

## **Productivity Perspectives 2007**

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### **Takeaways from the Day**

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### **1. Introduction**

In the time allotted for this wrap up session, I do not have time to review all of the fine presentations that were made today. However, as the various speakers developed their topics, I noted down various implications of their analysis for the OECD (which is the premier international agency concerned with the data needs of productivity measurement), for the Australian Bureau of Statistics and for the Productivity Commission. Thus in section 2-4 below, I will list my suggested recommendations for these three agencies.

### **2. Recommendations for the OECD**

Here is a list of my recommendations for a program of work in the productivity area for the OECD:

- Provide “standard” measures of capital services for OECD countries broken down into machinery and equipment, structures, land and inventories. It is particularly important to make some estimates for land and inventory capital services since the EU KLEMS project excludes these services.
- Provide “standard” estimates of the labour and capital components of the mixed income component of operating surplus. Taking these first two points together, it should be possible for the OECD to have a publication that breaks down primary input components into price and quantity (or volume) components and this would enable the OECD to extend their present publication national accounts publication which has price and volume components for the output components of GDP to provide the same type of coverage for the input components of GDP.
- Provide alternative estimates for the price and quantity of Owner Occupied Housing (OOH) for member countries. At present, a wide variety of methodologies are used by member countries to price the services of OOH in their national accounts, which makes intercountry comparisons of GDP and productivity somewhat difficult to interpret. I would suggest that “standard” estimates for the price and quantity of OOH be provided using the acquisitions, rental equivalence and user cost approaches to the valuation of OOH services.

- It would be very useful if the OECD could provide “standard” output and input price and quantity data for at least two sectors for each member country’s economy. The two sectors would be (i) the market sector and (ii) the nonmarket sector (or more narrowly, the general government sector). EU KLEMS provides a much more detailed industry breakdown but the omission of land and inventory inputs means that more work needs to be done. Also there is a need for a careful analysis of indirect tax effects; i.e., EU KLEMS uses a final demand prices as their pricing concept and this is not necessarily the best framework for the measurement of productivity by industry.
- Provide standard estimates of nominal and real R&D expenditures for member countries. There is also a need to undertake further research in this area; i.e., R&D investments are inherently “monopolistic” in nature but the current growth accounting framework essentially assumes competitive pricing behavior.<sup>1</sup> There is also a need for case studies of the amortization of R&D expenditures.
- There is a need to develop standard estimates of human capital for member countries and the interaction of human capital with the educational system. As a start down this path, it would be necessary to distinguish different types of labour by their educational requirements (this would also improve the measurement of labour input by industry). The goal here would be to have “standard” measures of disaggregated labour input for each member country. Obviously, this cannot be done overnight. Moreover, the cooperation of the member countries would be required.
- The measurement of health outputs and inputs. This is a big job which will take a long time to sort out. It seems to me that it may be premature to try and value health sector outputs by *user valuations* (due to the difficulties in finding objective and reproducible valuations by demanders of health services) so for now, it seems better to focus on finding quantitative measures of health sector outputs and valuing these quantities using *cost weights*. In addition to quantity information on medical outputs produced during the accounting period, information on the prices and quantities of the inputs used to produce each of the outputs must also be obtained. The difficulties in finding a common classification system and obtaining the requisite data from member countries seems daunting but a start must be made.

### 3. Recommendations for the ABS

Here is a list of my recommendations for a program of work in the productivity area for the ABS:

- Keep working on the sectoral productivity estimates. Diewert and Lawrence (2005) raised their concerns that a preliminary set of sectoral productivity data seemed to contain many anomalies and Denis Lawrence in his presentation today indicated that he still has concerns about the validity of the latest data set.

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<sup>1</sup> For more material on the problems associated with the capitalization of R&D expenditures, see Diewert (2005a) (2005b) and Diewert and Huang (2007).

