



# research update

No. 1, 2008

## Research and Statistics Branch



*Research Update* enters its third year of publication by presenting two unique research tools—a database on productivity and the latest compendium of industrial statistics—as well as focusing on the economics of returns to scale and a

reassessment of key development issues. This first number for 2008 inaugurates a regular feature on current economic thinking, "In Short", by offering a UNIDO researcher's perspective on learning-by-exporting.

With the launch of UNIDO's World Productivity Database, researchers are now able to draw on the largest international database dealing with total factor productivity. Covering more than a hundred countries over a 40-year period, it transcends simple statistics to help policy-makers, development specialists, economists and others to measure the quality of donor assistance, economic reforms and other such interventions.

The latest *International Yearbook of Industrial Statistics* confirms the quantitative dimensions behind the current global food crisis. In his feature on the 2008 edition, the new Chief of UNIDO's Statistics Unit paints a graphic picture of developing countries having to increase their agricultural exports in order to buy manufactures and services from abroad.

The importance of returns to scale is the focus of the most recent seminar for UNIDO staff organized by the Research and Statistics Branch (RST). Drawing on data for Australia, New Zealand and the United States, Kevin Fox, Professor of Economics at the University of New South Wales, outlines key policy considerations for developing countries in exploiting this crucial factor for economic growth.

Against the backdrop of increasing globaliza-

tion, the study *Rethinking Development Realities* explores the potentials for industrialization as a means to reduce poverty in the developing world. In a series of essays, the Principal Adviser to UNIDO's Director-General tackles the issue of how late-comers to industrial development can use technical progress and trade capacity building to become more competitive economically.

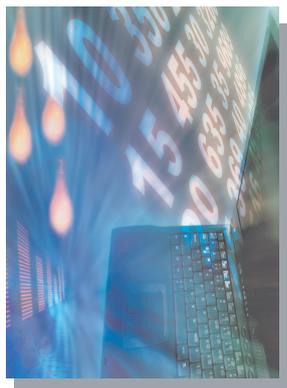
In the first of his series of "In Short" articles, RST economist Anders Isaksson challenges an unqualified interpretation of learning by exporting—based on the model of the Asian tiger economies—as the key to growth. Rather, he suggests that the strategic choice of trading partners is equally crucial to economic development.

With *Research Update* having established itself as the window on UNIDO's economic thinking, I warmly welcome and, indeed, encourage readers' comments on these and future articles. Looking forward to hearing from you!

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Electronic version, containing links to full articles is available at: [www.unido.org/doc/3474](http://www.unido.org/doc/3474)

## World Productivity Database



The world's most extensive database on total factor productivity (TFP) was recently launched by the Research and Statistics Branch on UNIDO's website. Designed to serve international organizations, the donor community, policy-makers and aca-

deme, the World Productivity Database (WPD), provides information on 112 countries' productivity performance, in terms of level and growth, as well as helping to gauge the qualitative outcome of interventions such as donor assistance and economic reform. In doing so, it opens up perspectives on poverty reduction and other welfare advancements.

The choice of total factor productivity as the common denominator of the new database is crucial. TFP measures the efficiency with which all production factors are used and, as UNIDO research has shown, differences in TFP are the main source of income gaps between countries. Because accumulation of labour and capital sooner or later runs into negative marginal returns, TFP growth through technical progress becomes the main source of growth. The sector contributing most to TFP growth is that of manufacturing. Since TFP and technical progress are difficult to measure, the demand is great for such information. The genesis of WPD lies in trying in to fill this lacuna.

For the initiated, WPD provides a wealth of information on which to draw, while the newcomer to productivity measurement is offered a selection of data of UNIDO's choice. WPD is particularly devoted to the challenging task of measuring TFP, but partial productivity measures, such as that of labour productivity, are also included.

