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ON NET EXTERNAL ASSETS IN DEVELOPED AND TRANSITION COUNTRIES

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Abstract:

The paper focuses on net external assets (NEA) in developed and transition countries in 1995, 2000, and 2005. The net international investment position is used as the main NEA indicator. In addition, alternative NEA estimates for developed countries are based on the cumulated current account, the cumulated financial and capital accounts, and the net factor income from abroad. The NEA estimates are divided by the gross domestic product (GDP) based on the U.S. dollar exchange rate. We identify the most important net creditors and net debtors, for which we study the average behavior of the real product growth, the unemployment rate, and the inflation rate among developed countries. We conclude that all the given estimates of NEA are good but imperfect.

Keywords: the balance of payments, developed countries, net external assets, transition countries

JEL Classification: F34, F41, C82

1. Introduction

The balance of payments is a systematic record of all transactions between residents and non-residents of an economy within a given time period. It consists of the current account (CA), the financial account (FA), the capital account (KA), the change in reserves, and the errors and omissions. The concept of the balance of payments is extensively developed in standard macroeconomic textbooks (see, for example, Samuelson and Nordhaus, 1998, p. 682). Obstfeld and Rogoff (1996) discuss the fundamental forces determining the CA – they present the intertemporal approach to the CA. The CA is a good approximation of a change of net external assets (NEA) of a given economy over time. The NEA is an important macroeconomic variable measuring the position of an economy on the world credit market. If the NEA is positive, the economy is a net creditor, while in the opposite case it is a net debtor. Duczynski (2000) shows that most countries were net debtors and roughly half of U.S. states were net creditors.

The principal existing studies on the NEA include Sinn (1990), Duczynski (2000 and 2009), Lane and Milesi-Ferretti (2001), and the *International Financial Statistics Yearbook* (IFS) of the International Monetary Fund. Sinn (1990) constructed a database

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of the consolidated NEA of the central bank, deposit money banks, private households and firms, and public authorities for a large number of countries in 1970-1987. From this database he constructed total balance-sheet estimates of the NEA and NEA/GDP (the NEA in relation to the gross domestic product) for the given countries in 1970-1987. Duczynski (2000) used the CA data of the World Bank (1994, 1995) and computed rough estimates of NEA/GDP for 113 countries in 1990 based on the cumulated CA in 1970-1990. The GDP estimates were based on internationally comparable data of Summers and Heston using the purchasing power parity (see Summers and Heston, 1991). The most important creditors in 1990 (with their NEA/GDP>0.15) were Botswana, Germany, Hong Kong, Iran, Japan, Kuwait, Lesotho, Malta, the Netherlands, Saudi Arabia, Suriname, Switzerland, Taiwan, and Venezuela, while the most important debtors (with their NEA/GDP<-0.5) were Congo, Guyana, Ivory Coast, Jamaica, Mauritania, Nicaragua, Seychelles, and Zambia. Duczynski (2000 and 2009) computed approximate NEA/GSP estimates (estimates of the NEA in relation to the gross state product) for 8 regions and 51 U.S. states for selected years in the 1977-2000 period with the use of the data on gross state product (GSP) and state personal income (SPI). These GSP and SPI data are available from the *Survey of Current Business*, various issues, and from the web site of the U.S. Department of Commerce, Bureau of Economic Analysis (http://www.bea.gov). Florida, Vermont, Connecticut, Maine, and Montana were found to be the strongest creditors on average, while Alaska, Louisiana, Wyoming, New Mexico, and Mississippi were the most important debtors. Lane and Milesi-Ferretti (2001) is a fundamental study on the NEA across countries. They constructed estimates of external assets and liabilities for 67 industrial and developing countries. Among other things, they focused on trends in the NEA and shifts in debt-equity ratios over time. The IFS also presents some NEA data (the net international investment position), which can be obtained if we subtract liabilities (code 79lad in the IFS) from assets (code 79aad in the IFS).

The remainder of the paper is organized as follows. Section 2 discusses the net international investment position of developed and transition countries. Section 3 provides a discussion of the results. Section 4 is then focused on alternative NEA indicators for developed countries. Section 5 analyzes the connection of NEA and selected macroeconomic variables for developed countries. The final section concludes the paper.

