The ICP BULLETIN

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In This Issue

Interview with the Executive Secretary of ECLAC

Alicia Barcena

1. What is the state of the statistical information system in Latin America and the Caribbean region in terms of producing timely, relevant and robust economic data?

The situation is a heterogeneous one; several Latin American countries have a reasonable statistical infrastructure, as well as economic, timely and good quality social information. Other countries in the region face major challenges: although they have relatively good indicators derived from population and housing censuses, some administrative records and some surveys, they suffer from general weaknesses in the emerging field of environmental as well as some economic statistics.

In the latter respect, efforts must be deployed to support regional national statistical institutes and central banks to strengthen the generation and dissemination of economic statistics and the process of adopting the new recommendations of SNA 2008. The ICP is an additional stimulus to strengthen the information system.

One important aspect in the region is the need to improve timeliness in the production and dissemination of data. More solid information in certain fields is needed in the case of some countries. For example many of them do not produce quarterly data on GDP; it is also frequent that labor market indicators are restricted to a group of reduced variables, much of them disseminated with large delays.

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New Demands for CPI and PPP Information in the Context of Increased Food Price Volatility and Economic Recession

Joachim von Braun, *Director General, International Food Policy Research Institute*

Introduction

The volatile food prices over the past couple of years coupled with the ongoing credit crunch and recession have seriously undermined food and nutrition security across the developing world. As prices rose, many poor households were forced to reduce the quantity and quality of their diets and cut back on spending for goods and services essential for their wellbeing. The number of undernourished people increased from 848 million to 963 million between 2002-05 averages and 2008 (FAO 2008), due mainly to the food crisis. Negative effects of this phenomenon are now being felt all across--capital is becoming more scarce and expensive, price volatility has increased, and jobs are being lost (von Braun 2008). These developments call for new attention to appropriately disaggregated and timely consumer price indices (CPI) and purchasing power party (PPP) information to help guide policy responses.

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Letter from the Editor

Dear Readers,

Designing short-term emergency responses for global economic and social crisis and formulating long-term development policies require relevant, robust and timely empirical information at the global, regional, national and sub-national levels. In some areas, the lack of standard and globally comparable data represents serious impediments to address both short-term challenges and long-term strategic issues. The two cover stories in this Bulletin shed light on this critical issue.

The interview with Alicia Barcena, Executive Secretary of the UN Economic Commission for Latin America and the Caribbean (UN-ECLAC) addresses issues related to challenges and opportunities the Latin America and the Caribbean region faces in building a sound and timely statistical knowledge base. She explains where the ICP fits in the general strategy of building the region's information base. She further elaborates on the role that ECLAC played in the implementation of ICP-2005 in 10 South American countries and the part it will play in the coordination of the 2011 round. The interview highlights an effort already underway to bring all South and Central American, and Caribbean nations under the ICP fold in the 2011 round. The article provides an overview of important steps undertaken to get the ball rolling.

Joachim von Braun's article, "New Demands for CPI and PPP Information in the Context of Increased Food Price Volatility and Economic Recession" underscores the urgent and critical need for relevant, robust and timely information base in view of the current global food crisis. The article highlights that "although abundant data are available on food issues, relevant information is often outdated, spotty in coverage, and insufficiently disaggregated to local levels." The author stresses that the information gap requires urgent attention and calls for a coordinated global action.

Jorgenson's and Vu's article "Growth accounting within the International Comparison Program" provides an interesting reading with important and newsworthy results. It offers a valuable analysis of the sources of economic growth of the world economy, focusing on 14 major economies in three regions, covering three time periods -- 1989-1995, 1995-2000, and 2000-2006. The authors make use of the latest PPP benchmark results to allocate the growth of world output, using input growth and productivity information. To their surprise, they found that "input growth greatly predominates!" Equally important, they document two significant findings: (i) "except for the industrialized economies, differences in per capita output levels are explained by differences in per capita input, rather than variations in productivity"; and (ii) "the contribution of investment in information technology has increased in all regions, but especially in industrialized economies and developing Asia."

Charles Thomas, Jaime Marquez, and Sean Fahle present their research findings on the comparison of China's prices relative to those of its trading partners. The article highlights several important findings. First, China's prices are significantly lower than those of its trading partners. Another noteworthy finding is that China's international prices based on the latest 2005 results are above those from the Penn World Tables 6.2 by an average of 56 percent. The article provides valuable analysis of the evolution of Chinese international relative prices.

Changqing Sun's article provides a brief explanation of the extrapolation method used to generate PPP rates for countries that did not take part in the 2005 round of ICP surveys. Since the publication of the 2005 results in the World Bank's World Development Indicators (WDI), a number of alternative extrapolation methods were considered. Changqing presents an alternative regression method that is found to yield better PPP estimates than the regression model used to produce non-benchmark data for the 2005 round.

Philemon Oyewole's article makes use of the 2005 ICP results to examine the relative price competitiveness of African countries in the international tourism market. Seppo Varjonen comments on Kim Ziechgang's article, which appeared in the December 2008 issue of the Bulletin regarding regional aggregation of GDP price and volume series and the role exchange rates plays in the conversion of national currencies into a common international unit of measurement vis-à-vis using PPPs. Misha Belkindas provides a status and progress report on the preparation for the 2011 round. Misha's article presnts highlights of actions taken in preparation for the 2011 round.

Yonas Biru

Growth Accounting within the International Comparison Program[1]

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Abstract

This paper analyzes the sources of economic growth of the world economy, seven regions, and fourteen major economies during three periods – 1989-1995, 1995-2000, and 2000-2006. We allocate the growth of world output, as measured in the World Bank's International Comparison Program, between input growth and productivity. We find, surprisingly, that input growth greatly predominates! Moreover, except for the industrialized economies, differences in per capita output levels are explained by differences in per capita input, rather than variations in productivity. The contribution of investment in information technology has increased in all regions, but especially in industrialized economies and Developing Asia.

1. Introduction.

The International Comparison Program has recently celebrated its 40th anniversary with the completion of purchasing power parities for 146 countries for 2005.[1] These PPPs make it possible to compare gross domestic product (GDP) per capita for these countries over extended periods of time. Feenstra, Heston, Timmer, and Deng (2009) have drawn attention to the need to focus on measures of production rather than expenditure, so that differences in output reflect differences in production possibilities rather than changes in the terms of trade.

Measures of real output generated by the ICP are often used to model economic growth.[2] However, empirical research on growth is severely restricted by the absence of measures of real input. Nominal and real measures of both output and input are combined in the production account of the new architecture for the U.S. national accounts proposed by Jorgenson and Landefeld (2006). Measures of real input are also included in the revision of the 1993 System of National Accounts that will be published in 2009.

The key elements of the new architecture are outlined in a "Blueprint for Expanded and Integrated U.S. Accounts," by Jorgenson and Landefeld.[3] They present a prototype system that integrates National Income and Product Accounts (NIPAs) generated by BEA with productivity statistics generated by BLS. The system features gross domestic product (GDP), as does the NIPAs; however, GDP and gross domestic income (GDI) are generated along with productivity estimates in an internally consistent way.

In Section 2, we review growth accounting within the framework of the national accounts, focusing on the production account. In Section 3, we consider world economic growth over the period 1989-2006. In Section 4, we analyze the sources of world economic growth, emphasizing the rapidly growing importance of information technology equipment and software. In Section 5, we present level comparisons for output, input, and productivity. Section 6 concludes the paper.

2. Growth Accounting.

Issues in measuring productivity were considered by a Statistical Working Party of the OECD Industry Committee, headed by Edwin Dean, former Associate Commissioner

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1. *See: www.worldbank.org/data/icp/ An overview of the 2005 International Comparison Program is presented by Deaton and Heston (2008).*

2. *See Barro and Sala-i-Martin (2004) for a survey.*

3. *See Jorgenson and Landefeld (2006). An updated version is presented by Jorgenson (2009) and an overview is provided by Jorgenson and Landefeld (2009).*

for Productivity and Technology of the BLS. The Working Party established international standards for productivity measurement at both aggregate and industry levels. The results are summarized in Paul Schreyer's OECD Productivity Manual, published in 2001. Estimates of multifactor productivity in the prototype system developed by Jorgenson and Landefeld conform to the standards presented in Schreyer's Productivity Manual.

The prototype system of Jorgenson and Landefeld begins with the NIPAs and generates the production accounts in current and constant prices. These accounts provide a unifying methodology for integrating the NIPAs and the productivity statistics. Adding productivity statistics to the national accounts remedies a critical omission in the NIPAs and the 1993 SNA. Other important advantages of beginning with the NIPAs are that the existing U.S. national accounts can be incorporated without modification and improvements can be added as they become available.

The major challenge in implementing a consistent and integrated production account is the construction of a measure of real input. The 1993 SNA and BLS (1993) have provided measures of the price and quantity of labor services. These can be combined with the price and quantity of capital services introduced by BLS (1983) to generate price and quantity indexes of real input, as well as multifactor productivity. The primary obstacle to the construction of capital service measures is the lack of market rental data for different types of capital. Although rental markets exist for most types of assets, such as commercial and industrial real estate and industrial and transportation equipment, relatively little effort has been made to collect rental prices, except for renter-occupied housing.

An alternative approach for measuring rental prices, employed by BLS, is to impute these prices from market transactions prices for the assets, employing the user cost formula introduced by Jorgenson (1963). This requires estimates of depreciation and the rate of return, as well as asset prices based on market transactions. Measures of asset prices and depreciation, as well as investment and capital stocks, are presented in BEA's (2003) reproducible wealth accounts. BLS has generated estimates of the rate of return by combining property income from the NIPAs with capital stocks derived from BEA's estimates of investment. BLS employs the imputed rental prices as weights for accumulated stocks of assets in generating price and quantity measures of capital services.

The most important innovation in the prototype system of national accounts developed by Jorgenson and Landefeld is to include prices and quantities of capital services for all productive assets in the U.S. economy. The incorporation of the price and quantity of capital services into the revision of the 1993 SNA was approved by the United Nations Statistical Commission at its February-March 2007 meeting. A draft of Chapter 20 of the revised SNA, "Capital Services and the National Accounts," is undergoing final revisions and will be published in 2009. Paul Schreyer, head of national accounts at the OECD, has prepared an OECD Manual, Measuring Capital that was published in January 2009.

In Chapter 20 of the revised 1993 SNA, estimates of capital services are described as follows: "By associating these estimates with the standard breakdown of value added, the contribution of labour and capital to production can be portrayed in a form ready for use in the analysis of productivity in a way entirely consistent with the accounts of the System." The measures of capital and labor inputs in the new architecture for the U.S. national accounts are consistent with the revised SNA and the OECD Manual. The volume measure of input is a quantity index of capital and labor services, while the volume measure of output is a quantity index of investment and consumption goods. Productivity is the ratio of output to input.

The new architecture has been endorsed by the Advisory Committee on Measuring Innovation in the 21st Century Economy, and presented to the U.S. Secretary of Commerce, Carlos Guttierez.[4] In response to the Advisory Committee's recommendations, BEA and BLS have produced an initial set of estimates integrating multifactor productivity with the NIPAs. The results were reported by Harper, Moulton, Rosenthal and Wasshausen (2009) at a special session on economic statistics at the Annual Meeting of the American Economic Association in San Francisco on January 4, 2009.

The production account for the prototype system of accounts employed below is based on the GDP and GDI in current and constant prices.[5] Multifactor productivity is the ratio of GDP to GDI in constant prices. Estimates of productivity are essential for projecting the potential growth of the U.S. economy, as demonstrated by Jorgenson, Mun Ho, and Kevin Stiroh (2008). The omission of productivity statistics from the

4. *The Advisory Committee on Measuring Innovation in the 21st Century Economy (2008). The Advisory Committee was established on December 6, 2007, with ten members from the business community, including Carl Schramm, President and CEO of the Kauffman Foundation and chair of the Committee, Sam Palmisano, Chairman and CEO of IBM, and Steve Ballmer, President of Microsoft. The Committee also had five academic members, including Jorgenson. The Advisory Committee met on February 22 and September 12, 2007, to discuss its recommendations. The final report was released on January 18, 2008.*

5. *For more details on our methodology for growth accounting see Jorgenson (2005).*

NIPAs and the 1993 SNA is a serious barrier to application of the national accounts in assessing potential economic growth.

The production account for the U.S. has been disaggregated to the level of 85 industries, covering the period 1960-2005, by Jorgenson, Mun Ho, Jon Samuels, and Kevin Stiroh (2007), Industry Origins of the American Productivity Resurgence. The methodology follows that of Jorgenson, Ho and Stiroh (2005), Information Technology and the American Growth Resurgence. This methodology conforms to the international standards established by the OECD Productivity Manual (2001).[6] The EU KLEMS project has recently developed systems of production accounts based on this methodology for the economies of European Union (EU) member states.[7] For major EU countries, this project includes accounts for 72 industries, covering the period 1970-2005.

The output data for our growth accounts are compiled from World Development Indicators (2008). We use GDP measured in 2005PPP$ for the individual countries. We aggregate these data to obtain the size and share of GDP and growth for the seven regions described below and the world economy. We also use GDP in 2005PPP$ to aggregate the sources of economic growth. Finally, levels of output and input per capita are aggregated by population shares, rather than shares of the GDP.

The input data are drawn from the following sources:

- The Total Economy Growth Accounting Database provided by the Groningen Growth and Development Centre for the data on employment and hours worked[8].
- The EU KLEMS dataset for the data on capital and labor services for countries of the European Union and Japan[9].
- The data from Digital Planet reports published by the World Information Technology and Services Alliance (WITSA) for investment in Information Technology (IT).

We construct estimates of investment in Information Technology (IT) and labor quality as follows:

- We update the data from Jorgenson (2003) for the US and Canada and use the data from the EU KLEMS dataset for Japan and 14 European countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Netherlands, Slovenia, Spain, Sweden, and United Kingdom. For all other economies, we estimate their IT capital stock data based on the data on IT expenditures from the WITSA Digital Planet reports and data on IT penetration from WDI.
- To estimate IT capital services, we assume that the hedonic price indices for computer hardware, computer software, and telecommunication equipment in these countries follow the same patterns observed for the U.S. Additional details on our methodology can be found in the electronic version of Jorgenson and Vu (2006).[10]

Our sample consists of 122 economies, which account for over 95 percent of the world GDP and ICT expenditures. For purposes of analysis, we divide the world economy into seven economic groups/regions:

1) G7 (seven largest industrialized economies): Canada, France, Germany, Italy, Japan, United Kingdom, and United States.
2) Non-G7 (17 non-G7 industrialized economies): Australia, Austria, Belgium, Denmark, Finland, Greece, Ireland, Iceland, Israel, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, and Switzerland.
3) Developing Asia (16 economies): Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Malaysia, Nepal, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, and Vietnam.
4) Latin America (20 economies): Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, and Venezuela.
5) Eastern Europe and the former Soviet Union (22 economies): Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Ukraine, and Uzbekistan.
6) Sub-Saharan Africa (29 economies): Benin, Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Cote d'Ivoire, Ethiopia, Gabon, Ghana, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, South Africa, Sudan, Swaziland, Tanzania, Togo,

6. See Schreyer (2001).

7. The EU KLEMS project was completed on June 30, 2008. For further details see: www.euklems.net. A summary of the findings is presented by Ark, O'Mahoney, and Timmer (2008).

8. Webpage URL: www.ggdc.net/index-dseries.html. A summary is provided by Timmer, Ypma, and van Ark (2005).

9. Webpage URL: www.euklems.net

10. See: post.economics.harvard.edu/faculty/jorgenson/papers/handbook_worldgrowthresurgenc_appendix_050810.pdf

continued

Uganda, and Zambia.

7) North Africa and Middle-East (11 economies): Algeria, Egypt, Iran, Jordan, Lebanon, Mauritania, Morocco, Syria, Tunisia, Turkey, and Yemen.

We also report our results for the group of seven major developing and transition economies, which include Brazil, China, India, Indonesia, Mexico, Russia, and South Korea.

3. World Economic Growth, 1989-2006.

We have sub-divided the period 1989-2006 into 1989-1995, 1995-2000, and 2000-2006 in order to focus on the response of IT investment to the accelerated decline in IT prices in 1995 and the impact of the dot-com crash of 2000. The period 2000-2006 includes the dot-com crash of 2000, the shallow U.S. recession of 2001, and the recovery that followed. The period 1995-2000 encompasses the IT-generated investment boom of the last half of the 1990's.

World economic growth has undergone a powerful revival since 1995. The GDP growth rate jumped more than a full percentage point from 2.27 percent during 1989-1995 to 3.60 percent in 1995-2000, and 3.68 percent in 2000-2006, as shown in Table 1. We can underscore the significance of more rapid growth by pointing out that GDP growth of 2.27 percent raises world output by nearly 10 times in a century, while 3.68 percent growth increases the output by almost 40 times.

In order to set the stage for analyzing the impact of IT investment on the growth of the world economy, we first consider the shares of world product and growth for the seven regions, the G7 economies, and the group of seven major developing and transition economies presented in Table 1. The G7 economies accounted for slightly above half of world product from 1989-1995. The GDP growth rates of these economies-- 2.15 percent for 1989-1995, 3.14 percent for 1995-2000, and 2.12 percent during 2000-2006 – lagged considerably behind world growth rates for these periods. The G7 shares in world growth were 49.4 percent during 1989-1995 and 44.5 percent during 1995-2000, but a relatively meager 27.7 percent during 2000-2006. This led to a decline of almost four percentage points in the G7 share of world product from 51.9 percent in 1989-1995 to 48.0 percent during 2000-2006.

During 1989-1995 the U.S. accounted for 23.4 percent of world product and 45.0 percent of G7 product. The U.S. share of G7 output rose to 46.6 percent from 1995-2000 and 48.5 percent during 2000-2006. After 2000 Japan fell from its ranking as the world's second largest economy to third largest after China, but remained second among the G7 economies. Germany dropped to the fourth place since 1995, following the U.S., China, and Japan. However, Germany retained its position as the leading European economy. France, Italy and the U.K. were considerably smaller, but similar in size. Canada was the smallest of the G7 economies.

The share of the G7 in world growth is lower than its share in the world product throughout the three periods--1989-1995, 1995-2000, and 2000-2006. This was more pronounced after 1995, and was especially notable after 2000. Similar trends can be observed for each individual G7 economy except for the U.S. and Canada during the period 1995-2000, and Germany during 1989-1995. The U.S. growth rate jumped from 2.44 percent during 1989-1995 to 4.29 percent in 1995-2000, before subsiding to 2.79 percent during 2000-2006.

The 16 economies of Developing Asia generated only 14.8 percent of world output before 1995, but 18.0 percent during 1995-2000 and 21.1 percent after 2000. The burgeoning economies of China and India accounted for 53.0 percent of Asian output during 1989-1995, 56.6 percent in 1995-2000, and 61.8 percent after 2000.[11] The economies of Developing Asia grew at 7.54 percent before 1995, 5.69 percent during 1995-2000, and 7.05 percent after 2000. These economies generated an astounding 49.5 percent of world growth during the remarkable revival of 1989-1995! Developing Asia's share in world growth declined to 28.5 percent during 1995-2000 due to the Asian financial crisis, but recovered to 40.6 percent during 2000-2006. China alone accounted for about one-fifth of world growth during the period 1989-2006.

