

Country specific indicators on TRADE and EMPLOYMENT

Explanatory notes

Purpose

For ease, the collection of country-specific indicators, explained in this note, is henceforth referred to as *TRADEMP*¹.

The first purpose of constructing *TRADEMP* is to **link** together labour (employment and wages) and trade related variables for a large number of countries at the industry level. These variables however, are theoretically related by activity data such as production, value added, apparent productivity, number of firms, etc... as they are the indicators to first respond to trade before transmitting the adjustment to labour variables.

This information will be useful for economists, trade analysts and trade policy makers, who wish to capture the evolutions of activity, trade flows, wages and employment simultaneously.

TRADEMP consists of an empirical piece of work. For further theoretical investigations on the relations between trade and employment, which can be extremely complex, see among others Leamer (2000), Harisson and Hanson (1999), and Slaughter (1999). More references are listed below.

TRADEMP is a complementary application to the *National Export TradeMap*, also available on this web site. The latter presents the export portfolio of countries, at a detailed product level. In *TRADEMP*, the country export portfolio is presented at the industry level and includes other dimensions such as wage, production and employment.

Sources and Concept

TRADEMP is a collection of data pertaining to trade, activity and labour of 96 industries at the 3 or 4-digit ISIC nomenclature (Rev.2) for sixty countries, over the 1981-1997 period (see in annex 1, the list of available data by country).

This initial version of *TRADEMP* collects data from three compatible UNIDO² sources: the 4-digit ISIC Industrial Statistics database, the 3-digit ISIC Industrial Statistics database and finally, the Industrial Demand-Supply Balance database at the 4-digits level ISIC Code. The first two databases contain industrial data on wages, employment (number of employees, number of female employees), activity (number of establishments, output, value added) and investment (gross fixed capital formation). The third database includes industrial data on domestic output, domestic apparent consumption and trade (exports, imports, exports to developing countries, imports from developing countries, exports to industrialized countries, imports from industrialized countries).

The 2000 edition of the UNIDO databases has been used. The Industrial Statistics databases cover a large number of countries over the period 1977-1998 (175 countries at the 3-digits level and 115 countries at the 4-digits level). Unfortunately the period coverage as well as item coverage differ from country to country, depending upon data availability. The Industrial Demand-Supply Balance

¹ *TRADEMP* has been prepared by D. Mirza (Université de Paris I, Daniel.Mirza@univ-paris1.fr) and J.M. Pasteels (ITC, Pasteels@intracen.org), in collaboration with L. Fontagné (Centre d'Etudes Prospectives et d'Informations Internationales), under the supervision of F. Von Kirchbach (ITC, head of Market Analysis Section).

² United Nations Industrial Development Organization (see <http://www.unido.org/> for more details).

database, covers fewer countries (73 countries for the 2000 edition) than the other two databases, and statistics for the year 1998 have not yet been included.

TRADEMP has been constructed by merging the three UNIDO databases and deriving several indicators. Sixty countries are covered in this edition (see annex 1). Other countries have been excluded due to the lack of data (either in terms of number of years, of industries or variables covered). The year 1998 has not been covered due to the lack of trade data from the Industrial Demand-Supply Balance database for this year.

In the case of developing countries, countries for which the latest available data are prior to 1992 have been kept aside while for industrial countries, data from 1995 onwards must be available. It is also worth mentioning that for industrialized countries, other sources of industrial data are available, like the STAN database from the OECD. This source has however not been used for this first edition of *TRADEMP*. Other sources of employment data are available on the ILO (International Labour Office) database. These additional sources might be used for the next version of *TRADEMP*.

For each of the 60 countries, the data is either presented at the 4-digits or at the 3-digits level of the ISIC nomenclature, depending on the availability of the most recent data. For some of the industries at the 3-digits level, trade data is not available, as the aggregation of the trade data at the 3-digits level is not possible, since the components at the 4-digits level are related to more than one 3-digits industry.

