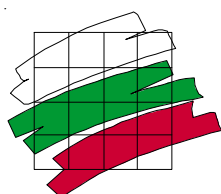


# WORKING PAPER SERIES

## FOREIGN DIRECT INVESTMENTS TO BULGARIA

*Stefan Petranov*



**AGENCY FOR ECONOMIC  
ANALYSIS AND FORECASTING**

31 Aksakov Str., 1000 Sofia, Bulgaria

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31 Aksakov Str., Sofia 1000, Bulgaria  
Tel. (+359 2) 9859 56 01, 981 65 97  
Fax (+359 2) 981 33 58, 980 93 22  
e-mail: [aeaf@aeaf.minfin.bg](mailto:aeaf@aeaf.minfin.bg)  
[www.aeaf.minfin.bg](http://www.aeaf.minfin.bg)

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## Table of Contents

<b>1. Description of Foreign Direct Investment Flows.....</b>	<b>1</b>
1.1. Sources and scope of the Data Available .....	1
1.2. Data Content.....	1
1.3. Definitions and registration of FDI .....	2
1.4. Recommendations .....	5
<b>2. The Role of FDI in Bulgaria's Financial System.....</b>	<b>6</b>
2.1. Investment in equity .....	6
2.2. Investment in other capital .....	7
2.3. Reinvested earnings.....	8
<b>3. Bulgarian Policies with respect to FDI.....</b>	<b>9</b>
<b>4. FDI in Bulgaria: Trends and Fluctuations .....</b>	<b>13</b>
4.1. Periodisation and trends .....	13
4.2. FDI dynamics by balance of payments item .....	18
4.3. Dynamics of FDI from privatization.....	18
4.4. FDI dynamics by sector of the economy.....	19
4.5. FDI inflows by country of origin .....	20
4.6. Conclusions .....	21
<b>5. Econometric models .....</b>	<b>23</b>
5.1. Determinants of FDI inflows.....	23
5.1.1. Econometric Model and Data .....	24
5.1.2. Empirical Estimates .....	25
5.2. The Impact of FDI on Domestic Investments .....	28
5.2.1. Econometric Model and Data .....	28
5.2.2. Empirical Estimates .....	30
5.3. Empirical Estimates as Simultaneous Equations .....	31
<b>6. Literature .....</b>	<b>32</b>
<b>Appendix 1. Data on FDI inflows from BNB and FIA.....</b>	<b>33</b>
<b>Appendix 2. FDI Inflow Data as of May 2003 .....</b>	<b>34</b>
<b>Appendix 3. Econometric Models and Variants.....</b>	<b>35</b>
FDI models.....	35
A. Annual Data Models.....	35
B. Quarterly Data Models .....	41
GFCF models .....	46
A. Annual data models .....	46
GDGF models.....	50
B. Quarterly Data Models.....	50
Simultaneous equation models.....	56
<b>Appendix 4. Data series .....</b>	<b>58</b>

## **1. Description of Foreign Direct Investment Flows**

### **1.1. Sources and scope of the Data Available**

There are two institutions in Bulgaria responsible for collecting and maintaining data on FDI inflows as follows: The Bulgarian National Bank (BNB) and the Foreign Investment Agency (FIA). The BNB maintains the database available for the purposes of the balance of payments statistics, and the FIA for the purposes of government policies as regards foreign investments. A detailed list of the data handled by both institutions by item and scope is given in Appendix 1 hereto.

Well until 1998, the data handled by the two institutions differed significantly as a result of the different data sources, scope and methodology of reporting. There were instances of drastic divergence in estimations of 15.4% in 1998 to 156% in 1993, with FIA statistics having been systematically overstated (See Appendix 1). The main methodological reasons behind the data overstatement were as follows: first, BNB took account not only of the investments made but disinvestments as well. Second, in reporting the FDI inflows into the country, BNB took account only of the investment amounts actually received, and not the investment commitments contracted, and third, BNB statistics gave account of the financial instruments of payment settlement at their market price rather than at their face (nominal) value<sup>1</sup>.

Since 1999 the Foreign Investment Agency has not collected any data of its own and made use exclusively of the BNB statistics available. The difference in estimation between the 2001 and the nine-month 2002 data released by the two institutions can be said to be only a matter of adjustment and revision, and data frequency. FIA officials have announced that the institution intends to adjust its own data to BNB statistics.

### **1.2. Data Content**

BNB's database is currently being established in compliance with the international standards and requirements laid down in the IMF Balance of Payments Manual, IMF, 5<sup>th</sup> edition, 1993, and OECD's Benchmark Definition of Foreign Direct Investment, 3<sup>rd</sup> edition, 1996. The database draws upon FDI statistics, given in USD terms, and three breakdown patterns and frequency (time basis). The breakdown given is by type of investment, sector of the economy and country of origin. Data frequency is monthly, quarterly and annual (a detailed list of the data available is given in Appendix 2). It should also be noted that the series available are relatively short, covering 4 to 10 observations, with the only two exceptions being the quarterly data over the 1996-2002 period (84 observations) and monthly data over the 1996-2002 period (84 observations) by type of FDI. Despite the existence of series of a bigger length, most data have proved to be rather unreliable. In a series of talks with BNB

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<sup>1</sup> *With a number of privatisation deals the price contracted may be paid, using means of payment the market price of which runs well below their nominal value.*

officials an opinion was repeatedly voiced that pre-1996 data were unreliable due to the methodological and administrative difficulties going along with the data collection process at the initial stages of the transition, as evidenced by the drastic divergence in BNB and FIA statistics.

In compiling data, BNB is currently relying on the following sources of information:

- Privatisation authorities;
- The Insurance Supervision Directorate at the Ministry of Finance (currently the Financial Supervision Commission);
- The Central Depository;
- Enterprises of the financial sector;
- Non-financial enterprises with foreign interest;
- The National Statistical Institute (NSI);
- Notary offices.

The different data providers submit information to the BNB on a different time basis, calling for regular revisions, and final data are usually made available with a lag of almost a year.

The breakdown of data by sector of the economy gathered by BNB complies with the National Classification of Business Activity, allowing for a distinction to be made between FDI inflows into the real and financial sector of the economy. BNB statistics on FDI by sector of the economy take account of financial intermediation, covering a wide range of financial activities and services from banking, insurance (pension and health), investment funds, to brokerage, etc., making it possible to analyse separately the impact of FDI inflows on the real sector of the economy. The data given by sector of the economy are annual, but BNB has all the information capacity to provide quarterly data from 1998 onwards.

### **1.3. Definitions and registration of FDI**

In accordance with the requirements of the adopted statistical conventions a direct investment in the country is an international investment, in which the direct investor, resident of a foreign economy, acquires a lasting interest (at least 10 % of the equity) in an enterprise resident of the Bulgarian economy (direct investment enterprise). The direct investment includes both the initial transaction, through which the relationship between the direct investor and the direct investment enterprise is established, and all subsequent transactions between them. The transactions can be both towards increase/decrease in the liabilities of the direct investment enterprise to the direct investor, as well as towards increase/decrease in the claims of the direct investment enterprise to the direct investor. Therefore, the BNB reports both accomplished investment and disinvestments.

The basic principles of reporting direct investment in the country are:

- only actually received, and not contracted, amounts are recorded, and,
- when financial instruments are used for settlements, they must be recorded at their market price, and not at their nominal value.

In accordance with the standard presentation of the balance of payments, the Direct investment in the country item comprises:

1. Equity capital – acquisition/disposal of shares and equities (in cash and in kind) by non-residents in/from the share or equity capital of Bulgarian enterprises. The acquisition of equities and shares in the capital is reported as increase in the direct investment in the country, and the disposal – as decrease. From the year 2000 this item includes transactions with real estate.

2. Other capital – principal received and paid on loans (both on short- and long-term ones of any kind – direct, commercial credit, commercial paper, corporate bonds etc.) between the direct investor and the direct investment enterprise. The receipt of a principal is treated as an increase of the direct investment abroad, and the repayment of the loan – as a decrease.

3. Reinvested earnings – the share of non-residents in the undistributed earnings/ loss of the enterprise for the reporting period. The share in the undistributed earnings is reported as increase of the direct investment in the country, and the share in the loss – as decrease.

Disaggregated data with respect to the above categories is available since 1997. In the period 1991-1995 the observed data is for the category “equity capital” only. Since 1996 the observations are for the categories “equity capital” and “other capital”. Since 1997 there is data for “reinvested earnings” as well.

In the compilation of the balance of payments, the BNB uses data from different sources and applies the following principles:

- Data from privatization authorities. The privatization authorities provide monthly data on the sold shares of the state in the capital of Bulgarian enterprises to non-residents, and for that reason they are included in subgroup “Equity capital”. The Bulgarian National Bank reports only the actually accomplished, and not the contracted receipts on privatization deals. The receipts are reported for the month, in which they were actually paid to residents.
- Data from Insurance Supervision (Commission for Supervision of the Financial Markets). The Insurance Supervision provides quarterly data on nonresidents' participation in the capital of Bulgarian insurance companies. If any changes in the data occur, the data is included under the tem “Equity capital”.

- Data from the Central Depository. The Central Depository provides monthly data on the purchased and sold shares by non-residents, whose participation in the firm's capital is at least 10%, as well as on the average monthly market price of the shares of the separate issues. The processed data is included in subgroup “Equity capital”.
- Data from the financial sector enterprises. Data from the financial sector enterprises is collected through special statistical forms, developed by the BNB, as well as through the commercial banks' annual financial and accounting reports (Balance Sheet and Profit and Loss Statements). The Bulgarian National Bank receives data on the non-resident investment / disinvestments in the capital of the commercial banks and their clients, on transactions connected with the inter-company indebtedness of commercial banks and their clients and on the commercial banks' reinvested earnings.
- Data from the non-financial sector. Data from the non-financial sector enterprises is collected through statistical forms, developed by the BNB. Through these forms the Bank receives data on the investment/disinvestment in the capital of Bulgarian enterprises on the part of non-residents – direct investors, on transactions connected with inter-company indebtedness and on reinvested earnings.
- Data from the National Statistical Institute. Since October 1999, the National Statistical Institute regularly provides data to the Bulgarian National Bank from its quarterly and annual statistical surveys on foreign direct investment, conducted among non-financial sector enterprises. Only the data that has not been reported by the other sources is included in the balance of payments.

Given the above methodology and technology of data collection the following should be taken into account. First, the quarterly registration of foreign direct investments in the non-financial sector is sample based. The general population out of which the sample is taken includes the reported in the annual survey of NSI enterprises with foreign participation in the equity. The sample is proportional to and is structured on the basis of the volume of the foreign participation in the equity of the enterprise prior to 31.Dec. It usually covers 90% of the foreign direct investments in the non-financial sector but it is still a sample. The annual survey is the one which is comprehensive covering the entire population of enterprises with foreign equity participation.

Second, data for green field investments is not available. Data on green field investments is not required by IMF, ECB or Eurostat and as a result it is not a priority for the BNB. Collecting such information would require additional instructions to all respondents to report greenfield investments separately.

#### **1.4. Recommendations**

In designing A Model of the Bulgarian Economy, the Agency for Economic Analysis and Forecasting should take account of the following important points:

- FDI statistics have to be provided by the Central Bank exclusively, as it gathers primary data and works in accordance with internationally recognized methodologies and practices of data collection. Furthermore, FDI statistics are largely compliant with other data on the financial sector collected and released by the BNB.
- It is desirable that the establishment of any adequate econometric relationship draws upon post 1996/97 data, as data gathering under the Other Capital and Reinvested Profit items started as late as 1996 and 1997 respectively. The low reliability of data of previous periods may give rise to misleading and often twisted estimations as to the FDI inflows into Bulgaria.
- The establishment of any econometric relationship should take account of the fact that data of the current and preceding year are only preliminary and further subject to regular revisions.
- If the impact of the FDI inflows on the real sector of the economy is to be analyzed, it appears reasonable that the Foreign Investment Agency makes all the necessary and timely arrangements to receive BNB data by sector on a quarterly basis.



## 2. The Role of FDI in Bulgaria's Financial System

FDI may enter the country by way of various transactions and the impact they are likely to produce on the country's financial system is investment specific. The main cases of foreign investment activity are here dealt with in succession as they have occurred based on the breakdown of FDI flows widely used and officially employed, with prominence given to the analysis of the initial effect the relevant type of FDI had.

### 2.1. Investment in equity

There are two main cases of equity investment as follows: privatization and other transactions:

*A. Privatization.* In the case of privatization, an enterprise's equity changes hands (from state ownership to a foreign person). What happens with privatization revenues depends on the legal status of the state-owned enterprise itself. There are two cases as follows: where an enterprise is directly owned by the state or indirectly.

Provided an enterprise is directly owned by the state, the revenues resulting from a privatization deal are accounted for on the fiscal reserve account where all government funds are kept. Book keeping operations having to do with the fiscal reserve account are reported in a different way depending on the source of money invested. If the revenues result from privatization, they cannot be employed to cover current budget expenditures but make up for contingencies alone. Which is why funds on the fiscal reserve account cannot be used for the purposes of budget deficit financing.

The fiscal reserve account is held and serviced by the Central Bank, and while an asset of the government it is also a liability of the Issuing Department, i.e. the currency board. Once imported into the country in the form of FDI inflow in case of privatization, foreign money enter the currency board and step up its FX reserves, i.e. the assets of the currency board. At the same time, the deposit of the government with the Issuing Department rises in the same proportion, inducing a further increase in the liabilities of the currency board. Or put in other words, and using the terminology and notation employed by *A Monetary Model of the Bulgarian Economy* drafted by Ton Knoester, 12 September 2002, with a privatization deal of this kind, G and R will to rise by the amount of revenues raised as a result of the deal. This can be said to be a relatively stable pattern of behaviour, having in mind that any reallocation of the revenues may only take place to guard against or meet specific contingencies.