The 17 non-G7 industrialized economies generated about 10 percent of world output and 10 percent of world growth during 1989-1995 and 1995-2000. However, these economies' share in world growth declined significantly to 6.8 percent after 2000. The growth rates of the 20 Latin America countries slightly improved over time, from 2.83 percent in 1989-1995 to 2.96 percent in 1995-2000 and 3.05 percent in 2000-2006. However, their growth performance was below the world economy after 1995. As a result, their share in world growth dropped from 11.0 percent in 1989-1995 to 7.3 percent in 1995-200, to 7.1 percent in 2000-2006.

All of the 22 economies of the Eastern Europe group experienced a deep decline in output during 1989-1995 after initiating the transition from socialism to a market economy. Collectively, these economies reduced world growth by 27 percent during

11. The growth rates for China may be exaggerated, as pointed out by Maddison (1998), Young (2003), and Maddison and Wu (2008). For extensive references to the debate over Chinese growth rates and a review of the issues, see the critique of Maddison (1998) by Holz (2006) and Maddison's (2006) reply.

the period 1989-1995, lowering their share of world product by about two and a half percentage points from 9.1 percent during 1989-1995 to 6.5 percent in 1995-2000 and 6.7 percent in 2000-2006. However, the growth share of this group rose from 3.8 percent in 1995-2000 to 10.5 percent in 2000-2006.

Sub-Saharan Africa, which includes 29 economies, has a world output share of about 2 percent, slightly below the share of Canada. Growth shares in the economies of Sub-Saharan Africa lagged behind their shares in world product before 2000. However, the growth rates showed an increasing trend, from 1.6 percent in 1989-1995 to 1.9 percent in 1995-2000, to 2.6 percent in 2000-2006.

The 11 economies of North Africa and the Middle East, taken together, were comparable in size to France, Italy, or the U.K. The economies of North Africa and the Middle East had a share in world growth of 6.1 percent during 1989-1995, well above their 3.4 percent share in world product. During 1995-2000 their share in world growth fell to 4.0 percent, still above the corresponding share in world product of 3.6 percent. This trend continued with a growth share of 4.8 percent and a product share of 3.8 percent after 2000.

4. Sources of World Economic Growth.

In this section, we allocate the growth of world output between input growth and productivity. Our most astonishing finding is that input growth greatly predominates! Productivity growth accounted for less than one-fifth of the total during 1989-1995, while input growth accounted for more than four-fifths. Similarly, input growth contributed almost three-quarters of growth for 1995-2000 and almost two-thirds for 2000-2006 (Table 2). The only departure from this world-wide trend was the revival of economic growth in Eastern Europe after 1995, driven by a rebound from the productivity collapse of 1989-1995.

We distribute the growth between investments in human capital and tangible assets, especially IT equipment and software. The world economy and all seven regions experienced a surge in investment in IT after 1995. The soaring level of U.S. IT investment after 1995 was paralleled by jumps in IT investment throughout the industrialized world. The contributions of IT investment to growth in Developing Asia, Latin America, Eastern Europe, North Africa and the Middle East, and Sub-Saharan Africa doubled after 1995, beginning from much lower levels.

The contribution of IT investment to the world economic growth has moderated substantially since the dot-com crash of 2000. However, the contribution of IT investment has continued to rise for Developing Asia, Latin America, Eastern Europe, North Africa and the Middle East, and Sub-Saharan Africa. The contributions of non-IT investment and labor input to world growth declined after the dot-com crash, but total factor productivity growth rose substantially, reflecting considerable increases in four groups: Developing Asia, Eastern Europe and the former Soviet Union, Sub-Saharan Africa, and North Africa and the Middle East.

In Tables 2A and 2B, we allocate the sources of world economic growth among the contributions of capital and labor inputs and the growth of productivity. About 40-50 percent of world growth between 1989 and 2006 can be attributed to the accumulation and deployment of capital and another 25-33 percent to the use of labor input. We find that productivity, frequently described as the primary engine of economic growth, accounted for only 20-35 percent of growth.

Our second objective is to analyze the determinants of the growth of labor input, focusing on the role of investment in human capital. We have divided labor input growth between the growth of hours worked and labor quality, where quality is defined as the ratio of labor input to hours worked. Labor quality growth captures the impact of changes in the composition of labor input. These arise, for example, through increases in the education and experience of the labor force. The contribution of labor input is the sum of the two components, weighted by the share of labor in output.

Our third objective is to explore the determinants of the growth of capital input, emphasizing the role of investment in information technology. The contribution of capital input to world economic growth before 1995 was 1.22 percent, 54.1 percent of the growth rate of 2.26 percent. Labor input contributed 0.67 percent or 29.6 percent of growth, while productivity growth was 0.37 percent per year or 16.3 percent of growth. During 1995-2000 the contribution of capital input climbed to 1.67 percent, but accounted for only 46.4 percent of output growth of 3.60 percent, while the contribution of labor input rose to 1.10 percent, 30.4 percent. Finally, productivity growth is the difference between the rate of growth of output and the contributions of capital and labor inputs. Productivity growth increased to 0.84 percent per year or 23.2 percent of growth.

After 2000, world growth continued at an accelerated rate of 3.68 percent. The contribution of capital slightly declined to 1.50 percent, or 40.7 percent of growth. The contribution of labor fell to 0.87 percent, or 23.6 percent of growth. More rapid growth was maintained by a jump in productivity growth to 1.31 percent per year or 35.7 percent of the growth of output. We arrive at the astonishing conclusion that the contributions of capital and labor inputs greatly predominate over productivity as sources of world economic growth throughout the period 1989-2006, although the share of productivity has been rising.

We have divided the contribution of capital input to world

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economic growth between IT capital and non-IT capital inputs. The contribution of IT almost doubled after 1995 from less than a quarter of the contribution of capital input during 1989-1995 to about a third during 1995-2000. The share of IT in the contribution of capital input receded to slightly more than one quarter after the dot-com crash of 2000. However, it is important to emphasize that the contribution of non-IT investment was more important throughout the period 1989-2006.

We have divided the contribution of labor input between hours worked and labor quality. Hours worked was the major source of the contribution of labor input to economic growth throughout the period 1989-2006. The contribution of hours rose from 0.31 percent before 1995 to 0.79 percent during 1995-2000, but fell back to 0.59 percent after 2000. The contribution of labor quality declined from 0.36 percent before 1995 to 0.30 percent during 1995-2000 and to 0.28 percent after 2000.

As shown in Table 2B, relative to the period 1989-1995, world economic growth in 1995-2000 and 2000-2006 jumped by more than one full percentage point. For 1995-2000, the contribution of capital explained 33.3 percent of this acceleration, while productivity growth accounted for 34.8 percent share, and labor contributed 31.9 percent. The jump in IT investment of 0.27 percent was by far the most important source of the increase in capital, and contributed 20.3 percent of the acceleration to growth from 1989-1995 to 1995-2000. This can be traced to the more rapid rate of decline of IT prices after 1995 analyzed by Jorgenson (2001). The substantial increase of 0.49 percent in the contribution of hours worked offset the decline in the contribution of labor quality.

5. World Output, Input, and Productivity.

In this section, we present levels of output per capita, input per capita, and productivity for the world economy, the seven economic regions, the G7 economies, and the group of seven major developing and transition economies. We find that, except for the industrialized countries, differences in per capita output levels are explained more by differences in per capita input than variations in productivity. Taking U.S. output per capita in 2000 as 100.0, world output per capita was 23.7 in 2006; using similar scales for input and productivity, world input per capita in 2006 was 48.8 and world productivity was 48.5, as shown in Table 3.

The final step in analyzing the world growth resurgence is to characterize the evolution of levels of output, input, and productivity for the world economy, the seven economic regions and the G7 economies, and the group of seven major developing and transition economies. Levels of per capita output, per capita input, and productivity are estimated, using the following methodology:

- Output is GDP, measured in 2005 PPP$, as in the ICP.
- Input combines measures of capital and labor inputs. Capital input is converted from its value in current US$ to 2005PPP$ by using the aggregate investment deflator to obtain the value in 2005US$ and the PPP exchange factor to convert to 2005PPP$. Labor input is estimated as the product of hours worked and the labor quality index and a similar constant for all countries.
- The level of productivity is computed as the ratio between output and input.

Taking the U.S. levels of output, input, and productivity in 2000 as 100.0, we estimate levels of output, input, and productivity for each of the 122 economies in the benchmark years 1989, 1995, 2000, and 2006. In Table 3, we present levels of output per capita when the transition from socialism began in 1989, at the start of the worldwide IT investment boom in 1995, at the beginning of the dot-com crash in 2000, and at the end of the period covered by our study in 2006. We also present input per capita and productivity for these years.

Taking U.S. output per capita in 2000 as 100.0, world output per capita was a relatively modest 17.5 in 1989. Using similar scales for input and productivity, world input per capita in 1989 was a considerable 43.0 and world productivity a significant 40.8. The level of world output advanced to 18.3 in 1995, jumped to 20.4 in 2000, and leapt again to 23.7 in 2006, reflecting rapid growth in world input per capita to 43.5 in 1995, 46.7 in 2000, and 48.8 in 2006. World productivity rose to 42.0 in 1995, 43.7 in 2000 and then 48.5 in 2006. This upward trend was most notable for Developing Asia.

For the G7 and non-G7 industrialized countries, input per capita and productivity have converged toward U.S. levels. Input per capita for Canada was 105.9 in 2006, exceeding the U.S. level of 104.5 on a base of U.S. = 100 for 2000. France emerged as the leader in productivity among the G7 with a level of 93.3 in 2006, compared to the U.S. level of 104.5. For the non-industrialized countries input per capita lagged well behind productivity. Levels of productivity in Latin America, Eastern Europe, and North Africa and the Middle East was more than half the U.S. level by 2006, while input per capita in these regions lagged considerably behind.

Among the seven developing and transition economies, Russia and South Korea have particularly impressive performances in productivity with levels of 85.8 and 86.5 respectively in 2006. South Korea's input per capita of 66.0 in 2006 considerably outstripped that of the other six developing and transition economies, but lagged behind the country's performance in relative productivity. Brazil and Mexico also had impressive levels of productivity, but these improved only slightly over the period

1989-2006. China, India, and Indonesia lagged in productivity performance, but even more in input per capita.

It is not surprising that productivity for developing and transition economies converged more rapidly to U.S. levels than input per capita. As globalization has expanded, technologies have been transferred with relative ease from industrialized economies to the developing world. Mobilization of inputs in developing economies has been remarkable, but has required far more time and effort. Institutional barriers to accumulation of human and non-human capital must be overcome and networks among the cooperating activities must be established and enhanced. Obsolete methods for organizing production must be displaced by up-to-date techniques that employ information technology equipment and software.

6. Summary and Conclusions.

World economic growth, led by the industrialized economies and Developing Asia, experienced a strong resurgence after 1995. Developing Asia accounted for about 40 percent of world economic growth during 1989-2006 but remained well below half the world average in output per capita in 2006. Sub-Saharan Africa and North Africa and the Middle East also languished well below the world average. Levels of output in Eastern Europe and the former Soviet Union lost enormous ground during the transition from socialism, but began to recover around 1995 and were nearly back to pre-transition levels in 2006.

Growth trends apparent in the U.S. have counterparts throughout the world. Investment in tangible assets, including IT equipment and software, is the most important source of growth; however, non-IT investment predominated. The contribution of labor input was next in magnitude with hours worked outweighing labor quality. Finally, productivity was the dominant source of growth only in Eastern Europe and the former Soviet Union during the recovery from the output and productivity collapse of 1989-1995 that accompanied the transition from socialism to a market economy.

The leading role of IT investment in the acceleration of growth in the G7 economies is especially pronounced in the U.S. The contribution of labor input predominated in the non-G7 industrialized economies, as well as Latin America, Eastern Europe, Sub-Saharan Africa, and North Africa and the Middle East. Productivity growth was an important source of growth in Developing Asia during the Asian Miracle before 1995, contrary to the Krugman (1994) thesis, but growth of capital and labor inputs rose in importance after 1995. Productivity has been stagnant or declining in Latin America, Eastern Europe, Sub-Saharan Africa, and North Africa and the Middle East.

All seven regions of the world economy experienced a surge in investment in IT equipment and software after 1995. The impact of IT investment on economic growth was most striking in the G7 economies. The rush in IT investment was especially conspicuous in the U.S., but jump in the contribution of IT capital input in Canada, Japan, and the U.K. were only slightly lower. France, Germany, and Italy also experienced a surge in IT investment, but lagged considerably behind the leaders. IT investment subsided among the G7 economies after the dot-com crash of 2000, while the contribution of non-IT investment varied considerably and explains important differences among growth rates of the G7 economies.

The surge in investment in IT equipment and software is a global phenomenon, but the variation in the contribution of this investment has grown considerably since 1995. The moderation in IT investment in the industrialized countries after the dot-com crash of 2000 was accompanied by continued expansion in the contribution of IT in the developing world, especially in Asia. The contribution of IT investment more than doubled after 1995 in Developing Asia, Latin America, Eastern Europe, and North Africa and the Middle East, and Sub-Saharan Africa.

The accelerated pace of globalization and IT penetration over the period 1989-2006 may be important factors in explaining the significant jump in productivity in output growth. Jorgenson, Ho, Samuels, and Stiroh (2007) have shown that this was concentrated in IT-intensive service and trade industries in the U.S. after the dot-com crash of 2000. At the world level, the contribution of productivity increased from 16.3 percent of growth in 1989-1005 to 23.2 percent in 1995-2000, and 35.7 percent in 2000-2006.

Although capital input remained the most important source of growth, its share steadily declined from 54.1 percent in 1989-1995 to 46.4 percent in 1995-2000 and 40.7 percent in 2000-2006. This reflects the fact that technology is relatively easy to transfer from industrialized economies to developing economies, while mobilization of capital inputs requires much more time and considerably greater effort. Outmoded techniques of production must give way to newer methods that incorporate the latest technologies, especially those that utilize information technology equipment and software. ■

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Table 1: Share in GDP and GDP Growth

Group	Period 1989-1995			Period 1995-2000			Period 2000-2006		
	GDP Growth	Average Share		GDP Growth	Average Share		GDP Growth	Average Share	
		GDP	Growth		GDP	Growth		GDP	Growth
World (122 Economies)	**2.27**	**100.0**	**100.0**	**3.60**	**100.0**	**100.0**	**3.68**	**100.0**	**100.0**
G7 Economies (7)	2.15	51.9	49.4	3.14	51.1	44.5	2.12	48.0	27.7
Developing Asia (16)	7.54	14.8	49.5	5.69	18.0	28.5	7.06	21.1	40.6
Non-G7 (17)	2.14	9.9	9.4	3.64	9.9	10.0	2.58	9.7	6.8
Latin America (20)	2.83	8.8	11.0	2.96	8.9	7.3	3.05	8.6	7.1
Eastern Europe (22)	-6.55	9.1	-27.0	2.13	6.5	3.8	5.76	6.7	10.5
Sub-Sahara Africa (29)	1.72	2.0	1.6	3.46	2.0	1.9	4.59	2.1	2.6
N. Africa and Middle East (11)	4.04	3.4	6.1	3.99	3.6	4.0	4.67	3.8	4.8

Economy	Period 1989-1995					Period 1995-2000					Period 2000-2006				
	GDP Growth	GDP Share		Growth Share		GDP Growth	GDP Share		Growth Share		GDP Growth	GDP Share		Growth Share	
		Group	World	Group	World		Group	World	Group	World		Group	World	Group	World
G7	**2.15**	**100**	**51.9**	**100**	**49.4**	**3.14**	**100**	**51.1**	**100**	**44.5**	**2.12**	**100**	**48**	**100**	**27.7**
Canada	1.45	4.2	2.2	2.8	1.4	4.05	4.2	2.2	5.4	2.4	2.56	4.4	2.1	5.3	1.5
France	1.41	7.7	4.0	5.1	2.5	2.66	7.5	3.8	6.4	2.8	1.6	7.4	3.6	5.6	1.5
Germany	2.57	10.9	5.7	13.1	6.4	1.96	10.8	5.5	6.8	3	1.03	10.3	4.9	5	1.4
Italy	1.4	7.4	3.8	4.8	2.4	1.77	7.0	3.6	4.0	1.8	0.81	6.6	3.2	2.5	0.7
Japan	2.11	17.4	9.1	17.1	8.4	1.24	16.6	8.5	6.6	2.9	1.33	15.5	7.5	9.7	2.7
United Kingdom	1.77	7.4	3.8	6.1	3	3.16	7.2	3.7	7.3	3.2	2.36	7.4	3.5	8.2	2.3
United States	2.44	45.0	23.4	51.1	25.2	4.29	46.6	23.8	63.6	28.3	2.79	48.5	23.3	63.7	17.6
DG7	**2.83**	**100.0**	**20.5**	**100.0**	**25.8**	**4.94**	**100**	**21.6**	**100**	**29.6**	**6.46**	**100**	**24.4**	**100**	**43.0**
Brazil	1.71	16.3	3.3	9.8	2.5	1.97	14.6	3.1	5.8	1.7	2.87	12.2	3	5.4	2.3
China	10.26	23.0	4.7	83.2	21.4	8.27	30.5	6.6	51.1	15.2	9.32	36.1	8.9	52.1	22.5
India	5.03	15.4	3.2	27.4	7.0	5.67	16.7	3.6	19.2	5.7	7.07	17.3	4.2	19	8.1
Indonesia	7.75	5.9	1.2	16.2	4.2	0.7	6.1	1.3	0.9	0.3	4.74	5.2	1.3	3.8	1.6
Mexico	2.09	10.6	2.2	7.8	2.0	5.31	10.4	2.3	11.2	3.3	2.25	9.3	2.3	3.3	1.4
Russia	-8.44	21.6	4.4	-64.6	-16.4	1.6	13.4	2.9	4.4	1.3	6.05	12.2	3.0	11.4	4.9
South Korea	7.85	7.3	1.5	20.1	5.2	4.49	8.2	1.8	7.4	2.2	4.28	7.6	1.8	5.0	2.1
China & India	**8.16**	**53.0**	**7.9**	**57.2**	**28.4**	**7.35**	**56.6**	**10.2**	**73.1**	**20.8**	**8.59**	**61.8**	**13.1**	**75.2**	**30.6**