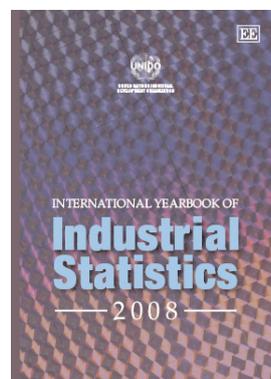
Complementing its breadth of country coverage, the database features productivity figures spanning 40 years, from 1960 to 2000. In addition, forecasts for TFP levels and growth from 2001 to 2010 are available. Because measuring TFP involves many difficult and important decisions—in terms of how to measure production factors as well as issues pertaining to measurement methods and specification—WPD includes a plethora of possibilities. For example, one can choose between five measures of labour input and four measures of capital input, account for schooling and health,

select from more than ten measurement methods, retrieve components of TFP growth such as technical change and change in technical efficiency and allow for both constant and variable returns to scale.

Multiple extensions to WPD are already underway. TFP at the level of aggregate manufacturing has been estimated and will shortly be added to the total economy productivity measures. Country coverage will expand to some 160, while the new time frame will run from 1960 to 2005, with forecasts to 2015. Land as an input, as well as capital input adjusted for utilization rates and country-specific depreciation rates, are among WPD's forthcoming features. Production functions with constant elasticity substitution and estimations accounting for dynamic panel features will round off the expanded version of the database. WPD can be accessed via <http://www.unido.org/data1/wpd/Index.cfm>, which is a UNIDO website devoted to research on productivity. Users' comments on WPD are welcomed by the author (A.Isaksson@unido.org).

Anders Isaksson

## International Yearbook of Industrial Statistics



With the economies of a large number of developing countries still dominated by production and export of raw materials, the 2008 *International Yearbook of Industrial Statistics* depicts an alarming trend. Developing regions stricken by poverty and hunger are, in effect, being forced to export their agricultural products to the developed world in exchange for manufactured goods and various kinds of services.

UNIDO's annual compendium of statistics on level, structure and growth of manufacturing production in the world has recently been published together with Edward Elgar Limited. Based on the latest data collected by UNIDO from the national statistics offices of its Member States, the publication is unique in providing detailed business structural statistics at 4-digit level of ISIC by country.