Provided an enterprise is indirectly owned by the state, the likely effect may take different manifestations. In a number of cases, earmarked for privatization are state-owned, enterprises which operate as commercial entities on their own within a larger holding structure that is also a commercial entity itself. On the formal side, enterprises undergoing privatization are sold by the parent company, i.e. the holding structure. This was the privatization pattern applied to all commercial banks by the

Bank Consolidation Company, and a number of hotels run by Slantchev Brjag AD. Such a privatization model may be employed in the future as well, for example for the privatization of the enterprises under Bulgartabac AD. In this case, the revenues from the deal are entered on the accounts of the parent company at some of the local commercial banks and remain there at its disposal. The state that is also a majority owner of the holding company may be given access to these funds only when and if dividends are paid at the end of the fiscal year or the company has gone into liquidation. The funds may then be used to meet current budget expenditures. As experience has shown, the government has been pursuing a pro-active policy towards dividend allocation. Using again the terminology and notation of *A Monetary Model of the Bulgarian Economy*, it can be assumed that both foreign currency assets (BA) and liabilities (BP) in the banking system will step up in the same proportion by the amount of the revenues from the privatization deal.

**B. Other transactions.** With equity investments, other than privatization, there are again a couple of possible scenarios producing a different effect on the financial system. In establishing a company and raising a company's equity by contributions in cash or the purchase and acquisition of real (immovable property), the effect investments are likely to produce will lead to an increase in the FX reserves in the banking system. But so will the foreign currency liabilities in the same proportion, i.e. the effect is analogous to the privatization of assets indirectly owned by the state. Employing again the terminology and system of notations of the monetary module under *A Monetary Model of the Bulgarian Economy*, it can be said that foreign currency assets in the banking sector will step up by the amount of the contributions made or the amount of revenues raised from the transaction (BA goes up), but so will in the same proportion foreign currency liabilities (BP) in the sector. The above effect will be only discernible if the local person is an account holder at a local commercial bank and the revenues are entered on the same account. Otherwise, such a transaction is hardly likely to produce any effect whatsoever on the Bulgarian financial system.

A vice versa, where a company is established or equity raised by contributions in kind (in the form of machinery, equipment or facilities), there is practically no foreign financial (cash) inflow into the country, and though there has been some foreign investment made, it will not have any direct effect on the county's financial system.

## **2.2. Investment in other capital**

Investment in other capital is essentially a credit relationship between daughter companies and the parent company and when it takes the form of cash loans the effect on the financial system they produce will be analogous to the effect investment in equity has. And again within the terminology and notations of *A Monetary Model of the Bulgarian Economy*, it can be said that foreign currency assets (BA) in the banking system will increase by the amount of the loan extended or decrease in case of disinvestments when a loan is repaid or the daughter company is a lender. At the same time, foreign

liabilities in the banking sector (BP go up) will step up by the same amount in the first case or report a proportionate decrease in the second case.

Where lending is not carried out on a cash basis, the credit relationship between the daughter and parent company is unlikely to produce a direct effect on the financial system.

### **2.3. Reinvested earnings**

Reinvested earnings represent the financial result of the relevant companies adjusted for the foreign investors' ownership share. It is a book entry on the accounts of the daughter company. If not paid out as a dividend reinvested profit will not prompt up any change vis-à-vis the current situation and hence not have any special effect on the country's financial system. In case the profit (or part of it) is paid out as a dividend the outflow will affect the financial system. Within the terms and notations of *A Monetary Model of the Bulgarian Economy*, it can be said that the foreign currency assets in the banking system (BA) will step down by the amount of the profit repatriated. But so will in the same proportion the foreign currency liabilities (BP) in the sector. In this case the transactions will be reported in the Current Account of the Balance of Payments as Income (not in the Financial Account as Foreign Investment).

### **3. Bulgarian Policies with respect to FDI**

It was as early as the onset of the reforms that government economic policies built on the understanding that foreign investment is more than needed and desired. Practically, all government teams so far have proclaimed the attraction of foreign investment as one of the key policy goals on their programmes. A common understanding is that foreign investment helps improve the balance of payments, brings production and managerial know-how into the country, spurs the structural adjustment of enterprises, opens new market outlets, as well as makes up for the low savings rate in the economy. It was for this same reason that government economic policies were so designed as to pursue the attraction of foreign investments as a key goal, though with faltering success, and often yielding unsatisfactory results.

The first Foreign Investment Act was adopted in 1991 in the wake of the reforms launched, providing for an all-embracing system of foreign investment regulations and certain underlying principles of foreign investment protection in Bulgaria that were incorporated in all the amendments to follow. The legal framework has granted foreign persons the full range of rights enjoyed by Bulgarian legal entities and physical persons as regards the business activity they are carrying and its legal status while not imposing any restrictions on foreign interest in the share capital of the existing or newly-formed companies. The act also set out special requirements as to foreign investment registration and regulation in some sectors of the economy like the military industry, banking and insurance, but these requirements were subsequently removed.

1992 saw the adoption of a new Foreign Investment Promotion and Protection Act that contained less stringent requirements compared to its predecessor. The 1992 Act laid down some of the most liberal provisions on foreign investment in Central and Eastern European countries, allowing foreign investors to hold up to 100% of a company's capital. Unlike in countries like the Ukraine, Lithuania, Kazakhstan and Belarus, Bulgarian law required no special permit for the implementation of large-scale foreign investment projects and provided for the equal treatment of local and foreign investors alike.

The provisions on special foreign investment protection had to do with the repatriation of after-tax profit from investment; liquidation (sale) of the investment itself; compensations in case of *force-major* expropriation of the site of investment for state needs as well as a liquidation quota in case of a termination of an investment. The same act provided for transfers abroad to be carried out freely in foreign currency, removing any specific requirements as to transfers in foreign currency. Also under the same act, protecting the property rights of foreign persons meant banning the expropriation of foreign investment by the government in an administrative manner. The expropriation of real estate owned by foreign persons may only take place in accordance with a legal act on *force major* state

needs that cannot be otherwise met and following a pre-expropriation and commensurate compensation at market prices.

Furthermore, the act also laid down some safeguard measures for foreign investment against any amendments to legislation that may have given rise to certain restrictions on foreign investment alone, with foreign investment made prior to the amendments having been subject the legal requirements applicable as at the date of making the investment. The 1992 Act provided for a 10-year transitional period for the application of provisions previously in, ensuring consistency in the legal treatment of foreign investment.

As for the legal forms of investment, the Bulgarian policy stance in respect to foreign investment in the early stages of the transition was more liberal than the policies implemented by Hungary, Poland, and the Czech Republic. And yet, despite the liberal stance of policy and less stringent legal framework making provisions for a number of incentive packages to trading companies and small investors, the country could not boast of significant foreign investment inflows at the time. The reasons behind this policy setback seemed to be mainly political and had to do with the uncertainty of the economic environment, the numerous and frequent amendments to the country's legislation, difficulties in implementing the legislation, high inflation rate, unstable exchange rate and the sluggish pace of privatization.

Following the financial collapse of late 1996 and early 1997 and entailing loss of confidence in the banking sector, hyperinflation and recession, the then government undertook active steps towards attracting foreign investments, giving privatization a strong push. End-1997 saw the adoption of the latest Foreign Investment Act, still in force, additionally removing restrictions on foreign investment activity, restating explicitly the only constraint on the acquisition of property rights to land by a foreign person or a subsidiary only to reiterate the legal requisites of the Constitution of Bulgaria.

The 1997 Act has provided for two legal options as follows: the establishment of a specialized government body under the Council of Ministers to take over the coordination of action carried out by the different authorities with respect to foreign investment, foreign investment promotion and priority investment projects – a Foreign Investment Agency (FIA). The Agency had been set up as early as 1995, but well until 1997 its functions and responsibilities were not regulated by a law or other act, and its activity was rather limited. Currently the FIA is the government designated authority in charge of the implementation of government policies as regards foreign investment, performing the following functions and tasks:

- Providing information on investment flows;
- Assistance to the implementation of investment projects;
- Investment assistance follow-up;

- Indirect marketing;
- Direct marketing;
- Undertaking measures to improve the country's investment climate;
- Maintaining a database on foreign investment flows available to foreign investors.

As per the second legal option concerning priority investment projects, the FIA may at the request of the investor propose to the Council of Ministers to set up a purpose-specific intragovernmental group to ensure institutional support to certain investment projects.

A new Foreign Exchange Act took effect on 1 January 2000. In addition to the full FX control liberalization of the investment regime it provides for, including the repatriation of investment, the Act has also set out a friendly legal framework for the outflow of investment made by local entities.

Furthermore, it has removed all restrictions on FX control in respect to investment in equity, real estate, securities, intellectual property, and concessions while subjecting them to the requirements of the area-specific legislation only. At the same time debt financing between foreign and local persons is only subject to registration procedures with the BNB.

The Foreign Exchange Act has also liberalized the outflow of investment, laying down certain registration requirements to equity investment made by local persons abroad, investment in securities issued by foreign persons, debt financing abroad and security provided by local companies to back up the debts of foreign companies, subjecting at the same time, investment outflows to data collecting and reporting provisions. The Foreign Exchange Act also made possible the settlement in foreign currency of payments between companies registered and/or operating in Bulgaria, and removed the restrictions to trade in valuables, precious stones and metals.

The legal framework for foreign exchange control set out has enabled Bulgarian companies, including subsidiaries and branches of foreign companies, to export capital and invest elsewhere in the world, and has thus proved an important step towards starting business operations in the region through the agency of Bulgarian subsidiaries.

The legal measures, accelerated privatization and macroeconomic stability following the institution of the currency board arrangement boosted the attraction of foreign investments in the post-1997 period. Well until 2000, both investor's interest and investment inflows into the country were steadily rising. Investments as a result of privatization went on the increase but so did in a higher degree investments as a result of non-privatisation.

2001 and 2002 witnessed a drastic decline in foreign investment inflows which was mostly due to the uncertainty having to do with the outcome of the 2001 general elections, technological time to draft amendments to the Privatisation Act as well as the delay in several large privatization deals rather than

to any change in government policies towards FDI. Currently, the attraction of foreign capital is a key concern on the government agenda. The economic strategy of the government foresees some USD 1 – 1.2mn worth of investment inflows into the country on a yearly's average over the 2002-2005 period, which is a sizable amount for a small economy like Bulgaria, and against the amounts attracted so far. In seeking to boost investment inflows the Bulgarian government has recently embarked on two important initiatives, one of which is already afoot – setting up a private equity fund that is a joint venture – Bulgarian and foreign. The other initiative has to do with the drafting and adoption of a parliamentary act on specialized economic zones.

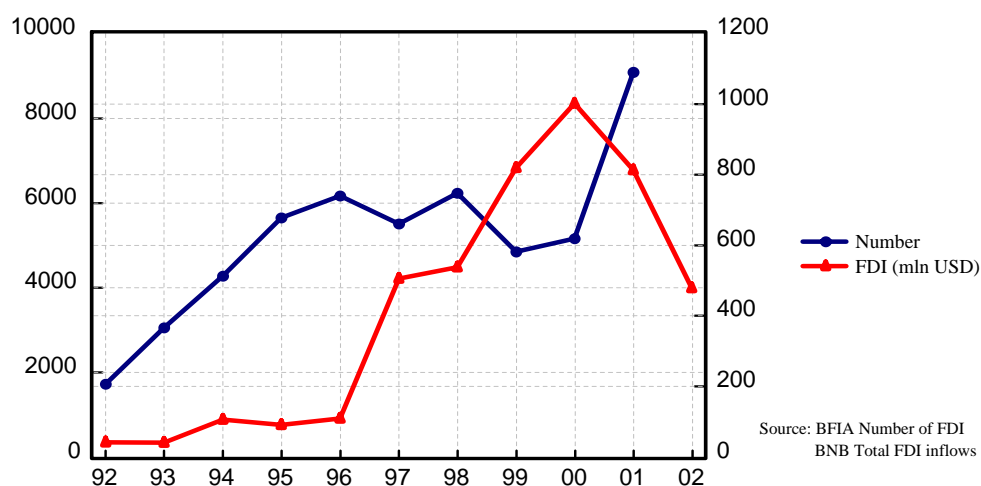
## 4. FDI in Bulgaria: Trends and Fluctuations

### 4.1. Periodisation and trends

FDI inflow dynamics points to two distinct periods (see Figure 1).

**Figure 1. Size and Number of FDI over the 1991-2002\*period**

*\*2002 data is preliminary.*



The first period spanned from 1991 to 1996, starting with the very onset of the economic reform endeavour and ending with the financial crisis of late 1996 and early 1997. It was as early as 1991 that the first legal act<sup>2</sup>, regulating foreign investment in the country was adopted to be only replaced by another act<sup>3</sup> in the following year. At the same time, the economic reform effort of the government was further enhanced by a vast privatization agenda<sup>4</sup>. The opening of the Bulgarian economy and declaration of official economic policies aimed at the attraction of foreign investment coincided with the onset of the privatization process, and had in this sense developed simultaneously over time, and in an interwoven fashion.

Over the same period, despite the economic policy goals declared, Bulgaria had failed to attract sizable foreign capital. It should be also noted, however, that investment activity on the whole, local investment included, was rather dull. The comparative data given in Table 1 below show that over that period investment activity remained well below not only the average in the transition economies, but the regional averages, including the Balkan countries, as well.

<sup>2</sup> *Foreign Investment Act (OG, No 47 of 14 June 1991)*

<sup>3</sup> *Foreign Investment Promotion and Protection Act (OG, No 8 of 28 January 1992).*

<sup>4</sup> *The Restructuring and Privatisation of State and Municipal Ownership Act, adopted in April 1992 (OG, No 38 of 8 May 1992)*



**Table 1.: Aggregate Investment as percentage of GDP for Transition Countries, Regional averages: 1990-1996**

	1990	1991	1992	1993	1994	1995	1996
<b>Baltic</b>	24.78	16.52	18.4	20.43	21.66	21.38	22.62
<b>Visegrad</b>	24.01	22.48	22.99	22.74	23.2	23.92	26.72
<b>Asia</b>	28.74	20.44	18.38	15.5	17.21	17.34	20.37
<b>BUR</b>	24.64	21.85	25.51	26.18	26.19	23.07	21.22
<b>Balkan</b>	18.49	13.23	14.94	14.88	15.68	16.99	19.17
<b>Bulgaria</b>	12.5	13.33	13.34	13.75	14	13.75	13.5
<b>CEEB</b>	22.43	17.41	18.78	19.35	20.18	20.76	22.84
<b>CIS</b>	25.92	21.58	21.68	22.37	22.05	21.84	22.30

*BUR – Belarus, Ukraine, Russia,*

*CEEB – Central and East European and Baltic countries,*

*CIS – Commonwealth of Independent States.*

*Source: World Development Indicators (2000), NSI, and author's calculations*

As for FDI, data revealed an even worse picture. FDI over the 1991-1996 period hardly totalled USD 442.2mn, accounting for a bare 1% of FDI in the Central and Eastern European countries (UNCTAD statistics<sup>5</sup>). Cumulative FDI per capita amounted to the negligible USD 55.3. In the six years to 1996, annual FDI inflows varied between USD 40 and 109mn, running at USD 73.7mn on average per annum, and reporting too small a size in both absolute and relative terms vis-à-vis the other transition economies.