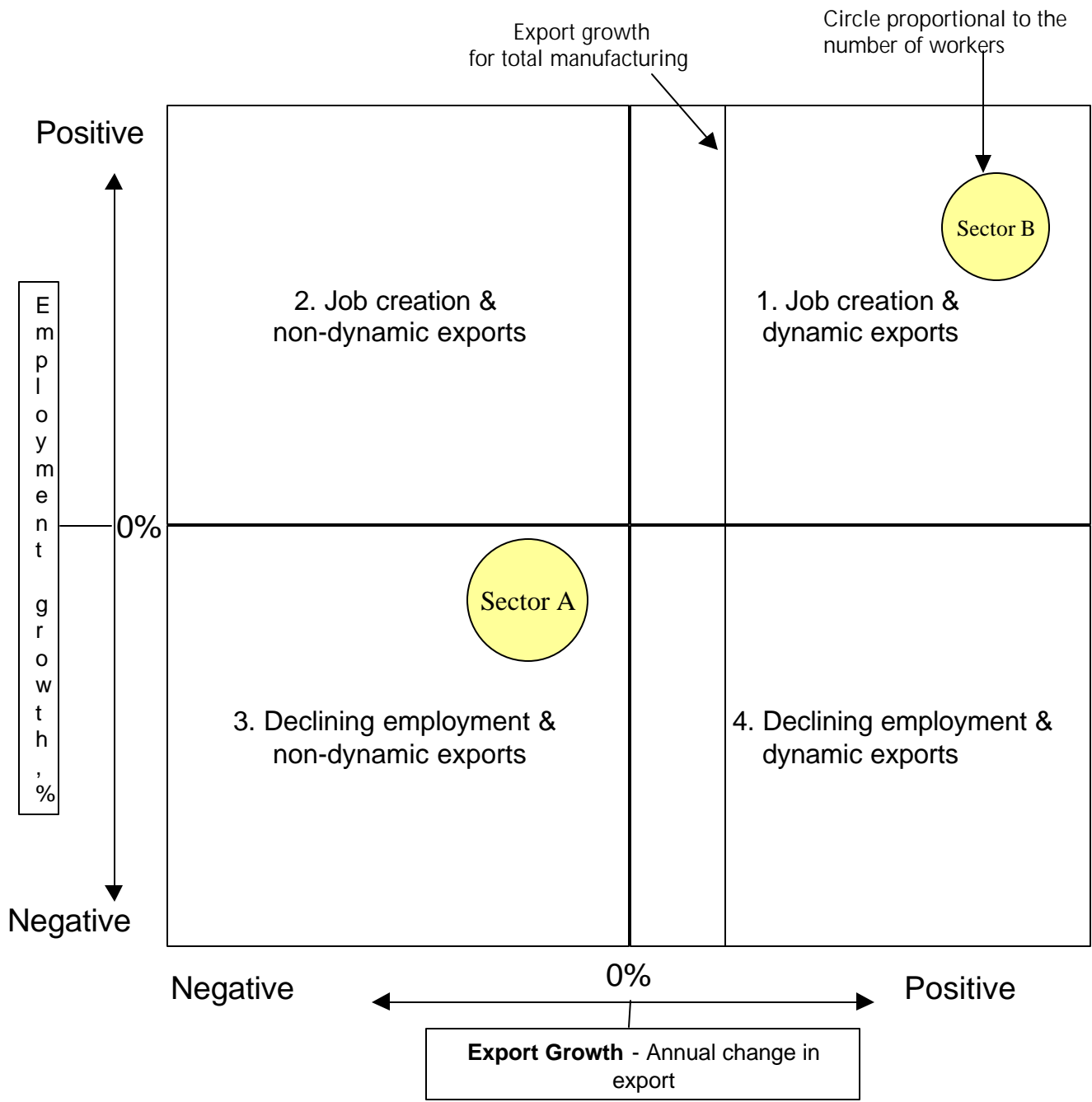
Important limitations

Finally, it must be mentioned that this initial version of *TRADEMP* **only includes data for the manufacturing sector**. Trade and employment data in the services and agriculture sectors are not captured in this application, despite their significant role in the different countries under review. In many developing countries (especially in LDCs) the agriculture sector employs more than half of the population, and services now represent more than 60% of the working population in industrialized countries.

Moreover, the different data included in *TRADEMP* only captures the **formal economy**. This should be kept in mind, especially for several developing countries for which the informal sector is estimated sometimes at 50% of the working population.

These observations have considerable significance, as the puzzle is not complete. In industrialized countries, globalization might have a global negative impact on industrial employment but simultaneously it implies usually more jobs in the services sector, as it creates many opportunities in various fields like transport, tourism, information technology, banking and insurance.

Chart 1. How to read the charts on Trade and Employment



Interpretation of the charts

Charts present the industrial portfolio in terms of employment (size of the bubbles) and evolution of employment (horizontal axis) and exports (vertical axis) over the recent past. The charts only include the **20 leading industries** in terms of employment.

Chart 1 illustrates in detail the different elements of these graphs. In particular, four quadrants have been defined for easier interpretation. The quadrants can be defined in absolute and relative terms. In addition to the vertical axis, the line labeled "*Export growth for total manufacturing*" divides the chart into two parts: sectors with export growth higher than for all national industries are located to the right whilst less outward oriented industries are located on the left side of this line.

Finally, it should be noted that since export flows are based on US\$ value, the decrease in exports might reflect a problem of negative evolution of terms of trade rather than a decrease in export volumes.

