A New Measure of the Korean Current Account

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Abstract

We apply Fisher's (1994) concept of the aggregate generational current account to data from the Republic of Korea in the post-war era. A generation's net foreign assets is the present value of its expected net transfers from abroad, and the aggregate generational current account is the annual change in the sum of these accounts across all current and future generations. Although the conventional measure of the Korean current account shows a chronic deficit during this era, our measure indicates that expected military and economic transfers from abroad have actually created long periods of aggregate generational current account surpluses. Also, the aggregate generational current account is more volatile than the conventional current account for Korea.

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1. Introduction

By now it is well known that the conventional measure of the government deficit is flawed. There are two major criticisms of this measure. First, Eisner (1989) has emphasized that the conventional measure of the government deficit does not account for changes in the value of the stocks of central governments assets and liabilities. Second, Auerbach and Kotlikoff (1987) and then Auerbach, Gokhale, and Kotlikoff (1994) have argued convincingly that changes in the conventional measure of the government deficit are not related in any meaningful way to changes in agents' utilities. In particular, increasing the conventional government deficit may not indicate that a person alive will experience increased utility, nor will a future decrease in the conventional government deficit indicate that some agent then alive will experience decreased utility. Fisher (1994) has shown that the conventional measure of the current account is not meaningful for exactly these reasons. This purpose of this paper is to construct a meaningful measure of the Korean current account, analogous to generational accounts for the closed economy. Our measure is the *aggregate generational current account*.

Two simple examples suffice to indicate why the conventional current account may not be an accurate measure of the change of net foreign assets. First, consider a Korean who buys a farm in Oklahoma for $1,000,000 in 1992 and an American who buys a luxury home outside Seoul in the same year for the same dollar price. Since these two transactions are off-setting, there is no change in American or Korean net foreign assets. Imagine now that oil is discovered on the land in Oklahoma, and the real value of the land doubles to $2,000,000 in 1993; this increase in the value of Korean assets located in the United States has no effect on the conventional current account.[1] If the Korean owner of this oil well decides to buy a luxury American car in 1993 by borrowing $100,000 against his newfound wealth, his purchase would increase the American trade surplus and increase

[1] Foreign direct investment has been evaluated at book value, not market value, in the United States' external accounts. See Ulan and Dewald (1989) for an insightful discussion.

the Korean trade deficit. But the correctly measured current account surplus should show a $900,000 increase for Korea in 1993 and a corresponding decrease for the United States in that year.

Second, consider a change in 1994 in American foreign policy in response to the threat of an attack on the Republic of Korea. Assume that this change entails an immediate grant of $1 billion and an annual real increase of $1 billion for a period of four more years in American military aid to the Republic of Korea, and let the annual discount factor be 0.9. This year's grant shows up as an increase in the conventional current account surplus for Korea and as a decrease on the conventional measure for the United States. What has happened to the rest of the present value of expected transfers ($3.0951 billion) from the United States to Korea? These capitalized transfers are indeed foreign assets, just as the ownership of a plot of valuable land in Oklahoma is. If the America government can tax only its own residents, then these transfers indicate both that some current or future Korean will experience higher utility and that some current or future American will suffer decreased utility, owing to future generational taxes.

The second example shows the essence of the aggregate generational current account. We argue that Korea experiences an aggregate generational current account surplus of $4.0951 billion and that America's aggregate generational current account worsens analogously in 1994. The primary contribution of this paper is to quantify the effects of these expected transfers from abroad and to show that they have been an important element in Korea's external accounts during the last half century. During a period of rapid growth, Korea has not been in chronic external deficit. Instead, it has been in generational external surplus for most of the post-war years, largely owing to expected future transfers from abroad.

The first example shows a weakness in the conventional current that is analogous to Eisner's objections to the conventional government deficit. Ulan and Dewald (1989) show how misleading the conventional measure of the American current account can be if

net foreign assets are not measured at market values, and Dewald and Ulan (1990) use their measure of the current account to show that the correlation between the government deficit and the current account may be spurious.[2] The second example gets at the essence of Auerbach and Kotlikoff (1987) and Kelly's (1991) theoretical objections to the conventional government deficit. Although Fisher (1994) showed that their logic carries over to the conventional current account, no one has yet constructed a meaningful measure of the current account. Our measure deals with both of these shortcomings.

We call this measure the aggregate generational current account. This new way of compiling the external accounts incorporates both changes in the market value of net foreign assets and changes in foreseeable net transfers from abroad. Deciding exactly what constitutes an expected net transfer from abroad is perhaps the most important part of the art of constructing these accounts.