Note: DG Stands for the group of the seven largest developing economies

continued

Table 2A: Sources of Growth

Growth contribution in percentage points

		World	G7	Developing Asia	Non-G7	Latin America	Eastern Europe	Sub-Sah. Africa	N. Africa & M. East
1989-1995	Growth	2.26	2.15	7.54	2.14	2.83	-6.55	1.72	4.04
	Capital	1.22	1.29	2.47	1.07	0.57	-0.13	0.50	0.98
	■ ICT	0.29	0.38	0.18	0.35	0.15	0.11	0.20	0.10
	■ Non-ICT	0.93	0.91	2.28	0.72	0.42	-0.24	0.30	0.87
	Labor	0.67	0.41	1.67	0.58	1.56	-1.27	2.42	2.24
	■ Hours	0.31	0.09	1.16	0.19	1.15	-1.40	1.82	1.61
	■ Quality	0.36	0.32	0.52	0.39	0.41	0.13	0.60	0.64
	TFP	0.37	0.45	3.40	0.49	0.69	-5.15	-1.19	0.82
1995-2000	Growth	3.60	3.14	5.69	3.64	2.96	2.13	3.46	3.99
	Capital	1.67	1.68	2.78	1.69	1.22	-0.47	1.07	1.28
	■ ICT	0.56	0.75	0.33	0.66	0.30	0.23	0.36	0.19
	■ Non-ICT	1.11	0.93	2.45	1.03	0.93	-0.70	0.71	1.09
	Labor	1.10	0.83	1.37	1.57	1.74	-0.30	2.01	2.62
	■ Hours	0.79	0.57	0.93	1.30	1.38	-0.35	1.54	2.07
	■ Quality	0.30	0.26	0.44	0.27	0.36	0.06	0.47	0.55
	TFP	0.84	0.63	1.54	0.38	-0.01	2.89	0.38	0.09
2000-2006	Growth	3.68	2.12	7.06	2.58	3.05	5.76	4.59	4.67
	Capital	1.50	1.20	2.82	1.44	0.95	0.26	1.70	1.38
	■ ICT	0.43	0.42	0.52	0.45	0.32	0.37	0.54	0.29
	■ Non-ICT	1.07	0.77	2.30	0.99	0.63	-0.11	1.16	1.09
	Labor	0.87	0.42	1.37	1.10	1.65	0.38	1.56	2.01
	■ Hours	0.59	0.16	1.00	0.78	1.46	0.08	1.29	1.91
	■ Quality	0.28	0.26	0.37	0.32	0.19	0.30	0.27	0.10
	TFP	1.31	0.51	2.86	0.04	0.45	5.12	1.32	1.29

Growth contribution in share (%)

1989-1995	Growth	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Capital	54.1	60.0	32.7	49.9	20.3	2.0	28.8	24.2
	■ ICT	12.8	17.6	2.4	16.5	5.3	-1.7	11.3	2.6
	■ Non-ICT	41.3	42.4	30.3	33.3	15.0	3.7	17.5	21.7
	Labor	29.6	19.2	22.2	27.2	55.2	19.4	140.4	55.5
	■ Hours	13.5	4.3	15.3	9.0	40.8	21.3	105.5	39.8
	■ Quality	16.0	14.9	6.9	18.2	14.4	-1.9	34.9	15.7
	TFP	16.3	20.8	45.1	22.9	24.5	78.6	-69.2	20.3
1995-2000	Growth	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Capital	46.4	53.4	48.9	46.4	41.4	-22.0	31.0	32.1
	■ ICT	15.6	23.8	5.8	18.0	10.0	10.8	10.5	4.8
	■ Non-ICT	30.8	29.6	43.0	28.3	31.3	-32.9	20.5	27.3
	Labor	30.4	26.4	24.1	43.1	58.9	-14.0	58.1	65.6
	■ Hours	22.0	18.3	16.4	35.8	46.6	-16.6	44.5	51.8
	■ Quality	8.4	8.2	7.7	7.3	12.3	2.6	13.6	13.8
	TFP	23.2	20.2	27.0	10.6	-0.3	136.1	10.9	2.3
2000-2006	Growth	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Capital	40.7	56.3	40.0	55.8	31.1	4.5	37.1	29.4
	■ ICT	11.7	19.9	7.4	17.3	10.6	6.5	11.8	6.1
	■ Non-ICT	29.0	36.4	32.6	38.5	20.5	-1.9	25.4	23.3
	Labor	23.6	19.7	19.4	42.7	54.1	6.6	34.1	42.9
	■ Hours	16.1	7.5	14.1	30.4	47.8	1.4	28.1	40.8
	■ Quality	7.6	12.1	5.3	12.3	6.3	5.2	5.9	2.1
	TFP	35.7	24.0	40.6	1.5	14.8	88.9	28.8	27.6

Table 2B: Sources of Growth Acceleration from 1989-1995 to 1995-2000 and 2000-2006

	Period			Growth Acceleration			
	1989-1995	1995-2000	2000-2006	From (I) to (II)		From (I) to (III)	
	(I)	(II)	(III)	(II)-(I)	Share	(III)-(I)	Share
Growth	2.26	3.60	3.68	1.34	100.0	1.42	100.0
Capital	1.22	1.67	1.50	0.45	33.3	0.27	19.3
■ ICT	0.29	0.56	0.43	0.27	20.3	0.14	10.0
■ Non-ICT	0.93	1.11	1.07	0.17	12.9	0.13	9.3
Labor	0.67	1.10	0.87	0.43	31.9	0.20	14.3
■ Hours	0.31	0.79	0.59	0.49	36.4	0.29	20.1
■ Quality	0.36	0.30	0.28	-0.06	(4.5)	-0.08	(5.9)
TFP	0.37	0.84	1.31	0.47	34.8	0.95	66.5

Note: Unit: %

Table 3: Levels of output and input per capita and productivity (U.S. = 100 in 2000)

Country	Output Per Capita				Input Per Capita				Productivity			
	1989	1995	2000	2006	1989	1995	2000	2006	1989	1995	2000	2006
World	**17.5**	**18.3**	**20.4**	**23.7**	**43.0**	**43.5**	**46.7**	**48.8**	**40.8**	**42.0**	**43.7**	**48.5**
G7	69.3	75.2	84.6	92.0	80.2	84.5	92.1	97.1	86.4	89.0	91.9	94.8
Developing Aisa	4.1	5.7	7.1	10.1	18.4	21.3	24.4	29.3	22.0	26.8	29.0	34.4
Non-G7	57.3	62.4	72.9	80.5	68.7	72.9	83.9	92.6	83.4	85.6	86.9	86.9
Latin America	18.1	19.3	20.7	22.9	30.4	31.2	33.7	36.2	59.5	61.9	61.5	63.4
Eastern Europe	25.4	17.1	19.2	27.5	39.4	37.0	36.0	37.4	64.6	46.1	53.3	73.5
Sub-Sahara Africa	4.3	4.1	4.2	4.8	16.1	16.1	16.4	17.4	27.0	25.4	25.9	27.7
N. Africa & M. East	11.0	12.3	13.7	16.4	21.4	23.1	25.5	28.4	51.3	53.3	53.6	57.7
G7	**69.3**	**75.2**	**84.6**	**92.0**	**80.2**	**84.5**	**92.1**	**97.1**	**86.4**	**89.0**	**91.9**	**94.8**
Canada	69.8	71.0	83.0	91.2	84.3	85.1	94.3	105.9	82.8	83.5	88.0	86.1
France	62.5	66.3	74.8	79.5	72.6	75.7	81.9	85.1	86.0	87.6	91.2	93.3
Germany	61.1	69.1	75.8	80.3	79.9	84.3	89.4	91.3	76.4	82.0	84.8	87.9
Italy	59.5	64.5	70.7	72.2	66.0	67.6	74.4	79.2	90.1	95.4	95.1	91.2
Japan	63.4	70.6	73.3	79.4	80.5	88.5	91.1	95.1	78.8	79.8	80.5	83.4
United Kingdom	58.5	62.9	71.8	82.2	72.4	73.6	82.6	92.1	80.7	85.5	87.0	89.3
United States	81.1	86.5	100.0	109.2	86.0	90.4	100.0	104.5	94.3	95.8	100.0	104.5
DG7	**6.8**	**7.4**	**8.9**	**12.3**	**24.9**	**24.8**	**27.3**	**31.9**	**27.1**	**29.8**	**32.5**	**38.7**
Brazil	19.7	19.9	20.3	22.2	33.8	33.7	34.8	37.4	58.3	58.9	58.5	59.5
China	2.8	4.8	6.9	11.5	17.2	20.7	25.5	33.7	16.1	22.9	26.8	34.2
India	3.0	3.6	4.4	6.1	13.9	15.5	17.1	20.5	21.4	23.3	25.6	29.9
Indonesia	5.0	7.2	7.0	8.6	17.2	20.0	22.9	23.8	29.1	36.1	30.5	36.0
Mexico	22.8	23.2	28.1	30.2	32.3	33.8	38.5	42.5	70.7	68.5	73.1	71.2
Russia	33.5	20.1	22.1	32.6	43.7	40.4	36.9	38.0	76.6	49.9	59.8	85.8
South Korea	25.2	37.7	44.8	57.1	42.0	53.2	56.5	66.0	60.1	70.9	79.4	86.5

Note: The levels for group and the world are averages weighted by population share

Interview ... continued from page 1

2. There is a general consensus that allocation of adequate resources for data gathering needs to be taken within a broader context of international development policies. What is needed to make this a reality? More specifically, what can international development agencies do that is drastically different from the current practice?

Efforts to alleviate poverty, coupled with the efficient allocation of economic resources and the sustainable management of natural resources can be achieved only if there is an adequate picture of reality based on timely and good quality statistical information. Therefore, the fundamental objective of international agencies in the field of statistics should be to support countries in building their technical and institutional capacities aimed at generating the information required for economic, social and environmental policies. While some agencies seek to meet specific and relatively short-term demands, priority should be given to the goals so that national statistical systems can achieve sustainability and improve their ability to meet the different demands of governments and the community.

3. In what way can international organizations use their considerable leverage in influencing national government decisions concerning resource allocations and priorities when it comes to broadening and deepening national statistical information?

It can be done in various ways. For instance, a systematic advocacy for the use of statistical information in "evidence-based policy making" is crucial for inclusive development. When an international organization becomes involved in the design of policies, programs or projects it appears as highly important to promote such approach. It is also vital to emphasize the importance of monitoring and evaluating those actions through the use of good quality and timely data. International organizations should help governments in decision-making based on information. They should also support the strengthening of statistical systems through technical advice, workshops, research, development methodology, training courses, and training of national teams.

4. Where does the ICP fit in the general strategy of building the region's information base?

ICP is –or should be– a program of great importance for the statistical development of Latin America and the Caribbean countries as it requires, and moreover, promotes the enhancing of their technical and institutional capacities in the field of statistics.

ICP can help ECLAC's activities in at least three dimensions. First, the outcomes of the Program offer important information for the analysis of the overall economic situation of the region and for policy formulation. The adequate measurement of real output, of the structure of the economies and of the relative purchasing power of national currencies will help in studying the relative situation of the region's different countries. For example, it helps in establishing appropriate measures for the analysis of productivity and competitiveness. Furthermore, relative poverty is sometimes assessed through the use of the one dollar per capita expressed in purchasing power parities (PPP). National or regional poverty lines (as the ones estimated by ECLAC) could also be compared in real terms using PPP. Secondly, ICP is also a program that stimulates the harmonization of practices and classifications among countries and according to internationally agreed standards. Finally, the program contributes to enhancing the national statistical capabilities, mainly in terms of price collection and national accounts.

5. Can you tell us your experience as a regional implementing agency for the 2005 ICP? What were the major lessons learned and challenges faced?

In addition to being the first region to deliver the results of the 2005 round, the participation of 10 countries in South America was very positive as it made possible the sharing of collective knowledge on national account and consumer price indices' methods. The exercise implied the coordination of the participating countries but also within each country. At the same time, a closer relationship between various national institutions involved in the calculation of PPP was also obtained. It should be stressed that each of the 10 participating countries was always fully aware that its decisions had an impact on the activities of the remaining nine.

The commitment of the participants was very high; it was encouraged by the exchange of experiences with peers and experts, as well as by the dialogue maintained with the Regional Coordination Office for the analysis of data consistency and quality.

There were some initial programming difficulties because the estimate of the project budget was underestimated. Moreover, the program extended far beyond the original date of conclusion. There was also an imbalance between the time and resources devoted to the calculation of the parities of the various components of GDP (food, housing, health, education construction, machinery and equipment, etc.). The data collection and validation process for construction projects and equipment goods was not as rigorous as for consumption goods because of funding shortage. As a result the role national statistical agencies played in these areas was limited. The 2011 round should correct such situations. This will, of course, involve mobilizing adequate resources to permit close collaboration between national and regional agencies.

6. One of the important lessons of the 2005 ICP round was that in general National Account estimates are not as robust as one would like to see, particularly at the disaggregated level whether it is expenditure on housing, household consumption, or capital formation

such as construction. Any follow up action plan with the countries to address this?

It is necessary to take actions to strengthen the national accounts of countries in the region, which is the basis for the weights used in the calculation of PPP. The harmonization of nomenclatures, the updating of base years of national accounts and the harmonization of methods and treatments in the countries of the region are key aspects of such efforts. This will definitely be one of the key areas that needs to be addressed in the 2011 round of ICP. It should be addressed early on in the planning stage. We need to make sure that equal emphasis should be put in national accounts work as in the area of price.

7. The gap between methodological developments and their practical implementations remains significant. The SNA has seen two revisions since 1968-- in 1993 and in 2008. However, on-the-ground implementation of new SNA recommendations lags far behind in developing countries. Can you share your views on what can be done?

Indeed, one of the problems facing Latin America and the Caribbean is the different levels of progress in the process of adopting the 1993 SNA by countries of the region, as well as the obsolete base or reference for national accounts at constant prices.

ECLAC, and in that respect, the whole regional statistical community -- as expressed in the Statistical Conference of the Americas (SCA) -- recognizes the weakness of some basic economic statistics as the main reason why some national accounts figures face quality problems in certain countries. In fact, this is one of the main sources of the difficulties you mentioned in the previous question. The Working Group on National Accounts of SCA, taking into account the Luxembourg Recommendations (May 2008), its own activities and the conclusions of the Latin American Seminar on National Account (October 2008), will elaborate a proposal with a Regional Plan of activities aimed at helping countries to adopt the new 2008 SNA by enhancing their basic economic statistics.

8. The involvement of Statistics Canada as coordinator of ICP in Latin America was the first time that a National Statistical Agency has played such a role in ICP. Can you share your experience?

The experience of a joint coordination with Statistics Canada was very positive; the region could benefit from a process of discussion and sharing experience with the Canadian colleagues involved in the project, both at the stage of defining the specifications, in the collection, validation and analysis of results.

9. Is the same arrangement envisioned or planned for the 2011 round?

ECLAC is willing to coordinate this important global project in the Latin American and Caribbean region. The challenge is obviously enormous, but given the high importance we attach to it, we consider that it would be viable if strategic partnerships with technical agencies, including the Statistics Canada, a key partner, are built. We also require further financial support to help countries with the additional costs derived from the activities of the project. Consequently, contacts have been initiated with the Inter-American Development Bank, the Corporación Andina de Fomento, the British Cooperation, and with subregional integration agencies that could support, either technically and/or financially, the 2011 ICP Round in Latin America and the Caribbean.

10. Central America and the Caribbean islands were not included in the 2005 round despite their expressed interest in being a part of the program. Can you tell us why?

The lack of resources was the main reason that made it impossible to include all the countries of Latin America and the Caribbean in the 2005 round when, as you mentioned, only 10 countries of South America participated.

However, ECLAC is implementing, in cooperation with the Central American Monetary Council, a program of harmonization of the CPI and an exercise in the estimation of PPPs for the countries of Central America, Panama and Dominican Republic, funded by the European Community ("REDIMA II"). The active involvement of central banks and national statistical institutes of the region has been a key factor in advancing the program's activities. Here, we used a scheme similar to the one used in the 2005 round for South American subregion. This exercise revealed the feasibility and necessity of bringing these countries into the next round of ICP.

ECLAC is also implementing a preparatory assistance project to assess the feasibility of Cuba's participation in the ICP. The project is being funded by UNDP-Cuba, with the technical counterpart to the National Statistical Office of Cuba. The Cuban authorities have expressed their interest to get involved in the 2011 Round.

11. What is being done to overcome funding problem not only to bring Central America and the Caribbean into the ICP fold but also to secure adequate resources both at the national and regional level for all participating countries?

ECLAC is considering the inclusion of all Latin American and the Caribbean countries. In the latter case, it has prepared a specific project and is discussing the topic with potential donors. The British Coperation has expressed an interest in the subject. Discussions have been held also with CARICOM to join forces in the region and jointly face the challenge. ■

Braun ... continued from page 1

Even though it can be generalized that it is the poor in developing countries who are the hardest hit by the food and financial crises, the types and size of impacts are radically different across countries, household, and individuals because of different initial conditions and policy responses. Even among the poor, the same people are not necessarily hit by each blow and not in the same fashion. World food prices and their effects are linked in a dynamic system in which sound data, policy analysis, and monitoring have critical roles to play in informing policy design and implementation (Figure 1). Indeed, to help the most vulnerable and develop sustainable solutions to the food and financial crises, it is essential to develop country- and context-specific policies with appropriate prioritization, targeting, and sequencing supported by evidence-based policy research.

The crises have revealed serious gaps in credible and up-to-date information, analysis, and policy monitoring mechanisms in many developing countries. These gaps hampered short-term and strategic responses to food prices, such as protecting the most vulnerable, and for building resilience in the food system. Moreover, in case of a largely food price-driven increase in the CPI– as was the case in many developing countries in 2008-- Central Bank and public finance policies guided by monthly average CPI information, may easily end up in misguided macro-economic policies (i.e., focus on general inflation control, rather than public and private stimulation of food production expansion). Going forward, it is essential that the renewed policy and investment attention placed on agriculture, food, and nutrition is maintained. At the same time, it should be accompanied by much more attention and investment in relevant information, analytical, and monitoring tools. A coordinated approach is also required to facilitate cross-country learning and capacity strengthening.

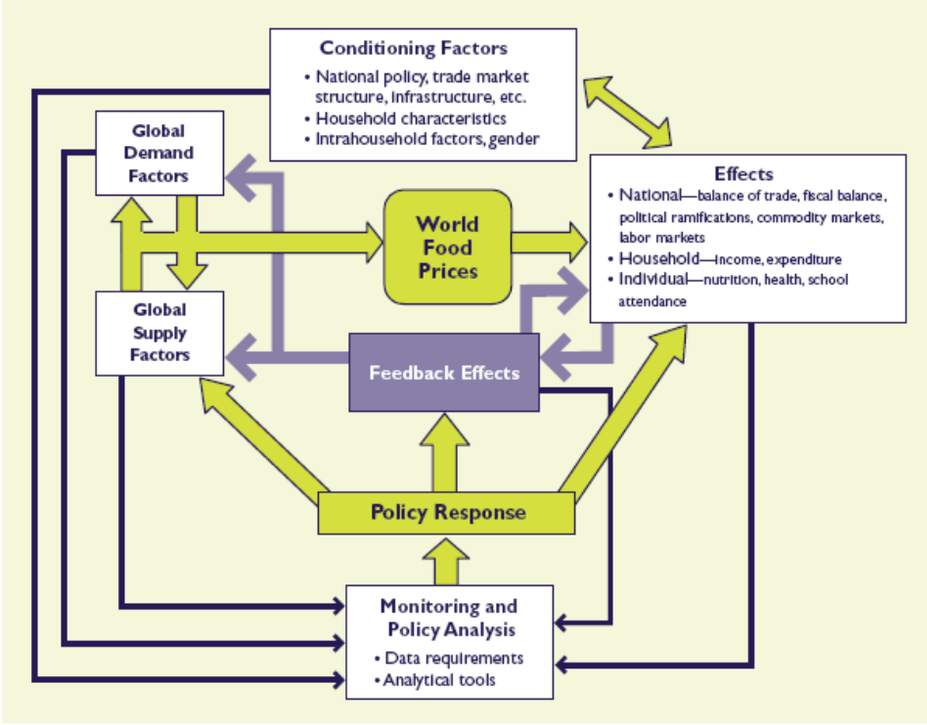

Figure 1 – Conceptual framework
Source: Benson et al. 2008.