Data on the number of FDI in the same period indicate that small investment was prevailing (see Figure 1, right-hand scale), with the average size of the investments made amounting to USD 19.1 thousand. According to surveys of the Centre for the Study of Democracy, until 1994 investments of less than USD 2000 accounted for 65.4% of total foreign investment, and only 14.6% of the investment reported ran higher than USD 20 000 (USD 20 000 or BGN 50 000 is the minimum capital required for the formation of a limited company). Practically, it was mostly individual investors that entered the market running small and often family companies in the area of trade. In most case these happened to be individuals from the Mid-East countries, seeking residence in Bulgaria for one reason or another. All this fostered the development of the service sector but had little effect on the balance of payments or local investment promotion.

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<sup>5</sup> UNCTAD FDI Database

Data reporting in the pre-1996 period did not allow for a breakdown of FDI by type (equity, other capital, reinvested earnings) or sector of the economy<sup>6</sup>.

From the point of view of FDI distribution by country of origin over the 1992-1996 period (see Table 2), German investments ranked first – in three of the 5 years, they ran first by FDI inflow into Bulgaria. But unlike in many other countries of Central and Eastern Europe, the distribution of foreign investments by country of origin was quite dynamic. While German investments held the first place in number and size throughout the period, in late 1992 and early of 1993, they were outweighed by investments from neighboring countries, mainly Greece and Turkey. Particularly, investors from Greece started investing actively in Bulgaria which was favoured not only by their geographic proximity but also by the numerous programs of the EU and the Greek government promoting investment in Bulgaria.

**Table 2.: Distribution of FDI by Country of Origin, as percentage of total FDI inflows**

1992		1993		1994		1995		1996	
AUSTRIA	37.8	GERMANY	55.3	GERMANY	52.6	GREECE	18.3	GERMANY	20.7
HUNGARY	35.8	USA	15.8	NETHERL.	17.9	IRELAND	10.7	NETHERL.	18.1
UK	18	TURKEY	9.6	USA	16.2	GERMANY	10.0	SWITZERL	9.0
LUXEM.	1.1	SWITZERL.	6.5	AUSTRIA	7.7	USA	9.9	KOREA	8.7
SWITZERL.	11.1	UK	55.5	ITALY	2.5	RUSSIA	9.3	USA	8.1
CYPRUS	10.9	GREECE	55	FRANCE	1.9	TURKEY	8.4	GREECE	5.7
RUSSIA	10.9	RUSSIA	11.3	GREECE	1.4	UK	8.4	RUSSIA	5.6

Source: Foreign Investment Agency.

A number of surveys as to investors' attitudes indicated that the main factors at work behind the low foreign investment volumes were as follows:

- *High political risk.* The period was interspersed with frequent changes of government coupled with instability and absence of a clear-cut home and foreign policy line.
- *High country risk.* Bulgaria imposed a moratorium on its foreign debt at the very outset of the economic reforms, and it was as late as 1994 that issues having to do with the debt restructuring and reduction were finally settled. Furthermore, the country risk stepped up as a

<sup>6</sup> Prior to 1996, there had been reported no disaggregated data on FDI by type or sector of the economy. Furthermore, there had been no single source of data collecting or methodology of reporting. Also, a number of official publications and analyses of that time treated commitments undertaken by investors to inject future investments in the privatised enterprises as investment proper. There were four sources whereby data were collected, often largely diverging as follows: Foreign Investment Register at the Ministry of Finance, a register of exporters kept by the Bulgarian Chamber of Commerce and Industry, data from the annual financial statements of enterprises and findings of data sample surveys, registers of companies with foreign interest maintained by the relevant line ministries.

result of the embargo on former Yugoslavia, as well as the general political instability in the Balkans stemming from the wars raging in former Yugoslavia.

- *Sluggish economic reforms.* Bulgaria was persistently lagging behind in its economic reform effort in terms of pace, depth and magnitude of adjustment vis-à-vis the other Central and Eastern European countries. There were also no clear policy goals, experience or mechanisms to implement economic reforms. Moreover, the country's legislation and rules of implementation underwent numerous amendments. At the same time, the Central European transition economies were steadily in the lead, posting the highest volumes of foreign investments attracted (Poland, the Czech Republic and Hungary alone attracted more than 60% of the FDI in the region).
- *Slow and cumbersome privatisation.* In that first period of economic reforms the Bulgarian governments were rather reluctant to carry out rapid privatisation and put large SOEs up for sale, including the state monopolies that were and still are the most palatable item of privatisation to foreign investors. At the end of the period, the Bulgarian government opted for a mass privatisation programme (voucher privatisation scheme) whereby a relatively big chunk of the state-owned assets were transferred to the private sector that however failed to bring any significant FDI inflows in the short-run.
- *Administrative barriers.* Foreign investors faced a number of administrative constraints and inconsistencies in establishing stock companies with foreign interest.
- *No stock exchange in operation.* The underdeveloped primary and secondary stock exchange trading in securities was also deemed a major business restriction by foreign investors, for they were unable to plan any further mobilization of local capital, or a likely exit of the investment they had made.

The second period spanned from 1997 to 2002. Its beginning was marked by three important developments that were FDI-conducive as follows: the Bulgarian government instituted the currency board arrangement and embarked on an ambitious programme for the sanitation of the banking system, putting an end to the financial collapse, stabilising the exchange rate and curbing inflation. Second, cash privatisation was given a fresh impetus, and third, Parliament adopted a new Foreign Investment Act<sup>7</sup>, still in force as last amended in 2002.

All the three developments were FDI conducive and inflows reported a multifold rise. For four and a half years, annual FDI inflows had been steadily increasing on a year-on-year basis by 2000 when they reached USD 1000.5mn (reporting a 9.2-fold rise, or a 74% growth rate on a yearly's average, relative to 1996). FDI were further boosted by the real growth reported by the Bulgarian economy as well as the invitation for EU accession negotiations addressed to the country in 2000.

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<sup>7</sup> *Foreign Investment Act (OG, No. 97/24.10.1997).*

As a result, Bulgaria was able to make up partially for its lagging behind vis-à-vis the other transition economies in respect to FDI. Taken as percentage of GDP, FDI surpassed 8% throughout the 1990-2000 period, ranking the country fourth of all transition economy by the same indicator, immediately after Azerbaijan, Slovakia and the Czech Republic<sup>8</sup>. The level hit was relatively high compared not only to the other transition economies, but also to the emerging markets of Malaysia, Thailand, Indonesia, China, Brazil and Turkey, generally recognized as benchmark economies, and to the less developed EU economies like Greece and Portugal<sup>9</sup>. By cumulative FDI inflows as percentage of GDP, Bulgaria was already performing well above the average in the Balkan region and the BUR countries. By cumulative FDI per capita, the country was above the average in the BUR countries, CIS as well as in the transition economies of the Asian region (see Table 3).

**Table 3.: Foreign direct investments**

	<b>Cumulative FDI inflows as % of GDP, 1988-99</b>	<b>Cumulative FDI inflows Per Capita, 1988-99 (\$)</b>	<b>Average FD inflows as % of Gross Domestic Investment, 1997-99</b>
<b>Baltic</b>	30.27	923.67	27.00
<b>Visegrad</b>	22.30	1122.80	13.40
<b>Asia</b>	32.35	183.00	39.28
<b>BUR</b>	9.37	91.00	7.33
<b>Balkan</b>	16.85	277.50	21.40
<b>Bulgaria</b>	17	269	15.1
<b>CEEB</b>	23.14	774.66	20.60
<b>CIS</b>	20.85	137.00	23.31

*BUR – Belarus, Ukraine, Russia,*

*CEEB – Central and East European and Baltic countries,*

*CIS – Commonwealth of Independent States.*

*Source: UNEC for Europe, Economic Survey of Europe, 2001,1; NSI, and author's calculations*

The last two years- 2001 and 2002<sup>10</sup>, witnessed a certain decline in FDI inflows, having to do mostly with the uncertainty of the general election outcome of 2001, technological time to draft and adopt amendments to the Privatisation Act, as well as the delay in several large-scale privatisation deals. As a result, FDI from privatisation contracted significantly.

<sup>8</sup> Data published in the EBRD Transition Report Update 2001.

<sup>9</sup> According to IMF data, World Economic Outlook, 2001.

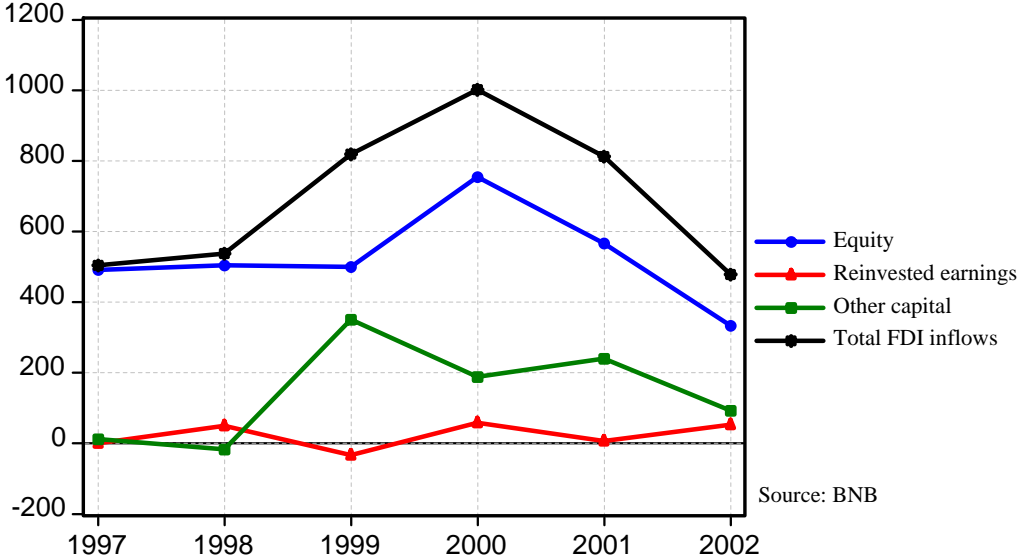
<sup>10</sup> 2002 data are only preliminary and will be revised upwards at the end of 2003.

The methodology of FDI data collection employed in the post-1997 period makes it possible to trace their dynamics by type and sector of the economy<sup>11</sup>, which, as a matter of fact, is the next step of the present analysis.

**4.2. FDI dynamics by balance of payments item**

Over the 1997 – 2001 period, investment in equity steadied invariably at around USD 500mn, the only exception being the peak year of 2000 when it hit some USD 754mn due to the privatisation of Bulgaria’s largest commercial bank. The ratio of the *equity investment as a result of privatisation* and *equity investment as a result of non-privatisation* sub-items to total equity investment also remained relatively constant (at 42% to 48% from privatisation).

**Figure 2. FDI Dynamics by Type** (in millions of USD)



It is noteworthy that (as evident from the figure above) reinvested earnings demonstrated a well-defined 2-year cyclical pattern of behaviour. It is also clear that investment in other capital (which is in real fact the net liabilities between the company and foreign investor) and reinvested earnings reported the opposite dynamics, indicating a likely choice between the two alternative sources of financing enterprises.

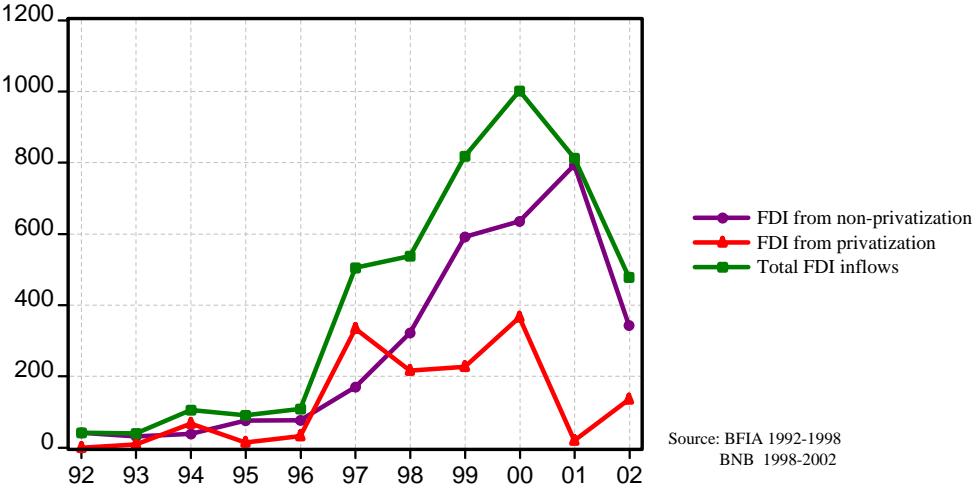
**4.3. Dynamics of FDI from privatization**

A relatively big part of the FDI inflows into the country resulted from privatization, a natural tendency reported by all transition economies. Most privatization studies in these countries have pointed to a

<sup>11</sup> In reporting FDI data, the Bulgarian National Bank has been complying with the international standards and requirements laid down in the Balance of Payments Manual, IMF, 5<sup>th</sup> edition, 1993, and the OECD’s Benchmark Definition of Foreign Direct Investment, OECD, 3<sup>rd</sup> edition, 1996.

strong correlation between revenues from privatization and cumulative FDI inflows<sup>12</sup>. Over the period surveyed, FDI inflows into Bulgaria as a result of privatization amounted at USD 1.643.1mn, accounting for 35.7% of the investment total. The bulk of investments were made in the post-1996 period, with a record high of USD 421.4mn reported in 1997.

