



universität  
wien

# MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

**„ The Measurement of Inflation: CPI “**

Verfasst von / submitted by

Hongjie Wang Bakk.rer.soc.oec.

angestrebter akademischer Grad / in partial  
fulfilment of the requirements for the degree of  
Master of Science (MSc)

Wien,2016 / Vienna, 2016

Studienkennzahl lt. Studienblatt /  
degree programme code as it appears on  
the student record sheet:

A 066915

Studienrichtung lt. Studienblatt /  
degree programme as it appears on  
the student record sheet:

MasterstudiumBetriebswirtschaft

Betreut von / Supervisor:

Univ.Prof. Dr. Jörg Finsinger

# Zusammenfassung

Das Phänomen der Inflation ist typisch für jede Marktwirtschaft in unterschiedlichem Maße, unabhängig davon, wie entwickelt ein Land ist. Praktische Relevanz des Inflationsproblems ist ändern auf der ganzen Welt durch Zahlen der jährlichen Verbraucherpreise bestätigt. Das heißt, die Regierungen müssen immer Veränderungen genau zu überwachen und schnell reagieren, um mögliche entsprechend scharfen wirtschaftlichen, sozialen und politischen Auswirkungen zu mildern.

Der Verbraucherpreisindex ist einer der am häufigsten verwendeten Preisindizes, die eine wichtige Rolle in der Wirtschaft spielt, da es sich um ein Grundwert ist, Sozialleistungen und andere Zahlungen dienen erneute Überprüfung der Löhne.

Diese These wird auf Verbraucherpreisindex (CPI) als eine der wichtigsten Methoden der Inflationmessung konzentriert. Das Ziel ist, CPI, seine wirtschaftliche Rolle zu definieren und verschiedene Prinzipien festlegen und nähert sich seiner Berechnung und Anwendung.

Die Arbeit ist folgendermaßen aufgebaut: Kapitel 1 ist Einleitung. In Kapitel 2 werden die wichtigsten und bezüglichen Definitionen von Inflation, Typen von Inflation, Ursachen usw. erklärt und diskutiert. In das dritte Kapitel wird die Theorien über Inflation kurz beschrieben. Im vierten Kapitel wird besonders auf den CPI dargestellt. Davon wird es auf zwei wichtigen Teilen (allgemeine System der Indizes für die Messung der Inflation und Verbraucherpreisindex (CPI)) aufgeteilt.

Für die Frage, wie die Inflation auf die Welt (Deutschland, EU, etc.) besonders durch CPI bemessen und kontrolliert, ist wird in Kapitel 5 diskutiert.

In Kapitel 6 wird es am Ende durch obigen Kapitels zusammengefasst, welchen Trends von Inflation es gibt und wie CPI a Rolle spielt.

## **Eidesstattliche Erklärung**

Ich erkläre hiermit an Eides statt, dass ich die vorliegende Masterarbeit selbständig und ohne fremde Hilfe verfasst, keine anderen als die angegebenen Quellen und Hilfsmittel benutzt habe. Die aus den fremden Quellen übernommenen Gedanken habe ich deutlich als solche kenntlich gemacht

## Contents

Zusammenfassung.....	
Eidesstattliche Erklärung.....	
1.Introduction.....	5
2. Definition.....	6
2.1 Definitions of inflation .....	6
2.2 Types of inflation .....	9
2.2.1 Basing on criteria of rising prices speed: .....	9
2.2.2 According to criteria of Government's reaction or control .....	11
2.2.3 Stagflation.....	13
2.2.4 Deflation .....	13
2.3 Reasons and appropriate kinds of inflation .....	15
2.3.1 Demand-pull inflation .....	15
2.3.2 Cost-push inflation .....	16
2.3.3 Structural inflation .....	19
2.4 Social and economic consequences .....	20
2.4.1 Economic consequences:.....	20
2.4.2 Social consequences.....	20
2.5 Measures against inflation .....	21
2.5.1 Counter-cyclical policy.....	21
2.5.2 Anti-inflationary policy.....	21
2.5.3 Monetary policy .....	23
2.6 Policy of indexation.....	23
3. Theories about inflation.....	25
3.1 .....	25
3.2 Ideas of monetarism regarding inflation .....	27

4. CPI as one of the main inflation measurement indexes .....	288
4.1 General system of indexes for inflation measurement.....	288
4.1.1 Rate of inflation.....	299
4.1.2 GDP deflator .....	299
4.1.3 PPI.....	30
4.1.4 Inflation expectations .....	31
4.2. CPI .....	31
4.2.1 Definition and application of CPI.....	32
4.2.2 Purpose of CPI application .....	33
4.2.3 Differences between CPI and other indexes for inflation measurement. ....	33
4.2.4 Calculation of CPI .....	34
4.2.4.1 Steps of preparation for the CPI calculations: defining consumer basket and methods of information collection. ....	34
4.2.4.2 The elementary expenditure aggregates .....	40
4.2.4.3 Calculating the higher-level indices.....	44
5. Inflation in the world: development and regulations .....	45
5.1 Measuring inflation in Germany.....	45
5.2 Inflation monitoring in EU .....	47
5.3 World experience of the inflation measurement .....	50
5.3.1 The US experience .....	51
5.3.2 Inflation measurement in China .....	56
6. Conclusion .....	57
References.....	59
List of Figures and Tab.....	64
Appendix I.....	65



# 1 Introduction

The phenomenon of inflation is typical to any market economy in varying degrees, regardless of how developed a country is. Inflation process stands out with difficulty of control, capability to a dangerous expanded self-reproduction and adverse socio-economic effects associated with inefficient redistribution of wealth and income of the country. Practical relevance of the inflation problem is confirmed by figures of annual consumer prices change around the world. In the recent decade there were a few cases of sharp inflectional up-trends (2002-2009; 2009-2011).<sup>1</sup> The abrupt changes of consumer prices rate directions reflect general instability and control difficulty over inflation processes. This means, governments always need to supervise changes accurately and react quickly in order to mitigate possible correspondingly sharp economic, social and political effects. It is supposed in modern economic and social literature that inflation is one of the most important issues in the modern economy, whose successful solution is directly linked to prosperity in a country and in the whole world.

Effective social and economic development, governance and regulation depend on well-timed receipt and analysis of comprehensive, evidence-based official statistics on social, economic, demographic, environmental and other social events in the country. Thus, development of appropriate indicators system and well-grounded mythology for their calculation can be crucial for the general success of governmental measures.

Consumer price index is one of the most frequently used price indices, which plays an important role in economy, since it is a basic value serving reconsideration of wages, social benefits and other payments.

The important role of consumer price index implies a need to create single economic calculation methodology of this indicator, which would reflect degree of price level change regarding complex system of factors. The counting technique can play decisive role for accuracy of economic conclusions and taking of further appropriate measures.

This thesis is focused on consumer price index (CPI) as one of the main methods of inflation measurement. The goal is to define CPI, its economic role and specify different

---

<sup>1</sup>The World Bank: Inflation, consumer prices (annual %), 2015, online

principles and approaches to its calculation and application.

In order to achieve the goal aforesaid it is necessary to perform the following tasks:

- To explain the essence of inflation giving different approaches to its definition and to demonstrate Fisher's model explaining mechanism of inflation;
- To describe different types of inflation basing on different criterions, including pace of its development, type of regulation by government and reasons of emerge.
- To explain the main theories describing inflation phenomenon
- To name common social and economic consequences of inflation
- To specify possible measures against inflation
- To show general system of inflation measurement
- To regard experience of inflation handling and measurement, specifying its features in Germany, European Union and around the world.

Performing the main goal of this thesis and the tasks mentioned is based on scientific literature, including theoretical macroeconomic books, modern research articles, studies and guidelines for indexes calculation given by international organizations and particular governments.

## **2. Definition**

### **2.1 Definitions of inflation**

Inflation is usually defined using two main approaches. According to the first one it is a rise of general price level in economy. Following the second approach, it is a reduction in purchasing power of a national currency. So, inflation is a process determined by interaction of two factors - pricing and monetary ones.<sup>2</sup>

Examples of the monetary definition approaches are:

“Inflation is the issue of too much money” (Prof. Hawtrey)<sup>3</sup>

“There is too much currency in relation to the physical volume of business” (Prof. Kemmerer)<sup>4</sup>

Examples of the pricing definition approaches are:

---

<sup>2</sup>Mishra R.: Industrial Economics and Management Principles, Laxmi publications, New Delhi, Boston, 2008, p. 187

<sup>3</sup>Kennedy M.M.J.: Macroeconomic Theory, PHI Learning, New Delhi, 2011, p. 229

<sup>4</sup>Kennedy M.M.J.: Macroeconomic Theory, PHI Learning, New Delhi, 2011, p. 229



“Inflation is a general and continuing increase in prices. This does not imply that all prices are increasing, some prices may even be falling, the general trend must be upward”(M.R. Edgmand)<sup>5</sup>

“Inflation is a self-perpetuating and irreversible upward movement of prices caused by excess of demand over capacity to supply” (E. Lames)<sup>6</sup>

In fact, as an economic phenomenon, inflation emerged in the XX century, although periods of significant price increases took place in earlier periods, for example, in times of war.

The term "inflation" emerged due to the massive transfer of national monetary systems to irredeemable paper money. <sup>7</sup>

Initially, the economic meaning of inflation was a phenomenon of paper money redundancy and its devaluation in this connection. In its turn, devaluation of money leads to increase in commodity prices.

In today's economy, inflation occurs as consequence of complex of factors, confirming that inflation is not a purely monetary phenomenon, but an economic, social and political phenomenon as well. <sup>8</sup>

Inflation also depends on social psychology and public sentiment. In this regard, the term "inflation expectations" is important to be mentioned.

The complexity of defining and measuring inflation is a huge variety of goods, which have their price, and, in general, should be taken into account when measuring inflation. These goods are tangible goods, services, resources, including labor, public goods, intangible assets like licenses, brands, securities etc.

Inflation has become permanent feature of the market economy. It was promoted by a number of global factors:

---

<sup>5</sup>Mishra R.: Industrial Economics and Management Principles, Laxmi publications, New Delhi, Boston, 2008, p. 187

<sup>6</sup>Mishra R.: Industrial Economics and Management Principles, Laxmi publications, New Delhi, Boston, 2008, p. 187

<sup>7</sup>Bandyopadhyay T., Ghatak S.: Current Issues in Monetary Economics, Barnes & Noble Books, Maryland. 1990, p. 142-143

<sup>8</sup>Kennedy M.M.J.: Macroeconomic Theory, PHI Learning, New Delhi, 2011, p. 230

- A rapid growth of commodity production
- Increasing complexity of production structure;
- price and social transfers systems become universal;
- Pricing practices have changed by influence of monopolistic enterprises,
- Number of fields with price competition was decreased.<sup>9</sup>

Increased production efficiency, which has been a trend for more than the last century, appears usually not in form of lower prices, but in increase in revenue and profits of production process participants

The essence of inflation is determined by violation of money circulation law (the Fisher's model), when money supply is higher than its effective level.

Money supply or currency circulation is the movement of money carrying out their functions in cash and non-cash forms in connection with sale of goods, payment of services provided and making various payments (payment of wages, payment of taxes, lending, covering credits, interest payments and other financial transactions).<sup>10</sup>

The scope of money supply includes:

1. Non-cash-cash transfer, conducted through entries in accounts at banks and other financial intermediaries, reflecting payments.

2. In-cash circulation in form of banknotes

Cash and non-cash money circulations have their specific features, which are:

- Cash and non-cash money have different circulation. Cash money gets circulation many times and drop out of it when it is physically battered.
- Non-cash money circulates once in form of write-offs from one account to another.
- Cash and non-cash turnovers have different participants. Cash circulation is always associated with the population and all other economy participants like enterprises. Non-cash turnover always require participation of banks and non-bank financial and credit institutions.
- Cash and non-cash have different functions. Cash performs payment function, circulation, saving and storage functions. Non-cash carry out payment and accumulation (in form of balance in accounts) functions.

---

<sup>9</sup>Bandyopadhyay T., Ghatak S.: Current Issues in Monetary Economics, Barnes & Noble Books, Maryland. 1990, p. 142-143

<sup>10</sup>Hall R. E., Lieberman M.: Macroeconomics: Principles and Applications, Cengage learning, 2009, p.354

- Cashless payments are easier to control.<sup>11</sup>

The law of money supply answers the question, how much money should be in circulation, in order to carry out its functions.

The money supply law defines of money needed for it to carry out its duties as a means of circulation and means of payment.

The required amount of money needed for performance of the money functions as a means of exchange depends on three factors:

- Number of sold in the market goods and services (with direct correlation);
- Level of prices for goods and tariffs (with direct correlation);
- Velocity of money (with reverse link).<sup>12</sup>

All factors are determined by production conditions. The more developed production, the bigger volume of goods and services sold in the market. The higher level of labor productivity, the lower cost of goods and services and prices.

The law of money supply or the Fisher's model can be expressed using the following formula:

$$V = \frac{P \times T}{M}$$

, where V means velocity, P stands for average prices level, T symbolizes volume of transactions and M means supply of money.<sup>13</sup>

As it is shown by world practice, inflation may be a well-controlled and regulated process through establishment of an appropriate functional economic system. Examples of the regulatory mechanisms are reviewed in the fifth section of this thesis.

## **2.2 Types of inflation**

### **2.2.1 Basing on criteria of rising prices speed:**

#### **Creeping inflation**

Creeping inflation is characterized with an increase in prices by no more than 3-5% per year. Such a low rate of inflation is observed in many developed countries. Its main

---

<sup>11</sup>Hall R. E., Lieberman M.: Macroeconomics: Principles and Applications, Cengage learning, 2009, p.354-355

<sup>12</sup>Jain C.L., Tomic I.M.: Essentials of Monetary and Fiscal Economics, published by GPC, New York, 1995, p. 75-76

<sup>13</sup>Auerbach A.J., Kotlikoff L.J.: Macroeconomics: An Integrated Approach, Second edition, 1998, p. 177-178

features are:

- Creeping inflation is not accompanied by any crisis shocks. It has become a familiar part of any market economy.
- It can be predicted
- People use money as a mean to store value.
- Some economists believe that the relatively low - three percent- inflation rate can be even useful for production stimulation.

Acceptable tempo of this "usual" inflation depends on specific conditions: it is different for different countries, but must be single digit in order to refer to this inflation classification group.<sup>14</sup>

### **Galloping inflation**

Relatively, galloping inflation has a very high rate. Different authors give different precisions of what rate can be estimated as high. Some of them don't specify this criterion at all.<sup>15</sup>

The most frequent opinion among economists referring to the specified rate is that galloping inflation has a rate of 20-100%.<sup>16</sup> Some authors define it reaches from 10% to 200%.

The most important features of the galloping inflation are:

- In contrast to the creeping inflation, it is always difficult to control its development;
- Money devalues so fast that income of employees and businesses doesn't keep up with rising prices and costs.
- Foreign investors avoid the country, depriving it of needed capital.
- Economy becomes unsteady and credibility of government declines significantly and rapidly.

### **Hyperinflation**

The most dangerous and destructive to a certain extent type of inflation is called hyperinflation. The average annual rate of price increase can exceed three digit values.

Hyperinflation's danger is that it gets out of control, becoming unmanageable:

- Conventional functional economic relationships and customary price controls do not work.