1. Diversity of effects at national and household level

The price of almost every agricultural commodity skyrocketed on global markets in 2008. Compared to their levels in the beginning of 2003, rice prices increased five-fold, and wheat and maize prices tripled at their peaks (FAO 2009). The effects of these global food price changes at the national level, however, widely vary depending on local conditioning factors, including national policy, trade market structure, and infrastructure. The transmission of global to local prices depends on a number of factors, including transportation and transaction costs, market efficiency, exchange rate dynamics, and trade controls (tariffs, quotas, etc.). For a country with poor links to global markets and/or high level of protectionism, direct impacts are only limited. Even if global food prices are transmitted to the same degree in different countries, actual effects on labor markets, fiscal balance, external balance, and political activity differ. The additional conditioning factors determining these effects include characteristics of the food economy of the country (e.g., whether the country is a net importer or exporter of food, the importance of subsistence production for the population, the share of food in the consumption baskets of the population) and broader economic and political considerations (e.g., the fiscal impact of high food prices, the capacity for implementing social protection programs, and the degree of political pressure on the government).

Similarly, the nature and the size of effects of local price changes at the household level depend on a number of household characteristics, including whether the household is a net food producer or

consumer, the composition of its expenditure, access to services and assets, and vulnerability due to non-price factors. Net food producers are likely to benefit from high food prices, since the increase in their income will more than compensate for the increase in the food purchased. The majority of the population in developing countries, however, consists of net food consumers and they will be negatively affected. To cope with high prices and their eroding purchasing power, these households reduce the quantity and quality of their diets and cut back on spending for goods and services essential for their wellbeing. For urban poor and landless rural households, these impacts can be especially severe. In addition, effects within the household also vary and depend on intre-household factors, such as access to the household's resources and gender. Indeed, food crises affect women more adversely and for longer period because they more often lack the income and assets that could help them cope with the crisis than men (Quisumbing et al. 2008).

In a situation like this caused by the world food and financial crises, however, linkages between conditioning factors and effects are not one-directional. Countries and households are dynamic systems, and any adjustment of public policy, or private firms, households and individuals can alter the conditioning factors, which would cause second-round effects and further adjustments. Second-round effects could operate in the opposite direction of the initial ones, and advanced analysis is needed to account for the dynamics of the system.

2. Differentiated CPIs by income classes and PPPs for food should become routine

A number of information types and analyses are needed to measure the actual effects of a food crisis on countries and households. Averages across groups mask great diversity and can lead to misguided policies. For basic analysis on the impacts on a country and its citizens, the essential data sets needed include nationally representative household consumption and expenditure surveys; price series for food, agricultural inputs, and fuel from key national and international market places; commodities import and export data in amounts and values, and disaggregated consumer price indices (CPI). Additional data sets include agricultural production estimates, elasticities of supply and demand in response to price changes, use of social services, wage rates, and labor market structure. Detailed data in terms of frequency (monthly and weekly, in addition to annual) and spatial resolution (rural as well as urban areas; regional and district level, in addition to national level) are needed to increase the precision of assessment.

Purchasing power changes drastically and swiftly, especially for the low-income classes, in the context of food price volatility and economic recessions. Therefore data should be further disaggregated to account for the impacts on most vulnerable groups. CPI calculations and PPPs should be routinely divided by income classes and other relevant population characteristics, such as rural and urban. The CPI for low-income groups would reflect the goods important for the consumption baskets of the poor, with food items topping the list. The weight of food in CPI is large in low- and some middle-income countries (Table 1). In a CPI for the poor, these weights would be even higher (i.e., up to 70 percent).

Producing PPPs specifically for food items would be helpful for cross-country comparisons and, if timely available, for guiding international food assistance. As this would be mainly relevant from a poverty perspective, it would seem sufficient to produce PPPs for basic expenditure headings, for example rice, bread, beef, poultry, fish, milk, fruits, potatoes, etc. The general national CPI infrastructure should serve the related data collection, and utilizing the International Comparison Program (ICP) for PPP aggregation and dissemination could be an appropriate way forward. Food PPPs broken down by main expenditure groups would point to the countries where staple foods are the most expensive. A breakdown of food PPPs by income group could point to the countries where food is most expensive for the poor. CPIs and PPPs, however, need to be combined with other relevant data to identify the specific groups of populations the assistance needs to be targeted at.

Table 1: Weight of food in CPI in some developing countries

	%
Bangladesh	58.8
Ethiopia	60.0
Kenya	50.5
Nigeria	63.8
Philippines	46.6
Tajikistan	72.0

Source: National statistical offices.

The methods of analyses to be applied are also crucial for assessing the complex impacts of food crises. Basic analyses, which can be done without advanced skills and applied software, should be available in government institutions with planning and budgeting responsibilities. Such basic analyses include:

- Monitoring of real food prices (world and local) and wages to understand the potential and actual magnitude of the price shocks households face and their ability to cope with them;
- Cross-tabulations of household survey data to develop profiles of population groups identified by likely impact of

continued

global food crisis (by region, poverty status, livelihood, net-seller/net-buyer status, etc.) to derive group-specific CPIs;

- Investigations of food group consumption patterns with household survey data to permit evaluation of the impact of changing food prices on the composition of the diets of various population groups in the country and to derive specific food-related PPPs

Advanced techniques and specialized software are required to more comprehensively analyze the effects of a food price crisis. Such are, for example computable general equilibrium models, which can simulate the impact of global price changes and the policies adopted in response on disaggregated economic growth and poverty. Such models also give the opportunity to gain insights on the fiscal implications of the crisis and the government's responses to it.

3. Monitoring and assessing policy responses

Governments adopted a wide variety of responses to the food crisis, and measures to respond to the financial crisis are in the making. Interventions intended to reduce food prices for consumers (price-oriented polices), increase food production (supply-oriented policies), and increase food availability for or income of target groups (income-oriented policies). Within these broad categories, actually implemented policies and potential policy responses vary widely. While these policies may have favorable impacts, they also have costs and unfavorable effects on different groups. Price-related interventions, for example, might successfully reduce food prices, which would reduce the incomes of net food sellers and the incentives for producers to increase agricultural supply. Price-related interventions also do not provide good targeting of benefits to poor households, and can lead to potentially high costs relative to the improvement in food security achieved. Leakages and spillover effects of interventions may also undermine their effectiveness. For example, export bans may increase contraband in food exports, while changes in public food reserve stocks may be offset by induced changes in private stockholdings. Conditioning factors – political, administrative, and economic – also influence the feasibility and impacts of these policy interventions.

Efficient and adequate response to the food price crisis requires monitoring of the impacts of these various policies – that is collecting data on selected indicators and observing how those indicators change over time. Disaggregated CPIs and food related PPPs are a useful beginning.

However, monitoring alone is not sufficient to inform policymakers what impacts a given policy or program are expected to have (ex ante assessment), are having (assessment during implementation), or have had (ex post assessment). To assess these impacts, one must define the counterfactual or baseline situation against which impacts are to be assessed and use analytical methods to measure the difference in outcomes between the situation with the policy or program being evaluated and the counterfactual situation. Assessing impacts during or after an intervention offers the advantage that the factual situation is observable. The counterfactual situation, however, is not. None of the related methods of impact assessment is free of problems. The best method to use will depend on the type of policy or program being assessed, the time frame and outcomes of interest, the data available for the assessment, the ability to build on prior assessments and models, and the ability of key stakeholders to use and comprehend the method used.

4. High pay-offs from informed policy design and implementation

Access to comprehensive and detailed information on a timely basis is vital to influence and inform policy responses to the current and future global food crises. At the international level, billions of dollars have been mobilized in 2008/09 to respond to the food crisis and at a national level, for instance in India and China, also billions have been added to public expenditures and investments with the intent to address the problem (von Braun 2009). Even small improvements in the goal-oriented utilization of these expenditures guided by improved data would justify relatively large investments in better CPI and PPP information as mentioned above.

Despite many improvements in data monitoring and analysis, many countries currently lack the capacity to provide timely and reliable datasets and carryout moderate and advanced data analyses. Although abundant data are available on food issues, relevant information is often outdated, spotty in coverage, and insufficiently disaggregated to local levels. Even information for basic and essential analysis, such as up-to-date representative income and expenditure surveys are scarce in developing countries. This information gap needs urgent correction as the payoff in better policies is expected to be high. Further, much of the information is collected in an uncoordinated fashion by different international and regional organizations. In some contexts, even when information is available, the principles of freedom of access to information about the vital issues related to food security are not always followed, and public, civil society and corporate actors are not sufficiently informed for sound decision-making in their domains.

Learning from the experiences of other countries, based on sound research, can often help in strengthening data gath-

ering, analysis, and policy monitoring, but mechanisms for doing so are lacking. Co-funding and cooperation among public institutions, foundations, and private enterprises should play an important role in building and advancing the scientific base of developing countries. Meeting the growing needs for information collection, policy analyses, and policy and program monitoring in developing countries require action, both at the national and international level. Coordinated global action is required to obtain needed data to conduct timely analysis for decision-making, and to facilitate cross-country learning and capacity strengthening. ■

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World Bank

Estimation of PPPs for non-benchmark economies for the 2005 ICP round

This note provides a brief explanation on the imputation method used to generate PPP rates at GDP and private consumption level for economies that did not participate in the 2005 ICP round. Although these so-called "non-benchmark" economies account for a relatively small share of the global economy and population, PPPs are needed to estimate poverty rates at the international poverty line and to include them in other cross-country analyses that depend upon real measures of output or consumption.

The imputation of PPPs for non-benchmark countries is not a new issue. In the previous round, the Penn World Tables (PWT) employed a method taking advantage of supplementary post adjustment indexes from three independent sources: the International Civil Service Commission (ICSC), the Employment Conditions Abroad, and the U.S. State Department housing allowance. These are price indexes used to adjust the salaries of expatriate staff stationed in field offices. It is a two-step approach: first, domestic absorption is computed as the sum of consumption, government expenditures, and investment. A set of regressions, depending on data availability, are estimated on the log of the per capita real expenditures of domestic absorption on the log of the nominal expenditures divided by the post-adjustment indexes (both relative to the U.S. values), with dummy variables for the Sub-Saharan African countries and the Central Asian countries. Then this model is used to predict the real per capita domestic absorption for the non-benchmark countries. Using a second set of equations the real shares of consumption, government expenditure, and investment are regressed on the nominal shares and the real per capita domestic absorption. Because the sum of the real shares equal one, the estimated coefficients are constrained. The predicted price levels are the nominal divided by the predicted real values for each component.

The WDI has adopted a different approach. The ICP 2005 final report includes a discussion[1] of the regression model used to impute PPP rates at GDP level established for the previous round and replicated using the 2005 results. Since then a search for better regression model was undertaken and an alternative model is found to yield better estimates. The new model uses the price level index (PLI) as the dependent variable. The PLI is the ratio of a PPP to a corresponding market exchange rate. The PLI with the United States = 100 is modeled as:

$$PLI_i = a + b*X_i + e_i \qquad (1)$$

The explanatory variables include GDP per capita in US$ at market prices, imports as share of GDP, exports as share of GDP, age dependence ratio, dummy variables for Sub-Saharan African economy, OECD economy, island economy, and landlocked developing economy, as well as the interaction terms of GDP per capita and dummy variables. Data mainly come from ICP 2005 and WDI database, supplemented by other official data sources in a small number of cases.

One particular concern is that USA is the base country in the multilateral comparison and by definition its PPPs are always 1 or PLIs are always 100. So it is necessary to add an explicit constraint on the equation (1) to guarantee that the USA is identically 1. This constraint can be written as

$$PLI_{usa} = a + b*X_{usa} \qquad (2)$$

Substitute (2) into (1), the equation becomes:

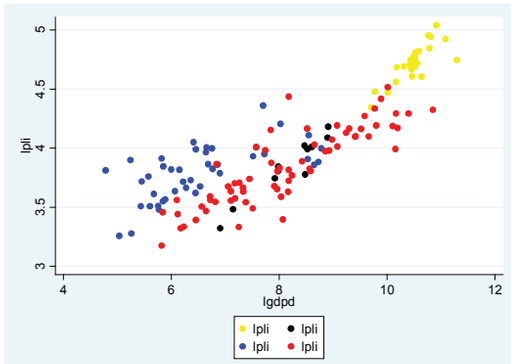
$$PLI_i - PLI_{usa} = b*(X_i - X_{usa}) + e_c \qquad (3)$$

1. *Global Purchasing Power Parities and Real Expenditures*, 2005 International Comparison Program.

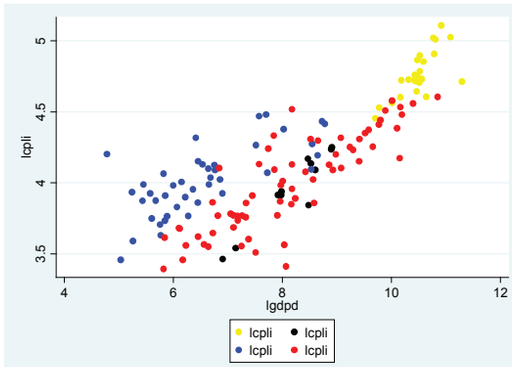
Both dependent variable and explanatory variables are "normalized" by the corresponding values of the United States. In the regression, all continuous variables are in natural log. There are two regressions – one for PLI at GDP level and one for PLI at private consumption level. Two regressions are run together using Zellner's Seemingly Unrelated Regression and the results are presented in the following table.

Figure 1: Price level index increases with GDP per capita in US$

PLI at GDP level



PLI at private consumption level



Color representation: yellow - OECD; blue - Sub-Sahara Africa; black-Latin America and Caribbean; red - all others

Figure 2 below plots residuals against fitted values in each regression and Figure 3 plots imputed PPPs for non-benchmark countries and actual PPPs for benchmark countries against GDP per capita in US$. Figure 4 compares the predicted PPPs with the actual PPPs for benchmark countries using the previous method reported in the ICP final report and using the method presented here. Clearly the average deviations for both PPPs are smaller using the new method. In future work we propose to compare the results presented here with those obtained from the PWT method applied to the new ICP data. ■

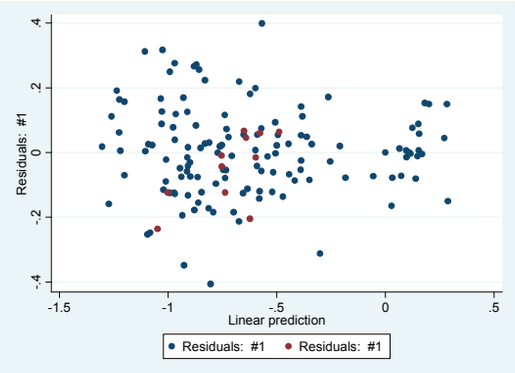
Table 1: Regression results

Dependent variable	Eq #1: PLI at GDP level (N=143)		Eq #2: PLI at private consumption level (N=143)	
	coefficient	standard error	coefficient	Standard error
GDP pc (US$)	0.279	0.008	0.253	0.007
Export as % of GDP	-0.102	0.017		
Imports as % of GDP	0.071	0.022		
Age dependency ratio	0.348	0.076	0.384	0.079
GDP pc (US$) * SSA dummy	-0.083	0.022	-0.056	0.022
GDP pc (US$) * island economy dummy	-0.063	0.026	-0.049	0.027
GDP pc (US$) * landlocked developing economy dummy			-0.011	0.005
OECD dummy	0.238	0.030	0.210	0.030
SSA dummy	0.733	0.158	0.603	0.163
island economy dummy	0.633	0.223	0.556	0.232
landlocked developing economy dummy	-0.071	0.032		
Regression summary[1]	R^2	RMSE	R^2	RMSE
	0.969	0.135	0.948	0.143

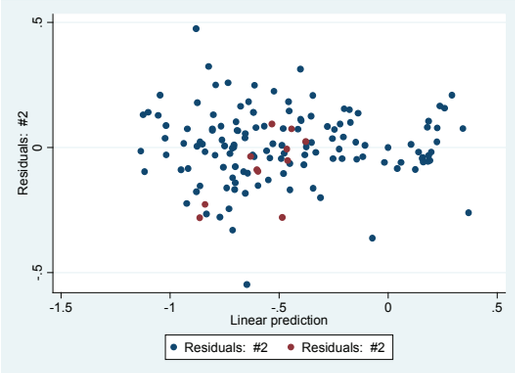
continued

Figure 2: Residuals against predicted values

Eq #1



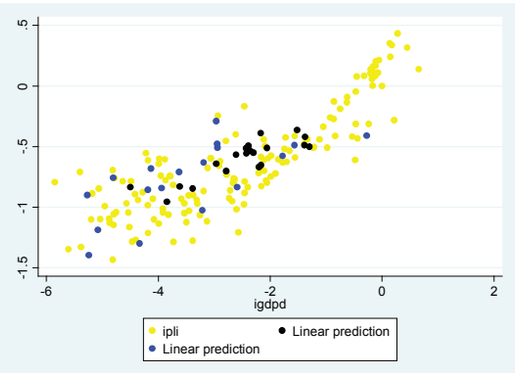
Eq #2



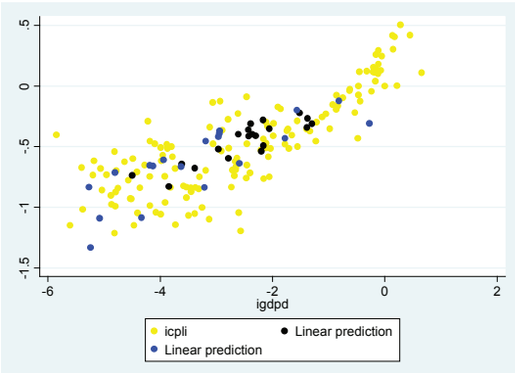
Color representation: brown –Latin America and Caribbean; blue – all other countries

Figure 3: Imputed and actual PPPs against GDP per capita in US$

PPP at GDP level



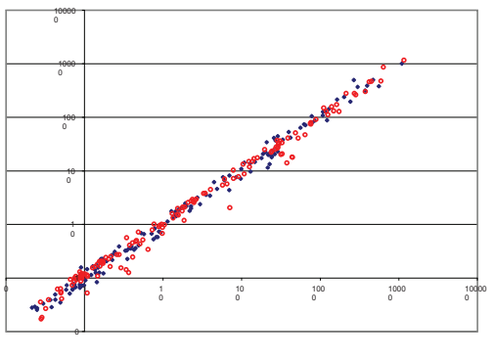
PPP at private consumption level



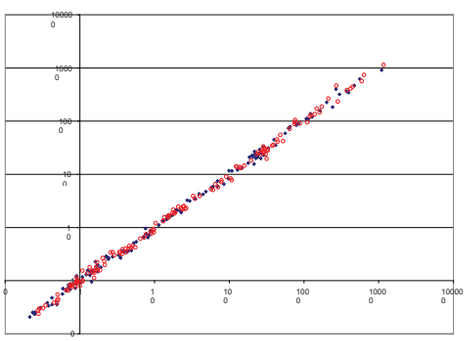
Color representation: yellow - ICP benchmark countries; blue - non-benchmark countries in Latin America and Caribbean; black – other non-benchmark countries