2. The Net International Investment Position

The present study focuses on 22 developed countries and 13 transition countries. We examine NEA indicators for 1995, 2000, and 2005. Although the selection of developed countries might be somewhat different today, we try to choose the countries which were developed in the given years, and, consequently, we follow the list of industrial countries in the *International Financial Statistics Yearbook* (IFS; 2002) of the International Monetary Fund (IMF). These countries include Greece and Portugal.

The principal data sources used in this paper are the IFS *Yearbooks* (2002 and 2007). The given IMF data are believed to be of high quality. The preferred NEA indicator

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is the net international investment position (NIIP; assets minus liabilities). The given NEA estimates are expressed in current U.S. dollars. We always divide the NEA data by the gross domestic product (GDP). To get a U.S. dollar based estimates of GDP for each country, we use the year average exchange rates presented in the IFS. A plausible alternative to this approach would have been a purchasing power parity figure of GDP – this approach is followed in Duczynski (2000) with the use of the Summers-Heston data set of internationally comparable estimates of GDP. The present paper works with exchange rates since exchange rates are market prices of market transactions.

Table 1

The Net International Investment Position (NIIP) in Relation to the Gross Domestic Product (GDP) for 22 Developed Countries

Country \ Year	1995	2000	2005
Australia	-0.54	-0.50	-0.57
Austria	-0.12	-0.19	-0.15
Belgium	0.17	0.61	0.34
Canada	-0.40	-0.19	-0.13
Denmark	-0.26	-0.14	0.00
Finland	-0.41	-1.49	-0.14
France	-0.02	0.09	0.10
Germany	0.05	0.03	0.19
Greece	n/a	-0.43	-0.78
Iceland	-0.50	-0.61	-0.83
Ireland	n/a	n/a	-0.26
Italy	-0.05	0.04	-0.03
Japan	0.16	0.25	0.34
Netherlands	0.34	-0.15	0.04
New Zealand	-0.75	-0.77	-0.81
Norway	n/a	0.20	0.67
Portugal	-0.06	-0.40	-0.67
Spain	-0.19	-0.26	-0.46
Sweden	-0.39	-0.24	-0.24
Switzerland	0.85	1.16	1.25
United Kingdom	-0.02	-0.02	-0.11
United States	-0.04	-0.16	-0.20

Table 1 shows the NIIP data for 22 developed countries. Debtor positions prevail among developed countries: Out of 62 observations, 19 are creditor positions, 42 are debtor positions, and 1 is a zero position. The present study can help us determine the most important net creditors and net debtors. Based on the arithmetic averages for 1995, 2000, and 2005, Switzerland, Norway, Belgium, and Japan are the principal

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net creditors, whereas New Zealand, Finland, Iceland, Greece, Australia, and Portugal are the most important net debtors. Recently, some of these debtors really have had relatively serious economic problems. This makes the present analysis to be of current concern. It should be noted that it may be the case that the government is heavily indebted but the economy as a whole is still a net creditor – this is, for instance, the case of Belgium and Japan.

According to the model of Barro *et al*. (1995), a country can be credit constrained on the international capital market if NEA/GDP<-0.5 if approximately one quarter of its physical capital is mobile internationally. The present paper shows that based on the NIIP, Australia in 1995 and 2005, Finland in 2000, Greece in 2005, Iceland in 2000 and 2005, New Zealand in 1995, 2000, and 2005, and Portugal in 2005 are the most important candidates for having been credit constrained. Important is also the determination of net creditors, which are clearly unconstrained unless the data are wrong.

Figure 1 shows the dependence of NIIP/GDP in 2005 on NIIP/GDP in 1995 for developed countries. This figure basically describes the evolution of NEA over time. The 1995 and 2005 estimates are highly positively correlated – the corresponding correlation coefficient equals 0.85. Regarding the NIIP data from Table 1, the correlation coefficient of the 1995-2000 estimates is 0.80, and the correlation coefficient of the 2000-2005 data is 0.77. Therefore, the NIIP figures exhibit a relatively high degree of persistency.

