1 Introduction

1.1 Justification of the study

Since 2000, Tajikistan has experienced prominent economic growth. The average rates of economic growth for the period of 2000-2012 exceed 7 percent (AGENCY ON STATISTICS OF TAJIKISTAN [AS], TAJIKISTAN IN FIGURES, 2013). The main drivers of recent growth were labour migration and remittances on the one hand and the Agricultural Sector on the other hand. The number of labour migrants in 2013 constitutes 1.2 million (FEDERAL MIGRATION SERVICES OF RUSSIAN FEDERATION, 2014). In 2013, remittances were approximately equivalent to 4.2 billion USD (RUSSIAN CENTRAL BANK, 2014) thus being twice as high as the state budget and equivalent to nearly 50 percent of GDP. Remittances are the second most important source of the population's income after wages and constitute 35 percent of the population's income (AS, INCOME AND EXPENDITURE OF POPULATION IN TAJIKISTAN, 2013).

The agriculture and food sectors in Tajikistan are important for economic development and food security. Official statistics and Labour Force Survey (LFS) data indicate that 45-65 percent of the labour force is employed in the agricultural sector (AS, LABOUR MARKET IN TAJIKISTAN, 2010)[1]. The majority of the population (73 percent) live in rural areas and depend economically on agriculture (AS, POPULATION IN TAJIKISTAN, 2014). In 2013, the agricultural sector ensured 21 percent of the country's GDP, although this figure was 35 percent in 1995 (AS, TAJIKISTAN IN FIGURES, 2014).

In 2008, transfer from the agricultural sector to the state budget in the form of tax revenue was equal to 33 percent. The share of the agricultural sector in exports (via cotton fibre, vegetables and fruits) was 30 percent in 2008. In poorer economies like Tajikistan, food comprises a large (65.6 percent) share of consumption (AS, TAJIKISTAN IN FIGURES, 2010).

During the transition from the Soviet era to independence, the agricultural sector of Tajikistan faced different price incentives and structural adjustments.

However, some obstacles in the sector limit its potential for being healthy, competitive and substantial. The main obstacles are:

- Tajikistan is a small, mountainous (93 percent of territory) and landlocked country;
- poor infrastructure and high transportation costs;

[1] Respectively in accordance with official current statistics and the 2009 Labour Force Survey (LFS).

- high rate of population growth;
- lack of qualified labour force in the agricultural sector due to migration (internal and international labour migration);
- declining productivity and agricultural income in recent years;
- agricultural sector and sectoral policy still in transition;
- food insecurity;
- scarcity of resources;
- environmental pollution and land degradation;
- water scarcity due to inadequate irrigation systems;
- existence of tariffs and non-tariff international trade barriers.

The increasing importance of scarce natural resources for agricultural production, trade and development need to be considered in the context of stable population growth and increasing population density, the steady inflow of remittances which has an ambiguous effect on the economy, as well as water scarcity and land degradation.

Analytical assessments of the impact of agricultural and trade policies on Tajikistan's economy are rather rare (e.g. POMFRET, 2007), so far, neither partial nor general equilibrium models have been applied for the analysis. This study is designed to fill this research gap.

1.2 Objectives

The objectives of the study are:

- to assess the agricultural policy of Tajikistan;
- to analyse the impact of changes in macroeconomic conditions (population growth, remittances, trade policy, agricultural policy, exchange rates), as well as of water availability and land degradation on the agricultural sector of Tajikistan;
- to develop policy-oriented recommendation s in order to improve the agricultural, trade and food sectors, ensure food and nutrition security, as well as maximise producer, consumer and overall welfare.

1.3 Research questions

a. How does the inflow of remittances, population growth and exchange rates influence production and trade of various agricultural products?

b. How does water scarcity and continued land degradation in Tajikistan influence production, consumption, trade, and the welfare of farmers, consumers and the Tajik society?

c. How are consumers, producers and the state budget affected by different policy options?

d. Which agricultural products would benefit most from international and regional trade liberalization and from regional agricultural policy reforms?

e. How does the value of agricultural production and the balance of trade change under official and depreciated exchange rates?

1.4 Methodology

There are two methodologies which serve as the basis for this study: the Producer Support Estimate (PSE) of OECD for measuring agricultural support for Tajikistan and the Partial Equilibrium (PE) Model. The PE model for the analysis is AGRISIM – an *ex-ante*, non-linear, multi-market, and multi-region net trade model. The linkage between these two methodologies is that some of the calculated agricultural support figures serve as input data in the AGRISIM Model.

In addition to the present structure of the model, two new exogenous variables, land degradation and water availability, are included in the supply function in order to reflect their importance for the agriculture of Tajikistan.

Population growth, income increase and remittances are included in the demand function as an exogenous variable.

The agricultural sector of Tajikistan will be modelled explicitly.

1.5 Structure of the study

The thesis is divided into six chapters and an executive summary. The first chapter is the introductory part. Justification, objectives and research questions, methodology and structure of the study are addressed in this chapter.

The second chapter is devoted to the analysis of the main macroeconomic and socio-demographic trends in the country, as well as to the development of agricultural policy and trends, and to the development of trade policy. The agricultural policy and agricultural trends section, Subchapters 2.3.1 through 2.3.4, address the issues of institutional reform, agricul-

tural land, land-use and land degradation, water-use and a descriptive analysis of the main agricultural development trends during the last two decades. A trade policy subchapter is devoted to Tajikistan's WTO accession and the planned country accession to the Common Economic Space (CES) of Belarus, Kazakhstan and Russia.

The third chapter deals with measuring agricultural support in Tajikistan. For the measurement of agricultural support, the study uses the Organization for Economic Cooperation and Development (OECD) approach, such as Producer and Consumer Support Estimates, Nominal Protection Coefficient (NPC), Nominal Assistance Coefficient (NAC), Total Support Estimate (TSE), General Service Support Estimate (GSSE), Single Commodity Transfer (SCT), Excess Feed Cost (EFC), etc. Calculation of agricultural support indicators is carried out for various agricultural commodities included and not included in the model.

Chapter four lays the theoretical basis. This chapter has six subchapters and each subchapter has sub-sections. The first subchapter discusses the Partial Equilibrium (PE) Model used in this study, its advantages and constraints compared to a Computable General Equilibrium (CGE) model. The second subchapter is devoted to the theoretical analysis of remittances and the exchange rate. The main principles and determinants of welfare changes are discussed in the third subchapter. Welfare effects of taxation and welfare effects of international trade are interpreted theoretically in the next two subchapters. The last subchapter lays the theoretical basis of currency appreciation and depreciation effects on the importing and exporting country.