---

<sup>14</sup>Dwivedi D.N.: Principles of Economics, 2Nd Edition, New Delhi, 2005, p. 518

<sup>15</sup>Dwivedi D.N.: Principles of Economics, 2Nd Edition, New Delhi, 2005, p. 518

<sup>16</sup>D.E.: O'Connor: The Basics of Economics, Green Wood Press, Westport, 2004, p. 253

- Money printing is run at full capacity
- Speculation is developing rapidly.
- Production gets disorganized

In order to stop or slow down the effects of hyperinflation, it is necessary for governments to resort to emergency measures. There is no single clear idea of how to deal with hyperinflation. Specialists constantly develop various, often quite contradictory prescriptions.<sup>17</sup>

To get ahead of inevitable, expected increase in prices, owners of the "hot money" seek to get rid of it as soon as possible. As a result, demand unfolds for those products, which can serve as a means of savings. They basically include real estate, art and precious metals. People act under the pressure of "inflation psychosis." This is spurring for the further rise in prices so that inflation begins to feed itself.

Hyperinflation could occur as a result of long wars and major socio-political upheaval. An example of hyperinflation is the situation which had developed in Germany and several other countries after the First World War.

### **2.2.2 According to criteria of Government's reaction or control**

There are open and repressed inflation according to criteria of reaction and control. The first type comes out through a rise in prices, the second one causes goods deficit. Open inflation is more typical for market economy, where prices are determined exclusively by interaction of supply and demand and there is no direct price settlement by government.

Open inflation refers to increase in prices for goods and services as soon as demand starts to exceed supply and production costs have increased. This process is not slow downed by state laws and manufacturers have ability to set the prices that are most favourable to them.

Consumers usually react on the open inflation with development of adaptive inflation expectations.<sup>18</sup>

Repressed inflation occurs when macroeconomic equilibrium of demand is accompanied by general governmental price control. This happens when state is concerned about inflationary disequilibrium of the market and pays attention to consequences of inflation

---

<sup>17</sup>Kennedy M.M.J.: Macroeconomic Theory, PHI Learning, New Delhi, 2011, p. 231

<sup>18</sup>Mishra R.: Industrial Economics and Management Principles, Laxmi publications, New Delhi, Boston, 2008, p. 188

instead of influence causes the misbalance is generated by. Instead of systematically prevention of inflation and block its mechanisms when needed, governments try to suppress its expression. As examples of governmental measures by repressed inflation can be called:

- temporarily freezing of prices and incomes;
- Definition of upper limits of the prices' growth.
- Government sets task to keep dynamics of wages at a level that does not exceed the rate of productivity growth.

The mechanism of suppressed inflation is inevitably associated with emerge of gap between prices established by state and higher market prices, so that this inflation discourages producers, as prices are limited and do not depend on demand, which prevents expansion of production and demand. Since the correlation between price and demand disappears, it is unclear for entrepreneurs, where is it better to direct their capital. Deficit becomes sharper; buyers overpay sellers in order to find a product needed. Moving of commodities from formal economy into a shadow one gets started.

It can seem that open inflation conditions are more favorable for consumer than situation of suppressed inflation. Reasons for such assumptions are a fact that is no shortage of goods and compensatory measures can be carried out. But in fact, the well-being of population still will decline.

Firstly, pace of anti-inflationary payments cannot always be kept with dynamics of prices, because the latter are growing every day and revision of rates of wages and fixed incomes occurs after a certain time. The higher the latency, the greater negative impact of inflation on current consumption.

Secondly, often it is extremely difficult to predict possible increase in prices, especially in uncontrolled hyperinflation. Sometimes governments underestimate danger of inflation, struggling with budget deficits and seeking to save in all areas of expenditure. Therefore, anti-inflationary compensations are rarely enough, which make decline of living standards inevitable.

Thirdly, such compensation generally cannot be complete. With cost-push inflation governments are forced to find compromise solutions when the anti-inflationary compensations do not fully cover loss of income from rising prices. Thus, decrease in real incomes is expected.<sup>19</sup>

---

<sup>19</sup>Lewis W.A.: Principles of Economic Planning, Routledge, 2003, p. 42-43

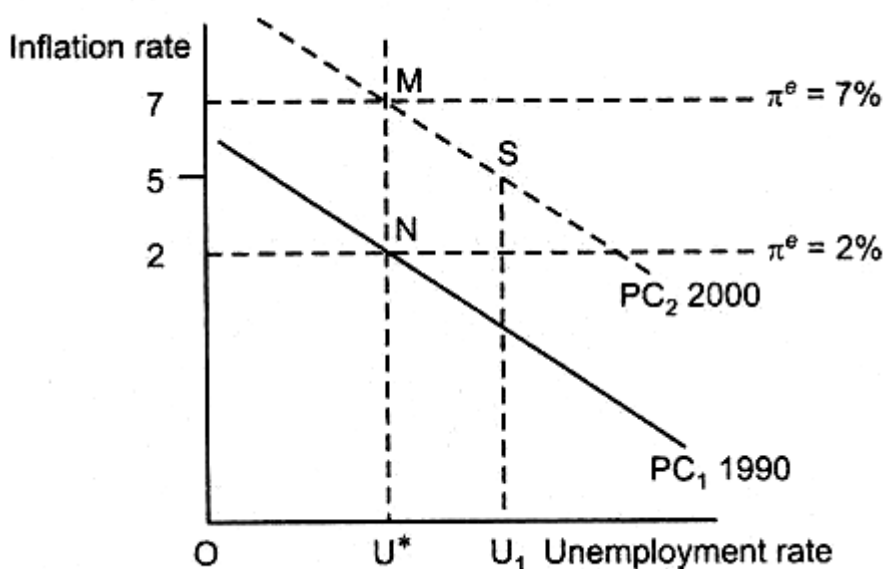
### 2.2.3 Stagflation

Stagflation is situation where the general price level increases with simultaneous reduction of production. So, the price and volume of output change in different directions.

Economists explain causes of stagflation in different ways. One the one hand, it can be triggered by economical structural imperfections. In an economy with a well-set market mechanism higher prices for one commodity group lead to lower prices for other commodities, so that market equilibrium is managed. And if an adequate level of competition is absent, there is a rigidity of price levels and they can't be reduced.

On the other hand stagflation is caused by monopolies and their power over the market, because demand curve of a monopolist firm coincides with demand curve of goods. Therefore, the amount of product that can be sold increases as price decreases. Thus, it is often more profitable for the monopoly to produce less and sell more.

Another point of view is that stagflation can be caused by inflationary expectations, when owners of production factors are beginning to inflate value of their resources and services, expecting the fall of their incomes because of inflation.<sup>20</sup>



**Figure 1 Stagflation<sup>21</sup>**

### 2.2.4 Deflation

<sup>20</sup>Leijonhufvud A.: Theories of stagflation, Los Angeles, 1980

<sup>21</sup>Stagflation in Short-Run Phillips Curve, online

Since 1970<sup>th</sup> deflation had been discussed rarely. It could even seem that economists considered it as a phenomenon representing purely academic interest. And in the recent years is becoming increasingly mentioned as a danger among the numerous problems referring to European and American economies.

Deflation is the opposite of inflation. This is defined as a tendency to reduction of average prices level in an economy due to reduction in aggregate demand, lowering cost of goods due to growth of labour productivity and reduction in money supply.

It is important to identify the main causes of deflation and its consequences. This phenomenon can be caused by a wide range of factors, including:

- increase of value of money;
- insufficient money volume in the market;
- labour productivity growth, causing reduction of cost for number of products;
- refusal of population to spend their money in anticipation of further increase of its value.

In most cases, the effects of deflation are negative, for example:

- emergence of suspended demand . This means that consumers delay purchase of goods purposefully, which ultimately leads to reduction in demand and problems in production.
- The phenomenon of deflation may lead to lowering of wages and bank lending
- loss of companies' profitability and, as a consequence, staff cut.
- Reduction of investments
- Consumers change their spending principles regarding types of products chosen.

An example of significant deflation in the twentieth century is a fall in prices during the Great Depression of 1920-1930. As a more contemporary example, economists consider the Japanese economy.<sup>22</sup>

Government implement diverse instruments to fight deflation, which are:

- Lending rates are reduced to the limit value (zero-level)
- The Japanese Central Bank carried out all kinds of operations on the open market continuously: government debt securities are bought up in order to raise liquidity by banks

---

<sup>22</sup>Burdekin R, Siklos R.: Deflation: Current and Historical Perspectives, Cambridge University press, 2004, p. 7-8



- The state spends much more than it receives from taxes, so that its debt is growing.
- increase and decrease of taxes
- direct increase of money supply through direct state spending
- Changing of banking regulations etc. <sup>23</sup>

Interestingly, even a mild inflation of up to 3% still can't be reached at a permanent basis. Despite deflation, other socio-economic indicators in Japan are at a good level: the standard of living and life expectancy are high, according to scientific and technological progress the country takes one of the leading positions in the world.

The problem of deflation is relevant for the United State. In addition to lower rates, its government also carried out the so-called quantitative easing. On the annual basis it bought government bonds and bad assets for many hundreds of billions of dollars

Talking about comparative danger of this phenomenon, inflation is not seen as more harmful process for economy, because under certain conditions it is quite normal, natural economic development. Normal inflation means that it causes general rise in price level by not more than 5% annually. But deflation can be a disturbing precursor of crisis, especially if it simultaneously manifests itself in various fields. It is also usually accompanied by significant rate of unemployment.<sup>24</sup>

## **2.3 Reasons and appropriate kinds of inflation**

### **2.3.1 Demand-pull inflation**

Demand-pull inflation is a kind of inflation, manifested in excess of demand over supply. This situation is denoted with full employment, full capacity utilization and production that is not able to respond to the excess money in circulation increasing real volume of output. Model of demand-pull inflation shows that increase in aggregate demand leads to a higher price level for a given volume of aggregate supply. At the same time entrepreneurs are expanding production, hiring additional labor. Nominal wages also get increased.<sup>25</sup>

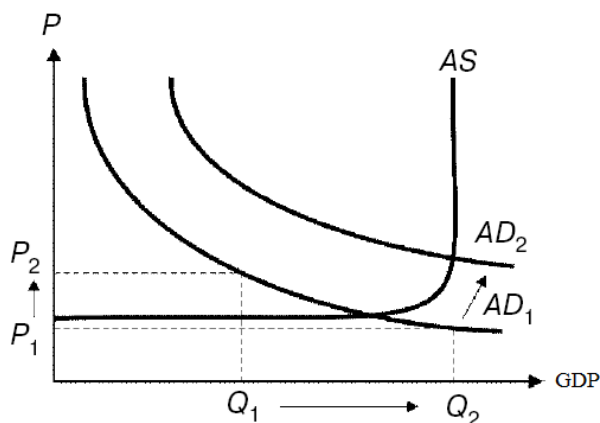
---

<sup>23</sup>Brezina C.: How Deflation Works, Rosen Publishing, 2011, p. 43-45

<sup>24</sup>Burdekin R, Siklos R.: Deflation: Current and Historical Perspectives, Cambridge University press, 2004, p. 8-10

<sup>25</sup>Tucker I.B.: Economics For Today, Cengage Learning, 2015, p. 471

In general, the demand-pull inflation indicates an imbalance between aggregate demand and aggregate supply. Shift of aggregate demand curve to the right from  $AD_1$  to  $AD_2$  leads to higher prices if economy is at intermediate or classic spaces of aggregate supply curve. Graphically the demand-pull inflation is shown in Fig. 2:



**Figure 2 Demand-pull inflation<sup>26</sup>**

The aggregate demand is changed under influence of factors that can be considered in four groups:

1. Changing consumption. This group include:
  - Wealth of population
  - Expectations about future levels of income and prices
  - Interest rate change
  - Income tax developments
2. Changing investment. These factors include:
  - Taxation
  - Level of interest rate
  - Expectations about how future sales develop
3. Changing government purchase
4. Changing volumes of export and import. This supposes:
  - Income that is earned by country through international activity
  - Exchange rate developments<sup>27</sup>

### 2.3.2 Cost-push inflation

<sup>26</sup>Maheshwari Y.: Investment Management, Eastern Economy Edition, New Delhi, 2008, p. 37

<sup>27</sup>Arnold R.A.: Macroeconomics, South-western Cengage learning, Mason, 2010, p. 293-295

Cost-push inflation is detected with growth of prices for resources and factors of production. Cost-push inflation is a result of reduction in aggregate supply and is accompanied by decline in real output and employment; unemployment rises.

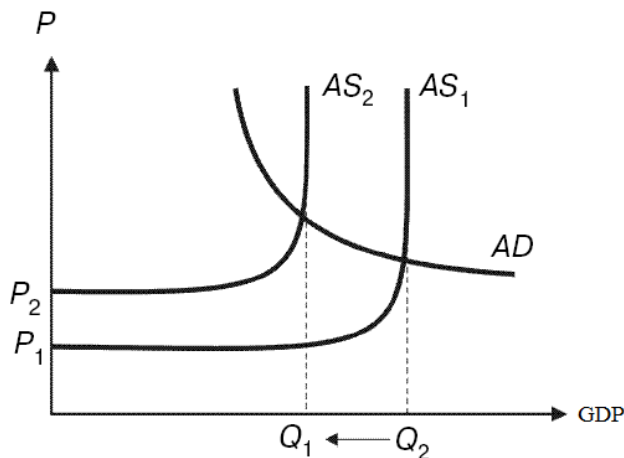
This type of inflation is determined by the following factors:

1. Reduction in labor productivity growth and decline in production volumes. As a rule, this is caused by structural changes in the economy or cyclical fluctuations, which contributes to increased production costs, profits reduction, lower production volumes and higher prices.
2. Expansion of services sector and increase of their role in society. Labor productivity in services usually grows slower than in industrial sector. At the same time, production wages take significant share in general costs. This often leads to increase in services prices.
3. Growth of wages share in total production costs. In an inflationary environment employers are forced to raise wages at the expense of increase in prices for products manufactured.
4. Non-price competition. Changing conditions of production that are aimed at expanding range and quality of products, sales with help of advertising lead to increased production costs and, thus, prices of commodities rise.
5. Growth of indirect taxes. This kind of taxes is included in prices of goods, which leads to their growth.<sup>28</sup>

A shift of aggregate supply curve to the left from AS1 to AS2 as a result of the reasons mentioned reflects an increase of costs per production unit. With a rise of price from P1 to P2 real output (or real GDP) is reducing from Q2 to Q1. The mechanism is demonstrated in Fig. 3:

---

<sup>28</sup>Tucker I.B.: Economics For Today, Cengage Learning, 2015, p. 472-473



**Figure 3 Cost-push inflation<sup>29</sup>**

All causes of demand-pull inflation are divided by economist into monetary and non-monetary factors.

Monetary factors are:

- Growth of nominal cash balances, which can be caused by:

- a) Increase of money supply. This takes place, for example, when assets of the Central Bank are increased. In all cases this leads to rise in money supply and increase in effective demand;

- b) Increase of number of payment means in economy. For example, this can be increased use of securities for payments;

- Increase of velocity of money. The process takes place when population tries to avoid keeping national currency, which is determined by low trust and inflation expectations.

Non-monetary factors include:

1. Factors associated with behavior of economic agents. For example, volume of household consumption rises, companies increase investments.
2. State budget deficit and rising public debt. Coverage of budget deficit is sometimes performed at the expense of additional issue of bank notes or by increasing issues of government securities and their placement.
3. Factors, associated with structural changes of aggregate demand;
4. Imbalances in economy, militarization of economy and the growth of military expenses. Some countries, participating in war, raise money using printing, so, they

<sup>29</sup>Maheshwari Y.: Investment Management, Eastern Economy Edition, New Delhi, 2008, p. 39

issue fiat money in order to finance the army. As a result of constant growth of unproductive consumption of national income such state creates conditions for state budget deficit and increase of public debt.