Quadrant 1 (upper right): **Job creation and dynamic exports.** The industries in this quadrant are characterized by an increasing number of employees and simultaneously by increasing exports to the rest of the world. In other words, sectors in this quadrant have grown in terms of employment due to successful outward orientation. This successful story of globalization might reflect different phenomenon like reduction of barriers to trade (resulting in trade creation and new jobs due to competitive advantage), successful export development for the corresponding industry (ex: canning, and preserving industry in Chile) or development of export platforms (as in the textile sector).

Quadrant 2 (upper left): **Job creation & non dynamic exports.** The industries in this quadrant are characterized by an increasing number of employees and simultaneously by decreasing exports to other countries. The decrease in exports can be in relative (in comparison to national export growth for total manufacturing) or absolute terms (decreasing exports in value terms, even if volume of exports increase).

A priori, sectors in this quadrant have grown in terms of employment due to inward orientation. In general, there are a limited number of industries in this quadrant, especially in the extreme left position (industries presenting negative export growth). It is likely to happen more frequently for developing countries, where the increase in population implies an increasing demand in the country (most likely higher than the external demand) and local output and consequently more jobs in the industry. It can also reflect a successful import substitution strategy for the corresponding countries.

Sectors in this quadrant with a positive export growth still describe a trend to increasing outward orientation, but at a slower pace than for all nation's industries.

Quadrant 3 (bottom left): **Declining employment & non-dynamic exports.** The industries in this quadrant are characterized by a decreasing number of employees and simultaneously by decreasing exports (in absolute or relative terms) to other countries. This unsuccessful story of globalization might reflect different phenomenon like reduction of barriers to trade (resulting in increasing import and job losses due to countries comparative and firms' competitive disadvantages), or geographic re-allocation of plants outside the country (like in the automobile or clothing industries). This last explanation is not always valid as many studies have shown a positive relation between increasing exports and outward investment.

Industrialized countries tend to have more sectors in this quadrant than developing countries. It usually concerns labor-intense industries with limited use technology. Industrialized countries do not always have a comparative advantage in these industries and they are affected by globalization. This is typically the case for the textile and clothing industries. For example, in France, the textile industry (ISIC 3210) lost many jobs (-4 % per year) over the last decade. Meanwhile, exports of the same sector grew by 7% per year, slightly less than the national growth (8.7%), and consequently the sector is located in quadrant 3.

As illustrated by this example, despite significant job losses, exports of the corresponding industries seldom decrease, as the economies go global and specializes in varieties of goods they still present a competitive advantage. For example, in the clothing industry, industrialized countries became more specialized in "haute couture" and luxury articles (like ties, costumes, etc.).

Quadrant 4 (bottom right): **Declining employment & dynamic exports.** The industries in this quadrant are characterized by a decreasing number of employees and simultaneously by increasing trade to other countries. This situation is not rare. It might happen in industries for which there were job losses consequently to an adaptation process to international competition, resulting in increasing productivity, successful specialization (or positioning) and consequently increasing exports.

This is for example the case of the electrical industrial machinery and apparatus manufactures in Canada (ISIC 3831). Employment in this industry is decreasing (2% per year), while exports are very dynamic (23% per year), boosted by increasing production per employee (+6% per year, against 4.7% for the whole country).

However, the evolution of production per employee over time is not always available, despite its crucial importance in the interpretation.

Final remark

Alternative graphs could be built for countries for which the export orientation ratio is available. The evolution of this ratio would then be used for the vertical axis, instead of the evolution of exports.

Interpretation of the tables

The title of the table indicates the last year of available data for the corresponding country. However, for some of the industries, when the data refers to another year (usually the previous year), it is mentioned into brackets in the industry label.

The tables only include the **33 leading sectors** in terms of employment. For most of the countries, it usually covers all the sectors. For countries using data defined at the 4-digits level of the ISIC, many sectors are not listed in the tables. For example, for the USA, the 33 leading sectors employ 10.7 million people, that represent 60% of total employment in the manufactures (17.5 million employees).

The indicators are not available for all the countries. An (*) follows the indicators that are not systematically available.

Note on the calculation of annual changes: Indicators expressed in annual change have been calculated over the period shown in annex 1 for the corresponding country. The period ends at the year indicated in the title. As shown in annex 1, there might be missing data for several years over the period under review. This is not a problem in terms of calculations, since a method dealing with missing data has been used (the least squared method). However, it implies that one should be careful when comparing the indicators **across countries** because a different time sample might have been used. In summary, these variables expressed in annual change should be taken as **indicative** only. They should be used to compare the evolution of employment, wage, productivity and trade openness of different sectors for a given country.