Chapter five is devoted to the empirical model used in this study, to the analysis of simulation results and discussion. Two sets of five scenarios each (including the base assumption) are simulated. The first set is run assuming the current exchange rate, while the second set utilises an experimental 10 percent depreciated exchange rate. The structure of the Partial Equilibrium net trade AGRISIM model is described in Subchapter 5.1 and equations of AGRISIM are in Subchapter 5.2. Subchapter 5.3 describes the base assumption and scenarios. Interpretations of simulated results are described in Subchapters 5.4-5.8 of this chapter. The last subchapter is a discussion part.

The last chapter refers to conclusions and policy implications. An executive summary in English and German languages, references and annexes close this study.

2 Tajikistan's Main Macroeconomic and Socio-Demographic Trends

Tajikistan is a small and landlocked country located in Central Asia. It shares borders with Afghanistan to the south, China to the east, Kyrgyzstan to the north and Uzbekistan to the west and north. Tajikistan is a former Soviet Republic that became independent on 9 September 1991, before the USSR's complete collapse. The climate is continental, subtropical and semiarid, with some desert areas. The average temperature in July ranges from 23 to 30 °C (73.4 to 86 °F) and 1-3 °C above zero (30.2 to 37.4 °F) in January. Mountains constitute 93 percent of the country's territory.

In February 2013 the total population reached 8 million. The annual rate of population growth from 2000-2012 was 2 percent. The countryside is home to ¾ of the population. The average rate of economic growth for the period of 2000-2013 was 7.4 percent (AS, TAJIKISTAN IN FIGURES, 2011). The median age in 2011 was 24.7 years. In 2011 GDP per capita (Purchasing Power Parity, current international dollar) was 2,324 USD. Net inflow of Foreign Direct Investment (FDI), Net Official Development Assistance (Net ODA), Foreign Direct Investment and inflows of remittances in 2009 constituted, respectively, 0.3, 8.3 and 35 percent of GDP (UNDP, HUMAN DEVELOPMENT REPORT [HDR], 2011). The inflow of remittances since 2004 and the stable economic growth that began in 2000 play important roles in poverty reduction.

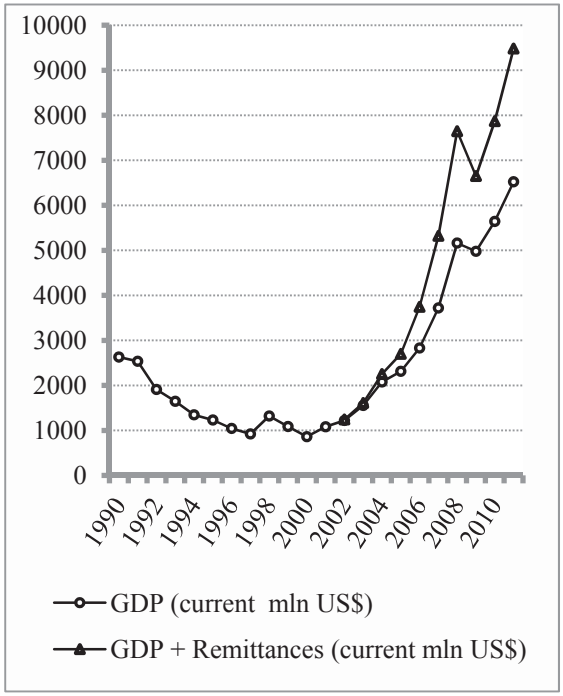
2.1 The main macroeconomic developments

In order to define the impact of changes in macroeconomic conditions on the agricultural sector of Tajikistan, it is necessary to know what is going on in the economy at a macro level and what is behind economic growth or decline.

This chapter deals with the analysis of the main macroeconomic and socio-demographic trends, as well as agricultural and trade policies. The impact of inflow of remittances on macroeconomic indicators and economic growth will also be examined in this part.

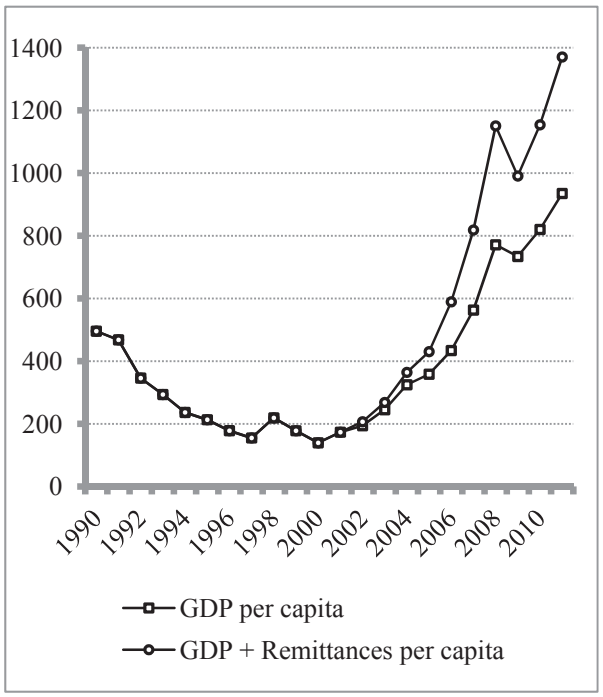
Since independence the economic development trends can be divided into two phases. For the period of 1990-1997 a declining economy was to be observed. A recovery of the economy (growth) started in 1998. Hence, the U-shaped transition of GDP can be observed. The average annual rate of growth of real GDP during 2000-2010 was 7.4 percent and a stable GDP per capita was ensured. Despite the negative impact of the recent 2008 global financial and economic crisis, real GDP growth during 2009 and 2010 was 3.4 and 6.2 percent respectively (Figures 2.1.1 and 2.1.2).