5. Credit expansion. It is conducted by issuing banks while lending to governments and by money supply saturation with foreign currencies that get exchanged for national one. Covering unproductive government spending with lending to economic entities over their real needs, commercial banks contribute to improper release of money into circulation, which are exchanged for goods and services.
6. Imported inflation. It is shown in two cases
  - When receiving international loans in foreign currency that are exchanged for the national one. Thereby, money supply in the country increases.
  - When purchasing foreign currency by countries with an active balance of payments at the expense of additional issue of national currency.
7. Small share of export sector and strong import dependence;
8. Declining GDP.<sup>30</sup>

### **2.3.3 Structural inflation**

The most frequent approach to definition of structural inflation is conventional division of economy into two sectors: industrial market and services sector. Differences between the sectors cause costs which put pressure on them. Thus, sector, whose performance is bigger, will put pressure on the other sector with lower productivity. This is why this kind of inflation is called "structural" - an economy is divided into structures or sectors.

The first reason structural inflation is a big difference in performances of the industrial and services sectors. That is, if there is a large gap between ultimate values of all products produced by these sectors, a tendency to structural inflation starts.

The second reason can be similar level of wage growth in these two sectors. It is possible that economy will face situation when level of income grows faster than economic level.

The third reason is different price elasticity in industrial sector and service sectors. In other words, there are different price change reactions on supply or demand changes. In favorable conditions, service sector supply price rises in direct proportion to the price of industrial sector.

---

<sup>30</sup>Haberler. G: Inflation. Its Causes And Cures, American Enterprise Association Washington, June 1960, p. 20-23

The fourth reason is reduced price flexibility. This means that prices are raised too high and it gets extremely difficult to lower or balance them.

“Inflationary spiral” can be seen as another definition to structural inflation, because it takes place as a result of combination of unforeseen demand-pull and cost-push inflation. The mechanism of the inflationary spiral is that, if a central bank increases money supply unexpectedly, this leads to increase in aggregate demand and, therefore, determines prices level growth, generating demand-pull inflation. Since wage rate remains unchanged, real incomes fall. In such conditions workers would demand higher wages in proportion to the increase in the prices level. This raises costs of firms and leads to reduction in aggregate supply, causing cost-push inflation. As a result the price level increases even more. Real incomes are down again and workers demand higher nominal wages. If their requirements are met, workers sometimes see it as an increase in real wages and increase consumer spending, causing the demand-pull inflation, which is combined with the cost-push inflation due to the increase in nominal wages. Everything is repeated again. The movement is a spiral, each turn of which reflects a higher price level or a higher level of inflation. Therefore, this process is called inflectional spiral or wages-prices-spiral. Growth in prices provokes wages rising, and the wage growth is basis for the price increase.<sup>31</sup>

## **2.4 Social and economic consequences**

### **2.4.1 Economic consequences:**

The main economic consequences of inflation are:

1. Inflation forces population to spend their money immediately. This increases demand for goods;
2. Reduction of lending;
3. Investment in the economy declines. Production volumes fall and unemployment rises;
4. Companies with long production cycles stop their performance;
5. Business activity declines, as inflation doesn't allow to calculate future prices, forecast sales accurately and define business incomes;
6. Inflation stimulates development of "shadow" economy, which prevents effective

---

<sup>31</sup>Leijonhufvud A.: Theories of stagflation, Los Angeles, 1980, p. 154-160

distribution of national income.

7. Depreciated money cannot perform its functions, so that foreign currency replaces the national one and eventually monetary system of the country gets destroyed;
8. Destabilization of foreign economic activity. Export of raw materials dominates, import starts increasing and burden of debt becomes more obvious.
9. Price system set by inflation has a negative impact on fiscal system as revenue from taxation is depreciated. Real value of tax revenues decreases.<sup>32</sup>

### **2.4.2 Social consequences**

Some economists believe that inflation is a kind of tax that government additionally imposes on incomes of population through issuing unsecured money, which leads to negative social consequences. A continuing process of inflation invisibly confiscates significant portion of the citizens' wealth.

The most frequently pointed out social consequences of inflation are:

1. Firstly, inflationary redistribution of national income leads to increase in social tensions. Inflation reduces standard of living of all population groups, especially those who have fixed income, because income growth lag behind growth rate of prices for goods and services.
2. Secondly, inflation devalues monetary savings of population in banks, insurance policies, annuities and other fixed-cost assets.
3. Thirdly, inflation raises unemployment and undermines motivation to work efficiently. Social differentiation of population and social tension in society are increased.<sup>33</sup>

## **2.5 Measures against inflation**

Inflation regulation is usually carried out in three following areas: counter-cyclical policy, Anti-inflationary policy and monetary policy.

### **2.5.1 Counter-cyclical policy.**

Counter-cyclical policy is a set of measures directed to revive of economy, regulation of business activity and smoothing of cyclical fluctuations. So, generally this kind of policy is

---

<sup>32</sup>Braumann B., IMF: Real effects of high inflation, IMF working paper, 2000, p. 7-8

<sup>33</sup>Kolodko G.W.: Social and Political Aspects of Inflation, Journal of Translations, spring 1989, p. 50-53

aimed either at stimulating economic growth or its restraining. This can be performed through:

- Credit encouraging. This includes change of interest rates, interest rates on long-term loans, regulation of reserve requirements and purchase of securities on the open market;
- Monetary incentives like banknote and receipt issuance regulation. In particular cases, the issuance should be extended restrictions on money supply growth must be cut;<sup>34</sup>

### **2.5.2 Anti-inflationary policy.**

This policy is defined as a set of measures on state economy regulation, aimed at inflation repression. It causes reduction in public spending, inhibits growth of prices and holds back aggregate demand.

Methods of anti-inflationary policy include:

- Deflationary policy. It is carried out through credit restraining of demand, money supply limiting and increasing tax burden.

One of the main characteristics of this policy is that it tends to cause slowdown in economic growth and can lead to economic crisis. Therefore countries either restraint in the use of these methods, or abandoned this policy at all.

- Income policy. It suggests parallel control over prices and wage, by freezing them.

Methods that state can use to influence dynamics of wage growth are financial methods, including taxes, accelerated depreciation, and credit methods like preferential loans.

- Policy of money supply restriction through monetary and fiscal mechanisms. This is directed to money supply compression by raising interest rates, increase in tax burden, and reduction of public expenditure. In this context, scientists also mention inflation targeting that is use of special measures established by governments, in order to maximize control over rate of inflation in the country. This is about establishing targets in regulation of growth of money supply and credit, which are than adhered by central banks while performing their functions. Inflation targeting is performed in four stages:

1. Setting of planned inflation rate in the country for a certain period of time;

---

<sup>34</sup>OECD: Counter-Cyclical Economic Policy, 2010, online



2. Selection of an appropriate monetary instrument for the rate of inflation monitoring;
3. Use of a monetary instrument when required (for example, increasing interest rate)
4. Comparing level of inflation in the country at the end of reporting period and planned analysis of effectiveness of the monetary policy conducted.
  - Policy of tax incentives for production. It includes measures intended to stimulate business directly by lowering taxes, and indirectly by reducing personal income tax rate.
  - Policy of slowing of velocity of money. Money supply growth does not lead to inflation if it is combined with a slowdown of the rate of money turnover. This can take place when investing in real sector of economy.<sup>35</sup>

Options of the anti-inflationary policies are selected according to priorities, which can include the following aspects:

- If economic growth is held back, deflationary policy must be carried out.
- If economic growth is stimulated, the policy of income preferred.
- If the goal is to defeat inflation at any cost, all methods can be used at the same time;<sup>36</sup>

### **2.5.3 Monetary policy**

The purpose of monetary policy is to maintain exchange rate that meets interests of a national economy.

It involves use of tools such as:

- a) Revaluation, which leads to reduction in import prices and increases export prices, holding back price growth within country;
- b) Limiting short-term inflow of capital from abroad that holds back expansion of deposit base and, thereafter, reduces money supply.<sup>37</sup>

### **2.6 Policy of indexation**

Thanks to statistical methods used in the modern economy it has become possible to

---

<sup>35</sup>Weidenaar D.J.: Anti-Inflationary Policies, online, p. 46-51

<sup>36</sup>Weidenaar D.J.: Anti-Inflationary Policies, online, p. 46-51

<sup>37</sup>Dwivedi D.N.: Macroeconomics: Theory and Policy, 2005, 431-432

calculate additional losses of population from rising prices and tariffs, using price indices, and, thus, determine necessary value of income increase of citizens. But there is a big issue of how effective the mechanism of indexation can protect incomes from depreciation and how it can influence prices and incomes in the opposite direction.

The essence of adaptive policy is to ensure that government indexes the main types of fixed-incomes of population, including minimum wages, pensions, scholarships, etc., at regular time intervals. Typically, the indexation takes 60%-70% of inflation rate. This is done in order to:

- on the one hand, maintain an adequate minimum income levels;
- and on the other hand, reduce national market demand and thereby extinguish inflation gradually, within half or two years, due to the difference in 30-40%.

Increased income in case of indexation is calculated by multiplying the amount of income that is subject to indexation, with consumer price index. Also, government may set coefficients, scales and other regulations at its discretion by which the minimum state guarantees of indexation are determined.

Indexation is performed basing on the following principles:

1. Guarantee of given by state about carrying out indexation of incomes.
2. Priority of support for living standards, which are reached by vulnerable groups of population as opposed to other alternative policies.
3. Performing indexation depending on types of income, their sources and social class of citizens considered.
4. Unity of mythology of price index calculating for goods and services, which are included in cost of living.
5. Preservation of incomes, which were increased when indexing or revision of tax rates.
6. Open information and specification of sources of income and indexation.
7. Publicity of measures referring to indexation of income<sup>38</sup>

This method of fighting against inflation has both advantages and disadvantages, which are discussed in all countries applying it. Obvious advantages are:

- social stability in society
- It serves as a realistic basis for legislation adjustments. In the first place, this refers to taxation.
- Relative clarity to recipients of state benefits paid.

As a disadvantages should be mentioned:

---

<sup>38</sup>Weaver R.: Automatic Government: The Politics of Indexation, Washington, 1988, p. 5-6

- Long term implementation of this approach to combating inflationary phenomena.
- Some economists believe indexing provokes higher state spending
- Flexibility of budgeting process can decline
- Disruption of general fighting system against inflation. It is pointed out from this point of view indexing is seen as a means against symptoms of inflation and not its causes.
- Specific indexes used can be not appropriate. For example, the most frequently used CPI reflects only changing prices but can't embody changing consumer preferences. In particular, people try to find cheaper substitutes. <sup>39</sup>

### 3. Theories about inflation

Keynesianism and monetarism belong to the main economic inflation theories. On their basis two main areas of anti-inflationary systems of measures were formed: deflationary policy and incomes policy.

#### 3.1 Inflation handling according to Keynesianism

In the 30<sup>th</sup> western economy development was marked by rapid extension and popularization of Keynesian theories expressed in the work of John. M. Keynes "The General Theory of Employment, Interest and Money." The most innovative nature compared to the previous neoclassical theories had two crucial ideas of Keynes. The first one was recognition that the market economy doesn't have continuously functioning mechanism of self-regulation and, under certain conditions, this economy may get in a deep crisis stagnation, which can't be eliminated by market forces only. This opinion justified the need for state regulation of economy that is aimed to correct defects of its sheer market development.

The second fundamental idea of Keynesianism was perception effective demand stimulation as a decisive direction of state economy regulation. As the main instrument of this stimulus Keynesianism saw increase in budget expenditures, including reaching its deficit, and liberal monetary policy.<sup>40</sup>

Exactly the second idea gradually formed a new theoretical and practical approach to

---

<sup>39</sup>Weaver R.: Automatic Government: The Politics of Indexation, Washington, 1988, p. 7-8

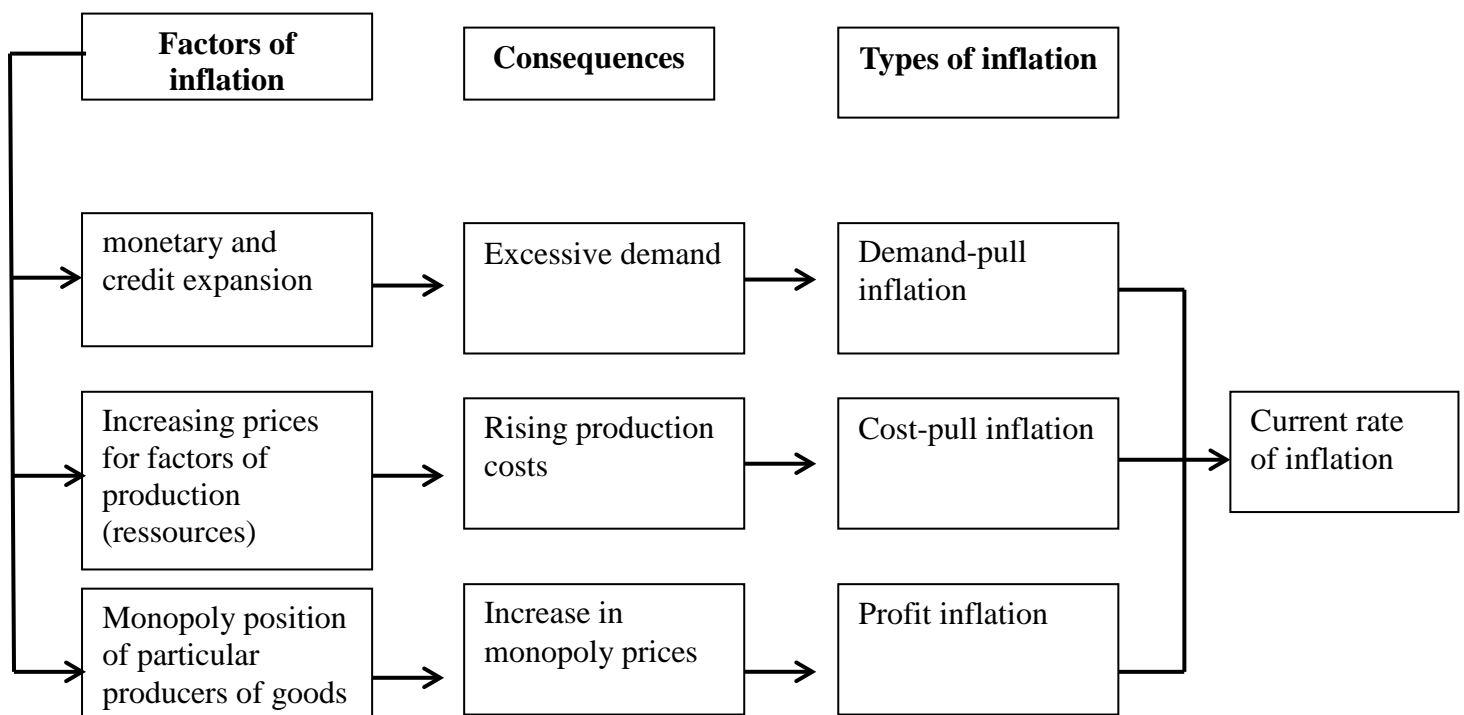
<sup>40</sup>Congdon, T.: Keynes, the Keynesians and Monetarism, Edward Elgar, 2007, p. 34-36

inflation handling.