Figure 1.

The Evolution of the Net International Investment Position over Time for Developed Countries

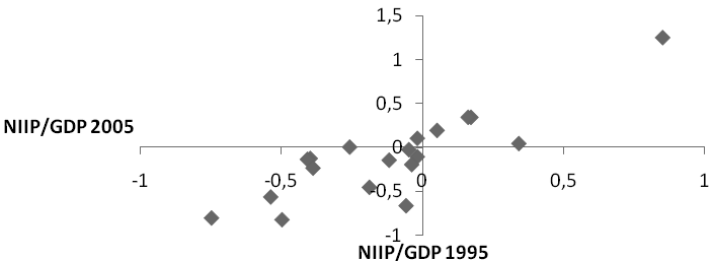

Table 2 presents the NIIP data for 13 transition countries for 1995, 2000, and 2005. Again, a debtor position is prevailing among the transition countries. Out of the 32 observations of NIIP/GDP, there are 7 creditor positions and 25 debtor positions. Based on the arithmetic averages of the 1995, 2000, and 2005 data, Hungary, Estonia, Bulgaria, Ukraine, and Poland are the most important net debtors, whereas Russia is in a slightly creditor position. Estonia in 2005, Hungary in 2000 and 2005, and Latvia in 2005 are the candidates for credit constrained economies. It should be noted that most of the given transition countries had accumulated substantial current account (CA) deficits till 2005. Exceptions are Russia (with a relatively high cumulated CA surplus), Ukraine (again with a cumulated CA surplus), and Slovenia (with an approximately zero cumulated CA position).

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Table 2

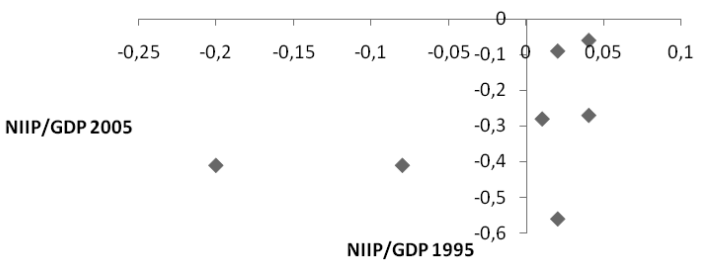
The Net International Investment Position (NIIP) in Relation to the Gross Domestic Product (GDP) for 13 Transition Countries

Country \ Year	1995	2000	2005
Belarus	n/a	-0.23	-0.13
Bulgaria	n/a	-0.35	-0.33
Czech Republic	0.04	-0.09	-0.27
Estonia	n/a	-0.49	-0.92
Hungary	n/a	-0.70	-0.85
Latvia	0.02	-0.30	-0.56
Lithuania	-0.08	-0.35	-0.41
Poland	-0.20	-0.32	-0.41
Romania	0.01	-0.23	-0.28
Russia	0.04	0.21	-0.06
Slovakia	0.14	-0.21	n/a
Slovenia	0.02	-0.12	-0.09
Ukraine	n/a	n/a	-0.33

Figure 2 shows the dependence of NIIP/GDP in 2005 on NIIP/GDP in 1995 for the transition countries for the 7 observations that are available. This figure provides some information on the evolution of NIIP over time in transition countries. The 1995 data and the 2005 data are positively correlated – the corresponding correlation coefficient equals 0.43. Concerning the data in Table 2, the correlation coefficient of the 1995 and 2000 estimates is then also 0.43, and the correlation coefficient of the 2000 and 2005 figures is 0.84.

Figure 2.

The Evolution of the Net International Investment Position over Time for Transition Countries



3. A Brief Discussion of the Results

These days, the highly topical issue is that some countries are often mentioned as countries with problems with servicing their government debts. Probably Greece is the best example; we can also name Iceland (having had a state bankruptcy already), Ireland, Italy, Portugal, and Spain. We can also add Japan as a country with significant

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risks; it is difficult to estimate the consequences of the recent earthquake, and the government of Japan is heavily indebted. Also the credit rating of the United States has recently been decreased. From transition countries, Hungary is sometimes mentioned as an economy with potential problems.