Before beginning the calculations, it is necessary to compile interest rates and exchange rates for each year in the sample; these rates are used subsequently to convert projected flows of domestic and foreign funds into present values. Calculating the *historical* values of an aggregate generational current account then entails two big steps. First, one measures current net foreign assets in each year at market value. Second, for each year, one makes a projection of all future net public and private transfers from abroad and calculates its present value. Then one sums the present values derived in these two steps and takes first differences. These differences are the aggregate generational current account surplus. Calculating *forecasts* of the aggregate generational current account

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[2] This theoretical arguments have important empirical implications. For example, even though the official measure of the net international investment position of the United States became negative in the last decade, the United States has had positive investment income even in 1986 and 1987, as Ulan and Dewald (1989) emphasize. Second, the conventional fiscal deficit need not be correlated to the current account deficit, as Evans (1990) has shown. Thus policy prescriptions based on the conventional measures of these deficits can be quite misleading.

entails making explicit assumptions about exchange rates, interest rates, the market value of net foreign assets, and expected net transfers from abroad.[3]

Why did we choose to implement this new procedure using data from Korea covering the last half century? Korea serves as a good example for two reasons. First, the Korean economy is one of most rapidly growing economies in the world. Hence, it is interesting to examine the extent to which constraints on the external account have hampered Korea's growth. Second, the Korean economy has received unilateral aid transfers from abroad for a considerable time. During the early post-war years, unilateral transfers played an important role in financing development. Third, the existence of foreign aid institutions and programs over a long period, especially during and after the Korean war, enables us to predict aid flows reasonably and to calculate the expected time of their duration, taking economic, social and political considerations into account.[4]

The rest of the paper is structured as follows. In the second section, we briefly explain the theoretical definition of the aggregate generational current account and show how we calculate it. In the third section, we construct this account using Korean data and describe these data in detail. Also, we analyze two different scenarios for possible future events and contrast their effects on the aggregate generational account with a benchmark based upon the *status quo*. The fourth section presents a brief conclusion.

2. The Aggregate Generational Current Account

Why do we economists compile and analyze macroeconomic statistics? Any thoughtful answer to this question will eventually appeal to a notion of human welfare. Economic statistics, however, are typically compiled in calendar time, and they may not be

[3] Since we are calculating an aggregate measure, it is not necessary to make any assumption about equal treatment of future generations as Auerbach, Gokhale, and Kotlikoff (1991) must.

[4] The Korean War lasted from 1950 to 1953. During and just after this period, there were several institutions and programs whose mission it was to supply relief goods to the Korean people and to aid in the reconstruction of the Korean economy. These included the Economic Cooperation Administration, the United Nations Korea Reconstruction Agency, Civil Relief in Korea, and the International Cooperation Administration.

measured in a way that relates them directly to the lives of the agents in an economy. In particular, conventional measures of the government deficit are problematic because they include transfers, and capital markets allow agents to smooth consumption during the course of their lives. Hence, current transfer payments are only part of a larger picture of how government policy impinges upon agents' utilities. Indeed, anticipated future transfers have as much an effect on agents' current behavior as current transfers might. Kotlikoff (1993) emphasizes that the real effects of such transfers ought to be part of any proper measure of the government deficit, and he argues that changes in government policy can only be understood within the framework of generational accounts.[5]

The current account includes transfers too. Thus all the criticisms leveled against conventional measures of the government deficit are true also for the current account. Unilateral transfers are not a small part of the current account; net military transfers and net unilateral transfers have accounted for about fifteen percent of the United States' current account deficit in the last decade.[6] Since international capital markets also allow agents to borrow in anticipation of future receipts, there is no simple relationship between current transfers and the utility of domestic and foreign agents in a properly specified international economy.

This simple observation has lead Fisher (1994) to define the aggregate generational current account. In a very general dynamic model, Fisher showed that the conventional measure of the current account is not well defined. In particular, for any description of all countries' unilateral transfers to the agents in the world economy, there is an implementation of these transfers such that any country's conventional current account

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[5] There is a subtlety here: the absolute level of a generational account is not meaningful, as Kotlikoff recognizes. A generational account, based upon current government policy and assumptions about the future behavior of the economy, can serve only as a benchmark against which one measures the effects of alternative government policies. Just as utility functions are defined only up to a class monotonic functions, so are changes in generational accounts meaningful only as a measure of changes in policy, since only differences in individual utilities can be identified with different government policies.

[6] Net military transfers have entered the United States external accounts on the balance of goods and services since 1960.

satisfies any exogenous constraint. The intuition is that a country can always delay unilateral transfers to abroad in order to make its conventional current account surplus as large as necessary. Since agents can borrow against anticipated future transfers, delaying a transfer will not affect an agent's consumption choices as long future receipts maintain his real income in every state of the world. But then the real affects of international economic policy are fully reflected only by expected transfers from abroad.

This aspect of the conventional current account is not a theoretical *curiosum*; it is a robust property of conventional macroeconomic statistics. Generalizing the theoretical work of Auerbach, and Kotlikoff (1987) and Kelly (1991), Fisher shows that a country can always implement its fiscal policy in a way that satisfies any arbitrary history-dependent constraints imposed on both its conventional current account. and its conventional government deficit.