Figure 4: Imputed PPP against actual PPPs

old method



new method



Color representation: blue – PPP at GDP level; red- PPP at private consumption level

Table 2: Imputed PPP estimates for non-benchmark economies

Country	Region	Exchange Rate (LCU/ US$)	PPP for GDP (LCU/PPP$)	PPP for private consumption (LCU/PPP$)
United Arab Emirates		3.672	2.438	2.696
Bahamas, The		1.000		0.886
Micronesia, Fed. Sts.	EAP	1.000	0.748	0.658
Kiribati	EAP	1.310	0.662	0.678
Myanmar	EAP	5.761	1.426	1.521
Papua New Guinea	EAP	3.102	1.336	1.687
Solomon Islands	EAP	7.530	3.201	3.920
Timor-Leste	EAP	1.000	0.469	0.490
Tonga	EAP	1.943	1.205	1.312
Vanuatu	EAP	109.25	58.13	69.37
Samoa	EAP	2.710	1.628	1.874
Turkmenistan	ECA	11022.1	3950.3	4768.8
Uzbekistan	ECA	1112.9	304.1	376.1
Antigua and Barbuda	LAC	2.700	1.774	2.068
Belize	LAC	2.000	1.222	1.465
Barbados	LAC	2.011	1.237	1.431
Costa Rica	LAC	477.8	244.8	279.0
Dominica	LAC	2.700	1.558	1.791
Dominican Republic	LAC	30.409	17.256	20.396
Grenada	LAC	2.700	1.827	2.043
Guatemala	LAC	7.634	4.022	4.540
Guyana	LAC	199.88	87.11	105.17
Honduras	LAC	19.000	8.151	9.662
Haiti	LAC	40.450	17.569	19.365
Jamaica	LAC	62.281	37.290	43.362
St. Kitts and Nevis	LAC	2.700	1.876	2.161
St. Lucia	LAC	2.700	1.619	1.898
Nicaragua	LAC	16.733	6.435	7.297
Panama	LAC	1.000	0.521	0.611
El Salvador	LAC	8.750	4.335	4.812
Suriname	LAC	2.732	1.601	1.834
Trinidad and Tobago	LAC	6.300	3.816	4.614
St. Vincent and the Grenadines	LAC	2.700	1.547	1.783
Algeria	MNA	73.276	31.807	38.739
Libya	MNA	1.308	0.735	0.850
West Bank and Gaza	MNA	4.490	2.207	2.310
Afghanistan	SAS	49.680	15.132	16.710
Eritrea	SSA	15.500	6.312	6.734
Seychelles	SSA	5.500	3.379	4.499

1 Both regressions exclude constant term as the equation (3) indicates. The same regressions are run with constant terms and a joint test on both constant terms being zero gives chi-=squared (2) =6.16.

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Measuring China's International Relative Prices

1. Introduction

China's development over the past 25 years has had profound effects on the patterns of international trade, in particular, and on the world economy, in general. Some of these effects are being quantified, and the ongoing work has required the development of new tools for measuring their magnitude. For example, Thomas et al. (2008) showed that changes in the trade patterns between industrial countries and China have required us to alter how we measure such fundamental concepts as the real exchange rate. However, just as it is now recognized that we need to use new measures to fully capture the channels by which emerging market economies interact with industrial economies, it is also becoming clear that we need better data to implement these measures. This paper uses the new data from the World Bank's World Development Indicators (WDI) to measure China's prices relative to its trading partners. These data incorporate the 2005 International Comparison Program (ICP) benchmark for purchasing power parities, and in addition to incorporating methodological improvements, they are the first to include actual price observations for China.[1]

These improvements allow this paper to make three contributions to the large literature on international price comparisons.[2] First, we measure Chinese bilateral relative price levels, as opposed to bilateral relative price indexes. Second, we use a geometric weighted average of relative prices (WARP) to retain the information embodied in those levels. Third, we compare the prices from the ICP's 2005 benchmark to the prices from the Penn World Tables (PWT), benchmark 6.2;[3] this comparison allows us to assess the practical benefits of the methodological advances in the ICP. Finally, we compare our estimate of Chinese international relative prices to existing real effective exchange rate indexes (REERs).

Our analysis leads to several findings of interest. First, China's prices are significantly below the average of prices of its trading partners. Indeed, by 2007, Chinese international relative prices were about half of the average of its trading partners' prices. Second, the choice of weighting scheme used to aggregate prices matters. For example, the measure of China's international relative prices using China's bilateral import shares is above the corresponding measure using China's bilateral export shares. Third, China's international prices based on the WDI are above those from the Penn World Tables 6.2 by an average of 56 percent. Finally, the recent evolution of Chinese international relative prices as estimated by WARP is quite different from what is reflected in existing REERs. Since 2001, the WARP increases steadily, meaning that China's real exchange rate has been appreciating. In contrast, the REERs have declined, suggesting the opposite.

** The views in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System.*

1. See Chen and Ravallion (2008), appendix G of World Bank (2008), and Deaton and Heston (2008).

2. For a recent review, see Chinn (2005).

3. For details on PWT, see Heston, Summers, and Aten (2006). For an introduction, see Summers and Heston (1991) and Gulde and Schulze-Ghattas (1993).

2. International Relative Prices

2.1 The WARP

Suppose, for expository ease only, that we have the foreign-currency price of a basket of goods in a foreign country i (call it P_i), and that we also have the yuan price of the same basket in China (call it P_{ch}). As shown in equation (1) below, by multiplying the ratio of these prices by the market exchange rate, $E_{\frac{i}{ch}}$, we define China's bilateral relative price with respect to the ith country, q_i as

$$q_i = \frac{P_{ch}}{P_i} \cdot E_{i/ch} = \frac{E_{\frac{i}{ch}}}{PPP_{\frac{i}{ch}}} \quad (1)$$

where $PPP_{\frac{i}{ch}}$ is the PPP exchange rate for China with respect to the ith country. Note that q_i differs importantly from the price indexes commonly used in macroeconomics. Specifically, a value of 0.5 for q_i means that the basket of Chinese products is half as expensive as the basket in the ith country. Section 3 below describes the measurement of q_i.

To measure the ratio of China's prices to the average of prices of its trading partners, we use a geometric mean of bilateral relative prices:

$$Q_t^g = \prod_{i=1}^{N} (q_{it})^{w_{it}} \quad (2)$$

where Q_t^g is the WARP for China and w_{it} is the time-varying trade weight associated with the ith country. To determine N, we focus on the 34 countries included in the broad measure of the Federal Reserve's real effective value of the dollar (Leahy, 1998). Significantly, Q_t^g retains the information embodied in the bilateral relative prices that it aggregates: for instance, a value of 0.5 for Q_t^g means that Chinese prices are half the average of foreign prices. An increase in Q_t^g means a real appreciation of China's currency.

An important property of Q_t^g is that it can change even if all bilateral relative prices are fixed. Specifically, logarithmic differentiation of equation (2), treating relative prices as fixed, yields

$$dlnQ_t^g = \sum_i dw_{it} \cdot \ln(q_i) \quad (3)$$

which captures the interaction between the distribution of bilateral relative prices and changes in the structure of trade.

2.2 Real Effective Exchange Rate Indexes

A common alternative to Q_t^g is the real effective exchange rate (REER) index. This index is designed to reflect how much, on average, Chinese prices have changed relative to the prices of its trading partners. Existing REERs are, generally, based on chained aggregation of bilateral CPI-adjusted exchange-rate indexes. For example, the BIS REER is

$$\frac{Q_t^{bis}}{Q_{t-1}^{bis}} = \prod_{i=1}^{N_{bis}} \left(\frac{r_{it}^{bis}}{r_{i,t-1}^{bis}} \right)^{w_{it}^{bis}} \quad (4)$$

where r_{it}^{bis} is the BIS' bilateral CPI-adjusted exchange-rate index; w_{it}^{bis} and N_{bis} are the associated weight and number of countries (see Klau and Fung, 2006). The IMF uses a geometric mean of indexes:

$$Q_t^{imf} = \prod_{i=1}^{N_{imf}} \left(r_{it}^{imf} \right)^{w_i^{imf}} \quad (5)$$

where r_{it}^{imf} is the IMF's bilateral CPI-adjusted exchange-rate index; w_i^{imf} and N_{imf} are the associated weight and number of countries (see Zanello and Desruelle, 1997).

By convention, $Q_{t=base}^{bis}$ and $Q_{t=base}^{imf}$ are set equal to 100 in a given base period and the level of the index for all other periods is defined recursively. Note that, unlike Q_t^g, if relative prices are constant, then Q_t^{bis} and Q_t^{imf} will not change. In the case of Q_t^{bis}, this is due to the chained aggregation. For Q_t^{imf}, this result comes from that fact that, although it uses the same method of aggregation as Q_t^g, it does not use time-varying weights, so $dw_{it} = 0$ in all periods.

3. Implementation

The first step in implementing our measure is to obtain data for the bilateral relative prices--the q's. The previous discussion assumed, for expository convenience, the availability of data for the price levels of the foreign and domestic baskets. Yet, data for bilateral relative prices are particularly difficult to obtain because they require comparability of products across countries. To this end, the 2005 ICP benchmarks enhanced the comparability of products through the use of "Structured Product Descriptions," which is a list of attributes determining the price of a product (World Bank, 2008, p. 142).

continued

For reasons of data availability, we estimate q_i using the ratio of two U.S. bilateral relative prices:

$$q_i = \frac{P_{ch}}{P_i} \cdot E_{i/ch} = \frac{\frac{P_{us}}{P_i} \cdot E_{i/\$}}{\frac{P_{us}}{P_{ch}} \cdot E_{ch/\$}} = \frac{q_{us.i}}{q_{us.ch}} \quad (6)$$

where we estimate $q_{us.i}$ using the WDI data for (GDP) purchasing power parities. The usefulness of equation (6) rests on the fact that the WDI's estimates of PPPs are constructed relative to a set of world prices, rather than the prices in any one country, and are invariant to the choice of numeraire currency. Because the WDI data are annual, we apply the method developed by Thomas et al. (2008) to estimate the associated quarterly observations; the constraint that we impose is that the average of quarterly parities for a given year must be equal to the annual parity for that year.

For weights, we follow the scheme adopted by the broad measure of the Federal Reserve's dollar index (Leahy, 1998). Specifically, the un-normalized broad weight for a given country is $w_{it} = 0.5 \cdot \mu_{it} + 0.25\xi_{it} + 0.25\varsigma_{it}$, where μ_{it} is the share of imports from the ith country; ξ_{it} is the export share to the ith country; and ς_{it} is the extent to which exports to the ith country compete with exports from other countries; the normalized broad weight for the ith country is $w_{it} = \frac{w_{it}}{\sum_i w_{it}}$. We use data from the IMF's Direction of Trade Statistics.

4. Results

Bilateral Relative Prices The top panel of Figure 1 shows Chinese bilateral relative prices from 1980 to 2007 for selected countries. As one may expect, China's prices are below the prices of most countries, as reflected in values of q well below one. Chinese relative prices with respect to industrial countries have, since 2000, been concentrated around 0.4. In other words, the price of the Chinese GDP basket is four-tenths the price of the comparable basket in industrial countries. However, China is not the country with the lowest prices in the world: Chinese prices are above Indian prices, as reflected in a value of q above one.

The bottom panel shows the bilateral weights for China from 1980 to 2007 for selected countries. The weight for Japan, which was the largest until 1995, has declined steadily since 1980. The weight for the United States, which is now the largest, has been fairly constant. The weight for South Korea has increased from virtually zero in the 1980s to nearly eight percent by 2007, suggesting that Korea is now an important trading partner for China.

WARP Figure 2 shows our estimate of Q^g, using various weighting schemes. The thick line is the WARP with broad weights. The calculations indicate that China's prices are well below the average of foreign prices, as reflected in $Q^g < 1$. Further, Q_t^g shows steady and pronounced declines from 1980 to 1994 followed by steady but moderate increases. By 2007, Chinese international relative prices were about half of the average of its trading partners' prices. The figure also shows that Q^g is sensitive to the choice of weights. Specifically, the aggregate of relative prices based on export weights, the thin line, is generally below the aggregate of relative prices based on import weights, the dashed line. The resulting gap in these measures is consistent with what one might expect from economic theory. Indeed, the gap indicates that China tends to buy products from the relatively low-price trading partners, hence the higher Q^g, and to sell products to countries that have a relatively high price, hence the lower Q^g.

WARP and Data Vintages We now ask whether improvements in the collection of price data obtained in the ICP's 2005 benchmark alter the prevailing understanding of China's international relative prices. This question is relevant because until 2005, China had not participated in ICP rounds. As Deaton and Heston (2008) note, previous price data for China were based on partial information and short-cut methods. We begin by comparing China's bilateral relative prices from the WDI to those from the Penn World Tables (PWT6.2), which represented the state of knowledge prior to the 2005 ICP round. We want to emphasize that, at this point, the WDI and PWT are out of sync, as the WDI data have incorporated the recent survey information from several countries, whereas the revised prices from PWT have not yet been released. As Deaton and Heston (2008) note, PWT release 7.0 will incorporate the new price data.

The top panels of Figure 3 show that the bilateral prices from PWT6.2 are generally lower than the bilateral prices from WDI. For example, Chinese prices relative to prices in industrial countries (Canada, Germany, Japan) with WDI data are about twice as high as those from PWT data. One possible explanation, as Deaton and Heston (2008, p. 20) argue, is that the use of the Structured Product Descriptions to enhance product comparability across countries might have led the ICP to oversample prices of products that are sold in urban, high-end outlets. Indeed, the prices for China were collected in 11 cities and did not include prices from rural areas (Deaton and Heston, 2008, p. 22).

With these considerations in mind, the bottom panel shows our estimates of Q^g using both the WDI and the PWT data; these aggregates are calculated using the same weights. The cal-

culations reveal that, regardless of data source, China's prices are below the average of foreign prices, as reflected in Q^g being below 1 for the two data sources. The results also indicate that the aggregate of Chinese international relative prices is, on average, 50 percent higher with WDI data than with the PWT data. The profile of the two series is, however, quite similar: sustained declines from 1980 to 1994, followed by moderate increases. Thus, by 2007, Chinese prices are half of world prices if one uses WDI but a third if one uses PWT.

WARP and REERs Figure 4 (see page 42) compares our aggregate of international relative prices to real effective exchange rates indexes from the BIS and the IMF; the comparison starts in 1994 because that is the start date of the BIS data. Despite their methodological differences, all three measures tend to move together through 2001. Since then, however, Q^g rises steadily (real appreciation), whereas the REERs from both the IMF and the BIS decline (real depreciation) through 2003, stabilizing afterwards. By 2007, the gap between Q^g and the REERs is 30 percent.

How could the WARP increase when the REERs are declining? There are several explanations for the difference: aggregation methods, composition of baskets, and country coverage. We will focus on the first two explanations.

To assess the empirical importance of aggregation methods, we construct a chained aggregate using the WDI bilateral relative prices. Effectively, we replace the r_i's in equation (4) with the q_i's so as to control for the choice of price measure. The thin solid line shows that the chained aggregate q_i's is fairly stable after 2001, and below Q^g. This finding indicates that the interaction term is boosting the growth rate of Q_t^g relative to the growth rate of a chained aggregate using the same q's. Intuitively, $\sum_i dw_{it} \cdot \ln(q_i) > 0$ because emerging-market economies, such as Mexico and Korea, have the lowest prices (the largest q's) and have seen their trade share increasing, $dw_{it} > 0$.

The difference between geometric and chained aggregation explains, however, only about one-third of the gap between Q^g and the REERs, suggesting that differences in the measures of relative prices might be relevant in accounting for the rest of the gap. Specifically, the basket used for q_{it} refers to GDP items and thus includes domestic consumption, domestic investment, government purchases, and exports, whereas the basket used for r_{it} is limited to consumption items both from domestic and foreign sources. So the question is whether the differences between the GDP and CPI baskets might contribute to an explanation of why Q^g grows whereas the REERs decline during 2002-2003.

To examine this question, we use IMF data and compute average annual growth rates for the CPI and the GDP deflator for China and its two largest trading partners, Japan and the United States. The table below reports the results.

Average Inflation Rates: 2002-2003 (percent, annual rates)

	CPI	GDP Deflator
China	0.2	2.1
Japan	-0.6	-1.6
United States	1.9	1.9

Source: IMF

For China, the growth rate of the GDP deflator is well above the CPI inflation. Hence using China's GDP prices instead of consumer prices boosts the growth rate of the numerator of q_i. (see eq. 1) for all of the countries and hence raises the growth rate of Q^g (see eq. 2). For Japan, GDP prices fall at more than twice the rate of the fall of the CPI. Thus using GDP prices for Japan lowers the denominator of q_i, boosting the growth rates of both q_{japan} and Q^g. For the United States, the choice of CPI versus GDP prices has little effect on q_i. These calculations suggest that the gap between Q^g and the REERs owes importantly to the use of the GDP basket for measuring prices.