- Extend the productivity data base for the market sector to some of the hard to measure sectors that are presently left out. As usual, the initial estimates will probably not be perfect but it is useful to make a start and over time, the estimates will gradually improve.
- Have another look at the measurement of inventory change. Current procedures can lead to rather odd looking measures of price changes associated with inventory changes. The problem is that normal index number theory breaks down if the value aggregate under consideration can change sign over the two periods being compared. It is important also that measures of inventory change be integrated with the capital services provided by the starting stock of inventories.<sup>2</sup>
- Provide alternative estimates for the price and quantity of Owner Occupied Housing (OOH) for member countries. In particular, estimates for the price and quantity of OOH should be provided using the acquisitions, rental equivalence and user cost approaches to the valuation of OOH services.
- Provide estimates of nominal and real R&D expenditures and undertake further research in this area.
- Continue to develop more disaggregated estimates of labour input by industry and eventually develop estimates of human capital.
- Develop a plan for the measurement of health sector outputs and inputs. For the present, I would recommend that health sector outputs be valued using cost based weights since this will lead to more objective and reproducible estimates compared to the use of final demand valuations.<sup>3</sup>
- Develop price and volume estimates for final demand components and for primary inputs by State. There is a great deal of demand for this information and the paper presented by Gudrun Meyer-Boehm (2007) at this Workshop shows that it can be done but of course, the ABS would do a better job. It would be desirable to have a breakdown between the market and nonmarket sectors by State but I am not suggesting that a complete *industry* productivity data base be constructed at the State level, due to the difficulty of obtaining data on the deliveries of outputs across states and the use of intermediate inputs by the State of origin by industry. It should also be noted that providing data on infrastructure capital stocks by State would enable researchers to obtain more satisfactory estimates of the value of infrastructure investments in improving market sector productivity; see Fox (2007).
- A missing input that is very important for Australia is the stock of resources. Over the next five years or so, it would be very useful if the ABS could develop estimates for the prices and quantities of various resource stocks.<sup>4</sup> Dean Parham (2007a) (2007b) has made the case that these missing resource stocks are “lurking variables” (i.e., omitted variables) that could explain the puzzling productivity performance of the Australian mining industry.
- Finally, Robert Breunig in his presentation at this Workshop noted the importance of studying productivity at the firm level. I agree with his assessment of the

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<sup>2</sup> For materials on a consistent accounting framework, see Diewert and Smith (1994) and Diewert (2005c).

<sup>3</sup> See Diewert (2007) for some hints on how to implement this cost based methodology.

<sup>4</sup> These resource stocks can be treated in the same way as inventory stocks.

importance of encouraging productivity researchers to access firm level data on outputs and inputs. However, the ABS must protect the confidential nature of its firm level data and so it is not entirely clear how the ABS should proceed to encourage further research in this area.

#### **4. Recommendations for the Productivity Commission**

My set of recommendations for the Productivity Commission is much more limited since the construction of productivity data is not their primary task. However, it seems that the Productivity Commission is in fact sponsoring some research that is measurement related and hence I can recommend that they continue along this path, since the ABS has limited resources and cannot measure everything of interest with their present resources.

- Given the continuing interest in the effects of changes in the terms of trade on the welfare of Australians, it would be useful to update the study by Diewert and Lawrence (2006) on the effects of changes in the terms of trade, since their data stopped at 2004. Since the Productivity Commission sponsored the original study, it would seem to be appropriate for the PC to finance an update of the project.
- Perhaps the Productivity Commission, in cooperation with the ABS, could construct estimates of resource stocks in Australia, given the importance of this “lurking variable” in explaining mining sector productivity growth.
- The Productivity Commission is already sponsoring some research into the measurement of inputs and outputs in the health industry; see Gabbitas (2007). Given the importance of health, it seems reasonable that this research be continued. As I indicated above, initially, I think it makes sense to value health outputs using cost weights but eventually, we will want to move away from this cost based “activities” or “procedures” approach to measuring outputs to an “outcomes” approach that uses final demander valuations for health outputs. Of course, an important “lurking variable” in this framework is the set of characteristics of the patients undergoing various treatments. It will take some time to adequately measure health sector outputs but perhaps the Productivity Commission with its focus on economic measurement is in a good position to undertake research in this area.

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