INDUSTRY : ISIC (rev.2) code and corresponding industry label. When the code finishes by 0, it means that the 3-digits code is used. For example, "3110 Food products" is an industry defined at the 3-digits level, in opposition to "3117 Manufacture of bakery products".

Employment (Nb of employees): number of employees by industry for the corresponding year.

Annual change in employment (%): annual change in employment over the period under review (see previous note on the calculation of annual changes)

Annual change in exports (%): annual change in exports over the period under review (see previous note on the calculation of annual changes); the evolution of exports is considered in nominal terms (in US\$).

Exports (US\$ m.): total exports to the world for the industry (in US\$ million, nominal terms)

Imports (US\$ m.): total imports from the world for the industry (in US\$ million, nominal terms)

Production (US\$ m.) (*): total output for the industry (in US\$ million, nominal terms)

Annual change in export openness (%)(*): annual change in openness to trade over the period under review (see previous note on the calculation of annual changes). Trade openness means here export ratio, formally: exports/output. There are alternative versions of trade ratios, such as the total trade ratio (exports + imports)/output, the import ratio (imports/output), and the marginal trade ratio (growth of trade/growth of output).

Wage per head (US \$) (*): average wage per head for the industry, expressed in US\$ (current US\$).

Annual change in wage p.h. (%)(*): annual change in wage per head over the period under review (see previous note on the calculation of annual changes)

Annual change in productivity (%)(*): annual change in productivity over the period under review (see previous note on the calculation of annual changes). Productivity means here "apparent productivity", e.g. production divided by the number of employees. Alternative definitions of productivity exist (see Bernard and Jones (1996) among others).

References

- Bernard, A.; Jones, C. Comparing Apples to Oranges: Productivity Convergence and Measurement across Industries and Countries. *American Economic Review*; 86(5), December 1996, pages 1216-38.
- Feenstra, R.C.; Hanson, G.H. Globalization, Outsourcing, and Wage Inequality. *National Bureau of Economic Research Working Paper: 5424*, January 1996, pages 8.
- Feenstra, R.C.; Hanson, G.H. The Impact of Outsourcing and High-Technology Capital on Wages: Estimates for the United States, 1979-1990. *Quarterly Journal of Economics*; 114(3), August 1999, pages 907-40.
- Harrison, A.; Hanson, G.H. Who Gains from Trade Reform? Some Remaining Puzzles. *Journal of Development Economics*; 59(1), June 1999, pages 125-54.
- Leamer, E. Effort, Wages, and the International Division of Labor. *Journal of Political Economy*; 107(6), Part 1 Dec. 1999, pages 1127-62.
- Leamer, E. In Search of Stolper-Samuelson Effects on U.S. Wages. *National Bureau of Economic Research Working Paper: 5427*, January 1996, pages 36.
- Leamer, E. Wage Inequality from International Competition and Technological Change: Theory and Country Experience. *American Economic Review*; 86(2), May 1996, pages 309-14.
- Leamer, E. What's the Use of Factor Contents? *Journal of International Economics*; 50(1), February 2000, pages 17-49.
- Leamer, E.; Levinsohn, J. *International Trade Theory: The Evidence*. Grossman, G.M.; Rogoff, K., eds. Handbook of international economics, volume 3. Amsterdam; New York and Oxford: Elsevier, North-Holland, 1995, pages 1339-94.
- Slaughter, M.J. Globalisation and Wages: A Tale of Two Perspectives. *World Economy*; 22(5), July 1999, pages 609-29.
- Slaughter, M.J. International Trade and Labour-Market Outcomes: Results, Questions, and Policy Options. *Economic Journal*; 108(450), September 1998, pages 1452-62.

| | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 |
|--------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Philippines | | | | | | | | | | | | | | | | | |
| Portugal | | | | | | | | | | | | | | | | | |
| Romania | | | | | | | | | | | | | | | | | |
| Senegal | | | | | | | | | | | | | | | | | |
| Singapore | | | | | | | | | | | | | | | | | |
| South Africa | | | | | | | | | | | | | | | | | |
| Spain | | | | | | | | | | | | | | | | | |
| Sri Lanka | | | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | | | |
| Thailand | | | | | | | | | | | | | | | | | |
| Trinidad and Tobago | | | | | | | | | | | | | | | | | |
| Tunisia | | | | | | | | | | | | | | | | | |
| Turkey | | | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | | | |
| United States of America | | | | | | | | | | | | | | | | | |
| Uruguay | | | | | | | | | | | | | | | | | |
| Venezuela | | | | | | | | | | | | | | | | | |
| Zimbabwe | | | | | | | | | | | | | | | | | |

Legend: cells in dark indicate available data for the corresponding year.