**Figure 3. FDI Inflows as a result of Privatisation Deals or Non-privatisation, mln. USD**



FDI inflows from privatisation throughout the ten years to 2002 had invariably reported a rather uneven pattern of dynamics, manifesting large fluctuations (see Figure 3) due to the faltering pace of the privatisation process, frequent amendments to privatisation legislation and conclusion (non-conclusion respectively) of deals on large and structurally significant and vital enterprises, and state monopolies.

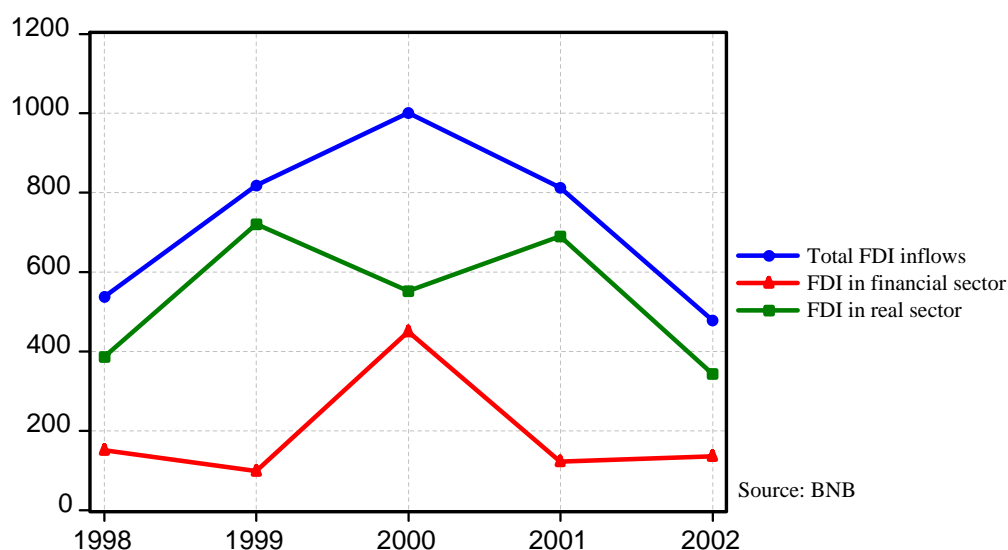
At the same time, foreign investment from non-privatisation followed a distinct and steady upward trend, reflecting the advance of the economic reforms, economic growth, and progress made on the EU accession negotiation process.

**4.4. FDI dynamics by sector of the economy**

A relatively robust chunk of FDI inflows of about 26% of the FDI total over the 1998-2002 period entered the financial sector. The same period saw the privatization of six state-owned banks, the country’s largest commercial bank – Bulbank including, to be followed by the sale of Commercial Bank Biochim (2001) and the State Savings Bank (2003). The share of foreign banks within total assets in the banking system has thus stepped up to nearly 80%. Over the same period, foreign investors made also a headlong but crucial entry into the local insurance market and private pension insurance funds.

<sup>12</sup> EBRD, Transition Report. 2001.

**Figure 4. FDI Inflows by Sector of the Economy, mln USD**



As evident from the above figure, 1998-2002 FDI inflows into the country's financial sector steadied between USD 100 -150mn per annum, with 2000 witnessing a robust growth as a result of the USD 317.9mn worth of sale of the largest commercial bank, Bulbank, being the only exception. FDI inflows into the real sector of the economy varied between USD 400 and 720mn, without reporting any specific trend.

#### 4.5. FDI inflows by country of origin

As in the 1991-1996 period, FDI dynamics by country of origin remained rather uneven. There seemed to be no particular country of origin or region reporting systematically an even share or dominating over the other countries or regions.

**Table 4.: Relative Share of FDI by Country of Origin**

	1997	1998	1999	2000	2001	2002	Total for the Period 97-02
ITALY	0.4	0.4	0.8	33.8	18.0	3.6	13.7
BELGIUM AND LUXEM.	50.6	4.1	0.0	10.0	7.5	2.0	12.6
GREECE	0.8	3.9	0.3	9.9	29.6	13.4	11.4
CYPRUS	5.5	24.4	19.8	7.5	2.2	2.4	11.7
AUSTRIA	3.0	6.9	9.1	7.0	11.5	28.0	11.1
GERMANY	7.7	4.0	4.9	3.9	8.3	12.8	7.1
USA	5.6	9.0	6.7	5.8	5.5	4.5	7.0
NETHERLANDS	0.4	8.9	12.9	-1.0	9.9	2.1	6.4
FRANCE	1.0	3.3	9.5	3.7	1.9	1.0	4.3
RUSSIA	0.0	2.8	12.2	2.2	-0.5	0.1	3.6
SWITZERLAND	0.5	7.2	1.1	2.5	4.1	5.1	3.6

<b>SPAIN</b>	10.4	8.0	0.4	0.1	0.6	-0.1	3.0
<b>Non-classified</b>	0.5	0.0	8.1	0.1	1.3	5.4	2.8
<b>GREAT BRITAIN</b>	4.3	5.7	3.4	-0.3	2.5	0.2	2.8
<b>CZECH REPUBLIC</b>	1.2	0.2	0.0	0.1	0.3	13.9	1.8
<b>TURKEY</b>	0.3	4.2	1.5	2.5	-1.2	3.0	1.8
<b>Total</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: BNB statistics.

#### 4.6. Conclusions

- Well until 1996, FDI inflows into the country had run rather low due to the unfavourable investment environment and absence of active privatization measures. Neither the size nor the caliber of FDI of that period produced any significant and healthy effect on the country's economy.
- The statistics made available in the 1991-1996/97 period relied on aggregated data that made the analysis of FDI inflows by component impossible. Furthermore, the quality of data produced may be questioned, as there had been no unified sources of data collection or methodology of reporting.
- In the post-1997 period, FDI inflows into country reported a most robust growth as a result of the macroeconomic stabilization achieved, improved investment climate and accelerated privatization effort, and Bulgaria was able to catch up with part of the transition economies, and is currently reporting performance indicators that match closely the region's average.
- There are all the reasons to believe that FDI in that period had a tangible effect not only on the balance of payments but the real sector of the economy as well.
- The data available make the answer to whether FDI are aimed at the acquisition of real assets or financial assets alone rather tentative. The FDI reported as a result of privatization are in actual fact a sale and acquisition of state-owned share capital. But so are FDI reported as a result of non-privatisation, covering similar transactions contracted with private institutions and individuals. However, their size cannot be established, employing the data collection methodology currently in use. Drawing upon assessment expertise, they can be said to enjoy a relatively small share.
- The size of FDI as a result of non-privatisation has been reporting a steady upward trend. It follows that the trend can be modelled, taking into account a number of factors having to do, among other things, with the improvement of the country's investment climate or the pace of the reforms.
- The size of FDI as a result of privatization reported fluctuations of great amplitude triggered by the very nature of the privatization process. The likely use of this FDI item into an econometric model should take note of the highly discrete nature of the process, and also of the



fact there are left just a few but mostly large enterprises earmarked for privatization. It implies that this component must be treated exogenously, relying on a specific privatization programme to be implemented on a year-to-year basis.

- As all state-owned banks but the Encouragement Bank have been sold to foreign investors, FDI inflows into the financial sector are expected to go on the decrease from 2003 onwards. Insurers and the private pension insurance funds are already operating in an environment of fierce competition and are not likely to attract any further foreign capital (actually two foreign investors in the sector exited the pension market segment in 2001 and 2002), which in turn may bring about a drastic contraction in the FDI inflows into the financial sector, as from 2003 onwards.
- FDI flows by country of origin are rather heterogeneous, making FDI explanation and forecasts by country of origin or even by region alone rather difficult. This is because large amounts of investments originating from a given country happen to be as a rule associated with a single large-scale deal. In addition, part of the FDI are reported to be from off-shore zones, which is not their actual origin and this makes the picture unclear.

## 5. Econometric models

In the present chapter the dynamics of FDI inflows in Bulgaria is treated from the perspective of finding econometric relationships that explain it. The latter will be useful in assessing the effects of changes in the factors that have impact on this dynamics. Moreover, (which is even more important) it could be used as a means of forecasting future development of FDI inflows. Similarly, it is interesting to answer the question about the possible impact of FDI on domestic investments.

As a result of testing different hypotheses several possible and statistically significant relationships were found. No attempt was made to pick out “the best one” in a certain sense. That is why several different variants of relationships are presented, as these relationships cannot be treated on their own. They have to be considered as a part of the general model and the decision which relationship to be included depends on the whole structure and the set of variables that are incorporated in the model.

The search for “suitable” models takes into account the following criteria:

- Goodness of fit
- Compliance with the usual statistical criteria for significance and unbiased estimators
- Compliance of estimated parameters with the generally accepted economic theory
- The parsimony principle – a small number of explanatory variables should be considered due to the short time series
- The possibility for alternative variants due to the necessity of correspondence of the FDI model with the variables and structure of the general model, which is still under development

### 5.1. Determinants of FDI inflows

There is no consensus in economic literature as to which factors influence the most the size of FDI. Different studies reveal different determinants. This is mainly due to the fact that development conditions are idiosyncratic for each country as well as to the existence of different types of FDI<sup>13</sup>, which are dependent on different factors. Likewise, one has to take into account the difficulties associated with measurement and accurateness of data for certain types of factors.

Published empirical research in economic literature shows that FDI in different countries and periods were influenced by factors such as the size of the host market, economic distance, agglomeration effects, factor costs, fiscal incentives, political stability, economic stability, business/investment

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<sup>13</sup> *Theoretically (Shatz and Venables, 2000) FDI are considered to be of two types – “horizontal” and “vertical” . The reason for the first one is to better serve the local market and the reason for the second one is to get lower-cost inputs.*

climate, trade barriers/openness<sup>14</sup>. A special study on transition economies<sup>15</sup> identifies as significant in comparative perspective factors like domestic credit, foreign credit, privatisation revenues, real interest rates and natural resource endowment.

### 5.1.1. Econometric Model and Data

Based on the specifics of Bulgarian economy the empirically tested model has the following structure:

$$F = f_1(G, FS, TI, D, R, DC, GER, INF, CAG, RW, EXG) \quad (1)$$

where:

*F* – FDI net flow. Due to the lack of sufficiently reliable US dollar deflator (for FDI particularly) the original dollar values of FDI flows were used<sup>16</sup>. Models were estimated using data for total flow (FDI) or data for the nonprivatization flow (FDINP).

*G* – real gross domestic product. This variable is used as a proxy for the market size. Data for GDP at 1998 average prices is used. Since there is difference between data for GDP at 98 prices on an annual basis and on quarterly basis we have used both data series - GDP98 is on annual basis and GDP98P is annual data derived from quarterly data series.

*FS* – FDI stock (FDI\_STOCK). This variable is used to reflect the agglomeration effects. It is calculated by accumulating FDI net flows.

*TI* – aggregated transition index. The index is calculated as an unweighted average of the 11 individual indices, describing the pace of the reforms in different sectors of the economy and published by the EBRD<sup>17</sup>. These indices account for: price liberalization, exchange rate and foreign trade liberalization, small-scale privatisation, large-scale privatisation, enterprise reform, competition policy, infrastructure reform, bank sector reform, non-bank financial sector reform, legal extensiveness of company law, legal effectiveness of company law. This index is an integral quantitative measure for the improvement in investment environment and political risk.

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<sup>14</sup> See for example Shatz and Venables, 2000; Branard, 1997; Fung, Iizaka, Lee and Parker, 2000; Dees, 1998; UNCTC, 1991; Lecraw, 1991; Apergis and Katrakilidis, 1998, Singh and Jun, 1995; Kravis and Lipsey, 1982.

<sup>15</sup> See Krkoska, 2001.

<sup>16</sup> Another possibility was tried also. Data for FDI was converted into BGN on the basis of the nominal exchange rate and then deflated by the GDP deflator for 1998 prices. Using data in dollar terms proved to work much better in econometric terms compared to the possibility of converting data into BGN. The reason probably has to do with the unstable exchange rate, with the application of a general deflator to a specific variable (FDI) and with the fact that part of the FDI is not in monetary form.

<sup>17</sup> See EBRD, Transition report, relevant years.

*D* – a dummy variable taking the value of 0 for the period from 1992 till 1996 and 1 after 1997 inclusively. It represents the change in the economic environment and the decrease of the macroeconomic risks after the adoption of the Currency Board Arrangement (CBA) in July 1997.

*R* – real interest rate. The variable is used as a proxy for the return on investments. It is calculated using Fischer's formula on the basis of data for interest rates on long-term credit in BGN and consumer price index<sup>18</sup>. Depending on the CPI two variants of real interest rate is calculated – RIRAA (with annual average CPI) and RIREY (with CPI end of year).

*DC* – domestic credit to non-financial institutions and households in real terms. The variable is used as an indicator of the presence of financing alternative to FDI. Data on nominal credit to non-financial institutions and households is deflated using the GDP 1998 deflator to arrive at real credit - DC98.

*GER* – growth rate of exchange rate of BGN to USD. The variable is an indicator for the currency risk faced by foreign investors.

*INF* – inflation of consumer prices. The variable is an indicator for macroeconomic stability and hence for macroeconomic risk.

*CAG* – current-account-to-GDP ratio. The variable is an indicator for macroeconomic stability and hence for macroeconomic risk.

*RW* – real average wage. This variable is a proxy for factor costs.

*EXG* – export-to-GDP ratio. The variable accounts for the openness of the Bulgarian economy.