As of 2005, Greece, Hungary, Iceland, and Portugal were really highly indebted, as measured by NEA. The net foreign debt was also significant in Spain. On the contrary, the indebtedness of Ireland, Italy, and the United States was rather low, and Japan was even a net lender. We should, however, always keep in mind that the NEA and the government debt are in some sense two different things: net external assets (NEA) measure the position of *the whole economy*, *i.e.*, government plus the private sector. Despite the fact that we cannot directly judge from NEA whether the government debt is sustainable, we regard the information on NEA as useful. A higher NEA of the whole economy indicates that the government is effectively borrowing mainly from the domestic private sector rather than from abroad.

4. Alternative NEA Indicators for Developed Countries

This section discusses some additional rough NEA estimates for the sample of 22 developed countries for 1995, 2000, and 2005. The second preferred indicator used in this paper will be the cumulated current account (CCA). This approach follows Duczynski (2000), who cumulated the CA in a 20-year period between 1970 and 1990 for some 113 countries. In the present paper, the CA is cumulated from the 1970s; the starting year of this cumulation depends on data availability in the *International Financial Statistics* (IFS). The CCA indicator is always expressed in nominal U.S. dollar terms. The CCA is an imperfect estimate of NEA since it implicitly assumes a zero position in the first year of calculation, and it does not reflect asset valuation changes, such as changes in prices on the stock market. Despite this fact, we find it useful to support the NIIP data, discussed in Section 2, with alternative NEA figures. The CCA data are relatively highly positively correlated with the NIIP data, and, therefore, the CCA data can be used as reliable approximations of NEA. Moreover, the CCA approach to NEA has already been used in the economic literature. These considerations motivate some additional work with the CCA in the present paper. Other approximate estimates of NEA discussed in this section will then be the cumulated financial and capital accounts (CFA+CKA), and the net factor income from abroad (NFI). The CFA+CKA indicator is a negative NEA estimate. The NFI indicator should at least approximately be proportionate to the NEA.

All the given data on the NEA are imperfect. Measuring NEA is a fundamental problem, but we cannot have perfect estimates. To assess the degree of these imperfections, we compute correlation coefficients of various NEA indicators. We come, for example, to the conclusion that the CCA can be used as a relatively good measure of the NEA.

Table 3 presents NEA/GDP estimates based on the CCA. These estimates are relatively highly positively correlated with the NIIP/GDP data from Table 1 – the corresponding

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correlation coefficients are 0.87 for 1995, 0.70 for 2000, and 0.93 for 2005. Regarding the CCA/GDP data, the correlation coefficient of 1995-2000 estimates is 0.88, the correlation coefficient of 2000-2005 estimates is 0.96, and the correlation coefficient of 1995-2005 estimates is 0.79. Thus, as expected, these NEA indicators reveal some degree of persistency.

Table 3

The Cumulated Current Account (CCA) in Relation to the Gross Domestic Product (GDP) for 22 Developed Countries

Country	Period from \ to	1995	2000	2005
Australia	1972	-0.52	-0.70	-0.59
Austria	1972	-0.10	-0.26	-0.16
Belgium	1975	0.18	0.50	0.47
Canada	1972	-0.40	-0.32	-0.13
Denmark	1975	-0.04	-0.01	0.12
Finland	1975	-0.25	0.04	0.34
France	1975	-0.01	0.11	0.10
Germany	1972	0.08	0.05	0.16
Greece	1976	-0.31	-0.54	-0.56
Iceland	1976	-0.25	-0.46	-0.53
Ireland	1974	-0.16	-0.06	-0.07
Italy	1972	-0.07	0.02	-0.03
Japan	1977	0.20	0.33	0.49
Netherlands	1972	0.75	0.59	0.60
New Zealand	1972	-0.57	-0.97	-0.68
Norway	1975	0.07	0.39	0.75
Portugal	1975	-0.16	-0.52	-0.66
Spain	1975	-0.18	-0.27	-0.33
Sweden	1972	-0.15	-0.03	0.24
Switzerland	1977	0.44	1.11	1.32
United Kingdom	1972	-0.17	-0.19	-0.20
United States	1972	-0.17	-0.25	-0.42

Notes: The CA data are missing for Denmark for 1979 and 1980 and for Greece for 1998.