Figure 2.1.1: Gross Domestic Product and Remittances (current million USD)



Source: Own compilation based on World Development Indicators of World Bank, 2012

Figure 2.1.2: GDP and Remittances (per capita, current USD)

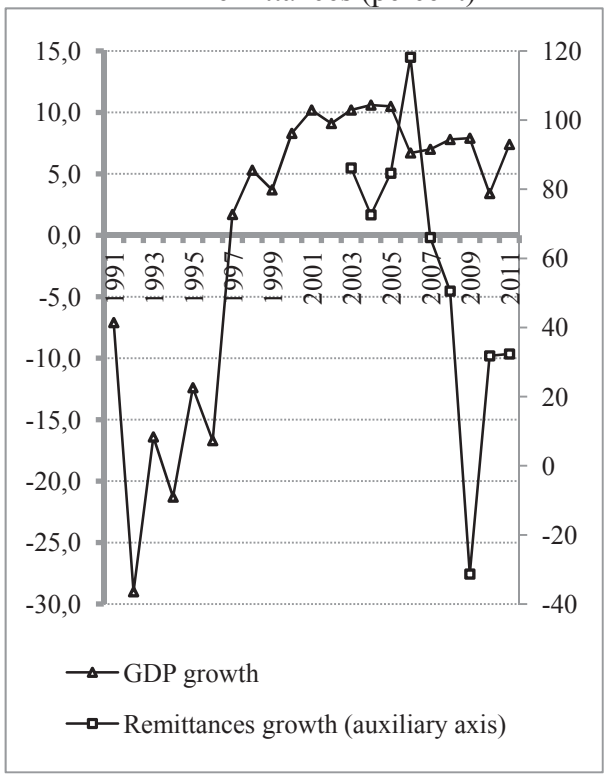


Source: Own compilation based on World Development Indicators of World Bank, 2012

There is no consensus among scientists on the inclusion of remittances as a source of export earnings; so far, it is not considered a source of foreign exchange inflows from exports of goods and services. However, it is wrong to ignore the huge influence of inflow of remittances on the macroeconomic level. In Tajikistan, the remittance-to-GDP ratio was 40 percent on average for 2005-2012. Therefore, it is one objective of this study to reflect the effect of remittances at the macro and micro levels. Moreover, one set of scenarios is developed based on the impact of remittances on the exchange rate.

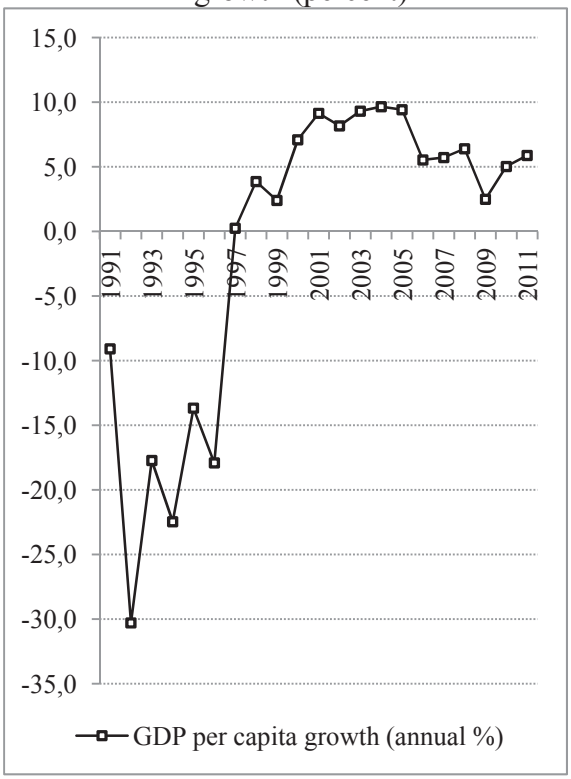
Annual percentage growth rates of GDP, per capita GDP and remittances are represented in Figures 2.1.3 and 2.1.4. Since 1997, a positive growth of GDP and GDP per capita has observed, after being negative during the period of 1991-1996. Remittances have substantially grown since 2003. An exception is 2009, due to the echo of the world financial crisis that led to decreases in the number of seasonal labour migrants and their remittances.

Figure 2.1.3: Annual growth of GDP and Remittances (percent)



Source: Own compilation based on World Development Indicators of World Bank, 2012

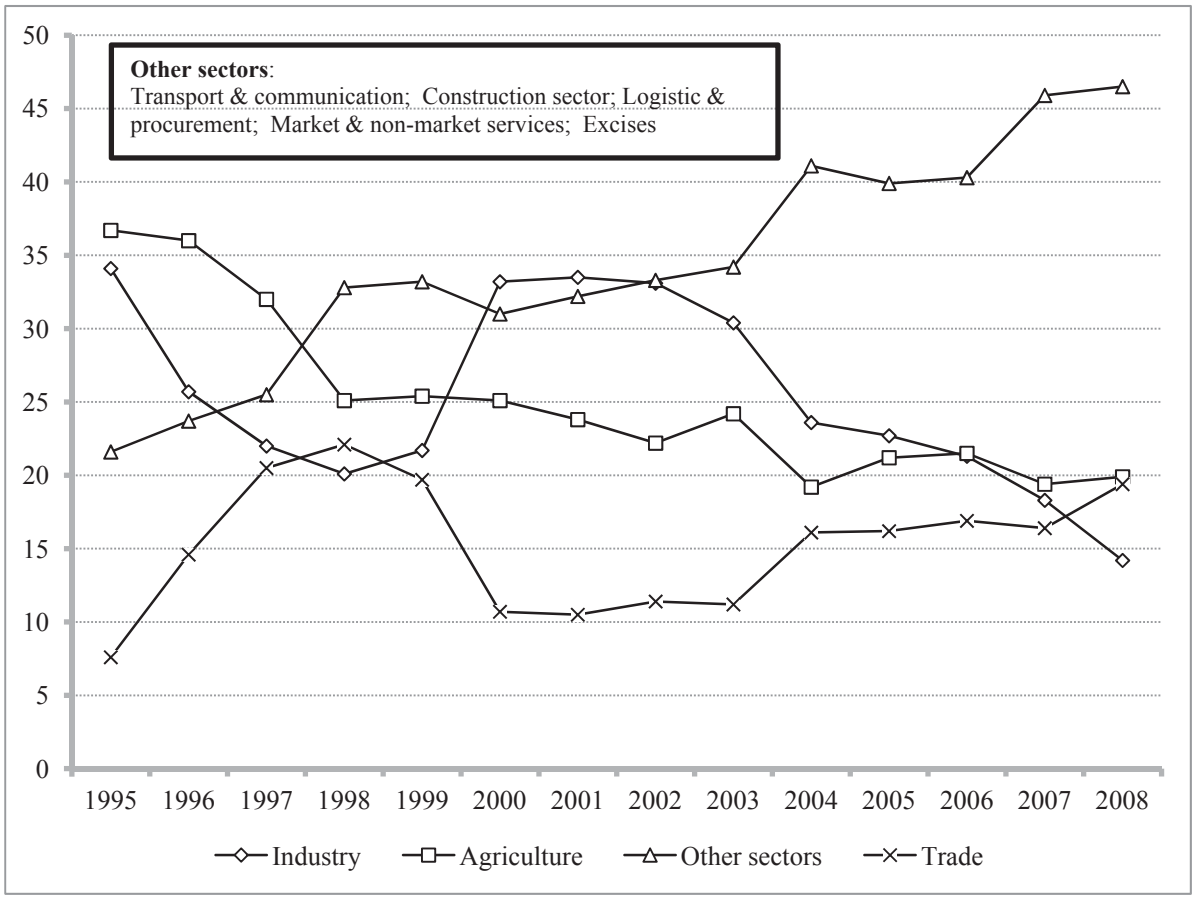
Figure 2.1.4: Annual GDP per capita growth (percent)