A country's fiscal policy is a function mapping from the set of histories of the world economy into the set of transfers to all the agents in the world economy. Any particular fiscal policy belongs to an equivalence class in the set of all such functions. Elements in an equivalence class hold constant the expected present value of transfers to all the agents in the world economy. Each equivalence class is large enough so that one of its elements will correspond to any arbitrary conventional current account profile. This is true no matter what the endowments, preferences, and stochastic structure of the world economy might be. These facts are the essence of Fisher's theoretical arguments showing that the conventional measure of the current account is not meaningful. A meaningful measure is one that is constant for all the elements in any equivalence class.

This argument can be extended to the government deficit as well. Since Auerbach, Gokhale, and Kotlikoff (1991) are interested in how government deficits transfers resources between generations and between males and females in the same generation, they construct a benchmark for representative male and female agents born in every year. Of course, external deficits matter for a different reason. The international economist

wants to know how current fiscal policy affects aggregate trade flows between countries. Thus our measure does not keep track of transfers to each generation of agents in the world economy.

Instead, we keep track of *aggregate* expected net transfers to abroad, and we do not take explicit inter-generational transfers into account. Hence, our measure is easier to construct that Auerbach, Gokhale, and Kotlikoff's generational accounts because it is not designed to keep track of transfers between males and females or between those alive and those not yet born. If one assumes that countries can tax only their own citizens, then a worsening of the aggregate generational current account indicates that some domestic agent (alive or not yet born) will suffer decreased utility and that some foreign agent will enjoy increased utility now or in the future. This simple fact is true because a country's *aggregate generational current account surplus is the annual change in the sum of the present value of net foreign assets across all generations alive and not yet born.* These net foreign assets are defined broadly enough so that they include expected net transfers from abroad. We show below that Korea's aggregate generational current account has typically been in surplus during the last half century; this fact reflects the rising standards of living in an economy where expected net transfers from abroad were positive.

3. Korea's Aggregate Generational Current Account

The actual derivation of the aggregate generational current account consists of two main parts: (1) computing the market value of the net international investment position of Korea; and (2) calculating the present value of net expected transfer payment from abroad. In essence, the aggregate generational current account treat expected transfers from abroad as assets and capitalizes them. Of course, such transfers have been a main source of financing imports into Korea. In the post-war era, there has been a secular change in the composition of the source of financing of international transactions. During the first two decades after the war, the main source of financing imports was foreign aid

intermediated by international institutions. However, after 1965, the United States became the main contributor of the aid to Korea and committed implicitly to providing long-term loans as a means of continuing support.

Foreign economic aid was the main source of financing the nation's balance of payments deficits in the 1950's and early 1960's. More than seventy percent of imports were financed by foreign aid during the reconstruction period of 1953 through 1960, indicating how heavily dependent the Korean economy was on foreign aid.[7] The share of economic aid in gross national product achieved its maximum of 14 percent in 1957. This share and the absolute amount of grants-in-aid started to decline as the United States changed the nature of its support to developmental loans in the late 1950's.[8]

Military aid has been closely related to the United States' military policy on the Korean peninsula since World War II. The major changes of the United States' military policy in general can be classified into four time periods: (1) Post-war relief from 1946 to 1948; (2) the Marshall Plan from 1949 to 1952; (3) the Mutual Security Act from 1953 to 1961; and (4) the Foreign Assistance Act from 1962 until the present. The flow of military aid from the United States started at the birth of Republic of Korea in 1948 and has continued until the present. It increased continuously during and after the Korean War and reached its peak during the Vietnam War.[9] Since 1956, the value of military aid has exceeded that of economic aid. Although most of military aid was used for the build-up of Korea's defense capability, it has been quite important in the Korean economic development process. After military aid reached its maximum in 1971, it declined following changes in the military policies and economic situation of the United States.[10]

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[7] See Sakong (1993), p. 96. See Krueger (1979) and Sakong for a more thorough discussion of these issues.

[8] The United States was the predominant contributor of aid throughout the modern period of Korean economic development, although there were several important aid institutions under the auspices of the United Nations.

[9] Korea participated in the Vietnam War from 1965 until 1972.

[10] The important policy changes were the Nixon Doctrine in 1969 and the Carter Administration's troop withdrawal plan in 1977.

In the last decade, as the United States experienced large fiscal and external deficits and Korea's real gross domestic product grew rapidly, the United States has demanded that Korea bear a larger part of the burden for the defense of the Korean peninsula.

Appendix 1 gives a detailed description of the data that we discuss in the next two sub-sections; our data are measured in thousands of current dollars. It is important that the reader keep in mind that almost all of our data are assembled from information not contained immediately in Korea's balance of payments. For example, the data on private assets and liabilities held in won are derived from surveys of the domestic financial sector, and the data on expected economic and military transfers come from idiosyncratic sources, not from the line in the balance of payments that reports unrequited transfers. The market value of foreign direct investment is calculated using country-specific stock market indices. As the reader shall see below, our measure of the aggregate generational current account is highly correlated with the historical values of the conventional measure of the current account. This fact is reassuring, and it lends confidence to our forecasts.