Keynesianism is based on the following assumptions:

- level of employment is determined by production volume;
- overall demand is not always set at level corresponding to volume of means of payment, because particular part of these means is deposited in form of savings;
- Production volume is actually determined by level of employers' expectations of effective demand in upcoming period, which contribute to capital investments.
- When there is equality between investments and savings, which reflects comparability of bank interest rates and interest of investment efficiency.

The logic of formation of inflation according to the Keynesian approach is shown in Fig. 4



**Figure 4** Keynesian inflation model<sup>41</sup>

The Keynesian have changed attitude towards inflation in countries with developed market

<sup>41</sup>Congdon, T.: Keynes, the Keynesians and Monetarism, Edward Elgar, 2007, p. 35-37

economy. Low, creeping inflation, which was originally understood as an annual price by not more than 2-3%, then its limits were raised to 5 %- 10% per year, has become recognized as an inevitable aspect of normal development of the market economy, which in certain circumstances, is likely to play positive role in production stimulation. Higher types of inflation like galloping and especially the hyperinflation were interpreted in a negative sense, because high socio-economic and sometimes political costs associated with this inflation rate sharply exceed possible economic benefits, if any.<sup>42</sup>

### **3.2 Ideas of monetarism regarding inflation**

Monetarism flourished in the last third of the XX century, which was associated with reduction in effectiveness of "recipes" of Keynesianism referring to inflation adjustment. All difficulties in development of the capitalist economy monetarists explained through the excessive economic role of government, including its inability to control the money supply. In accordance with the ideas of monetarists, the decisive role of state in economy should be reduced to sustainable increase of money supply that must ensure healthy development of the market economy by itself.

Thus, monetarists think that decisive role in the economic process is performed by money supply regulation. As the main ways of influence on economy they are consider national currency exchange rate regulations, credit rates and customs tariffs changes. According to this theory, there is a monetary rule that supposes that money supply in circulation must increase annually at a rate equal to potential growth rate of real GDP. For developed economies this growth is about 3-5% per year.<sup>43</sup>

Inflation in understanding of monetarists is a purely monetary phenomenon caused by excessive amount of money in circulation. A major role in economic development they see in the so-called inflationary expectations.

Fighting inflation according to monetarists must be based on measures aimed at money supply reduction and lowering effective demand. So in fact, the main measures are deflationary policies, including inflation targeting described in 2.5.2 section of this thesis. Particular importance was given to complete elimination of budget deficit financing and to sustainable maintenance of rigid restrictive monetary policy.

Monetarists deny completely any relevance of measures for cost-push inflation fighting

---

<sup>42</sup>Congdon, T.: Keynes, the Keynesians and Monetarism, Edward Elgar, 2007, p. 38-40

<sup>43</sup>Arnold R.A.: Macroeconomics, South-western Cengage learning, Mason, 2010, p. 293-295

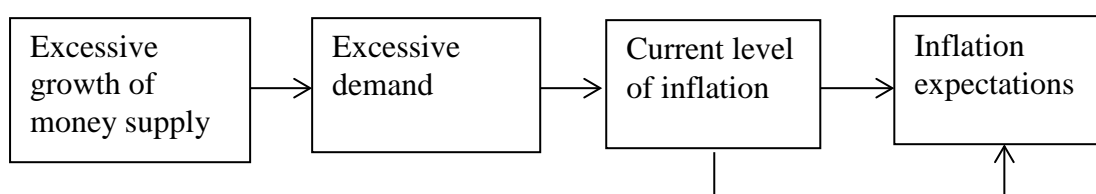
and offer to influence market conditions through comprehensive support of competitive market climate, and, regarding international economic relations, through floating exchange rate.

Increased inflation level determines growth of money supply, leading to increase in aggregate demand. However, inflation expectations of economic agents are highly significant, because they increase demand: people seek to "drop" money, which causes increase in inflation. At the opposite expectations level of inflation can be reduced.

The logic inflationary processes formation in accordance with the monetarist approach is shown in Fig. 5.

Other important statements of the monetarists' ideas are:

- reduction of tax burden should be seen as an important tool to encourage entrepreneurial activity and business development; as a result of tax cuts budget revenues get reduced;
- in proportion to the reduction of state income costs should be reduced either, primarily a the expense of their social components;
- social costs are minimized, because their growth reduces incentives to work (to earn income);
- public investment should be focus on development of science and high-tech industries, providing innovative type of economic development;<sup>44</sup>



**Figure 5 Monetarist model of inflation<sup>45</sup>**

## 4. CPI as one of the main inflation measurement indexes

### 4.1 General system of indexes for inflation measurement

---

<sup>44</sup>Argy V., Nevile J.: Inflation and Unemployment: Theory, Experience and Policy Making, Routledge, London and New York, 2016, 67-69

<sup>45</sup>Argy V., Nevile J.: Inflation and Unemployment: Theory, Experience and Policy Making, Routledge, London and New York, 2016, 68-69

### 4.1.1 Rate of inflation

One of the main indicators of inflation is **rate of inflation**, which is calculated as a percentage of price difference between previous year and current price levels. This can be described with the following formula:

$$r_i = (P_t - P_{t-1}) * 100\% / P_{t-1}$$

, where:

$P_t$  - general price level of current (considered) year (GDP deflator),

$P_{t-1}$  - general price level (GDP deflator) of previous year.

If an economy can successfully adapt to the pace of price increases, it is called balanced, otherwise it is seen as unbalanced. In the first case, prices rise moderately and steadily. The rest of the macroeconomic indicators vary substantially adequately.

When talking about unbalanced inflation, commodity prices rise with different pace and in different scales, and the economy does not have time to adapt to the changing conditions.

### 4.1.2 GDP Deflator

GDP deflator is a special statistical price index, which is calculated to measure level of prices for services and goods over a certain time period. This indicator allows users to study and monitor average change in level of current and basic prices, or, in other words, it determines the rate of inflation.

GDP deflator describes change in earnings, wages and other economic indicators.

GDP deflator can be also defined as a weighted average of price, which is calculated as a ratio of nominal GDP to real one. This can be shown with the following equation:

$$\text{GDP deflator} = (GDP_n / GDP_r) \times 100\%$$

where  $GDP_n$  is nominal gross domestic product and  $GDP_r$  represents the real one.

Nominal GDP, which it is also called absolute GDP, is volume of production of goods and services, expressed in current prices.

Real GDP is the same volume of goods and services, produced by a country in particular year, but measured in constant prices of the base period. Thus, this index is also called "inflation-corrected" GDP

The results obtained with GDP deflator index calculation are published together with indicators of GDP usually three times: firstly, provisional data are given, then revised information is published, and finally, the final results are announced.

In period of waiting for increase in basic interest rates, a rise of value of the GDP deflator

leads to a significant increase of rate of national currency, as well as increase in interest rates.

In this connection it can be confidently asserted that the GDP deflator index can significantly affect behavior of market participants.

### **4.1.3 PPI**

PPI can be defined as an average rate of change of prices for raw materials, materials and goods of intermediate consumption in relation to base period. It is used to calculate detailed GDP components with comparable prices.

In the United States, Producer Price Index is published monthly and contains three parts:

- Prices at entrance of production cycle. This relates to commodities such as crude oil, coal, energy and the steel scrap.
- Prices at stage of Processing (SOP-Index). It regards goods that are manufactured at particular level and sold after that to further producers that will create finished goods. So, these are semi-finished products, components for examples, lumber, cotton, steel and diesel fuel can belong to SOP products.
- Prices of production output. This relates to finished products.

Price of production output includes labor costs and reflects changes of inflation with correlation to change of labor costs.

PPI can be used for various purposes. The most common are the following cases:

- For calculation of macroeconomic indicators at constant prices;
- For international comparisons;
- For assessment of economic conditions and competitiveness of enterprises in terms of price changes;
- As a short-term reflector of inflationary trends;
- Indexation by considering public and private legal contracts. Particularly this is conducted for more precised PPI components;
- For national accounts deflators;
- To comply with requirements of some international organizations, including the OECD, Eurostat, European Central Bank and IMF for economic control and comparison;
- As an analytical tool for companies and research organisations.
- Current cost accounting;



- For calculation of other inflation indicators, for example, the Final Expenditure Price Index;

As PPIs serve different purposes, the way in which they are calculated varies depending on their users and given purposes they are supposed to be used.

The common formula for PPI calculation is based on information such as sale price and product quantity at beginning of the period considered and sale price at the end. The formula can be expressed in the following way:

Historically, PPI was obtained as a result of programs development, directed to improvement of wholesale prices measurement. "The WPI (wholesale price index) attempts to measure price changes as they occur at one stage prior to final demand—the wholesale level. The WPI would normally cover the price of products as they flow from the wholesaler to the retailer. It includes products from domestic wholesalers and factories as they are delivered to retailers. As such, the WPI differs from the PPI because it includes both domestically produced products sold in the home market (included in the PPI) and imported products (excluded from the PPI), while excluding prices of exported products." <sup>46</sup>

#### **4.1.4 Inflation expectations**

Making decision about interest rates regulation and determining future functional policies, governments often take into consideration indicator, which is called "inflation expectations". They reflect public expectations and perceptions regarding future pace of inflation. For example, if CPI rises, average long-term and inflation expectations remain constant. After a certain period of time, probability that a central bank will not take any measures to counter the trend increases.

The concept of inflation expectations is indefinably in nature. But, in general, it can be defined as an assumption taking into account various consumer and business surveys about future inflation that inflation will rise in the future on the basis of existing trends prolongation.

Experts usually build reports on inflation expectations using market-based and survey-based measures.<sup>47</sup>

## **4.2. CPI**

---

<sup>46</sup> IMF: Producer Price Index Manual: Theory and Practice, 2004, p. 68

<sup>47</sup>Bauer M.: Inflation Expectations and the News, Federal Reserve Bank Of San Francisco, Working Paper Series, 2014, p. 1-3

#### 4.2.1 Definition and application of CPI

Index (lat. - Indicator, list) can be defined as a statistical relative measure that reflects a ratio of different socio-economic phenomena over particular period of time (a dynamic index) or in some space (a territorial index).

Consumer Price Index is one of the most important indicators of level of inflation and is used for state financial policies implementation, analysis and forecast of price developments in economy, regulation of real exchange rate of national currency, minimum social guarantees revision and legal disputes resolving.

Consumer price index CPI can be defined as an index that measures dynamics of prices for consumer goods and services on monthly or quarterly basis. Prices registration is conducted in stores or other retail places. The most common method is calculation of average value of changes in prices for various products in one period compared to the previous one, using average amount spent by households on their purchase as weights for the estimation. CPIs are official statistic indicators, which are usually defined and announced by national statistics agencies, ministries of labor or central banks. CPI is published as soon as possible, usually within about ten days after the end of each month or quarter.

The index of consumer prices and tariffs for goods and paid services to population characterizes dynamics in general price level and tariffs on goods and services purchased by the population for non-productive consumption, as well as measures ratio of cost for fixed set of goods and services in current period to its value in the previous period. If CPI rises, economy experiences a phase of inflation. Prices are rising and consumers consider purchasing necessary goods as soon as possible advisable, in order to avoid a need to buy them at higher prices in the future. The economic situation, when the consumer price index is falling below zero, is called deflation.

In a market economy, particular importance is attached to organization of statistical monitoring over the level and dynamics of consumer prices. Thus, not only national, but also international standards on CPI are constantly developed and actualized. The main objective of the development of certain international standards in the field of economic statistics is to ensure international comparability of statistics. However, the existence of international standards is also useful for governments and statistics institutions in separate countries. These international guides for CPI calculation and interpretation are based on collective expertise and experience accumulated in different countries. Familiarity with this experience and expertise can bring significant benefits to each of them through an open

approach.

#### **4.2.2 Purpose of CPI application**

CPIs should serve particular purpose. The exact method of determining and building calculation principles of CPI to a large extent depends on by whom and for what purpose they are going to be used.

The history of the CPI originated in the eighteenth century. Laspeyres and Paasche price indexes, which are still widely used around the world, were first proposed in the 70-ies of the nineteenth century.

In many countries, CPI began to be used for the first time mainly because of a need to compensate losses of employees resulting from inflation by adjusting rates of wages in proportion to percentage change in the CPI. This procedure is known as indexation, which is described more precisely in 2.6 section of this thesis. According to this aim, in the past, definition of CPI often belonged to responsibilities of ministries or departments of labor. At present time, these indexes are compiled in most cases by national statistical services.

Besides making it possible to get information about level of inflation, CPI began to be used for several other purposes, in addition to indexation of wages. These directions include:

- CPI is frequently needed for indexation of social security benefits and pensions.
- CPI can be also used for adjustment of other payments. First of all, this supposes indexation of rental fees, payment of interest or bond prices.
- In addition, CPI also usually performs function of a reflection of the overall level of inflation, despite the fact that it can estimate consumer price inflation only. Regarding this possibility of CPI application, it is also used by central banks and governments to determine inflation targets, which are reference points for monetary policy.
- Information on prices obtained for CPI goals, is also used for other indices calculations, such as purchasing power applied to compare real consumption levels in different countries and price indices that are defined to deflate expenditure of households consumption, which is shown in national accounts.

#### **4.2.3 Differences between CPI and other indexes for inflation measurement.**

CPI differs from PPI significantly, first of all because it does not take into account changes in prices for raw materials and semi-finished products, which are used by enterprises and industrial firms.

It also differs from GDP deflator, because the latter takes into account changes in prices

for all goods produced within the country and not just consumer goods. The purpose of compiling CPI is to determine changes in prices for goods directly attributable to consumer and components of these goods, which are used by their production process.

Also, GDP deflator does not include changes in import prices. So, it shows change in prices for products produced by the national capital only. When calculating nominal GDP, its level is influenced by two factors: the real increase in output of goods and services and prices fluctuation. Making calculations based on GDP deflator, it is possible to define value gross national product, excluding changes in prices of goods and services manufactured. There is one more difference: GDP deflator takes into account change in structure of goods manufactured, and CPI does not include this principle.