Source: Own compilation based on World Development Indicators of World Bank, 2012

An analysis of the nominal GDP by economic sector reveals that the trade and agricultural sectors are the two most important sectors in the country's economy. In 2008 the shares of these two sectors of GDP were almost 20 percent each, although in 1995 the share of the agricultural sector was 35 percent, while the share of the trade sector was close to 8 percent. The decrease of the share of the agricultural sector is not related to a decline in value-added of the sector for the period, which will be discussed in more detail in Subchapter 2.3, but is related to the rate of growth of the other sectors (Figure 2.1.5).

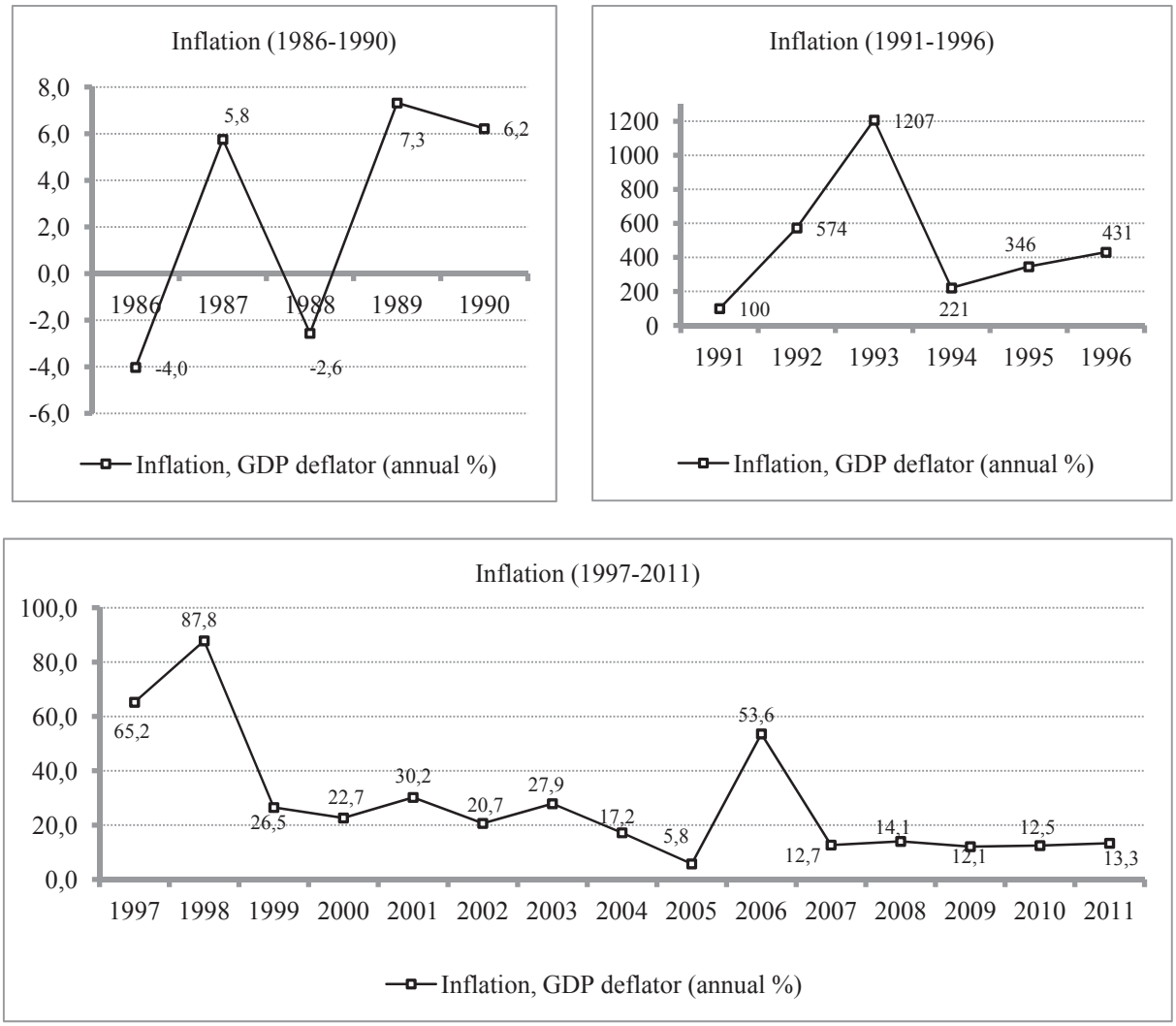
Figure 2.1.5: Nominal GDP by economic sectors (percent)



Source: Own compilation based on the data of AS, Statistical yearbook (2004 and 2010) "Socio-economic indicators".

The path of inflation in the observed period can be divided into three phases: the Soviet time (1986-1990) with low inflation or deflation; 1991-1996 as a period of hyperinflation, seeing the collapse of the planned economy and the basis for transition to a market economy and deep economic crisis; 1997-2011, a period of economic revival and the beginning of stable growth. During the last four years, inflation has stabilized although still in double-digit figures (Figure 2.1.6).