We can examine the convergence or divergence of CCA/GDP over time. For net creditors in 1995 (based on the CCA), the arithmetic average of CCA/GDP is 0.29, the standard deviation is 0.26, and the number of observations is 6. For net debtors in 1995, the average CCA/GDP is -0.22, the standard deviation is 0.16, and the number of observations is 16. For creditors in 2000, the average CCA/GDP is 0.35, the standard deviation is 0.36, and the number of observations is 9. For debtors in 2000, the average CCA/GDP is -0.35, the standard deviation is 0.28, and the number of observations is

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13. For creditors in 2005, the average CCA/GDP makes 0.46, the standard deviation amounts to 0.37, and the number of observations is 10. For debtors in 2005, the average CCA/GDP makes -0.36, the standard deviation is 0.24, and the number of observations is 12. Since the absolute values of CCA/GDP averages are increasing over time, this is evidence for the divergence of NEA/GDP. A similar conclusion can be drawn if we compute arithmetic averages of absolute values of CCA/GDP. For 1995, the given average is 0.24, and the standard deviation makes 0.19. For 2000, the average is 0.35, and the standard deviation amounts to 0.30. For 2005, the average is 0.41, and the standard deviation makes 0.30. Since the means are increasing over time, this supports the given evidence for divergence. This evidence will be confirmed in the following section.

It is of certain interest to examine the overall NEA/GDP position of 11 developed countries in the euro area, 11 developed countries outside the euro area, and also for all the 22 developed countries. Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain are in the euro area. The total CCA position of these countries in 1995 is 80.1 billion U.S. dollars. The total GDP estimate of these countries for 1995 is 6,948.8 billion U.S. dollars. Therefore, the overall NEA/GDP estimate is 0.01. For 2000, the total CCA estimate is 286.0 billion U.S. dollars, the total GDP figure is 6,164.3 billion U.S. dollars (due to U.S. dollar appreciation, we observe a decline; notice that this figure is exchange-rate based), and the NEA/GDP number is 0.05. For 2005, the total CCA number is 521.1 billion dollars, the total GDP number is 9,930.9 billion dollars, and the NEA/GDP estimate makes 0.05. Thus, the developed countries in the euro area are moderate net creditors as a whole. For the remaining 11 developed countries outside the euro area, the total CCA figure for 1995 is -756.9 billion U.S. dollars, the total GDP figure is 15,712.9 billion dollars, and the NEA/GDP estimate is -0.05. For 2000, the total CCA figure is -1,390.4 billion dollars, the total GDP is 17,930.6 billion dollars, and the NEA/GDP estimate is -0.08. For 2005, the overall CCA figure is -3,313.8 billion U.S. dollars, the total GDP figure is 22,474.8 billion dollars, and the NEA/GDP number is -0.15. Therefore, the developed countries standing outside the euro area are moderate net debtors on average. For the full sample of the 22 developed countries, the total CCA for 1995 is -676.8 billion U.S. dollars, the total GDP is 22,661.7 billion dollars, and the NEA/GDP estimate amounts to -0.03. For 2000, the total CCA number is -1,104.4 billion dollars, the total GDP makes 24,094.9 billion dollars, and the NEA/GDP estimate is -0.05. For 2005, the total CCA figure is -2,792.7 billion U.S. dollars, the total GDP is 32,405.7 billion dollars, and the NEA/GDP estimate is -0.09. This is evidence that the developed countries are a moderate net debtor as a whole.

The unpublished Appendix Table by Duczynski (2000) shows that the vast majority of *developing* countries in the world were net debtors in 1990, and this is quite likely to be the case also in 1995, 2000, and 2005. Thus a natural question arises: Who are the net creditors in the world? We can infer from the CA data that China, Russia, and some oil exporting countries are important net creditors in the world. Duczynski (2000) provides evidence that the overall CCA data for the world were biased downward, and this can really be the case for the developed countries examined in the present paper.