3.1 Korea's Net International Investment Position

The first big step is to calculate Korea's net international investment position. In doing so, we followed Ulan and Dewald's (1989) technique of evaluating direct foreign assets at market value. Calculating Korea's net international investment position is accomplished in three steps. First, we used the table in the Bank of Korea's *Economic Statistics Yearbook* reporting the assets of the central bank to determine the annual stocks of official reserve assets. We did not follow Ulan and Dewald's exclusion of the value of gold holdings from these calculations because the stock of gold was indeed an international assets for Korea during many of these years, especially during the period of the Bretton Woods System.

Second, we determined Korea's private foreign assets and private foreign liabilities from the two tables in the *Economic Statistics Yearbook* entitled "Monetary Survey" and

"Foreign Exchange Assets and Liabilities (Summary)." The former reports private assets and liabilities that are intermediated by the Korean banking system, and the latter reports private assets and liabilities that are held in foreign currencies. The first table reports the flow of funds for the domestic financial sector in won, and the second table reports the dollar values of Korea's assets and liabilities denominated in foreign currencies. We used end-of-year market exchange rates as reported by the International Monetary Fund in *International Financial Statistics* to convert the domestic flow-of-funds data from won into current dollars.

Third, we used the balance of payments data on long-term capital transactions from *Economic Statistics Yearbook* to determine the annual flows of both foreign direct investment into Korea and Korean foreign direct investment abroad. Again following Ulan and Dewald, we used stock market indices reported by the International Monetary Fund in *International Financial Statistics* to convert these flows into stocks of the market values of both inward and outward foreign direct investment.[11] The data on outward direct foreign investment are reported by region in *Economic Statistics Yearbook*. These data are broken down into the following areas: South-East Asia, Mid-Asia, North America, Latin America, Europe, Africa, and Oceania. We used stock market indices for the Australia, United States, Japan, and Germany to determine the market value of Korean outward foreign direct investment and GDP deflators to determine the market value of

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[11] The dollar value of Korean direct foreign investment abroad in country i at the end of year t, is $K_{i,t} = K_{i,t-1}\left(\frac{S_{i,t}F_{i,t}}{S_{i,t-1}F_{i,t-1}}\right) + I_{i,t}$, where $K_{i,t}$ is the dollar value of the stock of Korea net foreign assets; $S_{i,t}$ is the stock market index of country i at the end of time t, $F_{i,t}$ is the dollar price of currency i at the end of time t, and $I_{i,t}$ is the dollar value of the flow of Korean outward foreign direct investment in country i during year t. Data on inward foreign direct investment are available only from 1962, and those on outward foreign direct investment are reported starting only in 1968. We assumed that the each $K_{i,t}$ was zero before the relevant data were reported.

Korean investment in Saudi Arabia, Liberia, and Panama.[12] The market value of Korean inward foreign direct investment was simple to calculate because the data were already reported in dollars; we adjusted the book value of these investments using the Korean stock market index reported in *Economic Statistics Yearbook*. Summing the calculations from these three steps gives Korea's net international investment position, taking public and private assets into account.

3.2 The Capitalized Value of Korea's Expected Unilateral Transfers

The second big step in calculating aggregate generational accounts entails capitalizing expected net transfers from abroad. We analyzed two kinds of unilateral transfers: those involving military aid and those involving economic aid. The data on economic aid come primarily from the Bank of Korea's *Economic Statistics Yearbook*, and the data on military aid are derived from Hwang, Han, and Lee (1990). We are not sure that we have captured all military transfers into Korea because much of the information related to the military policy is classified. Still, we have included a large part of expected unilateral military transfers from abroad.

We assumed throughout that Korea had no long-term commitments *to pay* unilateral transfers to any other country. Hence, we are capitalizing only an expected inflow of military and economic transfers from abroad. Also, our calculations for military aid assume that such aid is provided entirely by the United States.

We did not simply capitalize transfers from abroad by assuming that they would continue into perpetuity. Instead, we determined the expected time periods for the two kinds of unilateral payments for the different periods of post-war Korean history. Because it is an *expected* unilateral transfer payment the duration of aid flow should be based on the social, political and economic situations involved around the announcement of the aid

[12] These countries are Korea's major trading partners in the broad regions reported in the data on outward foreign direct investment in the Bank of Korea's *Economic Statistics Yearbook*.

program. We classify the *expected duration of the aid flow* into five categories. These five categories have durations respectively of 1 year, 5 years, 10 years, 15 years and perpetuity. Once we have assumed the duration of an aid flow, we capitalize its value using market (dollar) interest rates during the years of its expected duration. Hence, a grant of $1 million with an expected duration of five years has a capitalized value of $\sum_{s=t}^{t+4} {}_t\delta_s$ millions, where ${}_t\delta_s = \prod_{j=t+1}^{s}(1+i_j)^{-1}$ is the market discount factor from period t to s, $1+i_j$ is the gross nominal interest rate from period j to j+1, and ${}_t\delta_t = 1$. The art of constructing expected unilateral transfers consists in positing the duration of transfers from abroad, and we used the accounts of Korean economic development in Kim (1970) and Kwon (1990) to form our judgments about the expected duration of economic aid flows. We make explicit our assumptions about the duration of both military and economic aid flows in Appendix 2.