Figure 2.1.6: Inflation rate, GDP deflator

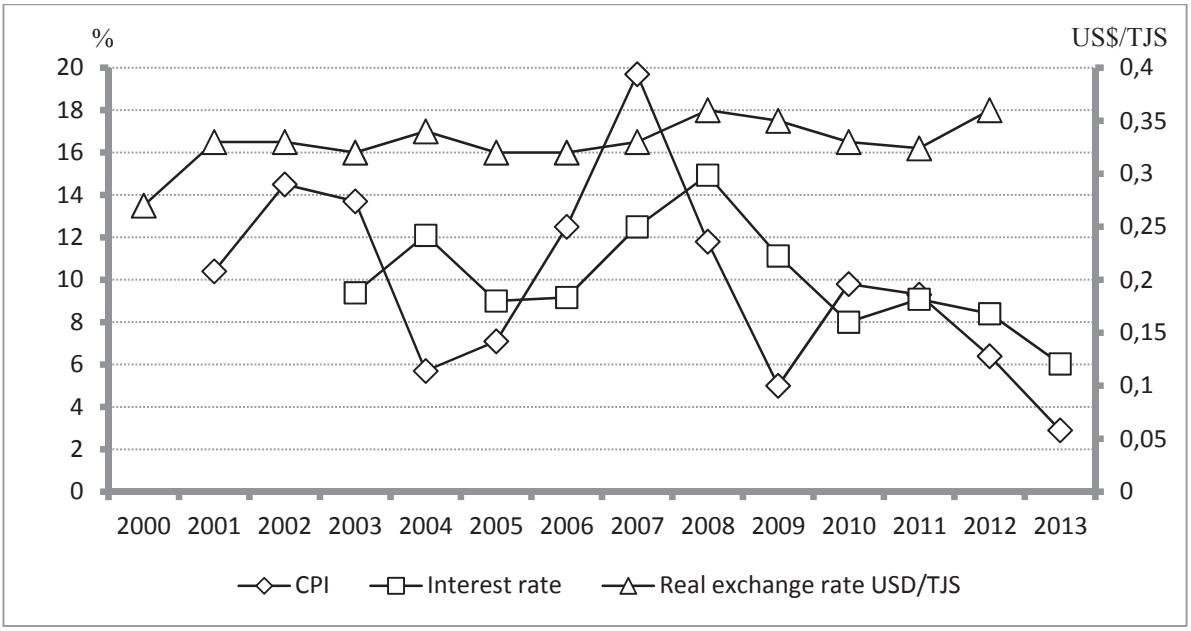


Source: Own compilation based on World Development Indicators of World Bank, 2012.

A higher fluctuation of the interest rate is observed for the whole period. The interest rate tends to decline since 2011. The interest rate was highest in 2008. As is revealed in the figure below, an exchange rate appreciation could be observed recently. The causes of the exchange rate appreciation and the real exchange rate trends development and other exchange rate changes indicators are addressed in Chapter 4 (Subchapter 4.2) and in Chapter 5 (discussion part, Subchapter 5.4). During the whole observed period, consumer price indices (CPI) fluctuated (Figure 2.1.7). The main source of higher and lower inflation of the CPI is related to the fluctuation of the oil price on the world market (Tajikistan is a net importer) and to the high inflation in the service sector. It is worth noting that the relationship between interest rate and exchange rate in Tajikistan during the last 12 years is contradictory (in some years) to theory

and some findings of recent studies. In the discussion part, the theoretical linkages between CPI, interest rate and real exchange rate will be addressed in detail.

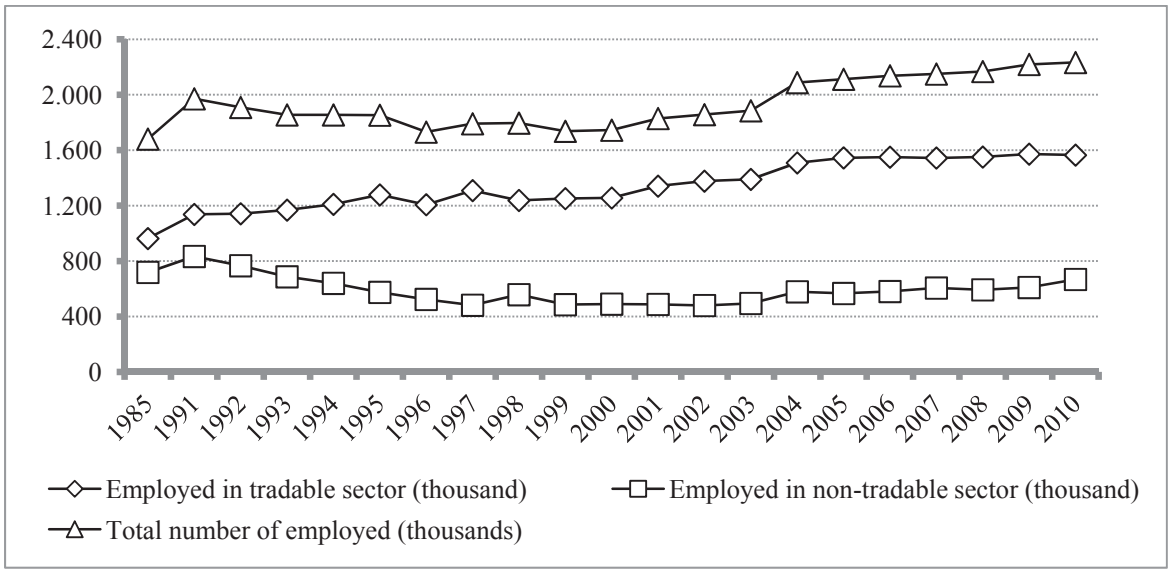
Figure 2.1.7: CPI, Interest Rate and Real Exchange Rate



Source: Own compilation based on the data of AS, "Tajikistan in Figures, 2012".

According to Agency on Statistics data for the whole observed period, the overall number of those employed in the tradable sector tends to grow, while throughout the same period the number of employed in the non-tradable sector increases (or decreases) under the influence of economic growth (or decline). Overall, the numbers of employed in the tradable and non-tradable sectors since 1985 increased by nearly 33 and 63 percent respectively. Overall, the growth of employment in the tradable sector is mainly achieved due to the growth of employment in the agricultural sector. It is worth noting that an increase of the level of employment in the agricultural sector, while allocated land remains on a stable level or decline, will lead to worsening productivity in the sector. The agricultural sector's development is addressed in more detail in section 2.3. Overall, employment in the tradable and non-tradable sectors remained on a stable level from 2004 through 2009. In 2010 the number of employed in the non-tradable sector increased by 10 percent (Figure 2.1.8) with an insignificant change in the number of employed in the tradable sector (AS, LABOUR FORCE IN TAJIKISTAN, 2012).