5. Conclusions

In this paper we assemble a measure of international relative prices to gauge the average amount by which prices in China differ from those of its trading partners. Our estimated weighted average of relative prices (WARP) uses the significantly revised PPPs embodied in the price data from the World Development Indicators. We find that data revisions are important for WARP because of its reliance on relative price levels. Specifically, the revisions embodied in the WDI price data generally raise the estimate of China's international relative prices. Thus, the ongoing efforts by the World Bank's International Comparison Program are central to an understanding of China's role in the world economy. We also find important divergences between the WARP and real effective exchange-rate indexes. We do not interpret these divergences as a call to abandon existing effective exchange-rate indexes. Rather, we interpret those divergences as an opportunity for WARP to complement the information in those indexes, a role that is likely to be present so long as changes in the pattern of trade continue. ■

continued

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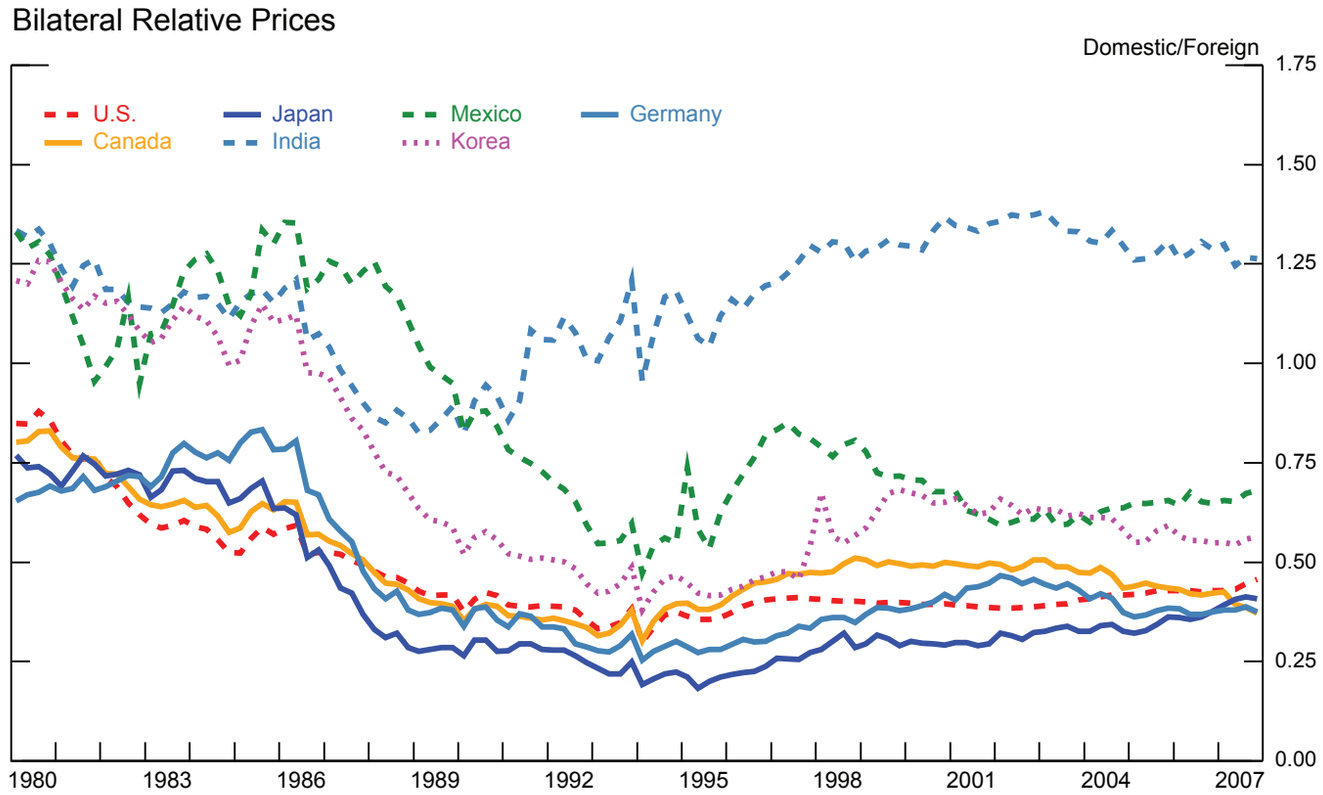
Figure 1: Bilateral Relative Prices and Trade Weights: China -- 1980 -2007, Selected Trading Partners



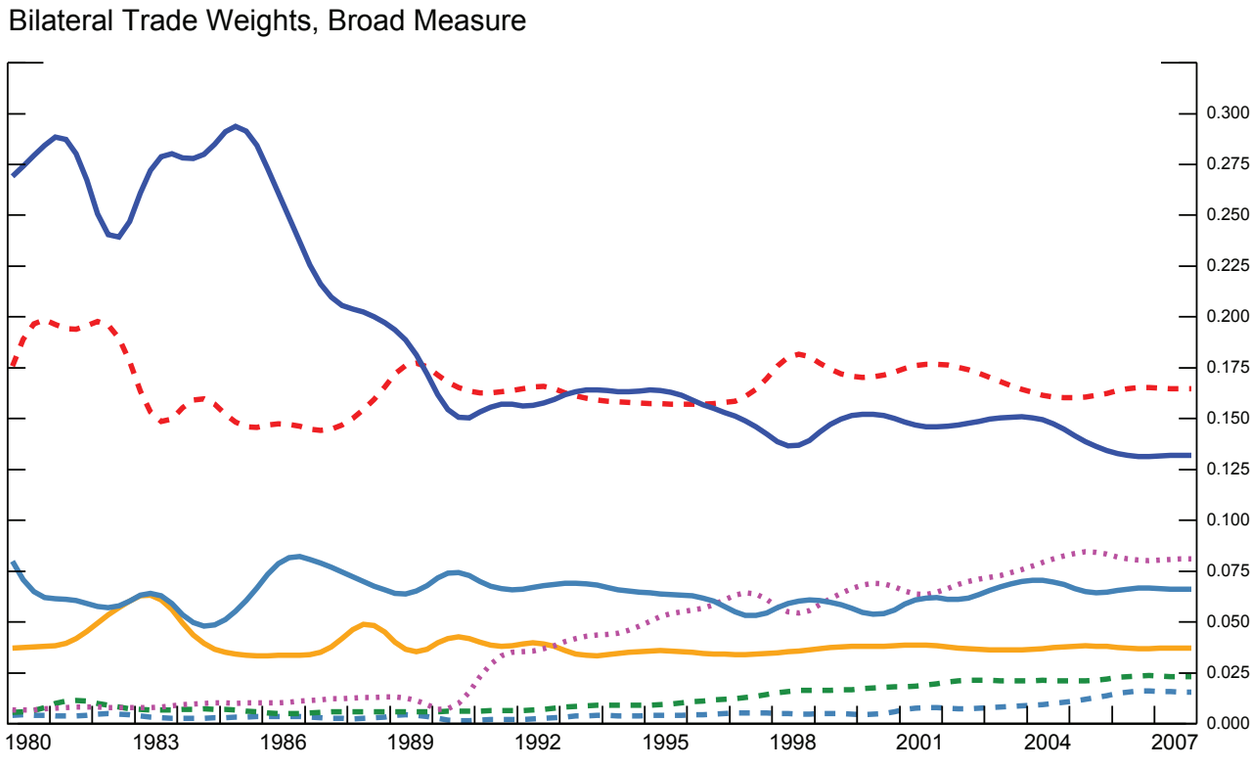


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Figure 2: WARP for China: Sensitivity to Weighting Scheme -- 1980 - 2007

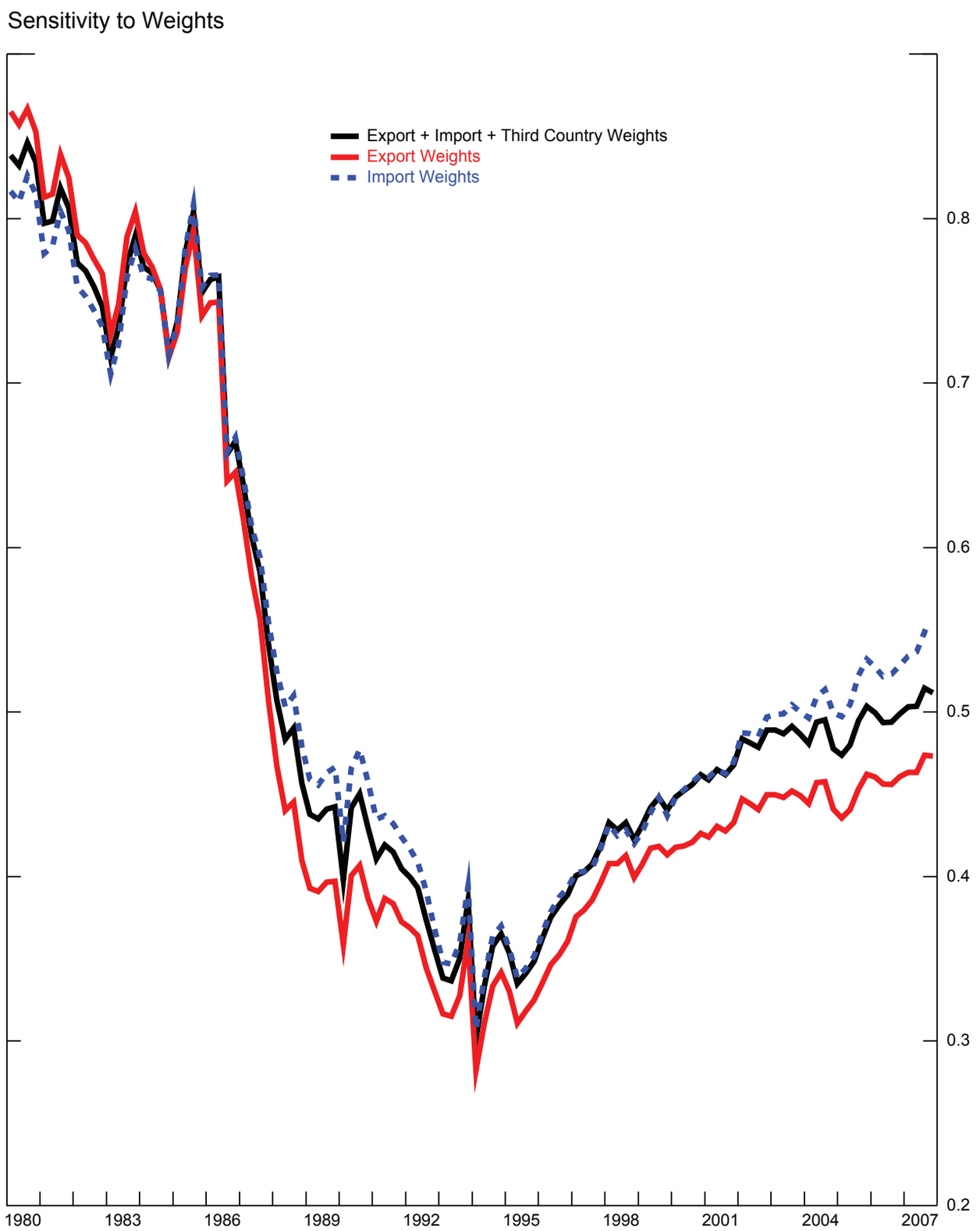
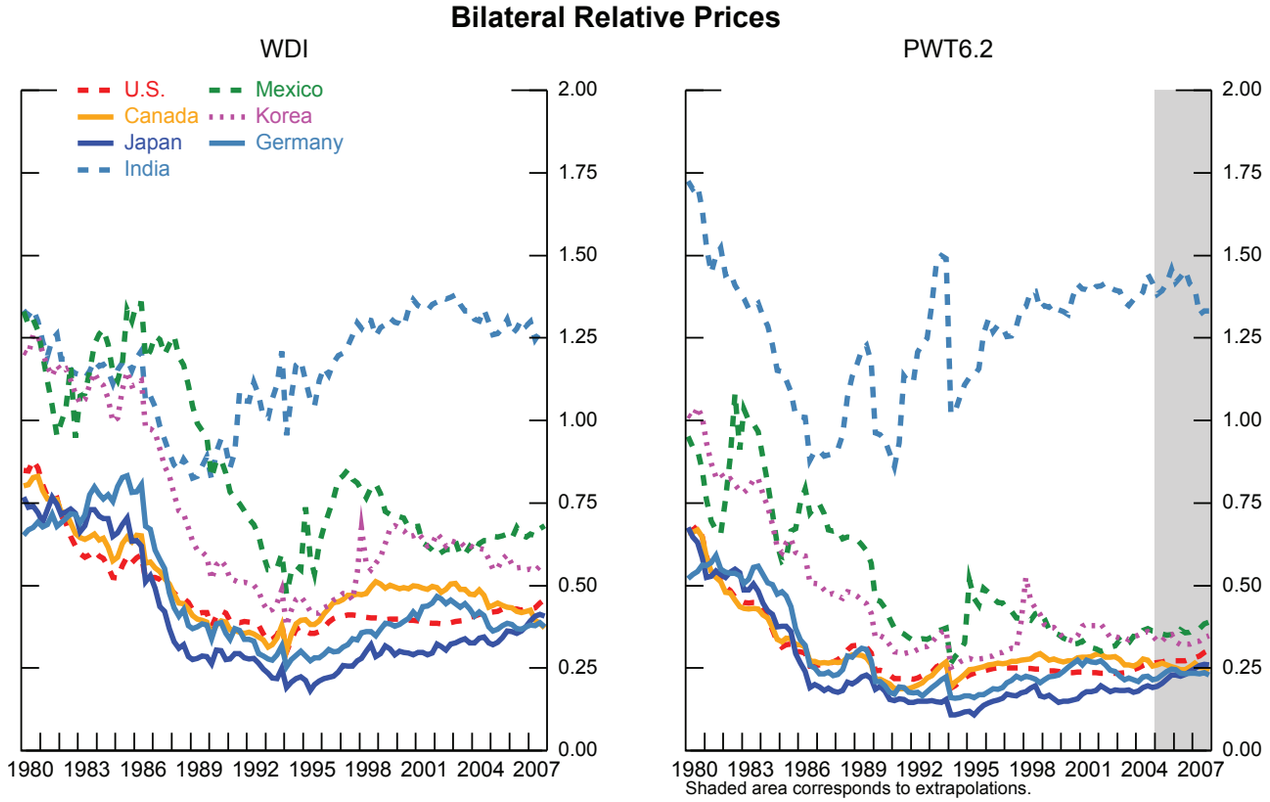
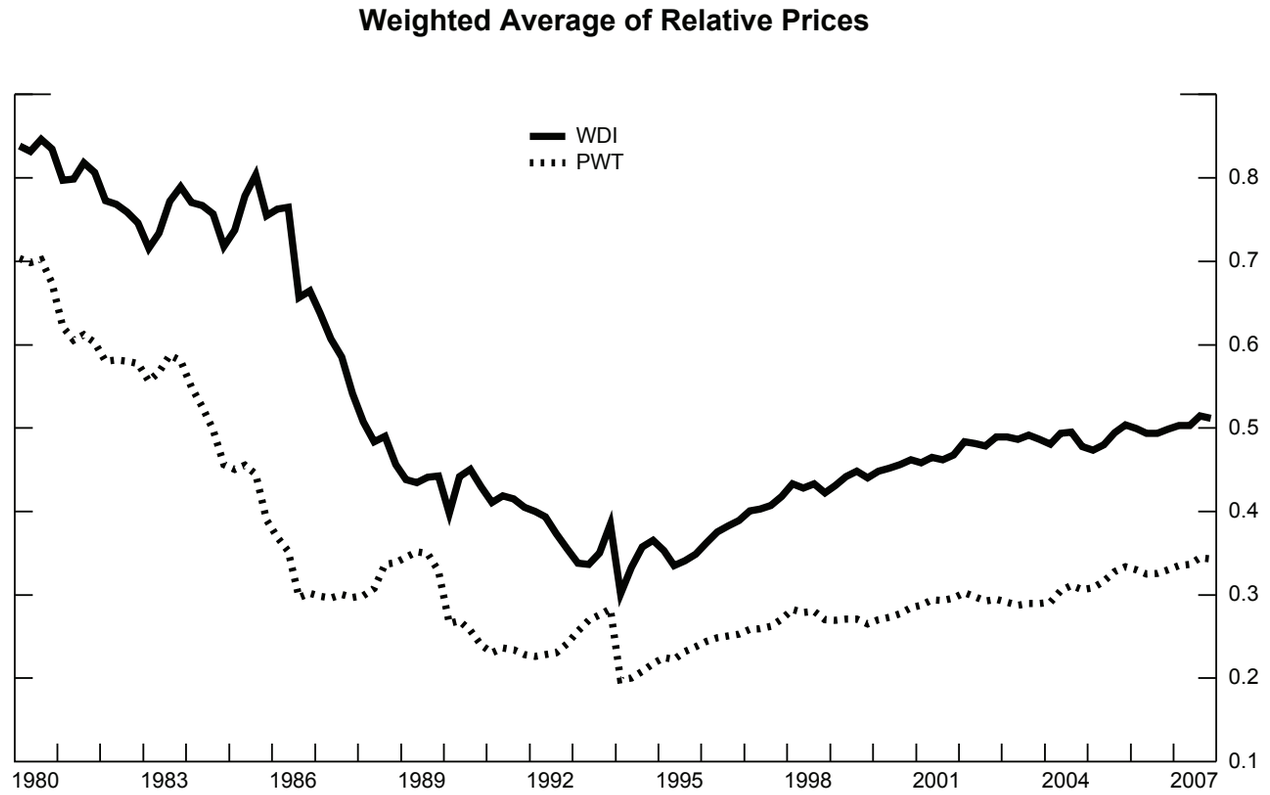


Figure 3: Chinese Bilateral Relative Prices from WDI and PWT --1980-2007, Selected Trading Partners





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An Application of ICP to the Marketing of International Tourism in Africa

Introduction

The International Comparison Program has traditionally been applied to the public sector for macroeconomic policies and decision-making. Theoretically, however, its use could be extended into the private sector, such as marketing of international tourism. Several reasons could be advanced about why tourists prefer one country over the other. However, evidence abounds that international travelers are sensitive to price of tourism in a foreign country (Crouch, 1992, and 1994a; Edwards, 1995). As noted by Dwyer, Forsyth, and Rao, (2001, p.2), "The competitiveness of an industry is a critical determinant of how well it performs in world market." In view of this fact, it becomes very important to study the price competitiveness of some African countries, especially as several of them look up to international tourism as a major foreign exchange earner for their economic development (Brown, 2000; Dieke, 1991; Gray, 2000). The challenge now is how to cost, or put a price, on living as a tourist in a foreign country? Given that African countries, like other countries of the world, differ in their currencies, rate of inflation, and quality of products, how could cost of tourism in different African nations be made comparable? Which African nations lead, and which ones lag behind with respect to price competitiveness in international tourism? Answers to these questions, which form the focus of this paper, are very important to national tourism development agencies, travel organizations, and charter airlines in their marketing of international tourism in Africa.

Using the results of the 2005 ICP, comparative prices of international tourism in Africa are analyzed by sectors and by sources of change over time. Right from its inception in development economics in the 1960's, the main objective of the ICP has been to assess comparability of expenditure data across countries. For this reason, it has found useful applications also in marketing (e.g., Oyewole, 1998). ICP compares the national accounts of countries using common currency terms based on purchasing power parity (PPP), rather than exchange rates. PPP is defined as "the number of units of a country's currency required to purchase the same amounts of goods and services as, say, one US dollar would buy in the United States" (World Bank, 1993). Several techniques exist for computing the PPP, such as the EKS, Geary-Khamis, and the Product-based methods. Detailed discussion of these techniques is beyond the scope of this paper (interested readers should consult Kravis et al. 1975; and Kravis, Heston, and Summers 1982). The present study provides a rank order of African countries according to their relative prices of the international tourism basket. The rank order could become a reference tool for use in other research on international tourism marketing in Africa. Several promotional strategies and national policy initiatives for international tourism development could be based on the results of this research as discussed below.

Data Source and Methodology

The data for this study were obtained from the Development Data Group (DECDG) of the World Bank, the World Development Indicators (World Bank 2008), various issues of the Yearbook of Tourism Statistics of the World Tourism Organization, as well as Oyewole (2004). Goods and services that are usually consumed by tourists were selected from the list of products and services in the World Bank's ICP data book. They include: (i) food, (ii) beverages, (iii) tobacco, (iv) purchased transport, (v) equipment for recreation, (vi) services for recreation, (vii) restaurant services, and (vii) accom-

modation in form of hotels, motels, etc. "Food" includes the following subcategories: bread and cereals; meat; fish; milk, cheese and eggs; oils and fats; fruits, vegetables and tubers; and other foods such as coffee, tea, cocoa, sugar, sweets, and spices. "Beverages" include both alcoholic and non-alcoholic beverages such as liquors and spirits, wine, cider, and beer. "Purchased transport" include local transport, such as taxis, buses, trams and the like; as well as long distance transport within the country, such as road, rail, and air transportation. "Equipment for recreation" includes radios, televisions, phonographs, musical instruments, camera, VCR, semi- and non-durable goods, as well as repairs of equipment and accessories. "Services for recreation" include public forms of entertainment, such as cinema, theatre, sports ground, television and radio licenses, hire of equipment, as well as religious and cultural performances. "Accommodation" includes hotels, motels, and other forms of public lodgings (World Bank, 1993). All these goods and services were then aggregated up to form a total tourism basket using the expenditure data of each of the eight components above as weights. Inbound/outbound transportation cost was not included because of the wide variability in cost of travel between countries (Uysal and Crompton, 1984). As pointed out by Qiu and Zhang (1995, p.45), this variability is due to an array of reasons, which include: "different classes of travel, different carriers, specials, different fee structures for advanced booking, chartered versus scheduled service, and different ports of exit and entrance into nations." Adding to all these are different modes of travel - rail, road, air, and sea.