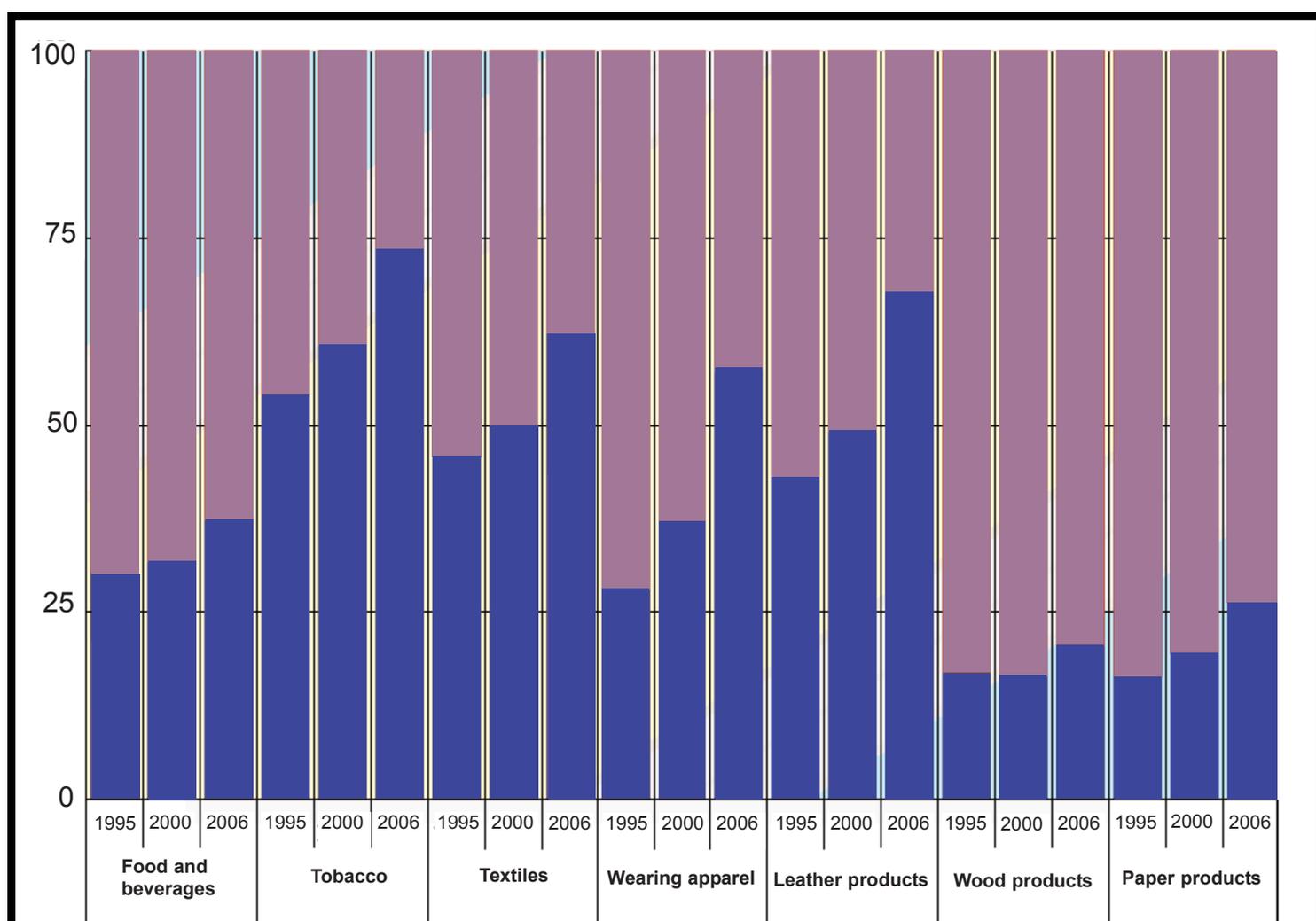
Although the *Yearbook* appears in a standardized format, each edition features distinctive improvements. In 2007, RST's Statistics Unit updated its national account database by re-basing the constant prices from 1995 to 2000. From now on, all manufacturing value added (MVA) and gross domestic product (GDP) figures presented in the publication at constant prices refer to 2000. Unlike industrial statistics, which are collected directly from national statistics offices, GDP and MVA data are compiled and validated using external data sources such as World Bank, UN Statistics Division, Organisation for Economic Co-operation and Development, Asian Development Bank and African Development Bank. Any missing data for a country or a year are estimated.

The 2008 edition introduces a number of new data compilation techniques. In the process of migration of UNIDO databases, estimation tools for recent years—known as now-casting programmes—have been moved to the client

server environment system. A unified statistics analysis software programme has been created for a number of statistical tables as well as for generating PDF files directly from the database.

Last year, the Statistics Unit compiled new base weights, thereby updating the ISIC 2-digit data set, from which a number of statistical tables are generated. The relatively extensive geographic coverage of this data set for manufacturing sectors at 2-digit level provides analytical information. For example, the following graph shows the proportion of developed and developing countries in world production of agro-based manufacturing products. It reveals that the share of developing countries in agro-based manufacturing products has significantly increased since 1995 and that they now produce more than half of textiles, wearing apparel and leather products. Their share in tobacco products accounts for nearly three quarters of world production.

Percentage distribution of world MVA by country groups in agro-industrial branches  
(at constant 2000 prices)



Source: UNIDO, *International Yearbook of Industrial Statistics*, 2008

However, the share of developing countries in manufacture of food and beverages has not increased at the same pace. Although 80 per cent of the world's population live in developing countries, they produced less than a third of the world's total of food and beverages in 2006. Meanwhile, exports of agricultural food products to developed countries increased at an annual rate of eight per cent (in nominal US dollars) during the period 2000-2005, with exports of cereals increasing to 9.2 per cent. The share of developing countries also remained low in manufacture of wood and paper products. To reverse this situation, it is imperative that developing countries build their production and trade capacity in order to acquire greater access to the international market. The *Yearbook's* empirical evidence reinforces the priorities set by UNIDO in providing technical assistance to developing countries for increasing their productive activities and enhancing trade capacity.