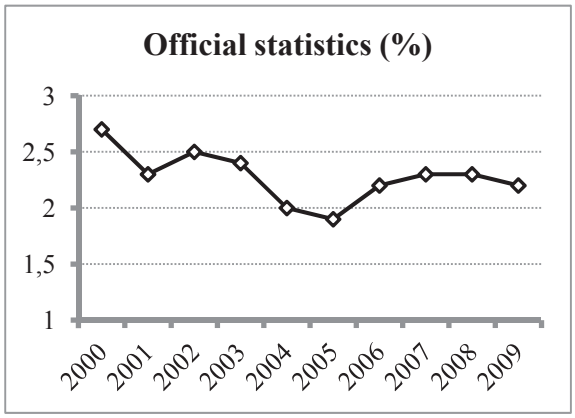
Figure 2.1.8: Employment in the tradable and non-tradable sectors

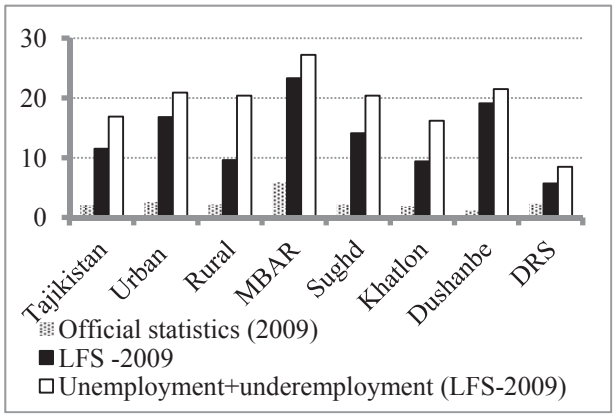


Source: Own compilation based on the data of AS, "Labour Market in Tajikistan, 2012".

The official rate of unemployment in 2009 was 2.2 percent, while the 2009 Labour Force Survey (LFS-2009) data was five times higher. There are no significant differences between urban and rural unemployment (Figure 2.1.9).

Figure 2.1.9: Unemployment rate





Source: Own compilation based on the data of AS. Statistical Yearbook "Labour Force in Tajikistan", 2010.

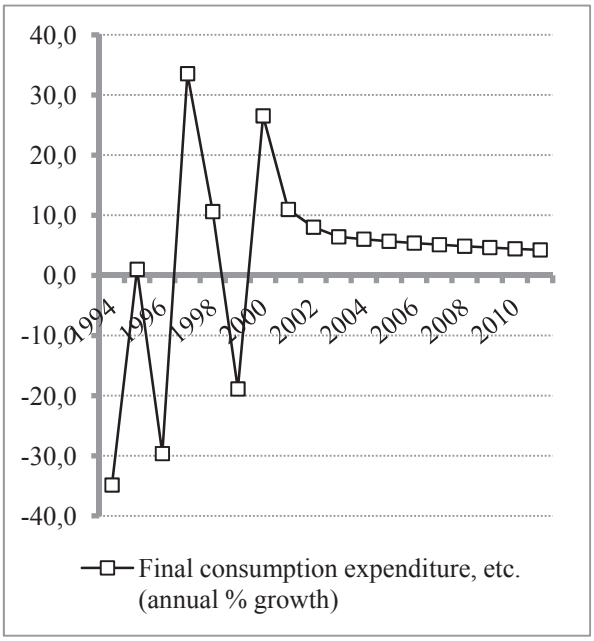
Notes: MBAR – Mountainous Badakhshan Autonomous Region; DRS – Districts of Republican Subordination.

The LFS was conducted in August 2009, which is why there are no differences between urban and rural unemployment. If the LFS had been conducted in the winter season, unemployment would have been higher in rural places.

Since 2000 the annual growth rates of final consumption expenditure (Figure 2.1.10) and gross savings (Figure 2.1.11) as a percentage of GDP are related to stable economic growth

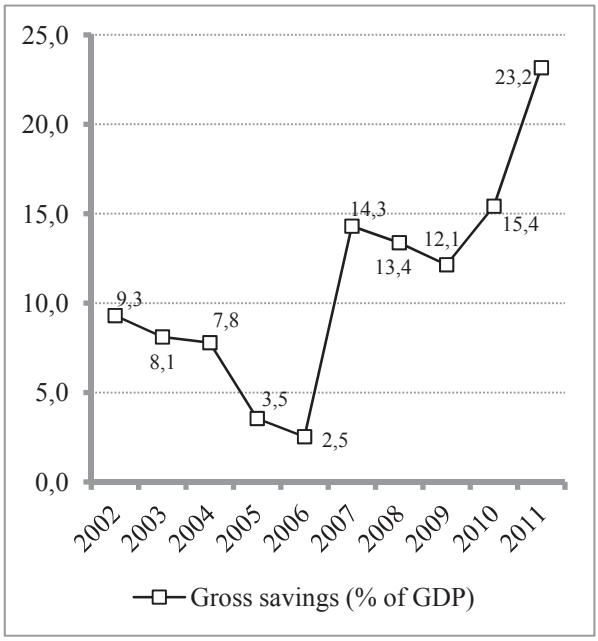
and remittances, while the decline during the period of 1994-1999 was the cause for economic instability and stagnation, hyperinflation, Civil War, etc.