3.3 Changes in Net Foreign Assets Broadly Defined

The aggregate generational current account is the yearly change in the value of a country's net foreign assets broadly defined. The penultimate step in computing the aggregate generational current account for Korea is to add the capitalized value of expected unilateral transfers to the net international investment position calculated in subsection 3.1. Then one takes first differences to arrive at the final numbers. Table 1 presents our computations for these historical data.

Table 1: Components of the Aggregate Generational Current Account

Thousands of Dollars

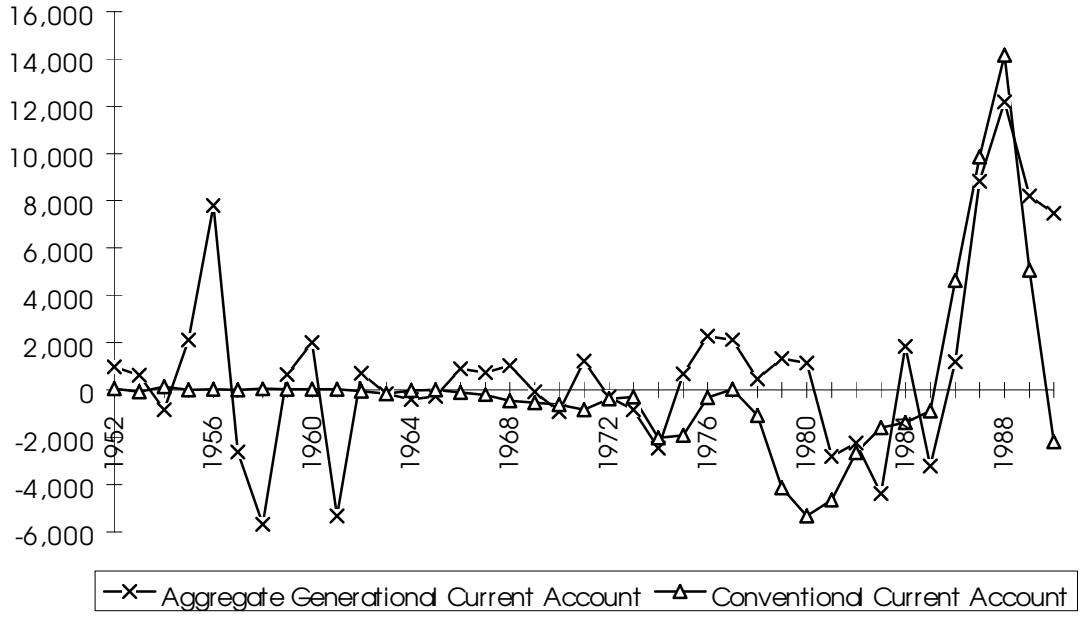
	Public and Private Net Foreign Assets	*Market Value of Net Foreign Direct Investment*	*Capitalized Economic Aid*	*Capitalized Military Aid*	*Aggregate Generational Current Account*
1950	26,839	0	1,191,032	91,398	NA
1951	38,084	0	2,112,159	113,298	954,272
1952	82,848	0	3,124,642	31,609	975,559
1953	108,889	0	3,678,056	68,155	616,001
1954	107,917	0	2,836,952	62,775	-847,456
1955	96,207	0	4,249,724	757,369	2,095,656
1956	98,669	0	5,142,309	7,654,434	7,792,112
1957	115,679	0	3,849,911	6,315,190	-2,614,632
1958	146,627	0	3,081,516	1,369,697	-5,682,941
1959	147,395	0	2,356,504	2,746,356	652,416
1960	157,042	0	2,494,729	4,614,654	2,016,169
1961	207,250	0	713,906	1,013,108	-5,332,162
1962	168,806	-600	761,137	1,705,627	700,706
1963	131,612	-5,579	966,325	1,397,149	-145,462
1964	136,499	-7,925	704,030	1,258,714	-398,190
1965	146,418	-13,335	564,156	1,126,607	-267,471
1966	245,417	-27,117	505,827	1,994,633	894,914
1967	652,296	-59,726	233,672	2,620,900	728,382
1968	803,500	-86,004	220,081	3,529,528	1,019,963
1969	1,101,682	-119,628	142,984	3,255,374	-86,693
1970	1,171,717	-189,010	92,749	2,391,696	-913,260
1971	1,017,812	-293,110	77,304	3,882,987	1,217,842
1972	1,141,923	-219,540	22,192	3,450,075	-290,344
1973	1,834,878	-436,959	9,304	2,139,591	-847,836
1974	996,608	-531,080	4,249	624,881	-2,452,157
1975	1,984,169	-764,464	4,991	543,159	673,199
1976	4,484,059	-871,741	7,444	410,312	2,262,218
1977	7,267,667	-1,129,183	3,968	17,228	2,129,606
1978	8,597,434	-1,974,875	169	10,251	473,299
1979	8,944,160	-1,071,415	224	80,718	1,320,709
1980	9,190,776	-885,219	361	786,080	1,138,310
1981	7,373,623	-1,194,552	236	100,855	-2,811,836
1982	5,042,940	-1,135,463	61	131,619	-2,241,006
1983	599,033	-942,455	30	1,619	-4,380,930
1984	2,710,350	-1,213,274	0	1,766	1,840,616
1985	-361,167	-1,365,516	0	1,955	-3,223,571
1986	2,224,453	-2,761,567	0	1,816	1,189,430
1987	14,513,512	-6,239,930	0	2,003	8,810,883
1988	34,190,871	-13,740,403	0	1,652	12,176,536
1989	42,255,860	-13,611,705	0	1,652	8,193,686
1990	45,378,090	-9,272,931	0	1,652	7,461,003