Following Dwyer, Forsyth, and Rao (2001), the Price Competitiveness Index for a given country i, was computed as follows:

$$PCI_i = \frac{PPP_i}{ER_i} x100$$

Where:

PCI_i = Price competitiveness index for country i

PPP_i = Purchasing power parity of country i

ER_i = Exchange rate in country i

Different types of PCI could be computed depending upon the composition of the PPP's (i.e., the goods and services whose PPP's are retained). For the purpose of this paper, tourism price competitiveness index (TPCI) is the type of PCI that was computed. To obtain the TPCI's, the PPP's of the items in the total tourism basket described above were used in computing the PCI's. Then, all the PCI's were rebased (or standardized) with Africa region =100. This allows comparability of the TPCI's.

Results and Discussion

Table 1 shows the TPCI for total international tourism basket and its components: food, beverages, tobacco, purchased transport, equipment for recreation, services for recreation, restaurants and hotels, etc. Countries are listed in alphabetical order. The entries indicate each country's price competitiveness relative to Africa region (=100).

Hence, each country could be compared with any other African country in the table. The smaller the figure for a country, the more relatively competitive is the country.

Looking at the figures in general, Egypt tends to be the most price competitive country in Africa as an international tourism destination (see Table 1). Each one of its indices is less than 90, and some are even less than 20, as in the case of hotels (19.47), and purchased transport (16.79)! Ethiopia also tends to have strong price competitiveness overall. All of its indices are less than 90. On the other hand, Gabon tends to be the least price competitive tourism destination. All its price competitive indices, except one, are above 120. Four of them are even more than 150, as in the case of purchased transport (150.65), restaurants (153.72), tourism services (150.56), and equipment for recreation (193.24)! Botswana is also equally weak. All of its indices, except beverages, are above 110. Four of them are even larger than 140, as in the case tourism services (164.79), services for recreation (172.85), purchased transport (194.63), and total tourism basket (142.84)! Other countries have varying indices as shown in Table 1.

Ranking of the Tourism Price Competitive Index

For a more thorough evaluation of the competitiveness of the African countries in this study, a ranking of the TPCI's was made based on each of the components of the international tourism basket. In addition to the eight main components, two averages were computed: (i) Tourism Goods-- made up of food, beverages, tobacco, and equipment for recreation; and (ii) Tourism Services-- made up of purchased transport, restaurant/cafe, hotel/motel, and services for recreation. These two averages were ranked along with the eight main components, and the Total Tourism Basket.

The most competitive country in the food component is Uganda, followed by Rwanda and Egypt. These top three countries have food indices all below 60. On the other hand, Chad, Angola, and Malawi are the least competitive on food with indices all above 140. In the case of beverages, Madagascar, Rwanda, and Egypt are the most competitive, in that order, with their beverages indices all be-

continued

TABLE 1: African ICP: Tourism Price Competitiveness Index 2005 (Africa Region = 100)

	Country	Food	Beverages	Tobacco	Purchased Transport	Equipment for Recreation	Services for Recreation	Restaurants, Cafes etc.	Hotels, Motels, etc.	Tourism Goods	Tourism Services	Total Tourism Basket
1	Angola	147.81	116.28	72.35	257.74	171.39	215.05	183.39	..	152.20	228.15	161.89
2	Benin	108.22	98.86	57.07	68.60	90.60	109.95	104.99	61.79	110.89	93.78	105.47
3	Botswana	137.53	94.06	110.03	194.63	138.82	172.85	130.52	113.39	138.05	164.79	142.84
4	B. Faso	76.33	69.84	82.45	88.01	124.13	93.11	81.43	84.88	79.09	100.81	82.64
5	Burundi	75.67	67.66	52.49	76.14	92.14	77.11	74.25	35.99	74.79	76.03	75.85
6	Cameroon	83.51	81.60	97.85	67.64	116.45	104.76	104.53	81.04	86.84	91.37	87.75
7	C.Verde	118.99	134.08	172.91	106.22	147.47	160.65	146.90	124.56	127.38	128.28	127.64
8	C.A.Rep.	98.30	96.75	88.03	115.55	98.56	46.22	94.72	72.05	99.08	83.98	100.56
9	Chad	165.24	128.49	93.62	88.09	83.92	64.57	89.82	152.82	162.86	81.21	137.53
10	Comoros	108.46	171.10	202.77	218.20	121.60	93.38	146.40	152.94	113.77	177.18	117.95
11	Congo, D.R.	116.91	114.06	80.11	121.86	101.24	73.66	122.39	61.53	119.04	121.89	122.05
12	Congo	131.12	125.58	97.35	118.05	121.18	127.36	108.32	99.94	131.58	125.64	128.53
13	C. d'Ivoire	88.45	84.13	109.65	114.33	120.48	150.50	112.79	70.17	90.59	115.16	94.86
14	Djibouti	98.48	172.98	61.89	112.01	89.00	47.43	147.28	154.17	62.95	141.87	69.89
15	Egypt	56.06	64.64	81.60	16.79	33.87	44.16	89.40	19.47	56.52	30.88	51.44
16	Eq. Guinea	138.17	100.75	73.32	113.22	181.36	193.54	122.84	188.74	134.51	128.80	133.65
17	Ethiopia	63.46	80.75	76.03	36.61	67.49	45.77	42.72	60.56	67.50	48.07	67.01
18	Gabon	141.85	127.78	91.24	150.65	193.24	125.93	153.72	128.92	146.05	150.56	148.23
19	Gambia	82.10	113.79	62.09	82.38	84.27	56.83	68.29	38.65	82.68	73.02	84.40
20	Ghana	108.00	99.62	102.52	82.94	78.28	122.19	102.22	97.85	110.98	83.31	109.59
21	Guinea	81.81	98.61	25.69	51.36	55.20	24.72	52.10	63.18	70.99	52.11	70.20
22	G.-Bissau	76.77	102.34	53.52	99.04	72.57	54.17	95.96	101.68	79.62	84.32	81.44
23	Kenya	81.59	83.97	83.91	70.25	47.39	66.01	62.26	44.54	83.29	69.54	77.45
24	Lesotho	132.26	80.56	186.50	73.94	84.07	129.44	97.86	110.28	131.38	77.31	128.68
25	Liberia	81.93	116.03	52.11	122.22	88.64	35.21	90.63	159.40	77.96	95.10	80.80
26	Madagascar	65.42	49.55	103.29	57.67	80.07	67.20	61.12	54.52	66.53	61.92	67.90
27	Malawi	146.69	82.41	73.47	127.28	31.32	62.28	81.06	102.23	104.67	71.90	92.73
28	Mali	98.93	112.94	56.67	116.39	78.52	105.85	84.70	98.12	94.59	101.38	96.49
29	Mauritania	101.23	81.88	71.01	116.86	67.19	112.14	100.82	126.20	101.40	116.52	104.67
30	Mauritius	89.84	91.81	174.53	138.13	142.94	121.26	83.74	135.82	98.47	112.18	101.10
31	Morocco	102.03	104.20	193.02	107.86	115.11	107.07	135.02	103.49	107.17	136.69	112.65
32	Mozambique	100.96	93.93	100.45	85.18	129.20	87.91	104.04	112.42	104.14	86.98	106.15
33	Namibia	136.20	80.80	199.99	110.30	150.34	203.82	121.81	180.36	136.54	220.07	148.19
34	Niger	101.27	104.81	78.94	77.44	100.39	101.95	91.05	97.43	98.15	91.21	96.93
35	Nigeria	127.31	113.26	76.62	82.36	53.80	71.60	105.62	108.48	128.59	84.72	126.40
36	Rwanda	51.79	62.11	67.91	85.04	74.28	62.45	70.41	80.39	58.57	78.11	61.13
37	São Tomé	89.93	106.80	124.53	119.04	108.87	90.26	101.86	165.62	95.52	113.34	98.84
38	Senegal	100.55	125.58	67.30	79.24	91.89	56.79	110.04	98.13	99.81	66.08	98.10
39	S. Leone	101.09	113.63	60.18	103.37	88.90	39.52	85.06	107.35	96.08	87.21	97.95
40	S. Africa	94.93	98.66	181.53	85.03	115.93	211.61	138.94	125.69	105.86	104.49	104.96
41	Sudan	86.44	93.09	165.45	61.16	76.78	69.23	53.44	91.38	92.00	58.07	85.84
42	Swaziland	100.30	111.82	196.55	80.78	114.31	141.33	105.98	107.74	105.56	94.19	106.47
43	Tanzania	83.43	72.26	78.37	54.51	57.49	150.98	..	..	85.30	53.41	86.10
44	Togo	89.80	81.47	75.87	77.05	90.95	115.79	95.84	77.43	92.05	80.52	88.33
45	Tunisia	88.05	89.69	102.14	111.86	167.52	119.24	71.51	60.02	86.09	97.27	87.65
46	Uganda	50.94	78.12	87.27	81.07	83.78	110.80	72.22	88.65	57.56	86.80	61.49
47	Zambia	93.83	126.86	97.82	95.88	77.02	56.36	..	..	94.76	73.80	81.62
48	Zimbabwe	..	..	..	..	..	..	..	..	..	..	..

low 80. By contrast, Djibouti, Comoros, and Cape Verde are the least competitive with their beverages indices all above 130!

As for tobacco, Guinea ranks first, followed by Liberia and Burundi. They all have their tobacco indices below 55. On the other hand, Comoros ranked last, followed by Namibia and Swaziland. The tobacco indices of these countries are all above 190! On purchased transport, the most competitive countries are Egypt, Ethiopia, and Guinea, in that order. They all have indices below 40. By contrast, however, Angola, Comoros, and Botswana are the least competitive under this component, with indices all above 190.

The most competitive country on equipment for recreation is Malawi, followed by Egypt. The indices of these two countries are all below 375. On the other hand, Gabon ranked last, followed by Equatorial Guinea and Angola. They all have indices above 170! Under services for recreation, topping the list is Guinea, followed by Liberia, and Sierra Leone. They all have indices below 40, making them the three most competitive countries in services for recreation. On the other hand, the least competitive countries on this component proved to be Angola, South Africa, and Namibia with indices all above 200!

Ethiopia ranks first under restaurants etc., followed by Guinea and Sudan. These three countries are the most competitive in terms of restaurants with indices less than 55. On the other hand, Angola, Gabon, and Djibouti are the least competitive with their restaurant indices all above 145! In the sector of hotels etc., Egypt is ranked first, followed by Burundi and Gambia. These three countries are the most competitive with their indices less than 40. On the other hand, Equatorial Guinea, Namibia, and Sao Tome are the least competitive with hotel indices all above 160!

The most competitive country on tourism goods is Egypt, followed by Uganda and Rwanda. The TPCIs of these countries on tourism services are all less than 60. Chad, however, ranks last, followed by Angola and Gabon. All these countries report a TPCI that is higher than 140 on tourism goods. As for tourism services, Egypt again ranks first, followed by Ethiopia and then Guinea, all with TPCIs less than 71. Ranking last, however, is Angola, followed by Namibia and Comoros. The TPCIs of all these countries are above 175.

In the total tourism basket, Egypt remains on top of the list with an overall index of 51.44. Rwanda is second with an index of 61.13, followed by Uganda that has an index of 61.49. At the bottom of the list, however, is Angola with an overall index of 161.89! Second to the bottom is Gabon, with an overall index of 148.23, followed by Namibia that has a total tourism index of 148.19. In all, Egypt ranked first three times (on purchased transport, hotels etc., and total tourism basket). Guinea ranked first twice (on tobacco, and services for recreation). Other sector leaders include Uganda (first in food), Madagascar (first in beverages), Malawi (first in equipment for recreation), and Ethiopia (first in restaurants etc.). On the other hand, Angola ranked last four times (on purchased transport, services for recreation, restaurants, and total tourism basket). Other sector laggards include Chad (last on food), Djibouti (last on beverages), Comoros (last on tobacco), Gabon (last on equipment for recreation), and Equatorial Guinea (last on hotels, etc.).

Table 2:African ICP: Sources of Relative Changes in TPCI of Total Tourism Basket 2000 to 2005

	Country	TPCI (Tourism Price Competitiveness Index)		Relative Changes (Africa Region =1)		
				TPCI	Exchange Rate*	CPI
		2000	2005	2005/2000	2005/2000	2005/2000
1	Benin	..	105.47	..	0.67	0.83
2	Botswana	140.41	142.84	1.02	0.90	1.05
3	Cameroon	105.86	87.75	0.83	0.67	0.80
4	Congo	143.00	128.53	0.90	0.67	0.81
5	Cote d'Ivoire	118.40	94.86	0.80	0.67	0.84
6	Egypt	127.59	51.44	0.40	1.50	0.92
7	Ethiopia	54.13	133.65	2.47	0.94	0.91
8	Kenya	110.26	77.45	0.70	0.89	1.05
9	Madagascar	102.66	67.9	0.66	1.33	1.18
10	Malawi	55.38	92.73	1.67	1.79	1.42
11	Mali	..	96.49	..	0.67	0.81
12	Mauritius	79.34	101.1	1.27	1.01	0.92
13	Morocco	102.85	112.65	1.10	0.75	0.77
14	Nigeria	86.05	126.4	1.47	1.16	1.49
15	Rwanda	94.02	61.13	0.65	1.28	0.99
16	Senegal	79.21	98.1	1.24	0.67	0.77
17	Sierra Leone	107.18	97.95	0.91	1.24	0.97
18	Swaziland	107.57	106.47	0.99	0.82	0.99
19	Tanzania	134.72	86.1	0.64	1.26	0.86
20	Tunisia	98.43	87.65	0.89	0.85	0.82
21	Zambia	99.33	81.62	0.82	1.29	1.80
22	Zimbabwe	53.60	..	..	..	..

** Determined as the annual average official exchange rate of the local currency to the US dollar as reported in the IMF's International Financial Statistics (IFS), line rf.*

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Pattern of Changes in TPCI's: 2000-2005

This study also examined how the TPCI's have changed over time in Africa, and the sources of the change. Table 2 shows how the TPCI's have changed between 2000 and 2005. International tourism is an export product for the destination country. This indicates that tourism price competitiveness is a function of two forces: (i) external cost of money (exchange rate); and (ii) internal cost of goods and services (inflation rate). Thus, changes in a TPCI could be traced to three main sources: (i) change in exchange rate; (ii) change in CPI; and (iii) change in tourism prices relative to prices of other goods and services within the country. In order to examine these changes, TPCI's of total tourism basket were computed for 2000 and 2005. The last three columns on Table 2 present the relative changes in the TPCI's, the exchange rates, and the CPI's between 2000 and 2005. Analysis was restricted to the 22 countries that participated in the 1985 ICP phase and for which 2000 data was available (see Oyewole 2004).

Due to unavailable/inadequate data, changes in prices of tourism basket relative to prices of other goods and services could not be computed. However, these changes could be deduced as being approximately the residuals after accounting for the two other changes that were computed (namely: changes in exchange rate and CPI).

With Africa region = 1, Table 2 shows seven countries that experienced a decrease in their total TPCI's between 2000 and 2005 (i.e., change in TPCI > 1). For three of these countries, however, the relative changes in exchange rate and CPI are less than unity. These countries include Ethiopia, Morocco, and Senegal. What this indicates is that the decrease in TPCI is due mainly to an increase in prices of tourism basket relative to other goods and services within those seven countries. Six countries are shown to have experienced a gain (change <1) in relative total TPCI, but a decrease (change >1) in relative changes in CPI and/or exchange rate. This indicates that the gain in TPCI could be traced mainly to a decrease in prices of tourism relative to prices of other goods and services. These countries include Egypt, Madagascar, Rwanda, Swaziland, Zambia, and Sierra Leone.

Another group of countries (namely: Malawi and Nigeria) had a decrease in their TPCIs between 2000 and 2005 (i.e., change in TPCI >1) and also had more than unity relative changes in exchange rate and CPI. This indicates that price of tourism basket must have risen in tandem with the general prices (CPI) in those countries. A final group of countries that had a relative gain (change <1) in TPCI experienced much greater gains (changes <1) in relative changes in exchange rate and CPI. The indication here is that these countries had an increase in prices of tourism relative to other goods and services, which were partially offset by the relatively lower exchange rate and/or inflation rate (CPI). Were it not for this interplay, those countries would have experienced a loss (change >1) in TPCI between 2000 and 2005. Countries that fall into this category include Cameroon, Congo, Cote d'Ivoire, and Tunisia (see Table 2).

Policy and Marketing Implications

The results of this study have implications for government policy and destination marketing strategy. The breakdown of the sources of changes in the TPCI's shows that although currency devaluation could make a country more price competitive in the international market, governments should balance this policy with low consumer prices in the case of international tourism. Otherwise, gains in currency devaluation could be offset by higher consumer prices, leaving the country in the same or even worse situation. This seems to be the case with three of the countries depicted in Table 3. Malawi, Nigeria, and Zambia all had greater than unity relative change in exchange rate between 2000 and 2005. However, they also had greater than unity relative change in CPI all leading to a relative decrease in tourism price competitiveness (change in TPCI > 1)

From the results of the sectoral analysis of TPCI's, it is evident that countries may be more price competitive in one sector, but less so in the others. Thus, governments could enhance the overall TPCI's of their countries by adopting policies that lower prices in those sector(s), where a country is less price-competitive. For example, taxes on hotel rooms could be lowered, or eliminated, to make a country more price-competitive in the area of accommodation for tourists.

In the same vein, sales taxes on other goods and services consumed by tourists could be lowered or completely eradicated to make a country more price-competitive. Alternatively, governments could adopt a policy of sales tax reimbursement. Upon leaving a country, tourists could present their passports and receipts of goods purchased at the border for reimbursement of sales tax paid. The net effect will be a lowering of cost of tourism in the country, which might improve its price competitiveness in the continent.

Results of this research also indicate marketing strategy options for destination marketers in the African countries studied. Under their competition-oriented approach to nation marketing, Riege and Perry (2000) advanced that there are two possible strategies for countries: (i) price, and (ii) non-price competition strategies. Following this, destination marketers in countries that are more price-competitive in this study could use price competition

strategy to maintain their cost/price leadership. As reiterated by Stevens (1992, p.44), "competitiveness is an all encompassing concept whose bottom-line is value for money." Some tourists may just want to visit Africa, irrespective of the country, at least for the first time. Hence, being in the same continent, but having lower tourism price could be an effective promotional campaign for marketers in countries that are found to be more price-competitive in this study.