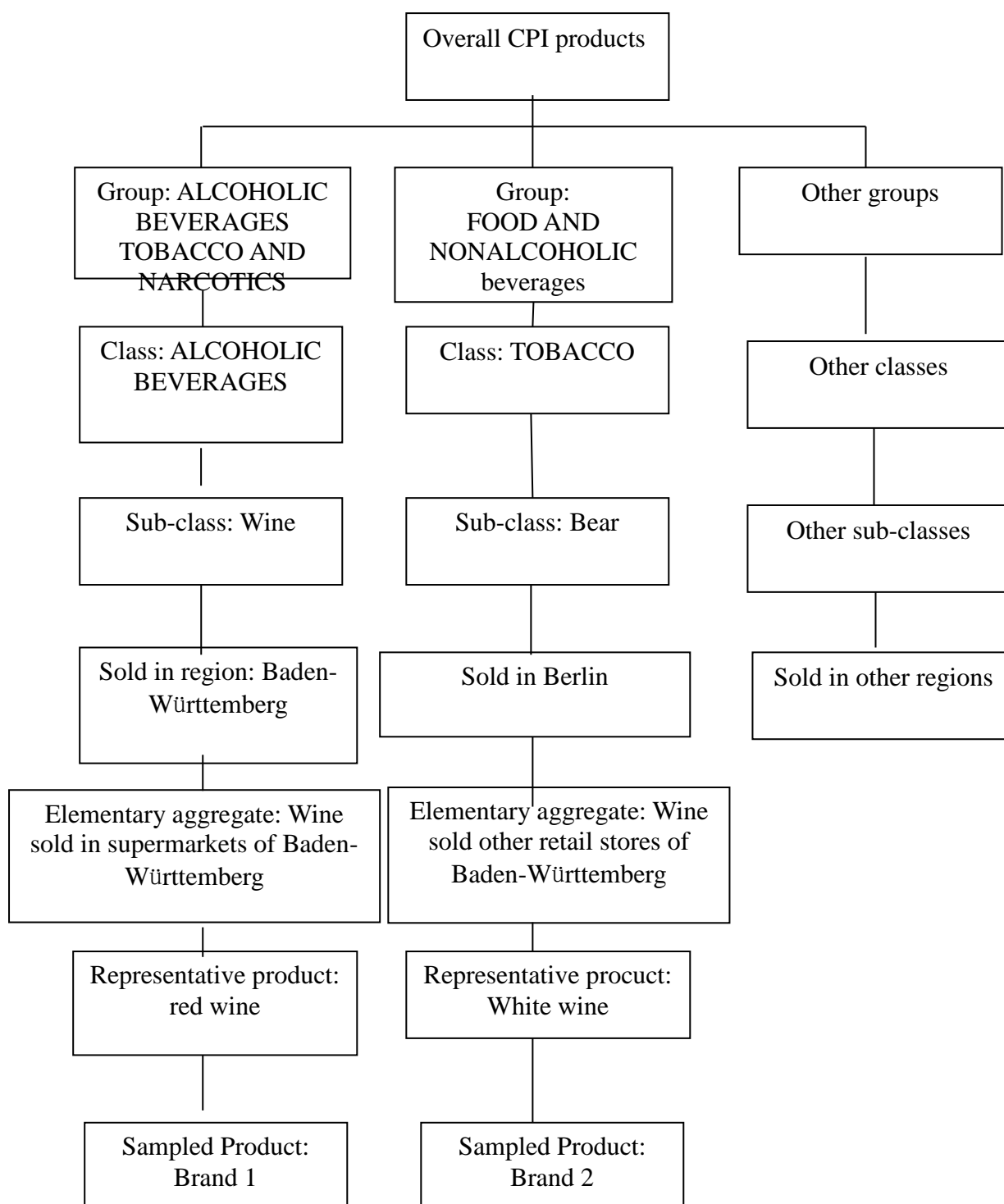
#### **4.2.4 Calculation of CPI**

##### **4.2.4.1 Steps of preparation for the CPI calculations: defining consumer basket and methods of information collection.**

The starting point of the CPI calculation is formation of consumer basket, embracing a set of goods and services purchased by households for purpose of final consumption. As a general rule, the consumer basket is a grouping of consumption expenditure of households in the most important commodity groups. The number of such groups generally ranges from 300 to 400 units.

For the purpose of grouping of consumer spending categories international organizations recommend to use Classification of Individual Consumption According to Purpose (COICOP), which describes multiple levels of aggregation. The highest level of aggregation is called section. For example, it refers to food and non-alcoholic drinks. Each section is divided into groups, for example, food. Each group is divided into classes like bakery products, fruits and vegetables, meat etc. Finally, the classes are divided into subclasses.

The usual CPI aggregation structure is shown in Fig. 6



**Figure 6** *CPI aggregation structure according to IMF and COICOP* <sup>48,49</sup>

<sup>48</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 60

<sup>49</sup>COICOP

Payment for purchased goods and services, especially for the category of durable goods, sometimes are carried out not at the time of their acquisition. Goods can be bought in installments or using borrowed money. Thus, development of consumer credit systems can have a significant impact on change of the consumer price index.

Classification of individual consumption is divided in three major categories of products:

- Short-term use products. The category includes food, hygiene items and other similar goods.
- Medium-term use products. These are apparel, footwear, means of communication, digital technology etc.
- Long-term use goods: transport, large appliances, furniture, furnishings and other items.

The various ways of CPI using shown in 4.2.2 can lead to different conflicts of interest. For example, use of CPI as a measure of overall inflation can push users of this index to expand number of components it includes, causing inclusion of items that are not goods and services consumed by households. Thereby the character and the concept of CPI get changed. It also should be noted that due to the widespread use of CPI for indexation of number of payments including not only wages, but also social security benefits, interest payments, private contracts, can distort its perception and appropriate conclusions.

Dynamics of the payments mentioned influence extremely large amounts of money, which are enough to have significant impact on public finances. Thus, minor differences in CPI dynamics caused by the use of different formulas or methods may lead to significant financial consequences. This means that the methodology of calculation of CPI has not only theoretical but also practical importance.

But still, it is possible to point out common components of the consumer price index, used for calculations in all countries. They are:

- Food and beverages. As the name of these goods suggests, this item includes components such as water, bread, pastry baking etc.
- Expenses for housing maintenance. This position is divided into three parts:
  1. Living costs reflecting rent.
  2. Energy costs measuring expenses for heating and electricity;
  3. Expenses for improvement of household, including other maintenance expenses. It estimates expenditure relating to decoration and similar expenses. This component of CPI also assesses changes in cost of living in hotels.
- Apparel. This index measures changes in prices for clothing.

- Transportation. Transport price index includes index of new vehicles, price index of used cars and trucks, public transport and motor-fuel indexes.
- Medical service. Medical care price index measures changes in payment of services provided by doctors, costs for medication and treatment, hospital stays costs, along with other similar positions.
- Recreation. Recreation price index estimates price changes in components such as movie tickets and other costs for entertainment.
- Education and communication. This index includes price indices of products such as mobile phones, computers, books, and other similar goods and services.
- Other goods and services. This component assesses price changes in expenditure categories that are not included in the previous groups, such as costs of cigarettes.

Apart from this general CPI breakdown into the individual components, there are some special indexes created to assess dominant trend of consumption in various categories. The most important among them is core-CPI, which is calculated by excluding prices of food and energy from the common CPI. Food prices are very seasonal and react strongly to perceived changes in situation of supply and demand, as well as fluctuations in commodity markets. Energy prices are even more susceptible to volatility of commodity prices. These two positions independent from consumer demand to some extent, and are dependent on external factors that don't belong to control of government officials and politicians.

At the next stage of the preparation, a share in total consumer basket of the above mentioned sections, groups, classes and subclasses of the classification must be calculated. These shares, referred to as weights, are set using expenditure surveys or household budget surveys conducted by a country's statistical authorities. It is recommended to revise the weight at least once every five years.

The next step is the formation of list of products, which are specific to each of the above-mentioned commodity groups. At the same time, each item is shown with provision of detailed description of its technical and economic parameters and characteristics that affect the price.

The further step includes collection of data on prices of representative goods. For this purpose, a list of sale points is created, where prices registration must be performed. The data on average prices of products allow calculating individual indices of prices for these products. The international recommendations suggest that expenses at the lowest level of classification must be called elementary aggregates.

Collection of information for CPI calculation is an important step, which can proceed with use of various methods. For example, institutions can choose the following options:

- Information about prices can be found in trade catalogs, which can be obtained by mail after an appropriate request. This source can represent offers of a particular kind of retail outlets. Also a leading shopping catalog can be sent, which shows goods distributed across the whole country and the prices are equal for all its regions. When considering goods being purchased via internet or mail, it is also necessary to take into account shipping costs and requirements for sales taxes.
- The price information can be found in Internet, especially when big stores offer goods for the same process as set in off-line retail stores.
- Sometimes, a national pricing policy sets particular price level for certain goods, so that retailers don't have freedom to change it even in cases of special offers and sales. This means that it is enough to visit one store only or send a request to the main office of the retailer about providing the single price list containing all goods and prices on considered products.
- In most cases, it is also possible to get price information via a phone call, which is a typical way for actual consumers. But it must be noted that not all service or goods providers can be reached in this way. Some of them don't work at permanent work place or are often out of office to manage their orders at customers.
- It is also possible to learn about prices fax, e-mail or letter fulfilling particular forms of central institutions. This option is advisable in cases when a central agency has more efficient ways of information collection or when the local collecting of data is not possible. This is especially relevant for tariff prices. For example, the prices can be received from insurance companies, telephone companies, variety of local authorities and public utilities.
- Secondary sources also can be used in some cases in order to learn prices of goods. For example, the method fits information about air ticket prices and used vehicles value. "Selection of regular flights made on the basis of detailed data on airline tickets obtained from the US Department of Transportation. Monthly check prices carried out after this dialog mode by referring to the computerized database of passenger tariffs of the private sector, is widely used by travel agents and others. In the case of used cars and trucks both for sampling and for determining the price of used data published by the professional association of dealers." As advantages of obtaining information from the secondary sources, the following aspects should be called:



- a) Users get possibility to build a larger samples
- b) The method is fast and the access to information is less expensive
- c) Avoiding a range of difficult problems related to obtaining pricing information.<sup>50</sup>

Average price reporting and the comparable prior periods for goods (services) are representatives are based on price data logging. Ensuring the comparability of prices, allowing you to eliminate the effect of structural changes and the assortment, is a prerequisite for calculating the consumer price index.

The prices for calculations must be comparable. The average comparable goods and services prices of the reporting the base periods are defined on the basis of data obtained by price registration. Ensuring of comparability of prices is a prerequisite for the consumer price index calculating because it allows the users to eliminate effect of structural and assortment changes.

A comparable price for goods and services with specific consumer characteristics in the reporting period compared to the base period is the price recorded by the same trade or service organization for particular product. To ensure comparability of price information the replacement method is used. For example, it is needed in case of absence of goods for sale in particular trade organization or in an entire region.

The average comparable prices for goods and services in the base and reporting period are prices calculated from the same amount of comparable prices of goods with specific consumer characteristics.

When calculating average comparable prices for definition of individual price indices it should be considered, that a terms of the same amount on price of goods and services in the city during the reporting year must be complied with. Failure by complying these rules results in insufficient accuracy of calculation of price indices. For example, if 4 price quotes were recorded at constant prices for considered goods in the base period, and only 3 price quotations were taken in the reporting period, the average price value changes, while the price for any of the variants has not changed.

The system of weights for calculating CPIs includes:

- Population structure, used in the calculation of aggregate price indices for individual products and services;
- Structure of consumer expenditures, used for calculation of group and composite indices of consumer prices.

---

<sup>50</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 87

According to IMF, the actual process of CPIs calculation must proceed in two stages. At the first stage, price indices are evaluated in order to build elementary expenditure aggregates. The next step is averaging of the elementary price indices in order to define higher-level indices applying the elementary expenditure aggregates relative values as weights.

#### 4.2.4.2 The elementary expenditure aggregates

There are three commonly used formulas that have been used by international organizations and statistical offices in order to figure out elementary price indices. The first formula reflects the Carli index  $i$  number of items. It can be defined as unweighted or simple arithmetic mean of price ratios, for two considered periods, which need to be compared. The periods are denoted with 0 and t:

$$I_C^{0:t} = \frac{1}{n} \sum \left( \frac{P_i^t}{P_i^0} \right)$$

The second formula represents the Dutot index. It can be obtained through calculation of ratio of the unweighted average prices of two considered periods:

$$I_D^{0:t} = \frac{\frac{1}{n} \sum P_i^t}{\frac{1}{n} \sum P_i^0}$$

The third equation shows the Jevons index that can be explained as the unweighted geometric average price ratio. It is similar to the unweighted (or simple) geometric mean prices ratio.

$$I_J^{0:t} = \prod \left( \frac{P_i^t}{P_i^0} \right)^{1/n} = \frac{\prod (P_i^t)^{1/n}}{\prod (P_i^0)^{1/n}}$$

Geometric means have a few specific features that must be considered when calculating the Jevon index. They are:

- if an observation of particular sample equals zero, the value geometric mean is identical (0) without dependence on other values.
- Jevons index has a high sensitivity to rapid lowering of prices. This requires determination of upper and lower bounds for particular ratios when applying the Jevons index. For example, this range can be from 10 to 0.1.

So, it is important to understand that different methods and indices can result a very

different values of calculations. Thus, users of the formulas should have an appropriate algorithm of choosing them. One of the most effective ways is checking, whether the index formula considered meets requirement of certain axioms or criterions. These criteria refer to properties which are typical for different types of indexes. As the main criterions the formulas users can take the following norms:

1. Proportionality test. This means that if prices of considered period are  $n$  times higher than the level of basis period, the index must equal  $n$ . But identity test is a special case, because it requires that "if the price of every item is the same as in the reference period, the index should be equal to unity"<sup>51</sup>
2. Units of measurement change test or commensurability test. It implies that change of the quantity units doesn't influence value of index. This criterion is relevant Carli and Jevons indices, but is not applicable for the Dutot index.
3. Time reversal test. It is conducted as interchange of information of two considered periods. If the measurement is correct, the obtained value of the price index should be reverse to the original index. This logic is not relevant for the Carli index.
4. Transitivity test. This means that there must be equation of chain index of two given periods with the direct index of the same two periods<sup>52</sup>

The elementary aggregates should cover only such sets of products that are homogeneous as high as possible. If the product set does not comply completely with the requirement of being uniform, mismatches in Dutot index according to criteria of invariance of unit changes or commensurability test can occur causing serious disadvantage.

Economists also interpret Dutot index as a price ratios weighted arithmetic average, calculation of which requires that each relation must be weighed considering its base period, although definition of this index is the ratio of average price that is unweighted.

In case when data for non-seasonal products are not available, one of the following steps should be taken:

- The goods, whose price information cannot be learned, must be excluded from the list in order to maintain comparability of the product sample, so that similar products are compared with each other, accepting that the sample is depleted;
- The last observed price should be shifted to later periods;
- The missing price can be calculated using the average change in prices of considered elementary aggregate products whose information is always available;

---

<sup>51</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 157

<sup>52</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 157

- It is possible to define the missing price considering change of comparable price of a certain product in another, similar store.

An additional, significant price statistician challenge by calculation of the CPI is necessity to take into consideration seasonal commodities. The following items can serve as examples of common seasonal commodities : many food items (fruits, vegetables), many goods related to apparel and footwear items, alcoholic beverages, water, electricity, heating oil, garden supplies, flowers, vehicle operation, vehicle purchases, recreation expenditures, entertainment costs, books, wedding expenditures; insurance expenditures, recreational equipment, software, toys and games, tourism and air travel expenditures. If seasonal commodities are present in the market during each season, then, in theory, traditional index number theory can be applied in order to construct month-to-month or quarter-to-quarter price indices.<sup>53</sup>

When calculating the CPI three types of reference periods must be distinguished. They are:

1. Reference period of weights. The period is determined dynamics of costs applied in calculation of weights. Typically, a year is taken as the base period of weights.
2. Reference period of price. The prices of this period are included in formula as denominators in the index.
3. Reference period of index. This period index is defined as a value of 100.<sup>54</sup>

There are two ways to calculate an index: direct method (defining the base index) and the method of the chain index calculation.

The direct elementary index is based on direct comparison the current period prices with base prices. The chain index supposes comparison of prices of each period with their previous period prices. As a result, the short term indexes are defined, which can be then integrated in order to build the index for a long period.

There is a certain correlation between the basic and chain relative values indexes: multiplication of a number of chain relative indices results in the base rate of the last period and division of the subsequent base relative value index to the previously obtained one results in the chain index of the subsequent period.