Figure 2.1.10: Final consumption expenditure, etc. (annual % growth)



Source: Own compilation based on World Development Indicators of World Bank, 2012

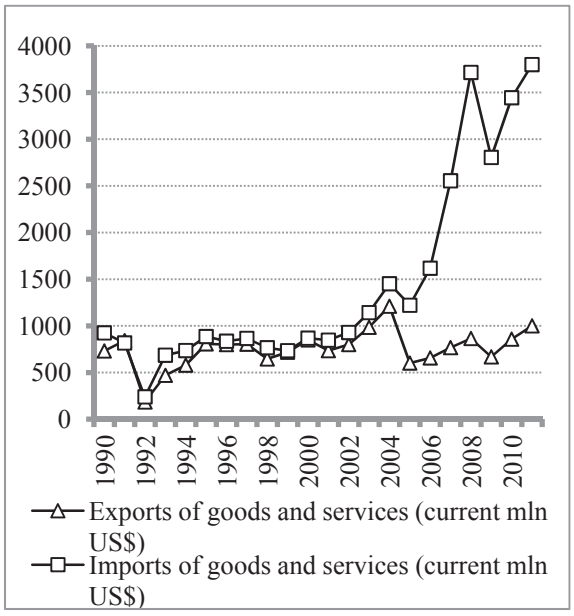
Figure 2.1.11: Gross savings (% of GDP)



Source: Own compilation based on World Development Indicators of World Bank, 2012

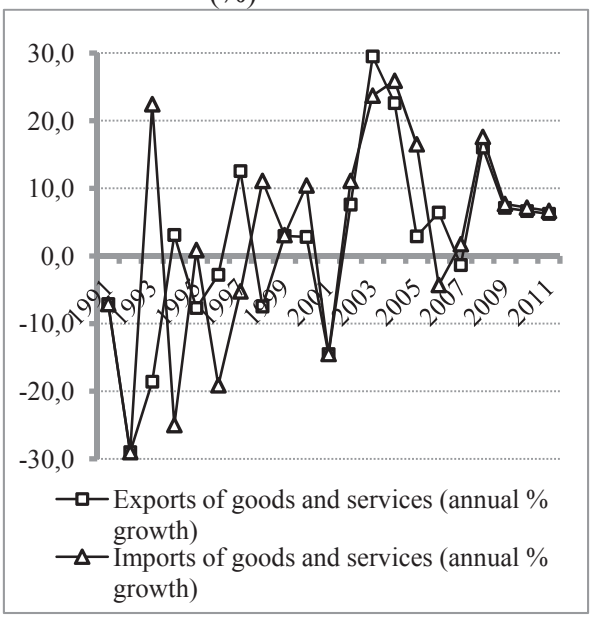
Exports and imports of goods and services for 1990-2004 were close to each other with slightly more imports than exports, while a sharp increase in imports began in 2005 so that by now the gap between these two indicators has widened, owing to the inflow of remittances (Figure 2.1.12). The annual percentages of growth and the decline of exports and imports of goods and services are related to economic boom and crisis (Figure 2.1.13).

Figure 2.1.12: Exports/Imports of Goods and Services (million USD)



Source: Own compilation based on World Development Indicators of World Bank, 2012

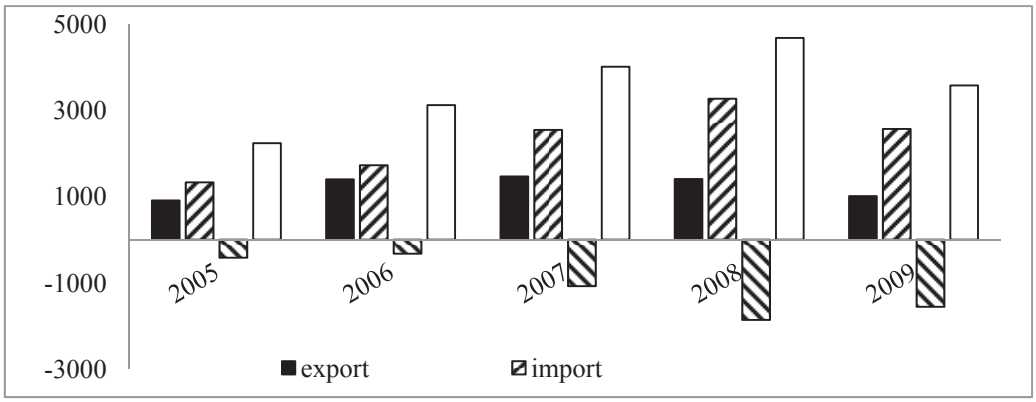
Figure 2.1.13: Annual growth of Exports/ Imports of Goods and Services (%)



Source: Own compilation based on World Development Indicators of World Bank, 2012

During the period of 2005-2009, net trade was still negative. Exports in 2009 increased by 10 percent compared to 2005, while during the same time imports increased by two times. In 2009, imports exceeded exports by 2.5 times (Figure 2.1.14).

Figure 2.1.14: Foreign trade turnover and net trade (million USD)

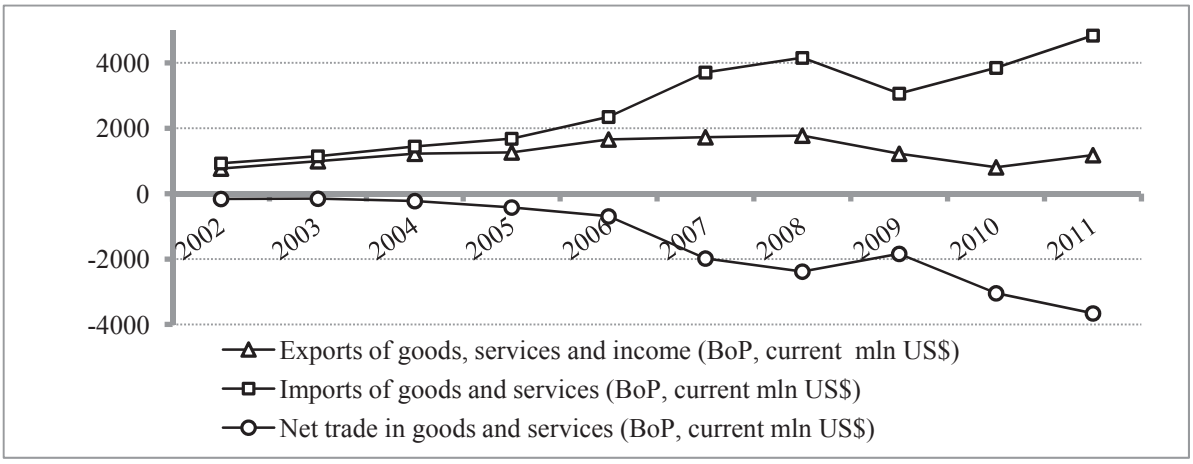


Source: Own compilation based on the data of AS, Statistical Yearbook "Foreign Economic Activity in Tajikistan, 2010".