### **5.1.2. Empirical Estimates**

Different models of type (1) have been tested from the viewpoint of functional form, data frequency and number of lags in variables. Regarding functional form several models were built – linear, logarithmic and the corresponding rate-of-growth models. Based on data availability quarterly and annual data models were tested. Due to the shortness of the data series only one-period lag and up to four-period lags were included in the annual and quarterly models respectively. As it was stated in Chapter 4 there are grounds to consider that the search for a formal relationship describing foreign investment is better to be applied to foreign investments from non-privatisation deals. Foreign investments from privatisation should be treated as an exogenous variable. On account of the lack of reliable data on these two components (FDI from privatisation and FDI from non-privatisation) compatible with the data from the balance of payments before 1997, the annual models are estimated using the total FDI inflows whereas quarterly data models were estimated using data on FDI from non-privatisation. Estimations were carried out for data till 2001 as data on FDI inflows for 2002 are

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<sup>18</sup> *It would be more precise if producers' price index is used. But data for this indicator is rather limited.*

preliminary and are subject to revision. Due to data availability models with annual data are estimated for the period starting in 1992, while models with quarterly data are estimated for the period starting in 1998<sup>19</sup>.

Results from the regression analysis are displayed in Appendix 3 and data for the statistically significant variables are shown in Appendix 4. The results could be interpreted in the following way.

#### ***A. Annual data model.***

The annual dynamics of FDI could be best described with double logarithmic linear function using two explanatory variables and one dummy variable. The adjusted coefficients of determination for the variants fall within the following range – 0.95-0.99. GDP is a statistically significant variable in all six variants of the model, which is to signify the presence of the size-of-market effect and thus an inflow of horizontal FDI<sup>20</sup>. The elasticity of FDI to real GDP is within the range of 0.05 – 0.13<sup>21</sup>. The dummy variable is also statistically significant in all variants. This shows an apparent sensitivity of FDI to political and economic risk<sup>22</sup>. The transition index is also statistically significant which shows the dependence of FDI on the general investment climate and business environment (see for example variant 1 and 2). FDI stock is another statistically significant variable regarded in itself (see for example variant 3 and 4). It is an alternative to the transition index in the sense that the two variables exhibit strong positive correlation (i.e. there is multicollinearity) and on account of this they shouldn't be used simultaneously in the same model<sup>23</sup>.

Variables associated with economic risk – currency risk, inflation and balance of payments turn out to be statistically insignificant. This could be a result of the specifics of the data series themselves – short series including “unusual” values for these variables during the period of high- and hyperinflation. This could also be attributed to the fact that the influence of these variables might be reflected in the dynamics of real GDP<sup>24</sup>.

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<sup>19</sup> *The same applies for the domestic investment models.*

<sup>20</sup> *Horizontal FDI are associated with the size of the market whereas the vertical ones are neutral to the size of the market.*

<sup>21</sup> *The first three variants are different from the second three only in the data used for GDP. In the former set of variants (GDP98P) annual data are used while in the latter (GDP98) annual data on GDP are derived from the aggregation of the quarterly data. Due to data discrepancy, tests were carried out for both set of data which yielded similar results. Variants using GDP98 data are shown for comparability with the models built on a quarterly basis.*

<sup>22</sup> *In a later stage it is worth using two separate dummy variables. One of them will represent the change in the macro-environment after the adoption of the Currency Board Agreement in 1997, while the other will represent the decrease of the political risk after the start of the accession to the EU talks in 2000. The lack of sufficient data at this stage limits the use of such a variable*

<sup>23</sup> *The improvement of the investment environment through its impact on investment inflows influences the size of FDI stock. On its part FDI stock reflects on the speed and quality of the reforms. No research was made on the causal link between these two variables due to the very short data series.*

<sup>24</sup> *Data reveal that the stabilization of the mentioned variables, i.e. macroeconomic risk reduction, is connected with growth of real GDP and vice versa.*

Export-to-GDP ratio proved to be statistically insignificant. The openness of the economy is probably better explained by the index of foreign exchange rate and foreign trade liberalization, which is part of the aggregate transition index.

No statistical significance was revealed for real interest rate. This could be caused either by the way in which this variable was defined or by the possibility that foreign firms have a concept for real return, which is principally different from real interest rates. No statistically significant relationship was found for the size of credit to the non-financial sector, which could be interpreted in the sense that internal credit was not a substitute for FDI in this period. Average wages are also statistically insignificant which could be attributed to the fact that foreign investors are influenced in a much greater extent by the quality of labour.

The analyses of residuals in the presented regression models show lack of heteroscedasticity. Residuals are not correlated with regressors as well. The Durbin-Watson statistic reveals the presence of some negative autocorrelation of residuals. This could be corrected applying first-order autoregressive correction or AR(1) correction. The results of the application of this procedure are presented in variant 5 and 6.

All values that proved to be statistically insignificant could turn out to be significant in a later stage. Therefore their exclusion from the model at this stage does not automatically lead to their exclusion from the subsequent update of the model.

### ***B. Quarterly data models.***

Quarterly data models confirm the relationships identified using annual data. GDP and the transition index<sup>25</sup> are again statistically significant. The presence of one period lag in GDP has to be explained with the fact that foreign investments are a strategic decision and are thus influenced more by the general tendency (in this case of GDP) than by the specific value of the current quarter. No dummy variable was used in the quarterly models as they encompass a period after the adoption of CBA and the establishment of macroeconomic stability.

In all cases the estimated econometric models display greater goodness of fit for models the dependent variable of which is FDI from non-privatisation deals compared to models using total FDI inflows. Examples of this are variants 1 and 2. This should be an expected result as FDI from privatisation depend more on the specific privatisation program of the government and on the pace of the administrative procedures rather than on the current values of the economic indicators. This leads to the rationale to disaggregate FDI to its two components – FDI from privatisation and FDI from non-privatisation. The former should be regarded as an exogenous variable dependent on the particular

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<sup>25</sup> *There are no quarterly observations for the transition index. For this reason quarterly data was derived as a linear interpolation of the annual data.*

privatisation program whereas the dynamics of the latter should be modelled using the corresponding econometric relationships. Despite the small difference among the models for the observed period, it could be expected that this difference will grow with time.

Analogous to annual data models FDI stocks for a certain period could be an alternative to the transition index as an explanatory variable as one can see in variant 3. The two variables are highly correlated which produces multicollinearity if included simultaneously in one and the same model – a situation shown in variant 4.

The other tested variables have not shown statistical significance. Variant 5 presents the results from the estimation in the case when real long-term credit to non-financial institutions is included as a regressor.

## 5.2. The Impact of FDI on Domestic Investments

### 5.2.1. Econometric Model and Data

Total investments in the country  $I$  are regarded as composed of two components - investments by domestic companies  $I_d$  and investments by foreign companies  $I_f$ .

$$I \equiv I_d + I_f \quad (1)$$

$$I_t \equiv I_{d,t} + I_{f,t} \quad (2)$$

Investments by multinational companies  $I_f$  are function of foreign direct investments  $F$ . This function could include lag variables, as certain period is needed before FDI are transformed into physical capital.

$$I_{ft} \equiv \sum_{i=0}^l \psi_i F_{t-i} \quad (3)$$

Investments are basically an adaptation of the existing capital stock to the desired capital stock. As a result net investments by domestic companies are determined by the desired capital stock in a certain period and the actual capital stock that existed in the previous period. The model applies the assumption of partial adaptation:

$$I_{d,t}^n = \lambda(K_{d,t}^* - K_{d,t-1}) \quad (4)$$

At the same time net investments determine the actual increase in the capital stock i.e.:

$$I_{d,t}^n = K_{d,t} - K_{d,t-1} \quad (5)$$

Using the flexible accelerator model (L. Koyck) in the sense of the neoclassical investment model without user cost of capital (Hall-Jorgensen), the desired capital stock corresponds to the expected GDP -  $G_t^e$

$$K_{d,t}^* = \mu G_t^e \quad (6)$$

Combining (4), (5) and (6):

$$K_{d,t} = \lambda \mu G_t^e + (1 - \lambda) K_{d,t-1} \quad (7)$$

Taking into account the law of motion of capital stock with annual depreciation rate  $d$  the following relationship between investments and capital is derived:

$$I_{d,t} = K_{d,t} - (1 - d) K_{d,t-1} \quad (8)$$

Replacing (7) in (8) yields:

$$I_{d,t} = \lambda \mu G_t^e + (d - \lambda) K_{d,t-1} \quad (9)$$

Equation (9) is subjected to a Koyck's transformation – multiplication of the two sides of (9) by  $(1-d)$  and afterwards replacement with one period lag. The result is then subtracted from equation (9):

$$I_{d,t} - (1 - d) I_{d,t-1} = \lambda \mu G_t^e - (1 - d) \lambda \mu G_{t-1}^e + (d - \lambda) I_{d,t-1} \quad (10)$$

Algebraic transformation of (10) yields the following equation for  $I_{d,t}$ :

$$I_{d,t} = \lambda \mu G_t^e - (1 - d) \lambda \mu G_{t-1}^e + (1 - \lambda) I_{d,t-1} \quad (11)$$

After substitution in (2) the final functional form of total investments is formed:

$$I_t = \sum_0^l \psi_{t-i} F_{t-1} + \lambda \mu G_t^e - (1 - d) \lambda \mu G_{t-1}^e + (1 - \lambda) I_{d,t-1} \quad (12)$$



The obtained theoretical model gives grounds for testing the presence of influence of FDI on total investments. It could be expected that the following econometric relationship exists:

$$I_t = f_2(F_t, F_{t-1}, \dots, F_{t-l}, G_t, \dots, G_{t-m}, I_{t-1}, \dots, I_{t-k}) \quad (13)$$

where

$I$  – domestic investments. Data for gross fixed capital formation in constant 1998 prices is used (GFCF98). All other variables are defined in 5.1.1.

### **5.2.2. Empirical Estimates**

In this case the period lag of FDI –  $l$  depends on two factors – the usual period necessary for foreign investments to transform into real assets and possibly the presence of investment obligations upon the conclusion of privatisation deals. The period lag in GDP –  $m$  depends on the way expectations about GDP are formed – rational expectations or adaptive.

The model could be expanded with other variables. Judging from the sources of financing one could expect that gross fixed capital formation also depends on factors such as domestic credit, foreign credit (not in the form of FDI), state subsidies, capital market financing and real interest rate. In the case of Bulgaria foreign credit (not in the form of FDI) to private sector and capital market are still not significant sources of financing and there are no reliable data on state subsidies.

Based on model (13) OLS econometric estimations were performed for the dependence of investments on FDI. These estimations are in different variants stemming from the different underlying assumptions about GDP expectation formation as well as about lag values and functional form. Like in FDI models quarterly and annual data are used. Part of the variants are displayed in Appendix 3.

#### ***A. Annual Data Models***

Results show that during the observed period GFCF could be explained with a high coefficient of determination using econometric models based on GDP and FDI – variants 1 and 2. FDI influence is positive – FDI growth has impact on GFCF with the corresponding time lag. Elasticity is in the range of 0.07 – 0.12. Real interest rate proved to be statistically insignificant in both cases (with annual average and end of year CPI) – variant 3. This could be explained with the stringent liquidity constraints faced by a large part of Bulgarian companies.

It is worth noting, however, that investments from previous periods are highly correlated to FDI. This fact leads their inclusion in the regression equation to multicollinearity – variant 4. Investments from previous periods have explanatory power similar to FDI and in that sense could be an alternative to FDI as a regressor.

Like the case with FDI models, residuals are not correlated with regressors and are homoscedastic. The Durbin-Watson statistic indicates some negative autoregression, which could be corrected by the AR procedure.

### ***B. Quarterly data models***

Quarterly data models reiterate the results yielded with annual data. GFCF can be described econometrically with GDP and FDI with one or two period lags – variant 1 and variant 2. Real interest rate is statistically insignificant – variant 3. Similarly to annual data, GFCF from previous periods is correlated to FDI and could be used as their alternative regressor – variant 4. Variants 5 and 6 reveal that the size of domestic credit to non-financial institutions in this period could be another explanatory variable for GFCF. Internal credit is correlated to FDI because during the period 1998-2001 there was a simultaneous tendency of increase in both FDI and internal credit to non-financial institutions as a result of the onset of macroeconomic stabilization and decreasing risk in the real sector.

### **5.3. Empirical Estimates as Simultaneous Equations**

The availability of relatively more quarterly data provides the opportunity to estimate the above models as a system of two equations. Results from such an approach is presented in Appendix 3. The above models were estimated using Seemingly Unrelated Regression (SUR) method. The results confirm basically what was obtained on the basis of OLS estimations. There is no difference between OLS and SUR when FDINP is the dependent variable in the model for foreign investments (see variant 1). But there is a difference when FDI is the dependent variable in the same model (see variant 2). The reason is that FDI appears as a regressor in the investments model while FDINP doesn't.