Division of the subsequent base index to the previous one equals to the chain index of the follow-up period, but expressed in the base index of physical volume. Thus, the above mentioned correlation is relevant only for common indexes with constant weights, or in other words, in primary indices. The logic doesn't work for indexes of secondary

---

<sup>53</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 220-221

<sup>54</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 220-221

characteristics.

Using of the chain process facilitates introduction of new products or their replacement when needed. It clearly reflects the price changes from a consumer perspective.<sup>55</sup>

The calculation methods demonstrated above are not the only options. There are also some other elementary aggregates that can be selected.

In case when information about the basis period costs is available for each product in the elementary aggregate structure, formula of the Laspeyres price index can be used in order to calculate elementary price index. It is also called the geometric Laspeyres. The way of calculation can be expressed as follows:

$$I_{La}^{0:t} = \sum w_i^0 \left( \frac{p_i^t}{p_i^0} \right), \quad \sum w_i^0 = 1$$

The Laspeyres index also has its geometric version in which can be defined as:

$$I_{JW}^{0:t} = \prod \left( \frac{p_i^t}{p_i^0} \right)^{w_i^0} = \frac{\prod (p_i^t)^{w_i^0}}{\prod (p_i^0)^{w_i^0}}, \quad \sum w_i^0 = 1$$

The harmonic average of price ratios is another alternative. Its formula can be shown as:

$$I_{HR}^{0:t} = \frac{1}{\frac{1}{n} \sum \frac{p_i^0}{p_i^t}}$$

The harmonic average prices ratio is the next option that can be defined as:

$$I_{RH}^{0:t} = \frac{\sum \frac{n}{p_i^0}}{\sum \frac{n}{p_i^t}} \quad 56$$

The unit costs of product are also very important in calculating of the elemental price index because they can be used as an index of the elementary average prices. Typically, prices are registered in a certain period of time. Every price is seen as representative of the average price level for a considered product in a chosen period.

The unit value index has a simple form. The unit cost of every period is defined by dividing

<sup>55</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 13-14

<sup>56</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 163

the total expenses on any product in the corresponding total number of goods.<sup>57</sup>

#### 4.2.4.3 Calculating the higher-level indices

Indexes of a higher level are calculated by defining weighted arithmetic average of the obtained elementary price indices. This general category of indexes is defined by IMF as the Young index. Young was one of the first developers of indices, explaining and proposing this type of index in the 19<sup>th</sup> century.

The Young index formula can be demonstrated as follows:

$$I^{0:t} = \sum w_i^b I_i^{0:t-1} I_i^{t-1:t}, \quad \sum w_i^b = 1$$

, where  $I^{0:t}$  stands for the consolidated CPI index or any higher level index, which is relevant from 0 to  $t$  periods.  $w_i^b$  represents the weight set to every elementary index prices.  $I_i^{0:t}$  indicates an appropriate elementary price index.

In the formula, elementary indices are marked with subscript  $i$ , and the higher level indexes are shown without subscript characters.

It is important to note that there is a certain correlation between the indices of Young and Lowe. Many statistical institutions use the Lowe index when demonstrating the results calculations to users. The Lowe indices define the change of cost of a fixed basket of goods and services over a certain period of time. But in fact, the Young CPI formula is used in such cases. The correlation of the two indices mentioned is shown in the following equation:

$$I_{Lo} = \frac{\sum p_j^t q_j^b}{\sum p_j^0 q_j^b} = \frac{\sum p_j^t q_j^b}{\sum p_j^b q_j^b} \bigg/ \frac{\sum p_j^0 q_j^b}{\sum p_j^b q_j^b} = \sum w_j \left( \frac{p_j^t}{p_j^0} \right) = I_{Yo}, \quad \text{where } w_j = \frac{p_j^0 q_j^b}{\sum p_j^0 q_j^b} \quad 58$$

$I_{Lo}$  — the Lowe index

$I_{Yo}$  — the Young index

$q_{j|b}$  — individual numbers in the base period of  $b$  weights.

It can be concluded from the equation that:

- “the Lowe index is equal to a Young index in which the weights are hybrid value shares obtained by revaluing the values  $q_b$ , the quantities in the weight reference period  $b$ , at the prices of the price reference month 0;

<sup>57</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 219

<sup>58</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 221

- the Lowe index can be expressed as the ratio of the two Laspeyres indices for periods  $t$  and  $0$ , respectively, based on month  $b$ ;
- the Lowe index reduces to the Laspeyres index when  $b=0$ , and to the Paasche index when  $b=t$ .<sup>59</sup>

## 5. Inflation in the world: development and regulations

Researchers distinguish between national, regional and global inflation. In scale of a separate country, object of analysis is dynamics of wholesale, retail and consumer prices and GDP deflator. These indicators are analysed at the level of Unions (the EU) and the world economy as a whole.

### 5.1 Measuring inflation in Germany

Calculation and analysis of the consumer price indices are the central method for inflation measurement in Germany. The country uses two types of this index: the national CPI and the Harmonized Index of Consumer Price (HICP).

The index measurements and announcements are performed with a monthly frequency - in the middle of a month, and the rental rates are defined on a quarterly basis.

The index calculations and presentation are regulated by the Price Statistics Law (Preisstatistikgesetz), the Federal Law of Statistics (Bundesstatistikgesetz) and the EU regulations on HICP.<sup>60</sup>

Collection of price data is performed monthly by about 600 price collectors in 1888 municipalities. The data includes prices of particular fixed number of goods in the same stores. Moreover, prices for certain types of products are learned centrally collected, mainly in mail-order catalogues or via the internet. In total, the number of the monthly collected individual prices exceeds 300,000.

The national index is calculated according to the Laspeyres formula. Elementary aggregates are calculated using the formula of ratio of geometric to arithmetic average. Concerning the base period, 2000 is selected as the national reference year.

The unit of observation is an act of buying. The monitoring is carried out at about 40,000 points, which report.

The consumer basket accounts for around 750 positions. The aggregation of elementary

---

<sup>59</sup>IMF: Consumer price index manual, Hong Kong, 2004, p. 166

<sup>60</sup>Deutsche Bundesbank: Consumer price indices for Germany, 2015, online

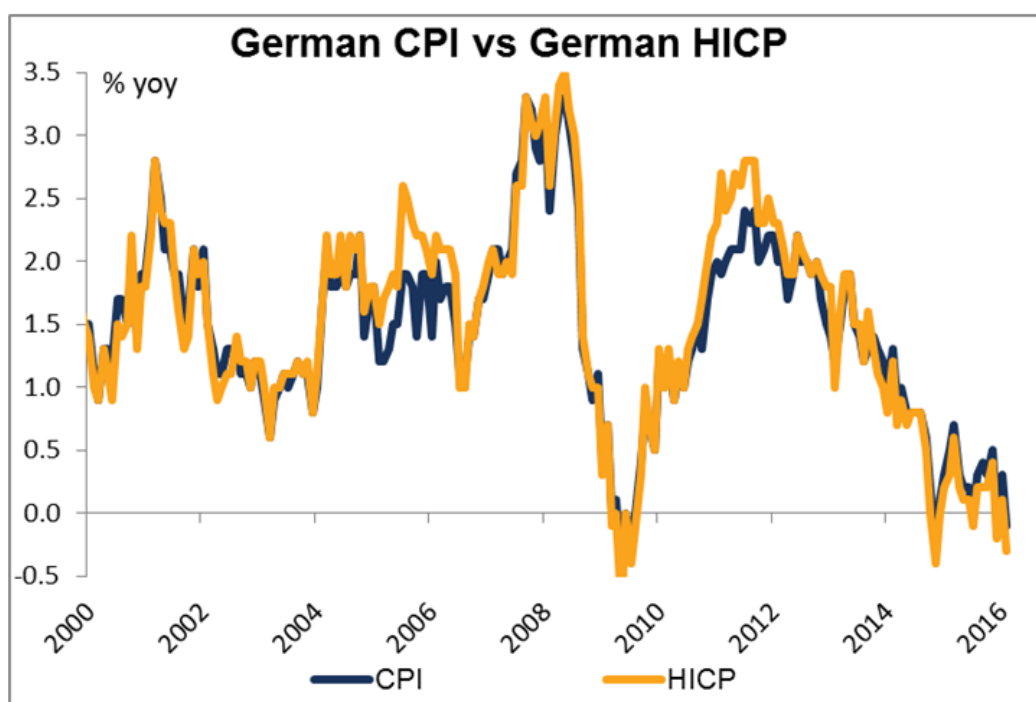
indices is managed also using the Laspeyres method.

The list of goods considered for CPIs is based on the COICOP. The detailing is extended to 12 products classes. The rentals are included in the calculations.

There is a special procedure for missing prices: If an item defined for the price observation purposes is no longer sold or can be available only seldom, another comparable one must be found for replacement.

The weights are updated with a five-year interval.

The German statistics institutions also carry out calculations of special indices for certain federal lands. <sup>61</sup>



**Figure 7 National CPI and HICP (harmonized) in Germany <sup>62</sup>**

The main discussion among German economists, statistical institutions and governmental representatives refer to the following CPI calculation methodology aspects:

- Weighing considering types of stores
- Adjustments to quality
- Types of accommodation and registration of rent
- Core inflation determination
- Subjective inflation, considering buying rate

<sup>61</sup>OECD: Country: Germany Subject: Consumer Price Index, 2015, online

<sup>62</sup>FXPRIMUS: Inflation measures: CPI, GDP deflator, PCE and HICP, 2016, online



- Accounting of fixed and current assets of companies (defining asset inflation)
- Regional comparisons of purchasing power

CPI is calculated in Germany as representative of the household's inflation development along with other economy sectors. The general indices system is shown in Tab1:

<b>Branch of the economy</b>	<b>Input prices</b>	<b>Output prices</b>
<b>Agriculture and forestry</b>	Index of purchase prices for means of agricultural production	<ul style="list-style-type: none"> <li>- Agricultural producer price index</li> <li>- Price index of forestry products manufacturers</li> </ul>
<b>Real economy</b>	Price index of goods receipt	PPI
<b>Building industry</b>		<ul style="list-style-type: none"> <li>- construction price index</li> <li>- price index for finished buildings</li> <li>- maintenance price index</li> </ul>
<b>Trade, catering and hotel industry</b>		<ul style="list-style-type: none"> <li>- wholesale price index</li> <li>- retail price index</li> <li>- price index for catering and hotel industry</li> </ul>
<b>Households</b>	Consumer Price index	Possible indices of tariffs and incomes
<b>Foreign economic activity</b>	Import price index, and index of the average value of imports	Index of export prices and index of the average value of exports

**Tab. 1 CPI in the general system of price indices in Germany<sup>63</sup>**

<sup>63</sup>Deutsche Bundesbank: Consumer price indices for Germany, 2015, online

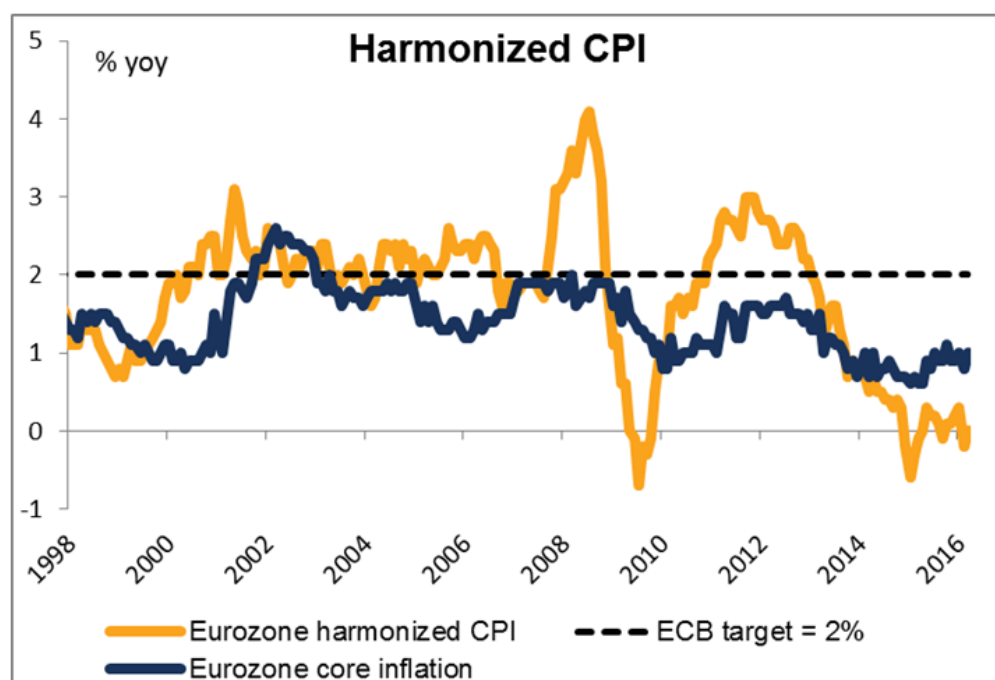
Need of use, principles of calculation and analysis of the harmonized index of consumer prices is described in detail in the next section of this thesis (5.2), because this is an important, relevant for all EU countries inflation indicator.

## 5.2 Inflation monitoring in EU

One of the most actual problems, attracting attention of economists around the world, has been development of the economic situation in the European Union. The crisis and vulnerability of its financial system are seen as the main problems for the GDP growth and economic planning. They also increase uncertainty of the global economy and require urgent solutions, because they cause budget deficits, public finances quality worsening and problem of unemployment. Thus, analysis of the core macroeconomic indicators, including inflation, is decisive for all governments of the Union.

Besides the CPI, inflation expectations are considered in EU as a significant economic factor, needed for macroeconomic predictions. AS a basis, statistics institutions use information published by OECD.<sup>64</sup>

In Europe, the CPI report is officially published monthly by Eurostat. There are several varieties of this index: the usual CPI and the Harmonized Index of Consumer Price (HICP).



<sup>64</sup>Sindair P. Inflation expectations, Routledge, London and New York, 2010, p. 140-143

### **Figure 8 National CPI and HICP (harmonized) in the EU <sup>65</sup>**

The need for development of international standards and harmonization of the CPI calculation methods emerged in Europe in the course of integration association. An important pre-condition at the stage of the monetary union creation was convergence of inflation levels in the EU Member States. For comparison of indices of different countries and the single monetary policy introduction, the EU governments have begun to develop a harmonized methodology for measuring inflation in the 90s. Eurostat, together with national statistical bodies of the EU members had analyzed all aspects of the CPI the compilation. As a result, a standard for Member-States and candidates for EU membership and the harmonized indices of consumer prices were developed. The harmonized CPI is used to bring different approaches to the calculation in the member countries into one line with each other. This index of consumer prices smooths out differences in coverage of goods and services involved in the calculation of national consumer price indices.<sup>66</sup> HICP methodology is used for calculation of a set of consumer price indexes of individual countries or their groups for the purpose of measuring inflation. Calculation of the HICP in individual countries is carried out by national statistical offices in accordance with the agreed approach. Calculations of HICP aggregates are conducted by Eurostat, as the central institution of the European Statistical System.<sup>67</sup>

The HICP index takes into account prices of imported products.

According to suggestions of the European Central Bank, price stability in a region can be reflected with a mark for the euro area inflation of not more that 2% per year. If the index is greater than 2%, possibility of interest rates raising increases.<sup>68</sup>

The Consumer Price Index is adjusted in line with dynamics of business cycle, measured by GDP. There are seasonally adjusted and unadjusted CPI (SA / NSA).