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Consequently, the developed countries as a whole need not be a net debtor.

Table 4 brings negative NEA/GDP data based on the cumulated financial account plus the capital account (CFA+CKA) of the balance of payments. The correlation coefficients between (CFA+CKA)/GDP and NIIP/GDP are -0.88 for 1995, -0.74 for 2000, and -0.93 for 2005. The correlation coefficients between (CFA+CKA)/GDP and CCA/GDP are -0.92 for 1995, -0.94 for 2000, and -0.97 for 2005. Concerning the (CFA+CKA)/GDP data, the correlation coefficient of 1995-2000 estimates is 0.90, the correlation coefficient of 2000-2005 estimates is 0.97, and the correlation coefficient of 1995-2005 estimates is 0.82. Thus, similarly to the previous data, the given NEA estimates have some degree of persistency.

Table 4

The Cumulated Financial Account Plus the Capital Account (CFA+CKA) in Relation to the Gross Domestic Product (GDP) for 22 Developed Countries

Country	Period from \ to	1995	2000	2005
Australia	1972	0.54	0.75	0.64
Austria	1972	0.13	0.29	0.15
Belgium	1975	-0.16	-0.47	-0.42
Canada	1972	0.46	0.37	0.16
Denmark	1975	0.12	0.22	0.00
Finland	1975	0.32	0.12	-0.15
France	1975	0.01	-0.11	-0.10
Germany	1972	-0.05	-0.04	-0.18
Greece	1976	0.45	0.72	0.60
Iceland	1976	0.35	0.61	0.62
Ireland	1974	0.15	0.13	0.06
Italy	1972	0.15	0.13	0.12
Japan	1977	-0.16	-0.27	-0.31
Netherlands	1972	-0.57	-0.43	-0.48
New Zealand	1972	0.22	0.53	0.51
Norway	1975	0.15	-0.02	-0.40
Portugal	1975	0.20	0.61	0.66
Spain	1975	0.27	0.37	0.36
Sweden	1972	0.17	0.09	-0.18
Switzerland	1977	-0.61	-1.39	-1.60
United Kingdom	1972	0.10	0.13	0.15
United States	1972	0.15	0.23	0.41

Notes: The CFA+CKA data are missing for Denmark for 1979 and 1980 and for Greece for 1998.

Table 5 shows the NFI/GDP data, where the NFI is the net factor income from abroad. We can assume that the given debt service (typically a prevailing part of the NFI) should be proportionate to the NEA. A potential problem with the NFI is that different nations pay and receive different interest rates (see, for example, Greece today). However, the NFI data here are relatively highly correlated with the NIIP data from Table 1 – the

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correlation coefficients are 0.93 for 1995, 0.76 for 2000, and 0.69 for 2005. Thus, we consider it useful to present here the NFI data as at least rough approximations of the NEA. Since we never can have perfect estimates of the NEA, it is always good to have as many imperfect and relatively independent NEA estimates as possible. An advantage of the NFI data in this sense is that they are constructed fundamentally independently of all the previous NEA estimates. The correlation coefficients between NFI/GDP and CCA/GDP are then 0.69 for 1995, 0.56 for 2000, and 0.64 for 2005. The correlation coefficients between NFI/GDP and (CFA+CKA)/GDP are -0.36 for 1995, -0.60 for 2000, and -0.67 for 2005. Regarding the NFI data from Table 5, the year-to-year correlations are 0.88 for 1995-2000, 0.97 for 2000-2005, and 0.85 for 1995-2005. The persistency of the given data is clear.