## 6. Literature

*Apergis, N. and C. Katrakilidis, "Does Inflation Uncertainty Matter in Foreign Direct Investment Decisions?" An Empirical Investigation for Portugal, Spain and Greece", Rivista Internazionale Di Scienze Economiche E Commerciali, Vol 45, 1998.*

*Branard, S.L, "An Empirical Assesment of the Proximity-Concentration Trade-Off Between Multinational Sales and Trade", American Economic Revie, Vol 87, No 4,1997.*

*Dees, S., "Foreign Direct Investment in China: Determinants and Effects", Economics of Planning, Vol 31, 1998.*

*Fung, K.C., H. Iizaka, J. Lee and S. Parker, " Determinants of US and Japanese Foreign Direct Investment in China", Univ of California at Santa Cruz, Working Paper No 456, 2000.*

*Kravis, I. B., and R. E. Lipsey, "The Location of Overseas Production and Production for Export by US Multinational Firms", Journal of International Economics, Vol 12, 1982.*

*Krkoska, L., Foreign Direct Investment Financing of Capital Formation in Central and Eastern Europe, EBRD, Working Paper No67, 2001.*

*Lecraw, D., "Factors Influencing FDI In Host Developing Countries: A Preliminary Report", in Multinational Enterprises in Less Developed Countries, ed. By P.J. Buckley and J. Clegg, 1991.*

*Shatz, H., and A. J. Venables, "The Geography of International Investment", World Bank Policy Research Working Paper, No 2338, 2000;*

*Singh, H.and K. W. Jun, "Some New Evidence on Determinants of foreign Direct Investments in Developing Countries" ,World Bank Policy Research Working Paper, No 1531, 1995.*

*UNCTC, "The Impact of Trade Related Investment Measures on Trade and Development" , New Yaork, United Nations, 1991.*

## Appendix 1. Data on FDI inflows from BNB and FIA

### FDI Flows in Bulgaria (mln. USD)

Year	<i>Data from BNB</i>				<i>Data from AFI</i>			Difference (%)
	Equity	Other	Reinvested Earnings	Total	Non-privatisation	Privatisation	Total	
1991	55.9	0.0	0.0	55.9				
1992	41.5	0.0	0.0	41.5	34.4	0.0	34.4	-17.1
1993	40.0	0.0	0.0	40.0	80.4	22.0	102.4	156.0
1994	105.4	0.0	0.0	105.4	76.7	134.2	210.9	100.1
1995	90.4	0.0	0.0	90.4	136.6	26.0	162.6	79.9
1996	104.0	5.0	0.0	109.0	180.0	76.4	256.4	135.2
1997	491.9	12.5	0.4	504.8	214.8	421.4	636.2	26.0
1998	504.6	-17.0	49.8	537.3	464.2	155.8	620.0	15.4
1999	500.3	351.0	-32.5	818.8	592.1	226.7	818.8	0.0
2000	754.8	188.5	58.3	1001.5	635.5	366.0	1001.5	0.0
2001	566.7	240.0	6.3	812.9	675.0	19.2	694.2	-14.6
2002	333.0	92.9	52.8	478.7				

## Appendix 2. FDI Inflow Data as of May 2003

### FDI Inflow Data Made Available as of May 2003

Indicator	Period	Frequency	Number of observations	Source	Remarks:
FDI by type of investment	1991 - 2002	Annual	12	BNB (External sector, BoP)	FDI data by type – equity, other capital (intra-firm indebtedness), reinvested earnings
FDI by type of investment	January 1991 – April 2002	Quarterly	48	BNB (External sector, BoP)	Analogous to the above data
FDI by type of investment	January 1996 – December 2002	Monthly	85	BNB (External sector, BoP)	Analogous to the above data
FDI by sector of the economy	1998 - 2001	Annual	4	BNB (External sector, FDI)	Data on 21 industries
FDI by country of origin	1996 – 2002	Annual	7	BNB (External sector, FDI)	FDI data by country of origin (116 countries)
FDI by country of origin	1992 - 2001	Annual	10	Foreign Investment Agency	FDI data by country of origin Discrepancy with BNB data because the Central Bank takes into account primary investments alone, and reports no data on secondary investment
FDI – as a result of privatization or non-privatisation	1992- 2001	Annual	10	Foreign Investment Agency	FDI data disaggregated into privatization and non-privatisation revenues (Greenfield investment, additional investment, reinvestment, joint venture)
FDI – as a result of privatization or non-privatisation	1998 - 2002	Quarterly	20	BNB (External sector, FDI)	Analogous to the above data

## Appendix 3. Econometric Models and Variants

### FDI models

#### A. Annual Data Models

##### A.1. Variant 1

Estimation Command:

```
=====
LS LOG(FDI) LOG(TRINDEX) LOG(GDP98P) D1
```

Estimation Equation:

```
=====
LOG(FDI) = C(1)*LOG(TRINDEX) + C(2)*LOG(GDP98P) + C(3)*D1
```

Substituted Coefficients:

```
=====
LOG(FDI) = 3.935785425*LOG(TRINDEX) + 0.07412027437*LOG(GDP98P) + 0.9148319541*D1
```

Dependent Variable: LOG(FDI)

Method: Least Squares

Date: 05/31/03 Time: 15:46

Sample(adjusted): 1992 2001

Included observations: 10 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(TRINDEX)	3.935785	0.692706	5.681754	0.0007
LOG(GDP98P)	0.074120	0.031373	2.362544	0.0502
D1	0.914832	0.273846	3.340677	0.0124
R-squared	0.983734	Mean dependent var		5.409641
Adjusted R-squared	0.979087	S.D. dependent var		1.279362
S.E. of regression	0.185012	Akaike info criterion		-0.293464
Sum squared resid	0.239607	Schwarz criterion		-0.202688
Log likelihood	4.467320	F-statistic		211.6781
Durbin-Watson stat	2.961024	Prob(F-statistic)		0.000001

## A.2 Variant 2

Estimation Command:

=====  
LS LOG(FDI) LOG(TRINDX) LOG(GDP98) D1

Estimation Equation:

=====  
 $\text{LOG(FDI)} = C(1)*\text{LOG(TRINDX)} + C(2)*\text{LOG(GDP98)} + C(3)*D1$

Substituted Coefficients:

=====  
 $\text{LOG(FDI)} = 3.935542389*\text{LOG(TRINDX)} + 0.07413359054*\text{LOG(GDP98)} + 0.9148857285*D1$

Dependent Variable: LOG(FDI)

Method: Least Squares

Date: 05/31/03 Time: 15:57

Sample(adjusted): 1992 2001

Included observations: 10 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(TRINDX)	3.935542	0.692714	5.681336	0.0007
LOG(GDP98)	0.074134	0.031374	2.362867	0.0501
D1	0.914886	0.273834	3.341023	0.0124
R-squared	0.983736	Mean dependent var	5.409641	
Adjusted R-squared	0.979090	S.D. dependent var	1.279362	
S.E. of regression	0.185001	Akaike info criterion	-0.293585	
Sum squared resid	0.239578	Schwarz criterion	-0.202810	
Log likelihood	4.467926	F-statistic	211.7042	
Durbin-Watson stat	2.960955	Prob(F-statistic)	0.000001	

### A.3 Variant 3

Estimation Command:

=====  
LS LOG(FDI)LOG(GDP98P) LOG(FDI\_STOCK) D1

Estimation Equation:

=====  
 $\text{LOG(FDI)} = \text{C(1)*LOG(GDP98P)} + \text{C(2)*LOG(FDI\_STOCK)} + \text{C(3)*D1}$

Substituted Coefficients:

=====  
 $\text{LOG(FDI)} = 0.137297*\text{LOG(GDP98P)} + 0.384635*\text{LOG(FDI\_STOCK)} + 1.181719*D1$

Dependent Variable: LOG(FDI)

Method: Least Squares

Date: 05/31/03 Time: 16:00

Sample: 1992 2002

Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GDP98P)	0.137297	0.039146	3.507297	0.0080
LOG(FDI_STOCK)	0.384635	0.130648	2.944059	0.0186
D1	1.181719	0.406063	2.910186	0.0196
R-squared	0.952936	Mean dependent var		5.478862
Adjusted R-squared	0.941171	S.D. dependent var		1.235232
S.E. of regression	0.299603	Akaike info criterion		0.654281
Sum squared resid	0.718094	Schwarz criterion		0.762798
Log likelihood	-0.598546	F-statistic		80.99154
Durbin-Watson stat	1.546262	Prob(F-statistic)		0.000005



#### A.4. Variant 4

Estimation Command:

=====  
LS LOG(FDI) D1 LOG(GDP98) LOG(FDI\_STOCK)

Estimation Equation:

=====  
 $\text{LOG(FDI)} = C(1)*D1 + C(2)*\text{LOG(GDP98)} + C(3)*\text{LOG(FDI\_STOCK)}$

Substituted Coefficients:

=====  
 $\text{LOG(FDI)} = 1.181763262*D1 + 0.1373123646*\text{LOG(GDP98)} + 0.3845961495*\text{LOG(FDI\_STOCK)}$

Dependent Variable: LOG(FDI)

Method: Least Squares

Date: 05/31/03 Time: 16:06

Sample: 1992 2002

Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D1	1.181763	0.406079	2.910180	0.0196
LOG(GDP98)	0.137312	0.039151	3.507239	0.0080
LOG(FDI_STOCK)	0.384596	0.130661	2.943474	0.0186
R-squared	0.952936	Mean dependent var	5.478862	
Adjusted R-squared	0.941169	S.D. dependent var	1.235232	
S.E. of regression	0.299606	Akaike info criterion	0.654301	
Sum squared resid	0.718108	Schwarz criterion	0.762818	
Log likelihood	-0.598656	F-statistic	80.98983	
Durbin-Watson stat	1.546169	Prob(F-statistic)	0.000005	

## A.5. Variant 5

Estimation Command:

```
=====
LS LOG(FDI) LOG(GDP98P) LOG(TRINDEX) D1 AR(1)
```

Estimation Equation:

```
=====
LOG(FDI) = C(1)*LOG(GDP98P) + C(2)*LOG(TRINDEX) + C(3)*D1 + [AR(1)=C(4)]
```

Substituted Coefficients:

```
=====
LOG(FDI) = 0.050539*LOG(GDP98P) + 4.41466*LOG(TRINDEX) + 0.787964*D1 + [AR(1)=-0.525452]
```

Dependent Variable: LOG(FDI)

Method: Least Squares

Date: 05/31/03 Time: 16:08

Sample(adjusted): 1993 2001

Included observations: 9 after adjusting endpoints

Convergence achieved after 5 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GDP98P)	0.050539	0.026173	1.930963	0.1114
LOG(TRINDEX)	4.414660	0.565152	7.811462	0.0006
D1	0.787964	0.206057	3.824006	0.0123
AR(1)	-0.525452	0.323238	-1.625589	0.1650
R-squared	0.989686	Mean dependent var		5.596747
Adjusted R-squared	0.983498	S.D. dependent var		1.203128
S.E. of regression	0.154556	Akaike info criterion		-0.595424
Sum squared resid	0.119437	Schwarz criterion		-0.507769
Log likelihood	6.679410	F-statistic		159.9267
Durbin-Watson stat	2.146780	Prob(F-statistic)		0.000022
Inverted AR Roots	-0.53			

## A.6. Variant 6

Estimation Command:

```
=====  
LS LOG(FDI) D1 LOG(GDP98) LOG(TRINDEX) AR(1)
```

Estimation Equation:

```
=====  
LOG(FDI) = C(1)*D1 + C(2)*LOG(GDP98) + C(3)*LOG(TRINDEX) + [AR(1)=C(4)]
```

Substituted Coefficients:

```
=====  
LOG(FDI) = 0.787953*D1 + 0.050544*LOG(GDP98) + 4.414606*LOG(TRINDEX) + [AR(1)=-0.525429]
```

Dependent Variable: LOG(FDI)

Method: Least Squares

Date: 05/31/03 Time: 16:11

Sample(adjusted): 1993 2001

Included observations: 9 after adjusting endpoints

Convergence achieved after 5 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D1	0.787953	0.206043	3.824222	0.0123
LOG(GDP98)	0.050544	0.026174	1.931066	0.1113
LOG(TRINDEX)	4.414606	0.565150	7.811393	0.0006
AR(1)	-0.525429	0.323232	-1.625550	0.1650
R-squared	0.989686	Mean dependent var	5.596747	
Adjusted R-squared	0.983498	S.D. dependent var	1.203128	
S.E. of regression	0.154553	Akaike info criterion	-0.595458	
Sum squared resid	0.119433	Schwarz criterion	-0.507803	
Log likelihood	6.679561	F-statistic	159.9322	
Durbin-Watson stat	2.146699	Prob(F-statistic)	0.000022	
Inverted AR Roots	-0.53			

## B. Quarterly Data Models

### B.1. Variant 1

Estimation Command:

```
=====
LS LOG(FDINP) C LOG(TRINDEX) LOG(GDP98(-1))
```

Estimation Equation:

```
=====
LOG(FDINP) = C(1) + C(2)*LOG(TRINDEX) + C(3)*LOG(GDP98(-1))
```

Substituted Coefficients:

```
=====
LOG(FDINP) = -32.86449538 + 7.90487178*LOG(TRINDEX) + 1.852213071*LOG(GDP98(-1))
```

Dependent Variable: LOG(FDINP)

Method: Least Squares

Date: 05/31/03 Time: 16:27

Sample(adjusted): 1998:1 2001:4

Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-32.86450	11.82072	-2.780245	0.0156
LOG(TRINDEX)	7.904872	2.896561	2.729054	0.0172
LOG(GDP98(-1))	1.852213	0.811335	2.282921	0.0399
R-squared	0.606814	Mean dependent var		4.868660
Adjusted R-squared	0.546324	S.D. dependent var		0.555272
S.E. of regression	0.374006	Akaike info criterion		1.038271
Sum squared resid	1.818448	Schwarz criterion		1.183132
Log likelihood	-5.306171	F-statistic		10.03163
Durbin-Watson stat	2.000425	Prob(F-statistic)		0.002317

## B.2. Variant 2

Estimation Command:

=====  
LS LOG(FDI) C LOG(GDP98(-1)) LOG(TRINDX)

Estimation Equation:

=====  
 $\text{LOG(FDI)} = C(1) + C(2)*\text{LOG(GDP98(-1))} + C(3)*\text{LOG(TRINDX)}$

Substituted Coefficients:

=====  
 $\text{LOG(FDI)} = -33.88896 + 2.270150*\text{LOG(GDP98(-1))} + 3.296148*\text{LOG(TRINDX)}$

Dependent Variable: LOG(FDI)

Method: Least Squares

Date: 05/31/03 Time: 16:28

Sample(adjusted): 1998:1 2001:4

Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-33.88896	11.30096	-2.998770	0.0103
LOG(GDP98(-1))	2.270150	0.775660	2.926735	0.0118
LOG(TRINDX)	3.296148	2.769198	1.190290	0.2552
R-squared	0.528781	Mean dependent var		5.175187
Adjusted R-squared	0.456285	S.D. dependent var		0.484914
S.E. of regression	0.357561	Akaike info criterion		0.948338
Sum squared resid	1.662047	Schwarz criterion		1.093198
Log likelihood	-4.586705	F-statistic		7.294000
Durbin-Watson stat	1.486990	Prob(F-statistic)		0.007515

### B.3. Variant 3

Estimation Command:

```
=====  
LS LOG(FDINP) C LOG(GDP98(-1)) LOG(FDI_STOCK)
```

Estimation Equation:

```
=====  
LOG(FDINP) = C(1) + C(2)*LOG(GDP98(-1)) + C(3)*LOG(FDI_STOCK)
```