Notice that the aggregate generational current account showed large surpluses during the 1950's. This fact reflects the large capitalized value of aid flows that occurred during and after the Korean War. Also, the sharp deterioration of the aggregate generational current account in 1961 reflects the reduction in expected transfers from abroad owing to worsening diplomatic relations with the United States in the wake of the military coup of that year. Since expected aid flows were largely curtailed by the last decade, the sharp surpluses in the late 1980's reflects the rise in the dollar value of Korean assets, owing to the rapid appreciation of the yen and other currencies against the dollar in those years. The aggregate generational current account shows generally smaller deficits than the conventional current account in most of these years because expected transfers from abroad have been an important element of the external balance for Korea.

Figure 1 presents historical data contrasting the aggregate generational current account with the conventional current account.

Figure 1: Korea's Aggregate Generational Current Account

Millions of Dollars



Notice that the two measures of the current account are highly correlated, although the aggregate general current account is more volatile than the conventional current account, just as the price of a common stock is more volatile than its underlying stream of dividends. The mean value of the aggregate generation current account is higher than that of the conventional current account during this period, but, using the Procrustean assumptions of normality and independence of the two processes, one cannot reject the null hypothesis that the two measures are drawn from distributions with the same first moments. Finally, the aggregate generational current account is more frequently in surplus than the conventional current account. This reflects the fact that the capitalized value of expected transfers from abroad has been an important part of the history of the post-war Korean economy.

The wide swings of the aggregate generational current account in the 1950's represent changes in the present value of expected military aid flows. The large drop in 1961 reflects the diplomatic uncertainties about receipts of foreign aid after the coup that brought Park Jeong Hee to power. As the present value of expected foreign aid has decreased, the aggregate generational current account follows the conventional measure quite closely. This fact confirms of the validity of our approach because almost none of our data are drawn from traditional balance of payments statistics.

3.4 Forecasting Korea's Aggregate Generational Current Account

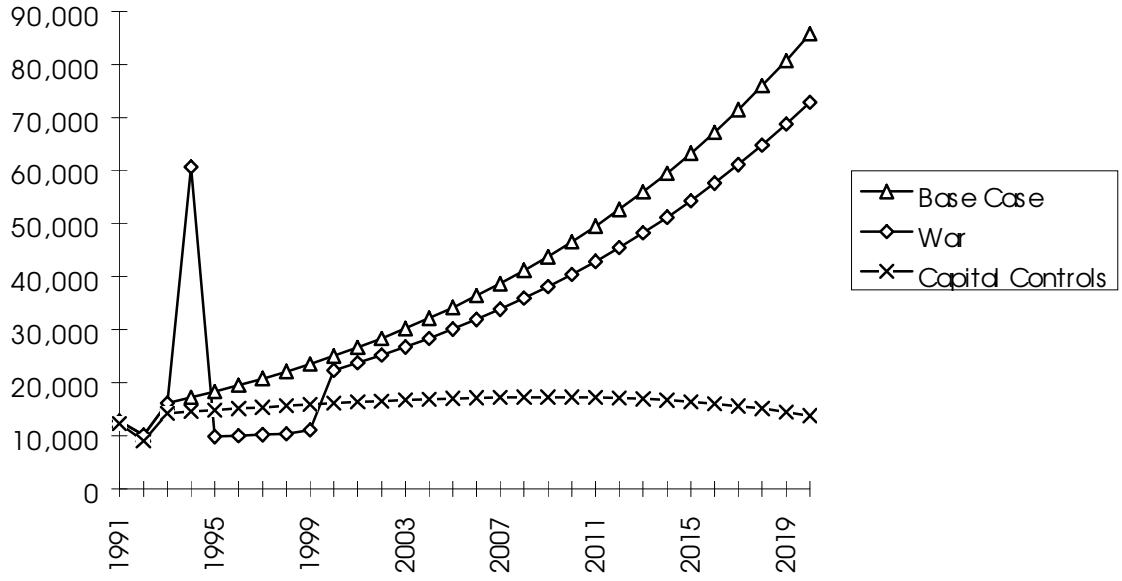
The aggregate generational current account is designed, of course, to make predictions about the effects of different economic policies on the utilities of agents in the world economy. In order to construct a benchmark, one must make explicit assumptions about the exogenous variables used in calculating the aggregate generational current account. The calibration of our forward-looking benchmark from 1991 to 2020 is based upon the following assumptions. We assume that nominal Korean assets and liabilities grow at six percent per annum and that nominal Korean central bank reserves remain

unchanged. We assume further that the inward flow of nominal foreign direct investment grows at four percent and the outward flow of such investment at six percent; we also posit that the world stock market indices grow at four percent per annum, and the Korean market index grows at six percent. Nominal military and economic aid are assumed to grow at four percent per annum. Exchange rates and the interest rate remain unchanged.