Table 5

The Net Factor Income from Abroad (NFI) in Relation to the Gross Domestic Product (GDP) for 22 Developed Countries

Country \ Year	1995	2000	2005
Australia	-0.038	-0.028	-0.040
Austria	-0.007	-0.012	-0.004
Belgium	0.024	0.022	0.015
Canada	-0.038	-0.031	-0.016
Denmark	-0.025	-0.025	0.000
Finland	-0.034	-0.014	0.000
France	-0.006	0.015	0.011
Germany	-0.001	-0.004	0.009
Greece	-0.014	-0.008	-0.031
Iceland	-0.029	-0.028	-0.037
Ireland	-0.110	-0.140	-0.151
Italy	-0.014	-0.011	-0.010
Japan	0.008	0.013	0.023
Netherlands	0.038	-0.006	0.010
New Zealand	-0.065	-0.065	-0.069
Norway	-0.013	-0.014	0.000
Portugal	0.000	-0.021	-0.026
Spain	-0.009	-0.012	-0.019
Sweden	-0.026	-0.009	0.002
Switzerland	0.034	0.087	0.118
United Kingdom	0.003	0.005	0.021
United States	0.003	0.002	0.001

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We can conclude that correlation coefficients presented in this paper show that the NIIP and the CCA data are relatively highly correlated with alternative NEA indicators, and, therefore, they form good approximations of NEA. The situation is similar with other NEA indicators. Thus, we can have imperfect but relatively fair estimates of NEA. It is always much better to have at least very rough estimates of NEA than no estimates at all. The problem of measurement in economics is important and it will probably attract future research.

5. NEA and Selected Macroeconomic Variables

This section considers the relationship between CCA/GDP and the real GDP growth rate, the unemployment rate, the inflation rate, and the change in NEA over time. First, we construct an arithmetic average of the annual growth rates of real GDP between 1995 and 1999 (g_1) and between 2000 and 2004 (g_2) for each of the 22 developed countries. The correlation coefficient of CCA/GDP in 1995 with g_1 is -0.27. The correlation coefficient of CCA/GDP in 2000 with g_2 is -0.48. This is some indication that debtors grew on average somewhat faster than creditors.

We can confirm this view with the following t-tests (see Kmenta, 1997, p. 145):

Table 6

t-tests for the Relationship of the Real GDP Growth Rates and Creditor / Debtor Position, Based on the CCA

	mc	sc	nc	md	sd	nd	t
g_1	2.45	1.37	6	3.81	1.75	16	1.71
g_2	1.84	0.52	9	3.07	1.26	13	2.75

Notes: g_1 applies for net creditors and net debtors in 1995, and g_2 applies for net creditors and net debtors in 2000, mc is the mean GDP growth rate (in %) in creditors, sc is the standard deviation in creditors (in %), nc is the number of observations in creditors, md is the mean in debtors (in %), sd is the standard deviation in debtors (in %), nd is the number of observations in debtors, and t is the t-statistic testing the statistical significance of the difference in means in GDP growth rates between creditors and debtors.

The difference in means in g_1 between net creditors and net debtors is marginally statistically significant, and the difference in means in g_2 is strongly significant. In a two-tail test, the critical t-values are 2.09 at a 5% level of significance and 1.73 at a 10% level of significance.

Regarding unemployment, we take data on the unemployment rate for 1995 (u_1), 2000 (u_2), and 2005 (u_3). The correlation coefficient of CCA/GDP in 1995 and u_1 is -0.18. The correlation coefficient of CCA/GDP in 2000 and u_2 is -0.13. The correlation coefficient of CCA/GDP in 2005 and u_3 is -0.05. This is only a weak indication that creditors had on average a somewhat lower unemployment rate than debtors.

The following t-tests find no significant relationship between the NEA and unemployment:

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Table 7

t-tests for the Relationship of Unemployment and Creditor / Debtor Position, Based on the CCA

	mc	sc	nc	md	sd	nd	t
u_1	7.30	4.20	6	10.14	4.68	16	1.30
u_2	7.44	4.20	9	5.85	3.35	13	-0.99
u_3	6.68	3.06	10	5.99	2.44	12	-0.59

Notes: u_1, u_2, and u_3, respectively, apply for net creditors and net debtors in 1995, 2000, and 2005, respectively. The unemployment rates are expressed in percentage terms. Other notes are analogous to those below Table 6.

Concerning inflation based on consumer prices, we compute arithmetic averages of annual inflation rates in 1995-1999 (π_1) and 2000-2004 (π_2) for each of the 22 developed countries. The correlation coefficient of CCA/GDP in 1995 and π_1 is -0.27, and the correlation coefficient of CCA/GDP in 2000 and π_2 is -0.54. This is a certain indication that creditors had on average lower inflation than debtors.