Similar statistics in the *Yearbook* facilitate economic analysis for different sectors of manufacturing in a sizeable number of countries. Researchers can also obtain such data in machine-readable format. UNIDO disseminates its industrial statistics database INDT-STAT-4 as well as the industrial demand supply database through CD-ROM.

*Shyam Upadhyaya*

## Presentation on returns to scale



Returns to scale as a source of economic growth was the topic of a seminar for UNIDO staff with Kevin Fox, Professor of Economics at the University of New South Wales, on 21 January 2008.

Based on his recent paper with Thai Vinh Nguyen, "Returns to Scale and Economic Growth: History, Theory and Econometric Evidence", he tackled this issue from the perspective of statistical evidence in order to gauge its importance for economic growth.

For the uninitiated, returns to scale is a technical term used in economics to describe how much output (e.g., number of cars) increases when all inputs (e.g., capital and labour) are increased by a given per cent. If output increases by more than that given per cent,

increasing returns to scale prevails. If output increases by the same amount as inputs, there is constant returns to scale. If output increases by less than inputs increase, there is decreasing returns to scale. The essential element is that as long as increasing returns prevails, increasing the amount of capital and labour used in production is worthwhile. On the contrary, it would be irrational to increase inputs if the return in terms of output increase were less than the input increase.

Increasing returns to scale can offer an important source of economic growth. However, its importance for growth depends crucially on its own sources. In terms of real-world examples of returns to scale and growth, the growth and development in just 40 to 50 years of some countries in the so-called East Asian Miracle is often mentioned. Historically, though, it is also alleged to have been an important source of growth in the United States.

To develop plausible explanations for rapid growth, Mr. Fox explained, is quite different from finding statistical evidence for it. Problems with realistic modelling of underlying technologies, as well as with estimation procedures, have led to mixed empirical evidence. Mr. Fox and his co-author have addressed these technical problems and applied recently developed techniques on industrial data for Australia, New Zealand and the United States.

Taking a retrospective view, Mr. Fox's presentation began by trying to explain why the United States grew so much faster than Australia. Subsequently, sources of returns to scale were discussed. An inexhaustive list includes large markets (e.g., same machinery producing multiple outputs for diverse consumers), abundance of natural resources (e.g., relative prices favouring the use of machinery and ideas), firm size (e.g., spreading fixed costs and risks and specialization) and accumulation of knowledge.

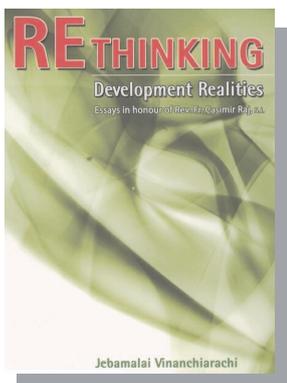
The crux comes, as Mr. Fox explained, when confronting the dilemma of shaky data. Dwelling on data issues, he concluded that in the case of the United States evidence of increasing returns to scale is apparent, while technical progress has been driving manufacturing growth in Australia. The results for New Zealand are mixed and depend on the estimation method used.

Mr. Fox pointed to a number of important policy implications for developing countries. Increasing access to larger markets through trade and regional integration, for example, could be a way to increase returns to scale.

Likewise, to connect to markets, transportation links are important, and investment in roads and railway is, therefore, imperative. In this context, Mr. Fox saw a crucial role for government spending. He concluded by stressing the relevance of formulation of industrial policy that exploits returns to scale as well as encourages technological change.

Kevin Fox

## Rethinking Development Realities



A new study puts the critical question of how well late-comers to industrialization can use technical progress and trade capacity building to reduce poverty into the context of today's internationally competitive environment. Comprising ten chapters,

*Rethinking Development Realities* begins by highlighting major development issues and goes on to examine new sources of dynamic growth from a range of perspectives.