We explore two policy scenarios. The first scenario involves a war breaking out in Korea in 1994. In this case, we assume that Korean inward and outward foreign direct investment and the Korean stock market index are frozen at their 1994 levels for five years. Further, we assume that there is a five-year increase in military aid of one billion dollars per year starting in 1994 and that agents anticipate that this increase will be phased out in 1999, at which time nominal military is reduced to an annual level of two million dollars. The second scenario is one of permanent capital controls. We assume that the growth rate of Korean outward foreign direct investment is zero. This assumption entails that Korean overseas assets are frozen permanently at their level 1991, perhaps in order to finance a central government deficit. Figure 2 presents our forecasts.

Figure 2: Forecast of Korea's Aggregate Generational Current Account

Millions of Dollars



Notice that the data are presented in nominal dollars. Again, we underscore that aggregate generational current accounts can only be understood with respect to some benchmark; hence, the use of nominal dollars presents no problem in interpretation. Figure 2 indicates that a war in 1994 would decrease the utility of Koreans born after the advent of war. This occurs for two reasons. First, we have assumed that overseas assets are frozen at their nominal levels in 1994 for five years; hence future Korean interest income from overseas assets is permanently lower, although capital markets are freed in 1999. Second, the increase in 1994 in the aggregate generational current account, owing to the massive military aid, occurs only when the war breaks out. We can conclude, then, that our war scenario is such that no Korean who has died before 1995 is hurt, and no Korean born in 1995 or after can be better off. Some Koreans alive in 1994 may experience a Pareto improvement, owing to the increase in military transfers into Korea.

Figure 2 also shows that capital controls in 1994 lower the utility of all Koreans not yet born. Moreover, they make no person alive in 1994 better off. Such controls are clearly a Pareto worsening for all relevant generations in 1994 because future interest income from abroad is now lower. Hence, fewer net resources will be transferred into the Korean economy. Notice that this scenario is such that the conventional current account typically improves in 1994 because of capital controls. In this case, a policy maker would draw exactly the wrong conclusion if he lauded the increased current account surplus for the typical mercantilist reasons.

4. Conclusion

We have constructed the first measure of an external deficit that is fundamentally related to human welfare. A current worsening of the conventional measure of the current account need not indicate that some future person will experience decreased utility. But a deterioration of the aggregate generational current account indicates an expectation of precisely that fact. For example, the military coup in 1961 entailed that Korea experienced a real constraint on its external accounts because of the anticipation of curtailed aid inflows. Also, the aggregate generational current account shows that the conventionally measured Korean external deficits of the 1960's and 1970's were not as profound as one might have thought.

Our construction is a benchmark. As we emphasized above, our measure has meaning only when compared with alternative economic and military policies. The current spate of research on generational accounts has lead the Office of Management and Budget recently to begin reporting the federal budget deficit using both the conventional measure and generational accounts. We hope our own work on a generational measure of the external deficit will spur further empirical research into macro-economic statistics based on economic fact, not accounting fiction.

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Appendix 1 Description of the Data

The data on the net foreign assets of Korea were constructed from the Bank of Korea's *Economic Statistics Yearbook.* Table 4 is entitled "Monetary Survey" and reports foreign assets and foreign liabilities denominated in won. We used the end-of-period market exchange rate from the International Monetary Fund's *International Financial Statistics* to convert these values into current dollars; we took into account the monetary reform in the early 1960's that changed the currency from hwan into won. The data on foreign assets and liabilities denominated in foreign currencies are reported in Table 118 of the Bank of Korea's *Economic Statistics Yearbook*; these data are already reported in dollars. The value of the assets of the central bank are also included in the net international investment position of Korea; these data include the value of the Bank of Korea's gold stocks, and they are reported in dollars in Table 116 of the *Economic Statistics Yearbook.*

Aggregate data on inward and outward foreign direct investment are reported in dollars in the balance of payments table under the category long-term capital. They are found in Table 106 of the *Economic Statistics Yearbook*. The data are reported in dollars and are disaggregated by host country for outward Korean foreign direct investment; they are found in Table 119 of the *Economic Statistics Yearbook*. We used disaggregated data on South-East Asia, Oceania, Europe, North America, Latin America, Mid-Asia, and Africa for Korean outward foreign direct investment. The data were adjusted for changes in the market value of assets using stock market indices (or GDP deflators) and nominal exchange rates available in *International Financial Statistics.* We used data from Japan

for South East Asian investment, those from the United States for North American investment, those from Germany for European investment, and those from Australia for investment in Oceania . We used the Saudi Arabian GDP deflator for Mid-Asian investment because Saudi Arabia has no stock market. We used GDP deflators from Liberia to construct direct investment in Africa and data on Panama to construct direct investment in Latin America for the same reason. Data on inward foreign direct investment were adjusted for changes in the Korean stock market using data from *Economic Statistics Yearbook*.