This observation can be confirmed by the following t-tests:

Table 8

t-tests for the Relationship of Inflation and Creditor / Debtor Position, Based on the CCA

	mc	sc	nc	md	sd	nd	t
π_1	1.37	0.71	6	2.24	1.21	16	1.64
π_2	1.67	0.98	9	2.88	0.82	13	3.13

Notes: π_1 applies for net creditors and net debtors in 1995, and π_2 applies for net creditors and net debtors in 2000. The inflation rates are expressed in percentage terms. Other notes are analogous to those below Table 6.

Here, the difference in means in π_1 between net creditors and net debtors is marginally statistically significant, and the difference in π_2 is strongly significant.

This section also considers how creditors and debtors changed their NEA positions over time. We compute the CCA between 1995 and 2000 and divide it by the initial GDP level in 1995 (CCA_1/GDP). Similarly, we compute the CCA between 2000 and 2005 and divide it by the initial GDP in 2000 (CCA_2/GDP). These variables reflect the change in the NEA position over time. The correlation coefficient of CCA_1/GDP with CCA/GDP in 1995 is 0.72. The correlation coefficient of CCA_2/GDP with CCA/GDP in 2000 is 0.83. These are relatively high correlations – this is evidence that indebted countries were becoming more indebted and that creditor countries were becoming even stronger creditors. *The CA exhibited persistency*.

These observations can be confirmed by the following t-tests:

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Table 9

t-tests for the Relationship of the Change of NEA and the Initial Creditor / Debtor Position, Based on the CCA

	mc	sc	nc	md	sd	nd	t
CCA_1/GDP	0.252	0.191	6	-0.032	0.198	16	-3.03
CCA_2/GDP	0.360	0.351	9	-0.199	0.310	13	-3.94

Notes: CCA_1/GDP applies for net creditors and net debtors in 1995, and CCA_2/GDP applies for net creditors and net debtors in 2000. Other notes are analogous to those below Table 6.

Here the differences between net creditors and net debtors are strongly statistically significant. The critical absolute t-value in a two-tail test at a 1% level of significance is 2.85. Thus, the present analysis provides relatively good evidence for the divergence of NEA across developed countries. This supports the analysis presented in the previous section.

6. Conclusion

The measurement of net external assets (NEA) is a fundamental problem in macroeconomics. The present paper focuses on 22 developed economies and 13 transition economies for the years 1995, 2000, and 2005. We use the net international investment position (NIIP) as the principal NEA indicator. In addition, for the developed countries, we derive three alternative indicators of NEA – based on the cumulated current account (CCA), the cumulated financial and capital accounts (CFA+CKA), and the net factor income from abroad (NFI). We always divide the NEA data by the gross domestic product (GDP). We provide evidence that the CCA indicator can be used as a relatively reliable measure of NEA to the extent that rough estimates are sufficient.

We identify the most important net creditors and net debtors. Most transition countries are found to be indebted. We observe that a debtor position based on the CCA moderately prevails among developed countries, but this finding may be subject to some bias due to data imperfections. Among the developed countries, we have evidence that creditors had a tendency to increase their creditor positions, while debtors were getting more indebted. The labor market (the unemployment rate) was practically not connected with the debtor or creditor position. Debtors grew on average somewhat faster than creditors in terms of the real GDP. Creditors had on average lower inflation than debtors. The present paper's analysis seems to be relevant from the viewpoint of the recent financial crisis since net debtors may be more vulnerable and more sensitive to the crisis. Some countries have currently problems with servicing their government debts. The present NEA analysis seems in this sense useful, although we must correctly distinguish the government debt from the indebtedness of the whole economy, measured by NEA.

To assess the credibility of various NEA estimates, we compute their mutual correlations in the sample of developed countries. Since these correlations are relatively high in

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absolute value, we can conclude that we have imperfect but relatively fair estimates of NEA/GDP. This measurement problem of NEA is important in economics and it will probably be paid attention in future research.

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