There are also two estimates of CPI:

- the preliminary estimation
- the final CPI announcement

The methodology of calculation of the HICP differs at some degree from the methodology for calculation of national CPIs. Statistical offices of the EU member states calculate along with the HICP their national CPIs, using their own approaches.

---

<sup>65</sup>FXPRIMUS: Inflation measures: CPI, GDP deflator, PCE and HICP, 2016, online

<sup>66</sup>Eurostat: HICP methodology, 2016, online

<sup>67</sup>Eurostat: HICP methodology, 2016, online

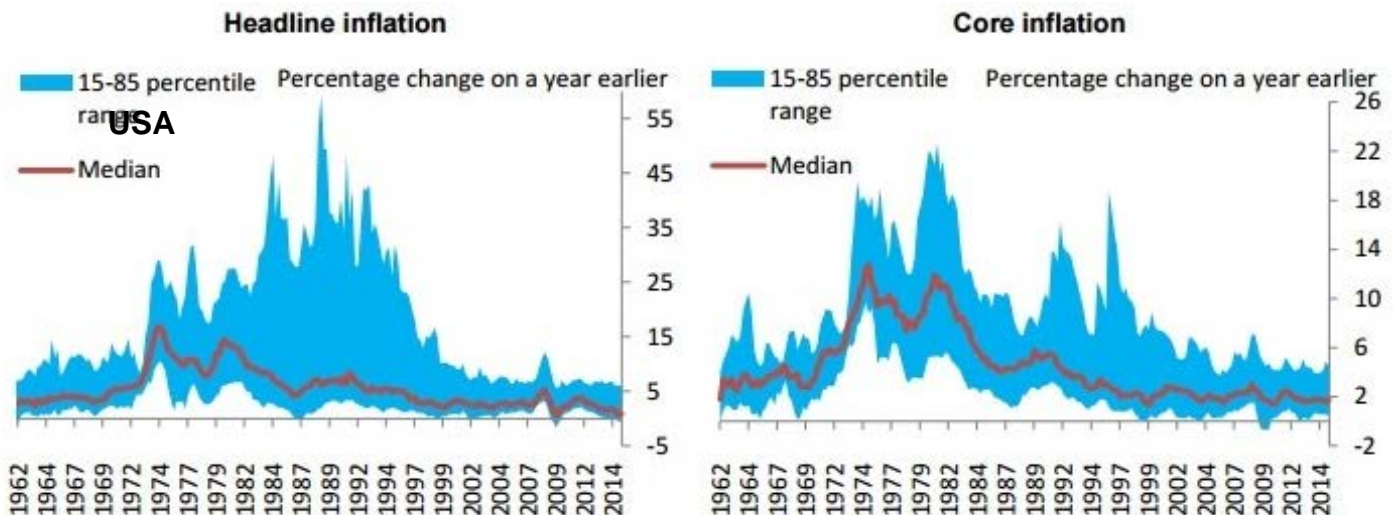
<sup>68</sup>European Central Bank: Measuring inflation – the Harmonised Index of Consumer Prices (HICP), online, 2016

The national indicators are used for internal purposes such as:

- adjustment of social payments
- provision of historical continuity and comparison
- internal analysis of competitiveness of enterprises of particular economic sectors etc.

### 5.3 World experience of the inflation measurement

The Consumer Price Index is an internationally recognized statistical indicator of the level of inflation. OECD and local Central literally equate this figure to express the general rate of inflation, and also divide the indicator in the general (headline) and core inflation <sup>69</sup>



**Figure 9 Inflation dynamics across the world according to Global Financial Data of OECD<sup>70</sup>**

#### 5.3.1 The US experience

The US consumer price index is published at 8.30 am Eastern Time every 15th of the next month after the reporting period. The information is published by the Bureau of Labor statistics, U.S. Department of Labor.<sup>71</sup>

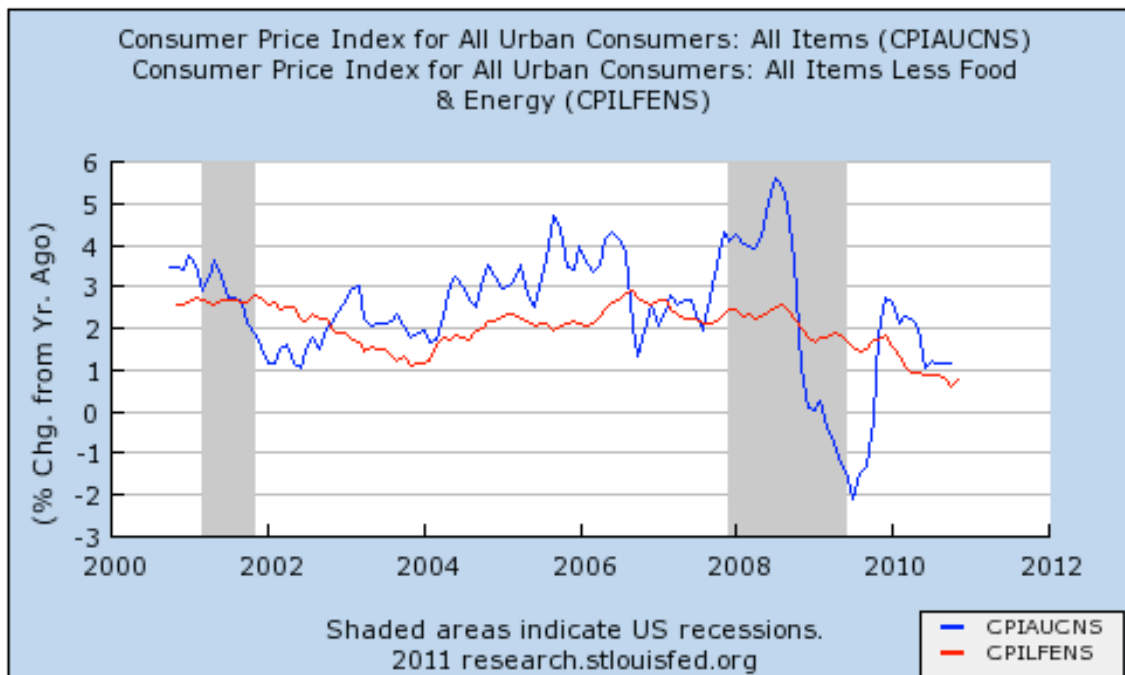
<sup>69</sup>Carney M.: How is inflation affected by globalisation? Bank of England, 2015, online

<sup>70</sup>Carney M.: How is inflation affected by globalisation? Bank of England, 2015, online

<sup>71</sup>FXPRIMUS: Inflation measures: CPI, GDP deflator, PCE and HICP, 2016, online

Two types of the CPI play in the US equally important role. They are:

- the usual CPI
- the core-CPI.



**Figure 10** The usual and the core CPI dynamics in the US<sup>72</sup>

On the financial markets, the CPI is under a special attention. The CPI growth may lead to an increase in key interest rates in the country. This, in turn, leads to an increase of the dollar ratio, as the situation increases attractiveness of investing in this currency at a higher interest rate.

The core CPI calculations are performed by the Organization of statistics of the Ministry of Commerce. The data obtained are used by the US government for development and analysis of effective economic and social policies.

The core consumer price index is published separately, and measures the change in price of goods and services, excluding food and energy products. It measures the change from a consumer perspective. This is a key way to measure changes in global long- and short-term shopping trends and inflation in the US.<sup>73</sup>

If defined indicators are higher than expected, this is perceived in the financial markets as a positive US dollar direction, while obtained indicators below the expected values can result in negative USD market perception. A logic considered is that the common

<sup>72</sup>Rettinger T.: Difference between CPI and Core CPI, 2012, online

<sup>73</sup>Rettinger T.: Difference between CPI and Core CPI, 2012, online

way to fight inflation is raising rates, which may attract foreign investment.<sup>74</sup>

In the US, the statistics covers about 19,000 retail businesses and 57,000 households, considering them as a representative sample of approximately 80% of the population.

Goods represent approximately 44 % of the consumer basket of goods, and the share of services accounts for about 56 %.

The weight of different industries in the indicator is:

- cost of housing and consumer services - 42%
- Food - 18%
- Transport - 17%
- Medicine - 6%
- Clothing - 6%
- Entertainment - 4%
- Other - 7%<sup>75</sup>

The sampling in the US takes place each month. According to its procedure, 78,500 price sources are registered in approximately 25,500 retail stores. Moreover, there are special contracts with more than 48,000 housing units, used to obtain information on rents.

Considering the sampling technique used, a POPS (point-of-purchase survey) serves as a store frame. This supposes that specific range of an item is chosen within each retail store and there is “probability of selection proportionate to sales within the outlet.”<sup>76</sup> 1982-1984

are used as the national reference year (the base period). The data collection and calculations cover all urban areas with population of higher than 2,500 people within the 50 US districts. The Bureau of Labor statistics doesn't take into account US territories.

There are separate calculations of indexes for 27 cities.

The US CPI covers a market basket containing 305 items of entry level that represent all products and services bought for everyday purposes by all urban areas occupants. The calculations exclude any illegal activities and gambling expenses.

The calculations regard expenditures of the urban areas occupants that a share of approximately 87 percent of the overall civilian non-institutional population. Clerical workers and wage earners, technical, professional and managerial workers, short-term workers, self-employed, retirees and unemployed population and other social groups not related to the labor force are excluded from the sample.

Other important aspects of the CPI calculation in the US include:

---

<sup>74</sup>Carney M.: How is inflation affected by globalisation? Bank of England, 2015, online

<sup>75</sup>FXPRIMUS: Inflation measures: CPI, GDP deflator, PCE and HICP, 2016, online

<sup>76</sup>EECD: Country: United States Subject: Consumer Price Index, 2015, online

- The prices taken into account include all discounts, rebates and applicable taxes. Sales coupons are excluded as they have low redemption rates.
- The price information is collected through personal visits of retail stores and CADC-devices (computer-assisted data collection). The method of telephone calls is applied for obtaining information from housing units that are chosen and registered for the survey.
- Prices are usually registered throughout the month. The price collection frequency actually depends on type of considered goods. For example, rent, utilities, food and some other goods are priced monthly, which is relevant for all urban areas. Prices for the rest of the items are monitored monthly in three big urban areas. Prices in other areas are registered every second month.
- The CPI calculations take into account rented housing costs.
- Owner-occupied housing is treated in a specific way: it is included on the base of rental equivalence approach.
- In case a price for considered month is temporarily missing, it is imputed considering available dynamics of the previous periods prices for similar goods of the same item type in the same region.
- Special adjustments are required for quality changes of observed variety of goods and services. If number of items in a new and previous variety is different. The correction can be performed using particular techniques. "The most frequently used technique is an imputation procedure. Direct estimates of the quality differences are sometimes made using information supplied by manufacturers or through the use of hedonic regression models."<sup>77</sup>
- When there is a need to introduce a new product in the list of items for the price monitoring, it must be checked, whether it fits the consumption classification. The procedure of the new products introduction takes place regularly: 20 percent of the items monitored is updated every year.
- An option of variety replacement is possible and needed, when a certain variety is not more available in a retail store. In this case, another product of the same outlet can substitute it. The condition is, it must have similar specifications as the previous variety.
- Treatment of seasonal items like food and apparel for the CPI differs in the US. To include them into calculations, year is shown two parts (seasons), and, in order to

---

<sup>77</sup>OECD: Country: United States Subject: Consumer Price Index, 2015, online

comply with comparability rules, size of the sample is doubled. In order to choose the paired price courses for different seasons, statistics institutions develop price initiation procedures. In case a certain product chosen for the monitoring is out-of-stock, its prices are excluded until it is available.<sup>78</sup>

- Concerning elementary aggregates calculation methodology, for most items, standing for about 60 percent of the overall expenditure weight, they are determined applying the geometric average formula. Basis indexes for rest item categories are calculated with a modified Laspeyres formula: “the price relative is computed as the ratio of two standard Laspeyres indexes (weighted average of price relatives). For each price quotation the current price is compared to its base price (the price of the item at the time the POPS survey was conducted) and multiplied by its quote weight (derived from expenditures reported in the POPS)”.<sup>79</sup>
- The standard Laspeyres formula is applied for the final index. According to the approach, basic index of each month must be multiplied by its weight (in this case- a relative importance), defined in reference period, for which 2003-2004 is chosen. After this procedure they are consolidated to higher levels.<sup>80</sup>

In the US, along with the so-called breakeven rate on TIPS (Treasury Inflation Protected Securities) and actual value of the consumer price index, state institutions use indicator of inflation expectations to make conclusions about trust of the American public to the Federal Reserve System.<sup>81</sup>

The market based approach considers data of financial market and use the following methodology for inflation expectations definition:

$$\begin{aligned}
 i_t^n &= r_t^n + IC_t^n \\
 &= r_t^n + n^{-1} \sum_{i=1}^n E_t \pi_{t+i} + IRP_t^n.
 \end{aligned}$$

82

Although the determination of inflation expectations is an object of great attention in the US, researches of the US Federal Reserve System have revealed the following challenges

<sup>78</sup>OECD: Country: United States Subject: Consumer Price Index, 2015, online

<sup>79</sup>OECD: Country: United States Subject: Consumer Price Index, 2015, online

<sup>80</sup>OECD: Country: United States Subject: Consumer Price Index, 2015, online

<sup>81</sup>Bauer M.: Inflation Expectations and the News, Federal Reserve Bank Of San Francisco, Working Paper Series, 2014, p. 4

<sup>82</sup>Bauer M.: Inflation Expectations and the News, Federal Reserve Bank Of San Francisco, Working Paper Series, 2014, p. 4



of its application:

1. Households tend to overstate inflation expectations comparing to the actual inflation growth probability.
2. If a survey refers to quantitative estimates, there is a higher probability that tell they expect inflation at a rate of 0, 3 or 5% than 1, 2 or 4%.
3. Research results depend on the demographic composition of respondents
  - Expectations of women, on average, are higher than that opinion of men;
  - People with lower income give higher estimates of possible future inflation than rich ones;
  - the young and the elderly also tend to express higher inflation expectations than middle-aged respondents<sup>83</sup>

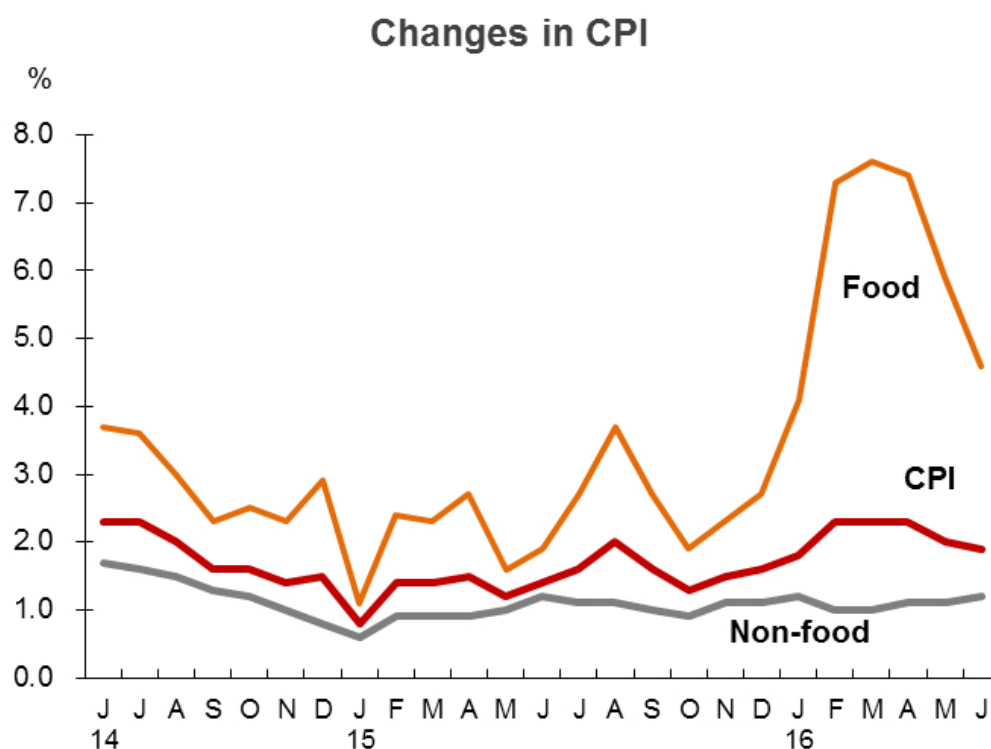
### **5.3.2 Inflation measurement in China**

The economy of the People's Republic of China is the second big economy in the world in terms of GDP since 2010. This fact determines the high interest to any changes of macroeconomic indicators in the country and their ability to be predicted, especially when it comes to inflation.