Since all data are expressed in dollars, we used the long-term Treasury Bill rate in the United States, as reported in *International Financial Statistics*, for the present value calculations. For the present value calculations that extend beyond 1994, we assumed that nominal American interest rates are constant into the indefinite future. The data on Korea's conventional current account are from the balance of payments tables in various issues of *Economic Statistics Yearbook*.

The data on economic aid to Korea are reported in Table 152 in the Bank of Korea's *Economic Statistics Yearbook*. They are reported in dollars, and we capitalized the values that are reported in the first column of that table. In order to avoid double counting, we subtracted the value of current aid received in a given year because we assumed that shows up as foreign exchange assets in that year. The data on military aid came from the table on page 31 of Hwang, Han, and Lee (1990). We summed the three columns labeled MAP (Military Assistance Program), MASF (Funded Military Assistance Service), and IMET (International Military Education and Training) for the sub-category covering aid accruing only to Korea.

Appendix 2: The Expected Duration of Aid Flows

Here are our assumptions about the duration of *economic aid*. For the years 1950 through 1956 inclusive, we assumed that aid flows are expected to last forever. For the years 1957 through 1960 inclusive, we assumed that aid economic aid flows would last for fifteen years. We made these assumptions because until 1958, economic aid increased steadily except during the Korean War and trade, aid and exchange rate policies exhibited a high degree of continuity (Krueger, p. 41). Also, economic aid was a main source of import financing import, and the share of aid in GNP rose from roughly in 1953 to 14% in 1957. Several institutions gave continuous unilateral transfers during these years. These included GARIOA (Government Appropriations for Relief in Occupied Areas) the Economic Cooperation Administration, UNKRA (United Nations Korea Reconstruction Agency), CRIK (Civil Relief in Korea). Still, foreign economic aid started to decrease in the late 1950's, and that is why we assumed that its expected duration was only fifteen years during the latter part of the decade.

We assumed that economic aid had an expected duration of only five years during 1961 and 1962. The absolute amount of aid flow started to fall in the late 1950's, and diplomatic relations between the United States and Korea deteriorated after the military coup d'etat in 1961. For the years from 1963 through 1966 inclusive, we assumed that the expected duration of aid was ten years. The relationship between donor and recipient was predicated on the assumption that aid would continue to be phased out. This factor was crucial leading to the decision to embark upon an export-promotion strategy (Krueger,

p.112). Also, the absolute and relative importance of aid decreased, and by 1965, aid financed less than one-third of flow of imports. Finally, Korea's export orientation succeeded in attracting foreign capital, so aid was no longer perceived as enduring.

We assumed that economic aid during the period from 1967 through 1977 inclusive would have a duration of five years. The flow of economic aid kept decreasing throughout this period, and the United States was no longer the sole provider of aid. Most of its aid switched from grants to loans. Also, the Korean economy experienced dramatic growth due to the success of its five-year plans. Finally, we assumed that the duration of economic aid was one year for the period from 1978 to the present.

Here are our assumptions about the duration of *military aid*. For the period from 1950 through 1960 inclusive, we assumed that military aid would last forever. This assumption follows from the facts that the Korean War broke out in 1950, the United States and Korea signed their Mutual Defense Treaty in 1953, the United States had a permanent strategic interest in the Korean peninsula during the Cold War, and American troops were present in Korea along the Demilitarized Zone.

For the year 1961, we assumed that military aid would endure for only five years because diplomatic relations were strained between the United States and Korea owing to the military coup of that year. For the years from 1962 through 1968 inclusive, we assumed that the duration of military aid was fifteen years. This was the period of the American troop buildup in Vietnam and Korea sent forces there as an ally of the Americans. The Brown Memorandum was issued in 1966, and the United States-South Korean Status of Forces Agreement came into effect in 1966.

For the years from 1969 through 1980 inclusive, we assumed that the expected duration of military aid flow was ten years: The Nixon Doctrine was promulgated in 1969, and there was less emphasis on military assistance. This period saw a call for big reductions in defense spending in the United States, and there was a plan for partial withdrawal of American forces from Korea. Indeed, the reduction plan entailed cutting American forces in Korea from 62,000 to 10,000 soldiers. The Carter Administration maintained a withdrawal plan in spite of the Pueblo incident.

From 1981 to the present, the expected duration of military aid is one year. The United States has called on Korea to increase its share of expenses for America forces in Korea, and the Nunn-Warner Resolution has led to a re-assessment of the role of American forces in Asia and the Pacific region.