. Die Konsequenz daraus ist eine reduzierte Sparquote. Im Gleichgewicht einer Volkswirtschaft hat eine derartige Änderung der Vermögensverteilung keine sichtbaren Auswirkungen auf das Bruttosozialprodukt, da Konsum und Sparen miteinander korrelieren. Anders ist der Fall für eine Volkswirtschaft im Ungleichgewicht, welches der Regelfall für eine jede Volkswirtschaft ist. Als Grundlage für eine Volkswirtschaft im Ungleichgewicht diente die Theorie des „Hayekian Traingle“, welche das Wachstum einer Volkswirtschaft und monetäre Einflüsse beschreibt. Hierbei ergab sich, dass eine wachsende Volkswirtschaft mit maximaler Kapazitätenauslastung durch die Investitionsquote in größerem Masse beeinflusst wird als durch steigenden Konsum. Die Investitionsquote hängt jedoch direkt von der Sparquote ab, so dass eine Allokation des Vermögens zugunsten der jungen Generation eher hemmend auf das Wirtschaftswachstum einer derartigen Volkswirtschaft wirkt. Anders verhält es sich bei einer Ökonomie in Rezession. In diesem Fall ist die Ressourcenverteilung ineffizient, so dass eine Erhöhung der Investitionsquote oder eben des Konsums eine derartige Volkswirtschaft wieder ins Gleichgewicht bringen kann. Da eine Erhöhung der Investitionsquote nur durch Geldpolitik mit diversen negativen Auswirkungen auf Spar – und Konsumverhalten möglich ist, ergibt es sich, dass eine Reallokation von Vermögen sinnvoller ist um eine Volkswirtschaft aus der Rezession zu reissen. Die beschriebene Vermögensumverteilung verursacht nach dem hier entwickelten Modell eine Erhöhung des nationalen Konsums und somit eine Verschiebung der volkswirtschaftlichen Gesamtlage aus der Rezession in Richtung eines volkswirtschaftlichen Gleichgewichts. Schlussendlich kann man sagen, dass eine Erhöhung des nationalen Konsums zur Erhöhung des Bruttosozialprodukts für eine Volkswirtschaft in Rezession mit Hilfe einer Vermögensumverteilung möglich ist, ohne die negativen Auswirkungen geldpolitischer Maßnahmen in Kauf nehmen zu müssen.

## **Eidesstattliche Erklärung**

Ich erkläre hiermit an Eides Statt, dass ich die vorliegende Arbeit selbständig und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe.

Die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Die Arbeit wurde bisher in gleicher oder ähnlicher Form keiner anderen Prüfungsbehörde vorgelegt und auch noch nicht veröffentlicht.

Wien, am 19.06.2007

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