The literature suggests that tourists usually base their travel decisions on exchange rate because they lack adequate knowledge of price levels in the countries that they plan to visit (Crouch, 1994b). Often, this leads to some disappointments on arrival (Little, 1980). Problems of this nature could be alleviated with the use of the TPCI's computed in this paper, since its computation takes domestic price level into consideration. Destination marketers could include this fact in their promotional campaigns. That could help to convince tourists of the realistic nature of the competitiveness of tourism prices in the marketers' countries relative to others in the continent. The importance of such promotions is underscored by the significant results reported in the literature on the positive influence of promotional spending on demand for international tourism (Papadopoulos and Witt, 1985; Clarke, 1978; and Sunday and Johansson, 1975). Thus, promotional campaigns built around such slogans as: "AFRICA FOR LESS," could be an effective strategy for destination marketers in countries that are found to be more price-competitive in this study.

On the other hand, those in less price-competitive countries could use non-price competition strategy by striving to differentiate themselves from others as product quality leaders. In addition, they may concentrate on market niches, catering to the needs and wants of particular tourist segments. In this way, they will avoid head-on competition with more price-competitive marketers, while maintaining a successful strategic position (Jefferson, 1995). In pursuing this strategy, destination marketers could combine their sectoral TPCI's with activities-based segmentation (Sung et al, 2000; Kerstetter, Confer, and Bricker, 1998). As summarized by Mckercher et al (2000, p.26), "Activities-based segmentation defines groups of tourists by their behavior or visitation patterns."

Thus, destination marketers in a country that is less price-competitive on hotels etc., for example, could still be able to attract (target) tourists visiting friends and relatives, since they would most likely stay with the people that they are visiting rather than in hotels or rented apartments. Alternatively, or in addition to that segment of tourists, such countries could target business and academic tourists, by providing high quality conference facilities, for example. Although this might lessen their price competitiveness on hotels, etc. further, they could still be able to attract business and academic tourists, since these people do not often pay for their hotel accommodation out of their own pocket. Such expenses are often covered by their organizations.

Another possible option for destination marketers in less price-competitive countries is strategic alliance through adoption of regional tourism similar to the one proposed for Kenya and Ethiopia by Frost and Shanka (2001). In pursuing this strategy, a country that is less price-competitive could link up with one or more countries that are more price-competitive in promoting multiple-tourism destination development. This may work best for close neighboring countries that perhaps share borders – but is not necessarily limited to such ones. In support of this recommendation is the observation by Dieke (1998), that more and more tourists who visit Africa prefer tour circuits to resort holidays limited to one location.

Limitations and and Conclusion

Some limitations of this study should be noted. Although a critical factor in destination competitiveness, inbound/outbound transportation cost is not accounted for in this study for reasons given above. Another limitation is that the data used were nationwide, which were not disaggregated by regions of a country. Thus, results may not be true for every part of a country studied. Rural and urban prices, for example, often differ. Hence, depending on where a tourist visits (urban or rural), the price structure experienced may differ from those reported in this study. For example, in Egypt, most tourists visit the pyramids near Cairo, whereas in Kenya, the most visited sites are the Safaris that are in the rural parts of the country far from the capital city, Nairobi. Similar thing could be said of Ethiopia, where the often-visited sites are Lalibela and the Old Churches of Gondar, all far from the capital city of Addis Ababa.

One other limitation is the lower quality of PPP data at the basic headings level compared to the ones at aggregate levels. Thus, for some countries like Egypt, Liberia, and Equatorial Guinea, one may notice wide disparity among the components of the tourism basket, because TPCI figures of those components were computed using basic headings' PPPs. Finally, annual variations of TPCI's were not determined in the study. Hence pattern of changes in TPCI from one year to the other, in between the two end points of 2000 and 2005, could differ from the one reported here.

In conclusion, applying the results of the 2005 ICP, this paper has presented

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relative price competitiveness indices of the countries of Africa in the international tourism industry and their rankings in that sector. It has shown that relative price competitiveness of a country could differ from one sector of international tourism basket to the other. Also, it has shown how changes in price competitiveness from one period to another could result from changes in the cost of the local currency abroad (exchange rate), in the domestic price level (CPI), or cost of tourism basket relative to other goods and services within the country, or a combination of these factors. Realization of these facts calls for certain policy initiatives as discussed above. Also discussed above are the marketing strategy options available to destination marketing managers in both the relatively more, and the relatively less price-competitive countries in Africa. Crouch (1994b, p. 13, italics added) once noted, and correctly so, that: "…in the study of tourism the issue of price is particularly vexatious." This paper cannot, nor does it claim to remove all these vexations. However, it has contributed to a better understanding of the phenomenon in the continent of Africa by basing its price comparability measure on the purchasing power parity of the ICP.

One useful direction for future research would be an examination of the relationship between a country's TPCIs and its receipts per capita from international tourism. The aim is to test the hypothesis whether the more price-competitive a country is, the more it attracts tourists from the international market. What is observed in the present study is that several of the most popular tourist destinations in Africa, such as Kenya and Egypt, also rank among the top 10 most price-competitive countries on several of the components of the total tourism basket. All of the TPCIs of Kenya, for example, are less than 85, with some even as low as 47.39 (equipment for recreation), and 44.54 (hotels, motels, etc.). Thus, with the availability of adequate data and resources, a research that conclusively determines whether more price-competitive countries attract more tourists, while less price-competitive countries are less attractive to tourists would be very informative and useful to marketers and policy makers alike. ■

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Call for Articles

The Bulletin extends an invitation for original articles that reexamine current practices or venture to challenge conventional thinking and shed new light on lingering problems. Papers on analytical uses of PPP are most welcome, as are papers on institutional, organizational and operational aspects of the ICP. Please send submissions or questions to *ybiru@worldbank.org*.

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Comments on "Integrating Regional GDP Aggregates Based on Exchange Rates and Inter-Country Comparisons Based on Purchasing Power Parity"

Kim Ziechgang's article in the December 2008 edition of The ICP Bulletin discusses regional aggregation of GDP price and volume series and the role exchange rates plays in the conversion to common units in this work vis-à-vis using PPPs for this purpose. In this very interesting and well-written article, he suggests that the exchange rate-based conversion should be used as the standard presentation of world and regional aggregates of GDP value, price, and volume time series. The role left for the PPPs would be GDP volume comparisons between countries and the associated international comparisons of productivity and living standards, as well as using them in the measurement of price levels.

On the measurement of the size of the national economy

First, the article briefly introduces the two conversion approaches. It has explained how the exchange rate-based conversion is appropriate not only for external trade of goods and services but sometimes also for non-tradable products. For example, if a non-resident owns an apartment, he or she prefers using exchange rates rather than PPPs in the valuation of asset and the implicit rental value of its services. Based on this reasoning, the author concludes that "using exchange rates in the conversion has some appeal in assessing the relative nominal size of national economies".

The author is right in his argumentation. However, maybe it should also be considered how meaningful the concept of nominal really is in the measurement of the size of national economy. GDP consists mainly of acquisition of goods and services in the domestic market and, at the same time, price levels may differ significantly in different countries. Exchange rates and PPPs may converge and the coverage of tradable products increases in the long term. But I do not think that this is a sufficient argument for supporting the use of exchange rates in the conversion of the whole GDP. The indicator of nominal size of the national economy is still of rather limited informative value. We may also draw a parallel between the ICP and temporal national accounts. In the national accounts, we are mainly interested in monitoring GDP growth in volume terms rather than at current prices, so the question is: why to do differently in the spatial context? The concept of the size of economy (when using the level of GDP as a yardstick) is meaningful only if measured in real terms, that is, when the effect of differences in price levels is eliminated by using PPPs in the conversion. There is, of course, nothing new in my argumentation but I would still like to stress my point that the use of exchange rates should mainly be limited to cross-border transactions, and not for monitoring the size of the whole national economy.

Aggregation of regional GDP growth and inflation

The author advocates the use of nominal country GDP shares as weights in the aggregation of regional price and volume indices. He does not suggest that the PPP-based regional aggregation should be abandoned but rather his aim is to explain how the two approaches could coexist coherently.

The argumentation favoring the use of exchange rates is based on economic theory. It is pointed out that the economic index number theory constructs the share weights of index components in nominal terms – volume shares are not recognized because they do not reflect the accounting constraints actually faced by optimizing purchasers' sourcing goods and services internationally. The argumentation is

also very convincingly proved mathematically. However, I am still not sure whether the underlying premises are fully sound. As discussed above, is it really correct to see (at least implicitly) national economies as entities where "all" goods and services are tradable? Are the exchange rates meaningful sub-components of prices of GDP if the major part of GDP is made up of domestic transactions?

Another question is how regional aggregation based on exchange rates could coexist coherently with the PPP-based aggregation. It seems that if we accept to use PPPs for the measurement of GDP in real values for the benchmark year, we have to also use these real value results as weights for volume and price indices from the benchmark year onwards. Otherwise, extrapolated PPPs and volumes would deviate further from results of different benchmark ICP comparisons. So, do we need two kinds of regional aggregations-- one based on exchange rate conversions and another based on PPP conversions or would this only confuse users? It is not explained in the article what the coexistence of two aggregation procedures means in practice.

Consistency of benchmark PPP comparisons and national accounts time series

The author discusses at length the relationships between PPPs and the individual country GDP deflator time series, and the individual country volume index series within a world or regional aggregate. It is stated that if we compare the relative volume indices between a given pair of countries from two ICP benchmarks, we arrive at the change in their relative GDP volumes from the first to the second benchmark period. Further on, this should be the same as the ratio of their GDP volume indices between the benchmarks. It is noted, however, that this does not hold in practice. Reasons mentioned in the article are that the ICP comparisons and national accounts are computed from non-identical data sets and often with different index and aggregation methodologies, and therefore results for benchmark PPP comparisons are not in line with the GDP growth rates in the same period.

There are indeed several factors that explain the gap between the benchmark ICP results and results that are derived by updating PPPs by relative price indices of GDP (or alternatively, real values are estimated directly based on relative changes of GDP volumes):

- In the national accounts, location is an important product characteristic, whereas in the ICP comparisons the location is ignored – price data underlying PPPs are average prices of the whole country. In other words, in the national accounts the "same" products delivered in different locations are different, whereas they belong to the same product category in the ICP comparisons. A case in point is housing services mentioned in the article where, price levels and their development differ often significantly in different parts of a country.[1]
- PPPs are valid only for the ICP benchmark years. Even if the price data underlying national accounts and ICP were the same, changes in volume and price structures would result in differences between GDP price/volume series in national accounts and ICP.
- Other differences in the data and methods in the two statistics as pointed out by the author. An interesting example is the treatment of new products entering the market. In the ICP their inclusion is not a problem as long as the product is representative in different countries. In the price indices underlying the national accounts, they could be included in different ways and there is no certainty that methodological solutions made by countries are the same.

Particularly the second bullet point, the influence of changes in price and volume structure, is important to recognize. In the OECD/Eurostat PPP Program, this has resulted in identifying two kinds of PPP series and PPP-based volume series. PPPs for the ICP benchmark years are called current PPPs and PPPs that are extrapolated for the intermediate years using relative price development of GDP are called, perhaps slightly misleadingly, constant PPPs. The difference between the two kinds of PPPs is that the former capture changes in volume as well as changes in relative prices, whereas the latter only capture changes in volume.[2]

Current and constant PPPs for a particular year may differ significantly due to changes in relative price and volume structures. In this respect, the most sensitive part of GDP is foreign trade because the shares of exports and imports of GDP are often very high, normally higher than any other sub-category of GDP. Consequently, even relatively modest changes in the terms of trade reflect directly in real GDP in the ICP comparisons, whereas the GDP volume development in the national accounts is unaffected as long as the volume of net exports remains unchanged. "Fortunately", the terms of trade are, perhaps often due to lack of proper price indices for exports and imports, relatively stable. Exceptions are oil-exporting countries – due to the

1. One could identify, at least in principle, same kinds or similar locations in different countries. In practice, this is very difficult. For example, how to compare the quality of housing services in countries with a very different climate or population density?

2 Current and constant PPPs are discussed e.g. in www.oecd.org/dataoecd/32/34/2078177.pdf.

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volatility of oil prices, the difference between current and constant PPPs has sometimes exceeded 10 percent at the GDP level. It is important to note this because there is a common misunderstanding that the difference between national accounts and ICP is stemming from a deficient measurement of PPPs in the ICP comparisons – no price surveys are organized for exports and imports but exchange rates are directly used as PPPs – but this is not the case. The exchange rates are largely valid to be used for this purpose and particularly for products that are traded at world market prices, such as energy.

Concluding remarks

There are no self-evident methods for regional aggregates of time series of GDP price and volume indices, which has been nicely shown in the article. However, if the aim is to compare the size of national economies or growth rates of a region, the least bad option seems to be the use of PPP-based GDP shares as weights. Use of exchange rates for this purpose is, in my mind, not fully justified and may confuse users. In my opinion, the role of exchange rates should be limited mainly in their use for cross-border transactions. ■

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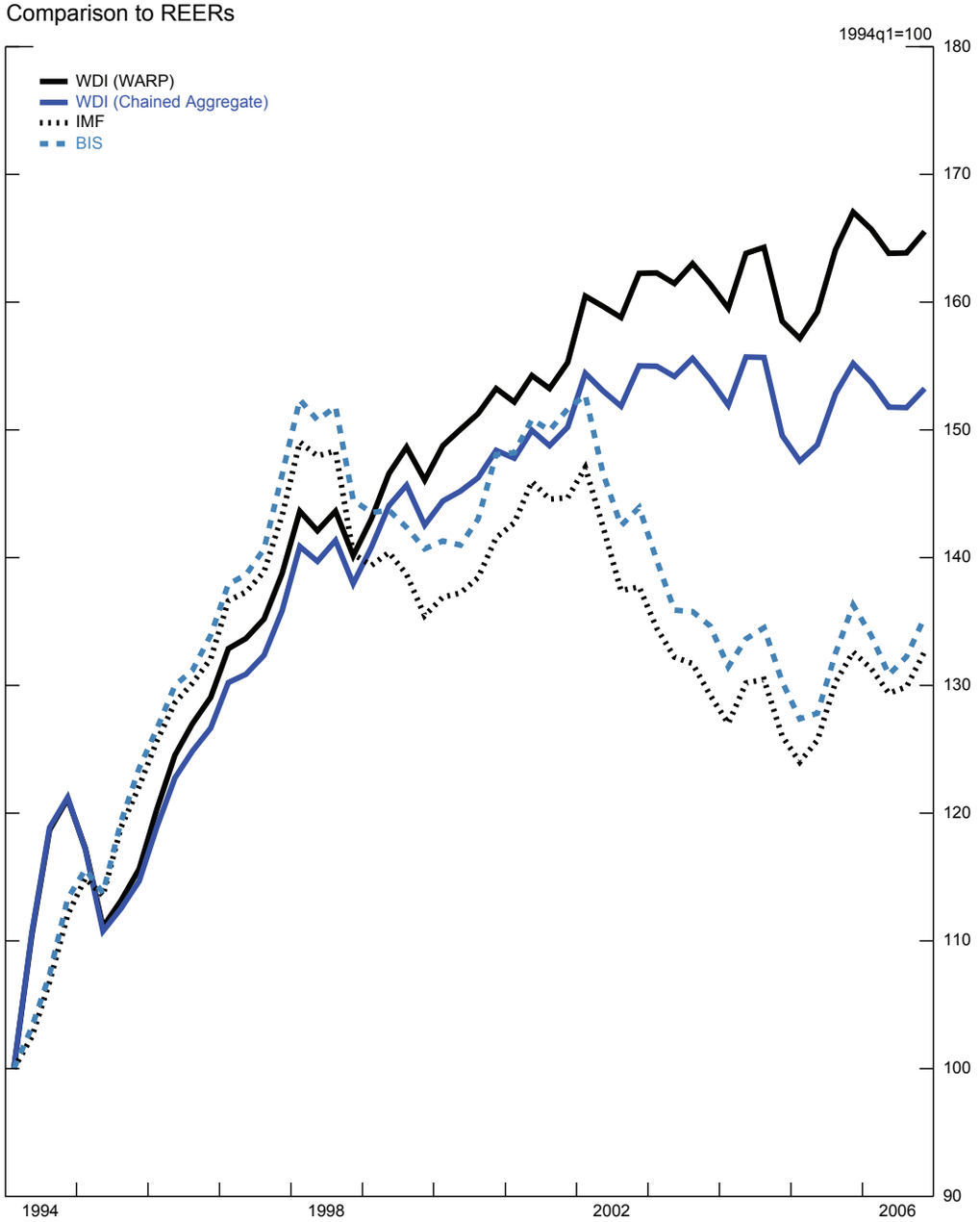
Figure 4: International Relative Prices for China -- 1980 - 2007: WARP and REERs



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Preparations for the 2011 Round of the International Comparison Program

At its 39th session in February 2008, the United Nations Statistical Commission (UNSC) welcomed the successful completion of the 2005 round of the International Comparison Program (ICP) and requested that preparations for the ICP 2011 round begin immediately. The UNSC also recommended that an Interim Executive Board (IEB) be formed with the mandate to oversee the preparations for the 2011 round. An Interim Technical Advisory Group (ITAG) was also formed to develop a research agenda and to address technical issues and priorities. And the UNSC requested the World Bank to accept the role of the Global Coordinator of the 2011 round by hosting the Global Office. Since then, several meetings of the IEB and ITAG have discussed the future work program and the setting up of important global and regional ICP structures.

Last February, at the 40th session of the Statistical Commission, the World Bank and the Interim Executive Board submitted a report on the preparations for the new round and the progress made during the interim period. The report proposes a governance structure and a detailed work program. The UNSC expressed its appreciation for the excellent work done by the IEB, the ITAG, the regional coordination agencies, and the World Bank. The proposed governance structure and the work program for the 2011 round were endorsed by the UNSC.

The initial steps toward implementing the governance structure involve appointing the global manager and forming the new Global Office. We are pleased to announce the appointment of Mr. Michel Mouyelo-Katoula to the position of ICP Global Manager.

Mr. Mouyelo-Katoula is an expert in price and national accounts statistics. He has held various managerial positions, most recently as coordinator of the Africa 2005 ICP at the African Development Bank. After Mr. Mouyelo-Katoula assumes his new position, staffing and the work program of the ICP Global Office will be announced.

The UNSC noted the increasing use of purchasing power parities data from the 2005 round, and recommended expediting the research program with the focus on data quality assessment. It expressed the urgency for forming the new Executive Board, increasing advocacy efforts, and mobilizing needed resources.

The new Executive Board will be established in the next several months followed by the constitution of the Technical Advisory Group. By September 2009, all regional coordinating agencies and country coordinators will be in place and the work to advance the 2011 round will begin in earnest. A resource mobilization campaign is underway and the advocacy strategy for the round is being prepared. There will be a concerted effort to broaden the country participation in the 2011 ICP round, particularly in Latin America, the Caribbean and the Pacific Island countries.

There is much excitement about the next ICP round. Built on a strong foundation of partnerships between international agencies and national statistical offices, ICP has demonstrated the value of shared knowledge and collaborative work. The experience gained and practices pioneered in the 2005 round have begun to influence other statistical activities, leading to improvements in price data collection and the national accounts of some countries. With further methodological improvements and even wider coverage, the 2011 round of the ICP promises to be a challenging and rewarding effort. ■

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