As the foreword points out, globalization continues its march across continents, confronting countries and peoples with accelerating and sweeping change. To be relevant, development economics has to be at least one step ahead of this juggernaut.

*Rethinking Development Realities* offers an analytical exposition of emerging issues and options pertinent to new sources of dynamic growth, knowledge, skills and factors of production, national innovation systems, innovative policy instruments, survival mechanism in an internationally competitive environment, foreign direct investment and domestic capability building, intellectual property and technology transfer in life science and grassroots innovations and livelihood development.

The study is based on the premise that, with industry being the most productive and dynamic sector and with its constant exposure to global competitive pressures for efficiency gains, the newly emerging economies of the South are in a position to leap ahead and utilize new opportunities and marketing practices. They even have the potential to set new standards.

Technical progress and export-led growth achieved by a number of countries, the study

observes, once again figure in international debates. However, this time it is for a different reason. The question arises whether technical progress and trade have contributed significantly to reducing inequality in terms of income and poverty. In order to examine this, it is important to revisit the dynamic sources of rapid economic transformation, with a view to identifying the missing links that can make technical progress and trade capacity building—the development imperatives—into potential resources for poverty reduction.

*Rethinking Development Realities* concludes with an examination of the myths and realities of winning the war on poverty through the global development agenda, the Millennium Development Goals. Recalling Nelson Mandela's speech in 2005, in London, the study cites his statement, "Poverty is not natural. It is man-made, and it can be overcome and eradicated by the actions of human beings. And overcoming poverty is not a gesture of charity. It is an act of justice. It is the protection of a fundamental human right, the right to dignity and a decent life".

Jebamalai Vinanchiarachi

## Learning by exporting and South-South trade



In 1993, the World Bank published *The East Asian Miracle*. The premise of the book was that the so-called tiger economies had learnt from industrialized countries—the North—by increased participation in exporting activities.

This learning, then, allegedly translated into higher productivity growth and, thus, income growth. If true, other developing countries—the South—should immediately try to emulate the tigers. It is beyond doubt that the economic growth of these countries was spectacular—only challenged by another generation of Asian fast-growers—and that export growth must also have played an important role. But was the World Bank really correct about the mechanism and, consequently, is learning by exporting an important source of growth for developing countries?

*The East Asian Miracle* led to a small industry of economic research. If the Bank was right, one would observe not only that firm exports—because this is something that occurs at the

micro level—are positively correlated with firm productivity but that causation runs from exports to productivity.

The Bank based its conclusions on the overwhelming statistical evidence of the former. Subsequent research focused on the latter, with the seminal paper, by Sofronis Clerides, Saul Lach and James Tybout, published in the top-ranked *Quarterly Journal of Economics*, in 1998. They showed that already productive firms self-select into exporting. That means the reason for finding a correlation between exports and productivity is not that firms learn and, then, become productive but the opposite. The key mechanism involved is the high costs of exporting, for example, in terms of compliance with higher standards. Other researchers have corroborated these results to the extent that this has become the consensual view.

Recent UNIDO research has added another dimension to this story. Could it be that learning effects depend on the choice of trading partner? Is it possible that technology from the North is too advanced for developing economies to adopt and that firms in the South would be better off—in terms of learning—by trading with other firms in the South, possibly

those that are only slightly more advanced technologically? For example, a firm exporting textiles is likely to learn more from other textile producers than from manufacturers of satellites.

UNIDO's research findings clearly support this view. We linked the theoretical work of Susanto Basu of Boston College and David Weil of Harvard University on appropriate technology to our own work on the scope for learning effects. Indeed, we found that firms in the South enjoyed learning effects by exporting to other developing countries but not when they exported to the North. Hence, choosing strategically the destination of exports could be an important consideration for policy-making in developing countries.

Finally, does this mean that the hype about the role that exports played in propelling Asian growth was incorrect? Of course not, but it probably implies that the virtues of export growth have other sources, such as scale or competition effects. It calls into question, however, the importance of the learning-by-exporting thesis as a general development recipe and provides a more nuanced link between exporting, learning and growth.

*Anders Isaksson*

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