It is quite interesting to look at the net trade including and not including the effect of remittances. From 2002-2011, imports exceeded the export of goods and services by 2.2 times on average, and the trade deficit was compensated due to remittances. The remittances of the

period of 2006-2011 were an important source of earnings of foreign exchange, which exceeded the earnings from exports of goods and services (Figures 2.1.15 and 2.1.16).

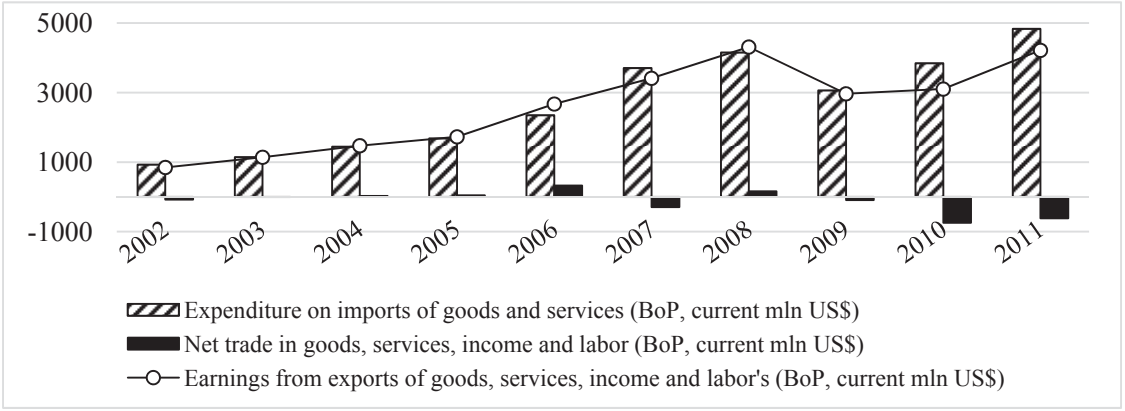
Figure 2.1.15: Net trade in goods and services



Source: Own compilation based on World Development Indicators of World Bank, 2012.

A comparison of the net trade before and after the inclusion of foreign exchange earnings due to remittances clearly indicates that the recent growth of imports is related to the stable increase and inflow of remittances (for more details see: Figures 2.1.15 and 2.1.16).

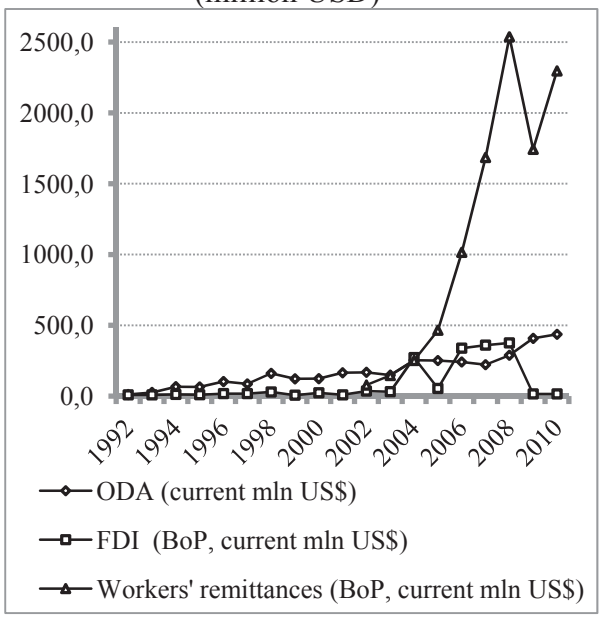
Figure 2.1.16: Net trade in goods, services, income and labour



Source: Own compilation based on World Development Indicators of World Bank, 2012.

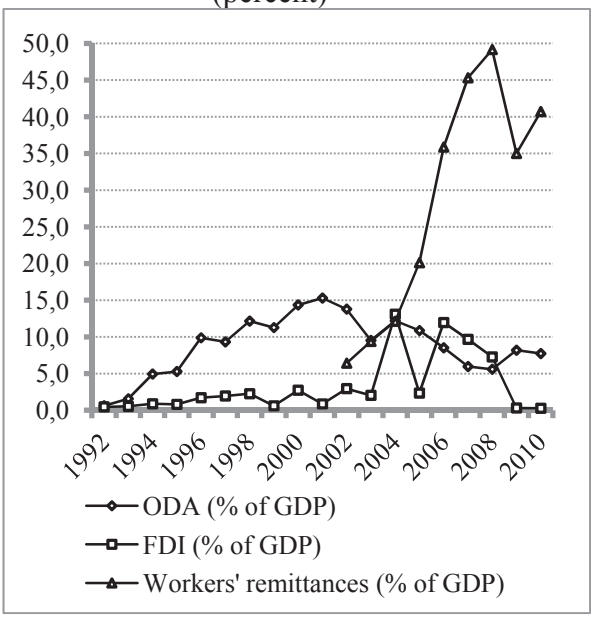
Remittances play a more important role in economic development than official development assistance (ODA) and foreign direct investment (FDI). On average for 2004-2010, remittances exceeded net ODA and FDI by five and seven times respectively (Figures 2.1.17 and 2.1.18).

Figure 2.1.17: Remittances, ODA and FDI (million USD)



Source: Own compilation based on World Development Indicators of World Bank, 2012.

Figure 2.1.18: Remittances, ODA and FDI (percent)



Source: Own compilation based on World Development Indicators of World Bank, 2012.

The inflow of remittances that have ambiguous effects on economic growth, inflation and consumption, as well as the development of different sectors of the economy (transport, service, construction, etc.) are discussed in greater detail in Subchapter 4.2 and in the discussion part (Subchapter 5.4).

The following subchapter deals with the impact of recent economic trends on the main socio-demographic features and vice versa.

2.2 Socio-demographic trends

"Population trends". Tajikistan's population is young, with a median age of 24.7 years. In 2012, about 35% of the population was under 15 years old, which exerts demographic pressure (AS, DEMOGRAPHIC YEARBOOK, 2012).

Due to the high birth rate and relatively low mortality rate, the absolute growth of the population has been rapid. The absolute population had increased by 6 times in 2000 compared with 1913 (intercensal period), and in February 2013, the country's population reached 8.0 million, which is eight times higher than the figure for 1913. The country's rural population for the same period has increased by five times (Figure 2.2.1).