

## THE USE OF BASIC IDENTITIES AND DEFINITIONS IN ECONOMIC ANALYSIS

by Lawrence R. Klein\*

In trying to understand and explain the complicated functioning of an economy at large, say a national economy, a regional group of economies, or the world economy, we make use of interrelationships among major factors or variables. This job is complicated because there are so many factors at work in any situation being analyzed.

Economists, and people who digest economic analyses, want simplification because that helps our understanding. But simplification can go too far; the total economy (the macroeconomy) is indeed held together by a complicated set of interrelationships and simplification can be quite misleading.

Some of the simplified relationships are statistically based; they are historical or logical relationships that have occurred or had been "ordained" by economic theory to occur, and they often break down—at crucial moments—mainly because of their high degree of simplicity. In this brief essay or tutorial, I am not going to discuss the validity of *statistical* relationships that often get overworked, but I am going to discuss simple relationships that have an accounting, legal, or institutional basis. Accounting relationships occur because of the "double-entry" method of accounting, i.e. placing individual transactions simultaneously on the credit and debit sides of a ledger. There are so many transactions, that when they are aggregated, all together, we cannot see the individual entries, only the totals or aggregates.

For example, when a good is shipped in

international commerce, it is recorded as an export by the sender and as an import by the receiver; consequently, world exports must equal world imports. If there is an international unit of account, such as the US dollar which is widely used now, we should find the simple accounting relationship.

**World Exports of any good are equal to World Imports of the same good. The value of World Exports of all goods is equal to the value of World Imports of all goods.**

The values should be expressed in terms of a common unit of account such as the US dollar, but for individual goods, physical units can be used. These are accounting balances. Another way of stating this balanced equation is to say that the *world trade balance* is zero. A slightly more sophisticated concept would be that the *world current account balance* (covering services, and financial transfers among countries) is zero. Reported data on world totals do not show zero balance because of smuggled or illegal transactions, confidential transactions (like deposits in numbered back accounts), or different valuation practices by the sender (exporter) and receiver (importer).

The above paragraph deals with an international balance constraint that is not satisfied perfectly by the reported information available. This discrepancy can upset economic analysis because, at a world level, it has sometimes been quite large, as much as \$100 billion in a single year.

In the economic accounts of a single country,

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for example, the United States, there is an item called *statistical discrepancy*. When measuring the GDP of a country, there are different ways of collecting and assembling the information. The GDP can be the sum (aggregate) of all incomes paid to factors of production to create the GDP. It can also be measured as the sum of all expenditures on the goods and services that are created by factor inputs. The former gives the *income side* total for GDP, while the latter gives the *expenditure side* total. The difference between the two estimates of GDP has been as large as \$90-100 billion and may have confounded policy makers who are often not sure just what is happening in the economy.

An example of a simple institutional or legal relationship in an economy is the correspondence between the banking system's reserves and the outstanding deposits.

**Bank reserves must be at least as large as a specified percentage of all deposits.**

Another kind of identity relationship is a definition, and one that is being used a great deal at the present time is that associated with *potential* output, a measure that concerns policy makers who are trying to determine whether an economy is operating over or under its *potential*. Policy makers such as monetary or fiscal authorities want to know when to apply stimulus, if an economy is performing below *potential*, or when to apply restraint if an economy is performing above *potential*.

**Potential output is defined as the joint product of population, the labor force participation rate, and the productivity ratio. The last mentioned is often stated as output per worker.**

The users of this definition frequently transform it from a statement about levels to a statement about time-rates-of-change.

**The rate of change of output is the sum of the rate of change of population and the rate**

**of change of labor force participation rate and the rate of change of productivity.**

This transformation stated in terms of sums of rates of change is valid, in an approximate sense, for small changes—of a few percent up or down at any time point.

In change form we have the definition of the production growth rate as the sum of the population growth rate, the participation growth rate, and the productivity growth rate. In this form, many economic analysts feel that they have a relationship that tells them something quite understandable and insightful about potential or actual growth in the economy as a whole. They might interpret the facts in the case of South Korea, for example, as:

population growth about 0.9% yearly  
participation growth about 1.25% yearly  
productivity growth about 6% yearly.

This suggests a production growth rate of 8.15%. It was formerly in excess of 9%, but has slowed in recent years. It reached 9% in the first half of this decade but could not stay at that level every year; so a rate below 9% for *potential* growth is reasonable.

The usefulness of this way of estimating *potential*, however, is a matter of how firm our judgment is about population, participation and productivity growth rates. Population growth is quite steady, but can be on a declining trend. Participation depends on such issues as women taking paid labor-force employment or permanence of the average years of schooling. Productivity can vary a great deal from year to year, depending on the flows of scientific and technological knowledge, not to mention its entrepreneurial implementation. The identity is a useful guideline to introduce thinking about the subject, but is not detailed or firm enough to provide estimates in a narrow band of uncertainty.

Korea, of course, is a "tiger" economy and, therefore, very dynamic and subject to short-run change in its pace of economic performance.

In the United States and Western Europe, however, the simplistic formula has been used with much more conviction and, in my opinion, not for good of policy formation. The principal choices have been restrictive fiscal policy—in Europe for meeting the Maastricht requirements and in the United States to achieve a near zero balance in public budgets—and appropriate monetary policy to fight inflation. In the latter respect, the Federal Reserve authorities in the United States look at two main *real* indicators: 1. The growth rate of GDP in relation to its *potential* and 2. the rate of unemployment in relation to its *natural* level.

The definitional identity above plays a crucial role for monetary and other policy authorities. The consensus view has been that the United States cannot grow faster than 2.0-2.5% annually, without pressing on capacity limitations that could ignite inflation. The naysayers to faster growth claim that

- ( i ) population is locked in at 1.0% per year, or less,
- ( ii ) participation has had its expansion and is now at a ceiling rate (women work as much as they can, and the baby-boom generation bulge has been absorbed),
- ( iii ) productivity has slowed and is not capable of recovering on a *sustained* basis.

When we analyze these static and pessimistic views in terms of the key rates of change in the expression for production growth, we find that there are indeed "escape hatches" or "safety-valves" that may enable the economy to expand more vigorously, maybe by more than 3% annually.

Immigration is a very fluid factor for both legal and illegal entrants. In the present situation of prosperity, birth rates may well rise again. Also, the prosperity, itself, brings additional workers into the labor force. Women still have a margin of decision about whether or not to participate. The age of retirement is gradually being stretched to more advanced years.

There are many reasons not to believe the productivity figures. The trends are confounded by the experience of the 1970s, without due allowance for the behavioral adjustments that were made to deal with energy crises (shocks). The treatment of services and intermediate goods in the production process is very unsatisfactory. Finally, there are fiscal policies that could be adopted to improve infrastructure investment and, thereby, contribute to productivity gains for the economy as a whole.

For a few years (after 1991), American policy makers labored under an illusion about the growth potential of the US economy. After the economy surged beyond their judgments, they became willing to change their mind and to be more tolerant or experimental. Nevertheless, they did not use reasoning from a simple analysis well in the past and missed significant opportunities.

They should have made separate industry or sector studies with more complex production relationships and studied detailed input-output relationships with technical factors that go far beyond the simple analysis treated in this brief exercise.

Much the same can be said of policy makers in Europe who are trying to reach the Maastricht targets through restraint rather than through the feed-back effects of faster growth, leading to smaller budget deficits. Single-minded restrictive policies based on oversimplified relationships do not face up to simultaneous treatment of inflation, unemployment, and deficit targets. VIP

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