Substituted Coefficients:

```
=====  
LOG(FDINP) = -27.21075 + 1.735696*LOG(GDP98(-1)) + 0.655621*LOG(FDI_STOCK)
```

Dependent Variable: LOG(FDINP)

Method: Least Squares

Date: 05/31/03 Time: 16:32

Sample: 1998:1 2001:4

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-27.21075	12.09153	-2.250399	0.0424
LOG(GDP98(-1))	1.735697	0.816225	2.126494	0.0532
LOG(FDI_STOCK)	0.655621	0.233059	2.813118	0.0147
R-squared	0.615573	Mean dependent var	4.868660	
Adjusted R-squared	0.556431	S.D. dependent var	0.555272	
S.E. of regression	0.369817	Akaike info criterion	1.015742	
Sum squared resid	1.777938	Schwarz criterion	1.160603	
Log likelihood	-5.125939	F-statistic	10.40830	
Durbin-Watson stat	1.970081	Prob(F-statistic)	0.002001	

## B.4. Variant 4

Estimation Command:

```
=====  
LS LOG(FDINP) C LOG(GDP98(-1)) LOG(TRINDEX) LOG(FDI_STOCK)
```

Estimation Equation:

```
=====  
LOG(FDINP) = C(1) + C(2)*LOG(GDP98(-1)) + C(3)*LOG(TRINDEX) + C(4)*LOG(FDI_STOCK)
```

Substituted Coefficients:

```
=====  
LOG(FDINP) = -26.83145+ 1.729741*LOG(GDP98(-1)) - 0.563975*LOG(TRINDEX) +  
0.700751*LOG(FDI_STOCK)
```

Dependent Variable: LOG(FDINP)

Method: Least Squares

Date: 05/31/03 Time: 16:35

Sample: 1998:1 2001:4

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-26.83145	16.74885	-1.601987	0.1351
LOG(GDP98(-1))	1.729741	0.867054	1.994963	0.0693
LOG(TRINDEX)	-0.563975	16.43320	-0.034319	0.9732
LOG(FDI_STOCK)	0.700751	1.337200	0.524044	0.6098
R-squared	0.615611	Mean dependent var		4.868660
Adjusted R-squared	0.519514	S.D. dependent var		0.555272
S.E. of regression	0.384899	Akaike info criterion		1.140644
Sum squared resid	1.777763	Schwarz criterion		1.333791
Log likelihood	-5.125153	F-statistic		6.406126
Durbin-Watson stat	1.965634	Prob(F-statistic)		0.007742

## B.5. Variant 5

Estimation Command:

```
=====  
LS LOG(FDINP) C LOG(TRINDEX) LOG(GDP98(-1)) LOG(LTCNF98)
```

Estimation Equation:

```
=====  
LOG(FDINP) = C(1) + C(2)*LOG(TRINDEX) + C(3)*LOG(GDP98(-1)) + C(4)*LOG(LTCNF98)
```

Substituted Coefficients:

```
=====  
LOG(FDINP) = -28.74341 + 11.83716*LOG(TRINDEX) + 1.812083*LOG(GDP98(-1)) -  
0.567369*LOG(LTCNF98)
```

Dependent Variable: LOG(FDINP)

Method: Least Squares

Date: 05/31/03 Time: 16:37

Sample: 1998:1 2001:4

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28.74341	16.30179	-1.763206	0.1033
LOG(TRINDEX)	11.83716	10.71325	1.104908	0.2909
LOG(GDP98(-1))	1.812083	0.845906	2.142181	0.0534
LOG(LTCNF98)	-0.567369	1.484056	-0.382309	0.7089
R-squared	0.611546	Mean dependent var		4.868660
Adjusted R-squared	0.514432	S.D. dependent var		0.555272
S.E. of regression	0.386929	Akaike info criterion		1.151165
Sum squared resid	1.796565	Schwarz criterion		1.344312
Log likelihood	-5.209320	F-statistic		6.297220
Durbin-Watson stat	2.007342	Prob(F-statistic)		0.008224



## GFCF models

### A. Annual data models

#### A.1 Variant 1

Estimation Command:

=====  
LS LOG(GFCF98) C LOG(GDP98) LOG(FDI(-1))

Estimation Equation:

=====  
 $\text{LOG(GFCF98)} = \text{C}(1) + \text{C}(2)*\text{LOG(GDP98)} + \text{C}(3)*\text{LOG(FDI(-1))}$

Substituted Coefficients:

=====  
 $\text{LOG(GFCF98)} = -40.6542 + 3.236907*\text{LOG(GDP98)} + 0.129290*\text{LOG(FDI(-1))}$

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 16:51

Sample(adjusted): 1994 2002

Included observations: 9 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-40.65420	4.284059	-9.489645	0.0001
LOG(GDP98)	3.236907	0.253366	12.77564	0.0000
LOG(FDI(-1))	0.129290	0.013748	9.404322	0.0001
R-squared	0.982689	Mean dependent var		15.05610
Adjusted R-squared	0.976919	S.D. dependent var		0.296658
S.E. of regression	0.045070	Akaike info criterion		-3.100012
Sum squared resid	0.012188	Schwarz criterion		-3.034270
Log likelihood	16.95005	F-statistic		170.3021
Durbin-Watson stat	3.262914	Prob(F-statistic)		0.000005

## A.2 Variant 2

Estimation Command:

```
=====
LS LOG(GFCF98) C LOG(GDP98) LOG(FDI(-1)) LOG(FDI(-2))
```

Estimation Equation:

```
=====
LOG(GFCF98) = C(1) + C(2)*LOG(GDP98) + C(3)*LOG(FDI(-1)) + C(4)*LOG(FDI(-2))
```

Substituted Coefficients:

```
=====
LOG(GFCF98) = -38.50617784 + 3.109878366*LOG(GDP98) + 0.07935180739*LOG(FDI(-1)) +
0.05494475906*LOG(FDI(-2))
```

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 16:53

Sample(adjusted): 1994 2002

Included observations: 9 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-38.50618	3.069485	-12.54484	0.0001
LOG(GDP98)	3.109878	0.181533	17.13120	0.0000
LOG(FDI(-1))	0.079352	0.020568	3.858050	0.0119
LOG(FDI(-2))	0.054945	0.020058	2.739306	0.0408
R-squared	0.993078	Mean dependent var		15.05610
Adjusted R-squared	0.988924	S.D. dependent var		0.296658
S.E. of regression	0.031220	Akaike info criterion		-3.794384
Sum squared resid	0.004874	Schwarz criterion		-3.706729
Log likelihood	21.07473	F-statistic		239.1038
Durbin-Watson stat	2.915394	Prob(F-statistic)		0.000008

### A.3 Variant 3

Estimation Command:

```
=====  
LS LOG(GFCF98) C LOG(GDP98) LOG(FDI(-1)) RIR1
```

Estimation Equation:

```
=====  
LOG(GFCF98) = C(1) + C(2)*LOG(GDP98) + C(3)*LOG(FDI(-1)) + C(4)*RIR1
```

Substituted Coefficients:

```
=====  
LOG(GFCF98) = -37.90002234 + 3.073134761*LOG(GDP98) + 0.1342677432*LOG(FDI(-1)) +  
4.662444321e-05*RIR1
```

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 17:08

Sample: 1995 2002

Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-37.90002	5.862357	-6.464980	0.0029
LOG(GDP98)	3.073135	0.347436	8.845173	0.0009
LOG(FDI(-1))	0.134268	0.021013	6.389735	0.0031
RIR1	4.66E-05	6.90E-05	0.675928	0.5362
R-squared	0.984740	Mean dependent var	15.07425	
Adjusted R-squared	0.973295	S.D. dependent var	0.311756	
S.E. of regression	0.050946	Akaike info criterion	-2.809259	
Sum squared resid	0.010382	Schwarz criterion	-2.769539	
Log likelihood	15.23704	F-statistic	86.04270	
Durbin-Watson stat	3.109373	Prob(F-statistic)	0.000434	

#### A.4 Variant 4

Estimation Command:

=====  
LS LOG(GFCF98) C LOG(GDP98) LOG(FDI(-1)) LOG(GFCF98(-1))

Estimation Equation:

=====  
 $\text{LOG(GFCF98)} = C(1) + C(2)*\text{LOG(GDP98)} + C(3)*\text{LOG(FDI(-1))} + C(4)*\text{LOG(GFCF98(-1))}$

Substituted Coefficients:

=====  
 $\text{LOG(GFCF98)} = -34.47195767 + 2.733445784*\text{LOG(GDP98)} + 0.1349597512*\text{LOG(FDI(-1))} + 0.15557482*\text{LOG(GFCF98(-1))}$

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 16:58

Sample(adjusted): 1995 2002

Included observations: 8 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-34.47196	5.431045	-6.347205	0.0032
LOG(GDP98)	2.733446	0.379701	7.198948	0.0020
LOG(FDI(-1))	0.134960	0.017238	7.828987	0.0014
LOG(GFCF98(-1))	0.155575	0.097893	1.589234	0.1872
R-squared	0.989578	Mean dependent var	15.07425	
Adjusted R-squared	0.981761	S.D. dependent var	0.311756	
S.E. of regression	0.042103	Akaike info criterion	-3.190554	
Sum squared resid	0.007091	Schwarz criterion	-3.150833	
Log likelihood	16.76221	F-statistic	126.6007	
Durbin-Watson stat	3.029057	Prob(F-statistic)	0.000203	

## GDCF models

### B. Quarterly Data Models

#### B.1. Variant 1

Estimation Command:

```
=====
LS LOG(GFCF98) C LOG(FDI(-1)) LOG(GDP98)
```

Estimation Equation:

```
=====
LOG(GFCF98) = C(1) + C(2)*LOG(FDI(-1)) + C(3)*LOG(GDP98)
```

Substituted Coefficients:

```
=====
LOG(GFCF98) = -25.05353397 + 0.2442206691*LOG(FDI(-1)) + 2.408180179*LOG(GDP98)
```

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 17:19

Sample: 1998:1 2001:4

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-25.05353	5.852964	-4.280486	0.0009
LOG(FDI(-1))	0.244221	0.099219	2.461432	0.0286
LOG(GDP98)	2.408180	0.366368	6.573113	0.0000
R-squared	0.772060	Mean dependent var		13.72911
Adjusted R-squared	0.736992	S.D. dependent var		0.363270
S.E. of regression	0.186301	Akaike info criterion		-0.355549
Sum squared resid	0.451203	Schwarz criterion		-0.210688
Log likelihood	5.844390	F-statistic		22.01622
Durbin-Watson stat	2.904647	Prob(F-statistic)		0.000067

## B.2. Variant 2

Estimation Command:

=====  
LS LOG(GFCF98) C LOG(FDI(-1)) LOG(GDP98) LOG(FDI(-2))

Estimation Equation:

=====  
 $\text{LOG(GFCF98)} = C(1) + C(2)*\text{LOG(FDI(-1))} + C(3)*\text{LOG(GDP98)} + C(4)*\text{LOG(FDI(-2))}$

Substituted Coefficients:

=====  
 $\text{LOG(GFCF98)} = -23.32454857 + 0.1805742229*\text{LOG(FDI(-1))} + 2.267321141*\text{LOG(GDP98)} + 0.155508605*\text{LOG(FDI(-2))}$

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 17:22

Sample(adjusted): 1998:1 2001:4

Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-23.32455	5.605334	-4.161134	0.0013
LOG(FDI(-1))	0.180574	0.101065	1.786707	0.0993
LOG(GDP98)	2.267321	0.355143	6.384251	0.0000
LOG(FDI(-2))	0.155509	0.094761	1.641060	0.1267
R-squared	0.813839	Mean dependent var		13.72911
Adjusted R-squared	0.767298	S.D. dependent var		0.363270
S.E. of regression	0.175239	Akaike info criterion		-0.433019
Sum squared resid	0.368503	Schwarz criterion		-0.239871
Log likelihood	7.464149	F-statistic		17.48672
Durbin-Watson stat	3.082847	Prob(F-statistic)		0.000112

### B.3 Variant 3

Estimation Command:

=====  
LS LOG(GFCF98) C LOG(FDI(-1)) LOG(GDP98) RIRAA

Estimation Equation:

=====  
 $\text{LOG(GFCF98)} = C(1) + C(2)*\text{LOG(FDI(-1))} + C(3)*\text{LOG(GDP98)} + C(4)*\text{RIRAA}$

Substituted Coefficients:

=====  
 $\text{LOG(GFCF98)} = -24.69062879 + 0.2318340665*\text{LOG(FDI(-1))} + 2.388109466*\text{LOG(GDP98)} + 0.002318209658*\text{RIRAA}$

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 17:32

Sample: 1998:1 2001:4

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-24.69063	6.237039	-3.958710	0.0019
LOG(FDI(-1))	0.231834	0.113697	2.039051	0.0641
LOG(GDP98)	2.388109	0.388211	6.151581	0.0000
RIRAA	0.002318	0.009016	0.257125	0.8014
R-squared	0.773308	Mean dependent var	13.72911	
Adjusted R-squared	0.716636	S.D. dependent var	0.363270	
S.E. of regression	0.193376	Akaike info criterion	-0.236043	
Sum squared resid	0.448731	Schwarz criterion	-0.042896	
Log likelihood	5.888344	F-statistic	13.64512	
Durbin-Watson stat	2.937828	Prob(F-statistic)	0.000357	

#### B.4. Variant 4

Estimation Command:

=====  
LS LOG(GFCF98) C LOG(FDI(-1)) LOG(GDP98) LOG(GFCF98(-2))

Estimation Equation:

=====  
 $\text{LOG(GFCF98)} = C(1) + C(2)*\text{LOG(FDI(-1))} + C(3)*\text{LOG(GDP98)} + C(4)*\text{LOG(GFCF98(-2))}$

Substituted Coefficients:

=====  
 $\text{LOG(GFCF98)} = -28.76964653 + 0.1047392726*\text{LOG(FDI(-1))} + 2.361779041*\text{LOG(GDP98)} + 0.3783810496*\text{LOG(GFCF98(-2))}$