CPI in China is also among one of the key indicators of inflation or deflation and is used to calculate the subsistence wages and to develop certain private labor agreements.

---

<sup>83</sup>Pianalto S.: Inflation, Inflation Expectations, and Monetary Policy, Federal Reserve Bank of Cleveland, 2006



**Figure 11** *CPI dynamics in China* <sup>84</sup>

Official Chinese statistics uses the Young index formula for calculation of CPI. But some economists find few significant defects in the way these calculations are conducted.<sup>85</sup> Firstly, institutions of statistics in China neglect during the CPI calculation the rise in gasoline and housing prices. It is logic though that if such prices are included in the index, in case of their increase a further increase of the CPI value will be resulted.

The housing price information preparation is still oriented on the 2002 outdated standard. This is why with the Chinese allocation environment and cooperative housing construction the housing expenditures take a small share of the overall household costs. But a few years long tendency of the real estate prices increase led to the fact that housing costs now occupies a significant part in total household expenditures. Without considering the housing price rising, the CPI calculation cannot represent the real CPI.

In addition to housing prices and oil prices, particular new categories of products are not taken into account or are included in the calculations not adequately because of irregular adjustments. The CPI can't be representative not containing these new categories. Another problem concerns, the system of data collection, which can cause insufficient quality of information. „The current CPI calculation model has its sequential steps of

<sup>84</sup>Pianalto S.: Inflation, Inflation Expectations, and Monetary Policy, Federal Reserve Bank of Cleveland, 2006

<sup>85</sup>Yifan Y, Muyun W.: An Analysis on the Defects of Chinese CPI Calculation, 2009, p. 12

operations: the selection of representative categories, followed by price sampling spots selection, calculation of weights and average prices, and finally the CPI calculation. Therefore, the basic data are generated from sampling. The unavoidable sampling error would also affect the CPI calculation. To generate the CPI source data, the sampling spots are decided by sorting the commercial centers with total sales first and then chosen through equidistant sampling.”<sup>86</sup>

## 6. Conclusion

Inflation is seen by participants of the modern economy as one of the most disturbing problems of the total economic development in many countries, which also negatively affects social conditions, stability and increases political stress.

There are different views on the nature and causes of inflation, but they are generally affected by two trends:

1. The first one considers inflation as a purely monetary phenomenon caused by violation of currency laws;
2. The second one interprets inflation as a macroeconomic phenomenon, caused by violation of proportions of social reproduction, and especially between production and consumption, supply and demand of economic goods.

But inflation is a complex, multifaceted phenomenon and its causes are determined by interaction of production aspects and the sphere of money circulation.

Consumer Price Index is one of the most important and informative indicator calculated to measure level of inflation in economy.

CPI reflects relation of price for a standard basket of goods and services to price of the same basket in the previous period. Thus, it enables to measure rate of growth or fall in consumer prices for the goods considered.

The consumer price index it not applied to any investment purchases and takes into account only those costs that are created by consumer when buying goods of general use. Content of the basket may change from time to time depending on current consumer preferences.

CPI is an important economic indicator because it reflects inflation from the standpoint of

---

<sup>86</sup>Yifan Y, Muyun W.: An Analysis on the Defects of Chinese CPI Calculation, 2009, p. 13-14

consumers, which enables to make various strategic economic conclusions. For example, CPI is an important factor for central banks, when they make decisions about interest rate changes and intent to adjust the whole monetary policy.

The index is usually calculated on a quarterly or monthly basis and represents a weighted average of various articles of consumer spending, such as food, utilities, clothing, appliances, electronics, etc. In turn, each of these components is also calculated on the weighted average basis.

Calculation of CPIs can be performed using various formulas of indexes, as it can be concluded from recommendations given by international organizations, including IMF and ECB. These formulas must be chosen and preferred in accordance with principles of the axiomatic theory of indices, one of the developers of which was Fisher. The axiomatic theory of indices supposes that the formula choice must be confirmed by particular accordance tests. It is important to note, that there is no index formula that complies with all possible tests. Thus, it is extremely important to check before accordance calculations, whether all information needed is available or there is access to obtain it.

The consideration of different inflation measurement systems, namely in Germany, in the EU and the USA and China, as examples of the world experience, has shown that in all countries considered the CPI is the central figure when analyzing macroeconomic developments under the influence of inflation.

The methodology of the CPI calculation is also similar in all regions analyzed. It consists of two steps:

- Elementary aggregates calculations
- The consolidated CPI. The Laspeyres index is the most frequent formula chosen for its definition.

## References

Argy V., Neville J.: Inflation and Unemployment: Theory, Experience and Policy Making, Routledge, London and New York, 2016

Arnold R.A.: Macroeconomics, South-western Cengage learning, Mason, 2010

Congdon, T.: Keynes, the Keynesians and Monetarism, Edward Elgar, 2007

Dwivedi D.N.: Principles of Economics, 2Nd Edition, New Delhi, 2005

D.E.: O'Connor: The Basics of Economics, Green Wood Press, Westport, 2004

Kennedy M.M.J.: Macroeconomic Theory, PHI Learning, New Delhi, 2011

Auerbach A.J, Kotlikoff L.J.: Macroeconomics: An Integrated Approach, Second edition, 1998

Jain C.L., Tomic I.M.: Essentials of Monetary and Fiscal Economics, published by GPC, New York, 1995

Hall R. E., Lieberman M.: Macroeconomics: Principles and Applications, Cengage learning, 2009

Mishra R.: Industrial Economics and Management Principles, Laxmi publications, New Delhi, Boston, 2008

Bandyopadhyay T., Ghatak S.: Current Issues in Monetary Economics, Barnes & Noble Books, Maryland. 1990

Jadresic E.: The Macroeconomic Consequences of Wage Indexation Revisited, IMF working paper 1998

Kolodko G.W.: Social and Political Aspects of Inflation, Journal of Translations, spring 59

1989, p. 50-60

Lewis W.A.: Principles of Economic Planning, Routledge, 2003

Leijonhufvud A.: Theories of stagflation, Los Angeles, 1980

Maheshwari Y.: Investment Management, Eastern Economy Edition, New Delhi, 2008

Tucker I.B.: Economics For Today, Cengage Learning, 2015

Haberler. G: Inflation. Its Causes And Cures, American Enterprise Association Washington, June 1960

Frish H.: Theories of inflation, Cambridge University Press, 1984

Braumann B., IMF: Real effects of high inflation, IMF working paper, 2000

Dwivedi D.N.: Macroeconomics: Theory and Policy, 2005

Weaver R.: Automatic Government: The Politics of Indexation, Washington, 1988

Burdekin R, Siklos R.: Deflation: Current and Historical Perspectives, Cambridge University press, 2004

Brezina C.: How Deflation Works, Rosen Publishing, 2011

IMF: Producer Price Index Manual: Theory and Practice, 2004

IMF: Consumer price index manual, Hong Kong, 2004

Sindair P. Inflation expectations, Routledge, London and New York, 2010

OECD: Counter-Cyclical Economic Policy, 2010

<https://www.oecd.org/tax/public-finance/45105376.pdf>

The World Bank: Inflation, consumer prices (annual %), 2015

<http://data.worldbank.org/indicator/FP.CPI.TOTL.ZG>

Bauer M.: Inflation Expectations and the News, Federal Reserve Bank of San Francisco, Working Paper Series, 2014

<http://www.frbsf.org/economic-research/files/wp2014-09.pdf>

COICOP

[https://www.statistics.gov.my/dosm/uploads/files/4\\_Portal%20Content/3\\_Methods%20%26%20Classifications/3\\_Codes%20%26%20Classifications/3\\_Economic%20Classifications/COICOP.pdf](https://www.statistics.gov.my/dosm/uploads/files/4_Portal%20Content/3_Methods%20%26%20Classifications/3_Codes%20%26%20Classifications/3_Economic%20Classifications/COICOP.pdf)

OECD: Country: Germany Subject: Consumer Price Index, 2015, onlineim Internet

<http://stats.oecd.org/mei/default.asp?lang=e&subject=8&country=DEU>

OECD: Country: United States Subject: Consumer Price Index, 2015, onlineim Internet

<http://stats.oecd.org/mei/default.asp?lang=e&subject=8&country=USA>

Pianalto S.: Inflation, Inflation Expectations, and Monetary Policy, Federal Reserve Bank of Cleveland, 2006

<https://www.clevelandfed.org/en/newsroom-and-events/publications/economic-commentary/economic-commentary-archives/2006-economic-commentaries/ec-20060915-inflation-inflation-expectations-and-monetary-policy.aspx>

CPI reports by the US Bureau of Labor statistics

<http://www.bls.gov/cpi/tables.htm>

Yifan Y, Muyun W.: An Analysis on the Defects of Chinese CPI Calculation, 2009, onlineim Internet

<http://www.yau-awards.org/English/N/N64-An%20Analysis%20on%20the%20Defects%20of%20Chinese%20CPI%20Calculation.pdf>

Carney M.: How is inflation affected by globalisation? Bank of England, 2015, onlineim

Internet

<https://www.weforum.org/agenda/2015/08/how-is-inflation-affected-by-globalisation/>

Deutsche Bundesbank: Consumer price indices for Germany, 2015, onlineim Internet

[https://www.bundesbank.de/Navigation/EN/Statistics/Enterprises\\_and\\_households/Prices/prices.html](https://www.bundesbank.de/Navigation/EN/Statistics/Enterprises_and_households/Prices/prices.html)

European Central Bank: Measuring inflation – the Harmonised Index of Consumer Prices (HICP), onlineimInternet , 2016

<https://www.ecb.europa.eu/stats/prices/hicp/html/index.en.html>

Eurostat: HICP methodology, 2016, online im Internet

[http://ec.europa.eu/eurostat/statistics-explained/index.php/HICP\\_methodology](http://ec.europa.eu/eurostat/statistics-explained/index.php/HICP_methodology)

Elbel K.G., Preißmann J.: Jährliche Neugewichtung des Harmonisierten

Verbraucherpreisindex, Statistisches Bundesamt, Wirtschaft und Statistik, August 2012

[https://www.destatis.de/DE/Publikationen/WirtschaftStatistik/Preise/NeugewichtungHVPI\\_82012.pdf;jsessionid=9389099717122DFA62253CFB0D82DE05.cae2?\\_blob=publicationFile](https://www.destatis.de/DE/Publikationen/WirtschaftStatistik/Preise/NeugewichtungHVPI_82012.pdf;jsessionid=9389099717122DFA62253CFB0D82DE05.cae2?_blob=publicationFile)

Rettinger T.: Difference between CPI and Core CPI, 2012, onlineim Internet

<http://www.economicshelp.org/blog/2587/inflation/difference-between-cpi-and-core-cpi/>

Stagflation in Short-Run Phillips Curve, online im Internet

<http://www.economicdiscussion.net/phillips-curve/stagflation-in-short-run-phillips-curve/3031>

FXPRIMUS: Inflation measures: CPI, GDP deflator, PCE and HICP, 2016, onlineim Internet

<http://www.integritas.asia/inflation-measures/>

HKTDC Research: Economic and Trade Information on China, 2016, onlineim Internet

<http://china-trade-research.hktcdc.com/business-news/article/Fast-Facts/Economic-and-Trade-Information-on-China/ff/en/1/1X000000/1X09PHBA.htm>



Weidenaar D.J.: Anti-Inflationary Policies, online im Internet  
<http://ageconsearch.umn.edu/bitstream/17310/1/ar790045.pdf>

## List of Figures and Tab.

Figure 1 Demand-pull inflation .....	16
Figure 2 Cost-push inflation .....	18
Figure 3 Keynesian inflation model .....	17
Figure 4 Monetarist model of inflation .....	28
Figure 5 CPI aggregation structure according to IMF and COICOP .....	35
Figure 6 National CPI and HICP (harmonized) in Germany .....	46
Figure 7 National CPI and HICP (harmonized) in the EU .....	49
Figure 8 Inflation dynamics across the world according to Global Financial Data of OECD .....	49
Figure 9 The usual and the core CPI dynamics in the US .....	51
Figure 10 CPI dynamics in China .....	56
Figure 12CPI dynamics in China.....	56
Tab. 1CPI in the general system of price indices in Germany.....	48

# Appendix I

## Zusammenfassung

Das Phänomen der Inflation ist typisch für jede Marktwirtschaft in unterschiedlichem Maße, unabhängig davon, wie entwickelt ein Land ist. Praktische Relevanz des Inflationsproblem ist ändern auf der ganzen Welt durch Zahlen der jährlichen Verbraucherpreise bestätigt. Das heißt, die Regierungen müssen immer Veränderungen genau zu überwachen und schnell reagieren, um mögliche entsprechend scharfen wirtschaftlichen, sozialen und politischen Auswirkungen zu mildern.

Der Verbraucherpreisindex ist einer der am häufigsten verwendeten Preisindizes, die eine wichtige Rolle in der Wirtschaft spielt, da es sich um ein Grundwert ist, Sozialleistungen und andere Zahlungen dienen erneute Überprüfung der Löhne.

Diese These wird auf Verbraucherpreisindex (CPI) als eine der wichtigsten Methoden der Inflationmessung konzentriert. Das Ziel ist, CPI, seine wirtschaftliche Rolle zu definieren und verschiedene Prinzipien festlegen und nähert sich seiner Berechnung und Anwendung.

Die Arbeit ist folgendermaßen aufgebaut: Kapitel 1 ist Einleitung. In Kapitel 2 werden die wichtigsten und bezüglichen Definitionen von Inflation, Typen von Inflation, Ursachen usw. erklärt und diskutiert. In das dritte Kapitel wird die Theorien über Inflation kurz beschrieben. Im vierten Kapitel wird besonders auf den CPI dargestellt. Davon wird es auf zwei wichtigen Teilen (allgemeine System der Indizes für die Messung der Inflation und Verbraucherpreisindex (CPI)) aufgeteilt.

Für die Frage, wie die Inflation auf die Welt(Deutschland, EU, etc.) besonders durch CPI bemessen und kontrolliert, ist wird in Kapitel 5 diskutiert.

In Kapitel 6 wird es am Ende durch obigen Kapitels zusammengefasst, welchen Trends von Inflation es gibt und wie CPI a Rolle spielt.