A Coincident Indicator of Economic Activity

Introduction

Our understanding of the state of the economy is based largely on the official data released by the Australian Bureau of Statistics (ABS). Depending on what is being measured, ABS data can take a long time to collect and compile and is subject to revision over time. For example, the ABS measure of gross domestic product (GDP) growth in the December quarter 2010 will be available at the beginning of March 2011. Thus, timely indicators of the Australian economy are important for both economists and policy makers.

Ai Group's Economics and Research Unit constructs a set of monthly performance indices for the manufacturing (Australian PMI©), services (Australian PSI©) and construction (Australian PCI©) sectors. These measures take only a couple of weeks to produce, often well ahead of data released from the ABS, and have been shown to contribute some timely and accurate information on the state of the Australian economy.[1]

Currently, Ai Group's performance indices are produced and analysed independently. While this is necessary for analysing current trends in each sector, there may also be scope for these indices to provide the basis for a timely indicator of the overall economy. This Economics Research Note explores some of the issues associated with constructing a coincident indicator of the economy and outlines the current work of the unit in this area. In particular, two methods are considered:

1. Creating a composite index of economic activity by combining the three Ai Group performance indices.
2. Creating a more complex index by combining Ai Group's indices with other information such as financial market data or timely data from the ABS. As discussed below, this could be achieved using regression techniques or the principal component method.[2]

Issues under consideration

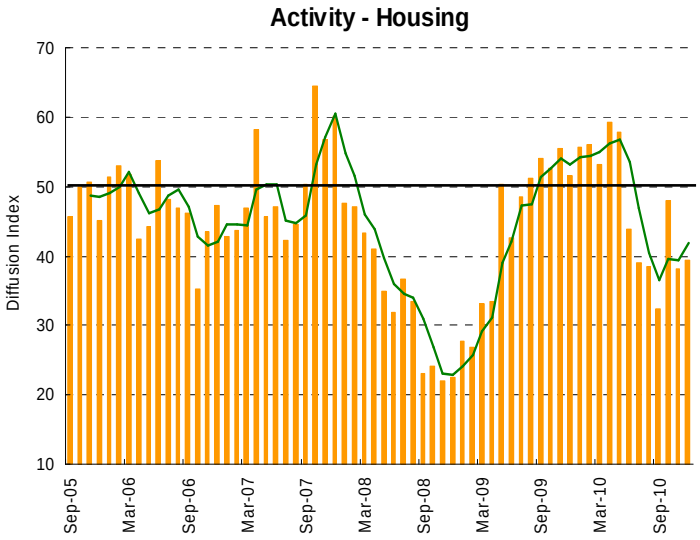
1. Combining the three Ai Group performance indices

The Australian PMI; PSI; and PCI are all diffusion indices; a reading above 50 points indicates that a sector is expanding. As each of the three indices are constructed in the same way, a coincident indicator of the economy could be created by simply weighting together our three performance indices. One issue with this approach, however, is that the indices do not all start at the same point in time. For example, the PMI has a long history dating back to the early 1990s while the PCI only began in 2005. Thus, if this approach was to be used to construct a coincident index of activity, the index would need to start from 2005. For at least a couple of reasons, a coincident indicator of the economy should probably have a longer history than this:

1. It is important to see how the index behaved during previous economic cycles. For example, the short history of the PCI means that there is no historical context to interpret the sharp collapse in the housing activity index seen around the start of 2009 (Chart 1).

[1] An analysis of the correlation between Ai Group's performance indices and official economic data, such as GDP, is available in previous Economics Research Notes (see http://www.aigroup.com.au/economicsresearch/researchnotes) and will shortly be published in the *Economic Papers* journal.
[2] Essentially the principal component method involves expressing two or more variables by a smaller number of 'principle' components that account for the variation in the observed variables and that then can be used as a predictor (e.g. in this case a principal component can be used as a predictor of GDP).

Chart 1



2. Prominent survey indices from the NAB and Sensis, for example, both have extended histories going back to the early 1990s. This feature is partly why the Reserve Bank chooses to focus on the NAB survey in their Statement of Monetary Policy.

While we only have limited time series history for the PCI and PSI, we do now have sufficient data to infer what the series might have looked like in the past i.e. we can now use regression techniques to estimate what the PCI would have looked like before the series was first published in 2005. This estimated series could then be 'spliced' on to the actual data in order to extend the history of the PCI. The same process could be applied to the PSI (and even the PMI), so that the composite index could be stretch back as far as the 1980s.

2. Cross-section coverage

A coincident index of the economy should ideally be based on the responses of a representative sample of businesses. Combining Ai Group's three performance indices ensures that businesses in the manufacturing, services and construction sectors are represented, though, importantly, this approach excludes businesses in the mining and agricultural sectors.

One way to address this is to add businesses from the mining and agricultural sectors to our current sample. However, it would be difficult to start including the responses of these businesses in a coincident index because it would cause a clear structural break in the series (making interpretation and comparison of the series over time more difficult). Nonetheless, there are at least a couple of ways that the mining sector could be incorporated into a new coincident index:

1. We could interview businesses from the mining sector over the next two years or so and then do a similar exercise to that above i.e. use regression techniques to estimate how mining businesses would have responded in the past.
2. Alternatively, we may be able to obtain historical data for the mining and agricultural sectors from other business surveys.

3. How should we combine our performance indices?

Another issue to consider is how the three Ai Group indices should be combined together. It seems sensible to weight the three performance indices according to their share of GDP, which would result in the weights shown in Table 1 below.

Table 1. Possible weights for a coincident index

Index	**Weight** (Based on share of GDP)	**Weight** (Smoothed)
PMI	0.13	0.30
PSI	0.78	0.50
PCI	0.09	0.20

However, given that the survey results are volatile from month to month, it may be sensible to not place too much weight on any one particular survey measure. Thus, weights that are more evenly spread across the sectors, as shown above, may be more appropriate.

4. Combining the Ai Group performance indices with other timely information

As the overall goal of this exercise is to produce a timely indicator of activity in the economy, it makes sense to consider how other information outside of Ai Group's indices could be incorporated into a coincident index. One possible approach is to combine Ai Group's monthly indices with other information such as financial market data to produce a more sophisticated index of activity. This is commonly done within central banks including the Reserve Bank of Australia.

The main issue with this approach is to determine how to combine each of the individual series that make up the index. While there is room to experiment with this, two possible methods include principal component analysis and regression techniques i.e. regression techniques could be used to produce a series that best explains a chosen measure of activity such as year-ended growth in GDP or domestic final demand.

Work ahead

Ai Group's Economics and Research Unit is currently working through the issues outlined above with a view to constructing a new coincident indicator of activity. One possibility is that the unit looks to develop a composite index based on the three Ai Group indices, to be published alongside the PMI; PSI; and PCI. At the same time, the unit will look at how other timely information could be used to produce a more sophisticated index. This could then prove to be a simple but powerful tool for analysing the state of the economy in real time.

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