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 17:27

Sample(adjusted): 1998:1 2001:4

Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28.76965	4.993347	-5.761596	0.0001
LOG(FDI(-1))	0.104739	0.096333	1.087268	0.2983
LOG(GDP98)	2.361779	0.300996	7.846535	0.0000
LOG(GFCF98(-2))	0.378381	0.139828	2.706051	0.0191
R-squared	0.858442	Mean dependent var	13.72911	
Adjusted R-squared	0.823052	S.D. dependent var	0.363270	
S.E. of regression	0.152810	Akaike info criterion	-0.706923	
Sum squared resid	0.280211	Schwarz criterion	-0.513776	
Log likelihood	9.655387	F-statistic	24.25696	
Durbin-Watson stat	2.489059	Prob(F-statistic)	0.000022	



## B.5. Variant 5

Estimation Command:

=====  
LS LOG(GFCF98) C LOG(FDI(-1)) LOG(GDP98) LOG(LTCNF98)

Estimation Equation:

=====  
 $\text{LOG(GFCF98)} = C(1) + C(2)*\text{LOG(FDI(-1))} + C(3)*\text{LOG(GDP98)} + C(4)*\text{LOG(LTCNF98)}$

Substituted Coefficients:

=====  
 $\text{LOG(GFCF98)} = -18.98362497 + 0.06972962039*\text{LOG(FDI(-1))} + 1.514198136*\text{LOG(GDP98)} + 0.6277282815*\text{LOG(LTCNF98)}$

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 17:29

Sample: 1998:1 2001:4

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-18.98362	5.885205	-3.225652	0.0073
LOG(FDI(-1))	0.069730	0.119224	0.584864	0.5695
LOG(GDP98)	1.514198	0.525561	2.881110	0.0138
LOG(LTCNF98)	0.627728	0.290770	2.158848	0.0518
R-squared	0.835823	Mean dependent var		13.72911
Adjusted R-squared	0.794779	S.D. dependent var		0.363270
S.E. of regression	0.164566	Akaike info criterion		-0.558690
Sum squared resid	0.324984	Schwarz criterion		-0.365543
Log likelihood	8.469521	F-statistic		20.36400
Durbin-Watson stat	3.062762	Prob(F-statistic)		0.000053

## B.6. Variant 6

Estimation Command:

```
=====  
LS LOG(GFCF98) C LOG(GDP98) LOG(LTCNF98)
```

Estimation Equation:

```
=====  
LOG(GFCF98) = C(1) + C(2)*LOG(GDP98) + C(3)*LOG(LTCNF98)
```

Substituted Coefficients:

```
=====  
LOG(GFCF98) = -17.15486346 + 1.316584617*LOG(GDP98) + 0.7430188774*LOG(LTCNF98)
```

Dependent Variable: LOG(GFCF98)

Method: Least Squares

Date: 05/31/03 Time: 17:30

Sample: 1998:1 2001:4

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.15486	4.858042	-3.531230	0.0037
LOG(GDP98)	1.316585	0.392237	3.356601	0.0052
LOG(LTCNF98)	0.743019	0.208272	3.567545	0.0034
R-squared	0.831143	Mean dependent var		13.72911
Adjusted R-squared	0.805165	S.D. dependent var		0.363270
S.E. of regression	0.160348	Akaike info criterion		-0.655583
Sum squared resid	0.334248	Schwarz criterion		-0.510723
Log likelihood	8.244667	F-statistic		31.99420
Durbin-Watson stat	2.885332	Prob(F-statistic)		0.000010

## Simultaneous equation models

### Variant 1

System: SYSTEM 1  
 Estimation Method: Seemingly Unrelated Regression  
 Date: 06/01/03 Time: 16:45  
 Sample: 1998:1 2001:4  
 Included observations: 16  
 Total system (balanced) observations 32

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-32.86989	10.65496	-3.084937	0.0048
C(2)	7.892853	2.610914	3.023023	0.0056
C(3)	1.853426	0.731320	2.534356	0.0176
C(4)	-25.06240	5.275765	-4.750477	0.0001
C(5)	2.408719	0.330238	7.293885	0.0000
C(6)	0.244313	0.089434	2.731757	0.0112

Determinant residual covariance 0.003205

Equation:  $\text{LOG}(\text{FDINP}) = \text{C}(1) + \text{C}(2) * \text{LOG}(\text{TRINDX}) + \text{C}(3) * \text{LOG}(\text{GDP98}(-1))$

Observations: 16

R-squared	0.606814	Mean dependent var	4.868660
Adjusted R-squared	0.546324	S.D. dependent var	0.555272
S.E. of regression	0.374006	Sum squared resid	1.818450
Durbin-Watson stat	2.000149		

Equation:  $\text{LOG}(\text{GFCF98}) = \text{C}(4) + \text{C}(5) * \text{LOG}(\text{GDP98}) + \text{C}(6) * \text{LOG}(\text{FDI}(-1))$

Observations: 16

R-squared	0.772059	Mean dependent var	13.72911
Adjusted R-squared	0.736992	S.D. dependent var	0.363270
S.E. of regression	0.186301	Sum squared resid	0.451204
Durbin-Watson stat	2.905185		

## Variant 2

System: SYSTEM 2

Estimation Method: Seemingly Unrelated Regression

Date: 06/01/03 Time: 16:48

Sample: 1998:1 2001:4

Included observations: 16

Total system (balanced) observations 32

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-33.85389	10.18253	-3.324704	0.0026
C(2)	3.373332	2.495630	1.351695	0.1881
C(3)	2.262330	0.698872	3.237119	0.0033
C(4)	-25.12488	5.274631	-4.763343	0.0001
C(5)	2.412822	0.330160	7.308050	0.0000
C(6)	0.244024	0.089412	2.729197	0.0112

Determinant residual covariance 0.002927

Equation:  $\text{LOG}(\text{FDI}) = \text{C}(1) + \text{C}(2) * \text{LOG}(\text{TRINDX}) + \text{C}(3) * \text{LOG}(\text{GDP98}(-1))$

Observations: 16

R-squared	0.528752	Mean dependent var	5.175187
Adjusted R-squared	0.456253	S.D. dependent var	0.484914
S.E. of regression	0.357572	Sum squared resid	1.662146
Durbin-Watson stat	1.487950		

Equation:  $\text{LOG}(\text{GFCF98}) = \text{C}(4) + \text{C}(5) * \text{LOG}(\text{GDP98}) + \text{C}(6) * \text{LOG}(\text{FDI}(-1))$

Observations: 16

R-squared	0.772056	Mean dependent var	13.72911
Adjusted R-squared	0.736988	S.D. dependent var	0.363270
S.E. of regression	0.186302	Sum squared resid	0.451210
Durbin-Watson stat	2.907262		

## Appendix 4. Data series

### A. Annual data

Variable	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
FDI (FDI inflows, mln.USD, BNB)	41.5	40.0	105.4	90.4	109.0	504.8	537.4	818.7	1001.5	812.9	478.7
FDI_STOCK (FDI stock, mln.USD, author's calculation)	41.5	81.5	186.9	277.3	386.3	891.1	1428.5	2247.2	3248.7	4061.6	4540.3
FDINPB (FDI from non-privatisation, mln.USD, BNB)	41.5	31.4	38.3	75.9	76.5	170.4	321.8	592.0	635.5	793.7	343.1
GDP98 (GDP at 1998 annual average prices, thousand BGN, NSI)	24415021	24048796	24481674	25161597	22848127	21544455	22421142	22937169	24173875	25157795	26357926
GFCF98 (Gross fixed capital formation at 1998 annual average prices, thousand BGN, NSI)	NA	NA	2990475	3473103	2726236	2163941	2919775	3528390	4066388	5016090	5486129
IRBGN (Interest rate on long-term credit in BGN, %)	NA	NA	118.09	78.89	294.99	174.27	15.69	16.04	15.26	15.06	14.40
INFLAA (CPI inflation, annual average, %, NSI)	91.3	72.8	96.0	62.1	121.6	1058.4	18.7	2.6	10.3	7.4	5.8
RIRAA (% , Real interest rate calculated from INFLAA and IRBGN using Fischer's formula)	NA	NA	11.3	10.4	78.2	-76.3	-2.5	13.1	4.5	7.1	8.1
EBRD index of price liberalization	3	3	3	2	2	3	3	3	3	3	NA
EBRD index of foreign exchange and trade liberalisation	3	3	4	4	4	4	4	4.3	4.3	4.3	NA
EBRD index of small-scale privatisation	1	1.7	2	3	3	3	3	3.3	3.7	3.7	NA
EBRD index of large-scale privatisation	1.7	2	2	2	2	3	3	3	3.7	3.7	NA
EBRD index of enterprise reform	1	1	2	2	2	2.3	2.3	2.3	2.3	2.3	NA
EBRD index of competition policy	2	2	2	2	2	2.3	2.3	2.3	2.3	2.3	NA
EBRD index of infrastructure reform	NA	NA	NA	NA	NA	NA	2.7	3	3.1	2.7	NA
EBRD index of banking sector reform	1.7	2	2	2	2	2.7	2.7	2.7	3	3.3	NA
EBRD index of reform of non-banking financial institutions	1	1	1	2	2	2	2	2	2	2.3	NA

Variable	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
EBRD rating of legal extensiveness (company law)	NA	NA	NA	NA	NA	3	4	4	4	4	NA
EBRD rating of legal effectiveness (company law)	NA	NA	NA	NA	NA	3	4	3.7	3.7	3.7	NA
TRINDEX (Aggregated transition index, author's calculation, unweighed average)	1.8	2.0	2.3	2.4	2.4	2.8	3.0	3.1	3.2	3.2	NA

## B. Quarterly data

	GDP98 <sup>26</sup>	GFCF98 <sup>27</sup>	LTCNF98 <sup>28</sup>	DEFL98 <sup>29</sup>	IRBGN <sup>30</sup>	TRINDEX <sup>31</sup>	FDI <sup>32</sup>	FDI_STOCK <sup>33</sup>	FDINP <sup>34</sup>	INFLAA <sup>35</sup>	RIRAA <sup>36</sup>
1997:4	6011559	635691	588922	0.93	13.46	2.83	100.10	891.10	NA	1058.40	-90.21
1998:1	4840276	436412	648526	0.99	15.16	2.87	195.20	1086.30	124.60	18.70	-2.99
1998:2	5151684	673196	799744	1.00	15.41	2.92	68.70	1155.00	28.60	18.70	-2.77
1998:3	6325562	813066	919919	1.01	16.26	2.96	93.90	1248.90	54.40	18.70	-2.06

<sup>26</sup> GDP98 – GDP at annual average 1998 prices, thousand BGN (Source: National Statistics Institute (NSI))

<sup>27</sup> GFCF98- Gross fixed capital formation at 1998 prices, thousand BGN (Source: NSI)

<sup>28</sup> LTCNF98 – Long-term credit to non-financial institutions deflated to 1998 annual prices using the GDP deflator, % (Source: Bulgarian National Bank)

<sup>29</sup> DEFL98 – GDP deflator for 1998 annual average prices (Source: NSI)

<sup>30</sup> IRBGN – Nominal interest rate on long-term credits, % (Source: BNB)

<sup>31</sup> TRINDEX – Aggregated transition index from the 11 individual indices published by EBRD (Transition Report 2002)

<sup>32</sup> FDI – FDI inflows, mln. USD (Source: Balance of payments, BNB)

<sup>33</sup> FDI\_STOCK – FDI stock for the period of 1992 – 2002, mln. USD

<sup>34</sup> FDINP – FDI inflows from non-privatisation, mln. USD, (Source: BNB)

<sup>35</sup> INFLAA – CPI, annual average, uniform distribution

<sup>36</sup> RIRAA – Real interest rate calculated from INFLAA and IRBGN using Fischer's formula

	GDP98 <sup>26</sup>	GFCF98 <sup>27</sup>	LTCNF98 <sup>28</sup>	DEFL98 <sup>29</sup>	IRBGN <sup>30</sup>	TRINDX <sup>31</sup>	FDI <sup>32</sup>	FDI_STOCK <sup>33</sup>	FDINP <sup>34</sup>	INFLAA <sup>35</sup>	RIRAA <sup>36</sup>
1998:4	6103620	997101	968854	1.01	15.94	3.00	179.60	1428.50	114.20	18.70	-2.33
1999:1	4893617	446243	978210	1.01	16.51	3.01	140.00	1568.50	117.30	2.60	13.55
1999:2	5163146	775173	1045142	1.02	15.94	3.03	161.80	1730.30	123.80	2.60	13.01
1999:3	6562739	1055492	1078019	1.03	16.39	3.04	182.90	1913.20	130.00	2.60	13.44
1999:4	6317667	1251482	1181680	1.09	15.31	3.05	334.00	2247.20	221.00	2.60	12.39
2000:1	5144955	784335	1204552	1.10	14.99	3.09	126.50	2373.70	126.20	10.30	4.25
2000:2	5462576	979537	1268426	1.11	15.85	3.12	159.30	2533.00	139.90	10.30	5.03
2000:3	6932790	1071106	1408906	1.08	14.24	3.16	221.90	2754.90	209.90	10.30	3.58
2000:4	6633555	1231410	1336088	1.14	15.97	3.19	493.80	3248.70	159.50	10.30	5.14
2001:1	5347758	926685	1284013	1.20	15.54	3.20	311.50	3560.20	292.30	7.40	7.58
2001:2	5660904	1173094	1429514	1.20	15.33	3.20	132.20	3692.40	132.20	7.40	7.39
2001:3	7229547	1277337	1574456	1.15	14.28	3.20	140.30	3832.70	140.30	7.40	6.40
2001:4	6919586	1638975	1716860	1.18	15.09	3.21	228.90	4061.60	228.90	7.40	7.16
2002:1	5531598	969049	1693931	1.26	15.14	NA	126.30	4187.90	113.20	5.80	8.83
2002:2	5980386	1308676	1852149	1.27	14.26	NA	103.10	4291.00	70.00	5.80	8.00
2002:3	7689549	1329131	2287710	1.19	14.08	NA	24.60	4315.60	8.00	5.80	7.83
2002:4	7156393	1879274	2470325	1.21	14.11	NA	224.70	4540.30	151.80	5.80	7.86