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The risks behind agricultural forecasts

Clémentine Marcon, intern at the Australian Farm Institute - AgroParisTech (France) student

Gaétane Potard, Research Officer – Australian Farm Institute

Too often we see 'economic projections' or 'forecasts' used unwarily. The International Monetary Fund (IMF) failing to estimate the consequences of European austerity measures on the European Union (EU) growth rates is a prime example. A core assumption of the IMF model in 2010 was that a 1% decrease of public spending and a 1% increase in tax for EU member countries would result in a decrease of 0.5% of the EU's GDP in the period 2010 to 2011. However, the assumptions surrounding the impact of austerity measures were too low in this instance, and ultimately the EU's GDP decreased by 1.5% for that period.

Overtime, similar occurrences have impacted on Agriculture as well. In the 1990s, the US Army Corps of Engineers increased the size of dams on the Mississippi river from 600-feet to 1,200-feet to further support barges of grains and soybeans. The cost and benefit analysis for the project drew upon data from the USDA and extrapolated the existing data for 40 years (Baumel 2001). The US Army Corps of Engineers outlook model assumed the benefits well exceeded costs as the US exports of grains and soybeans were predicted to increase in the short term. Ten years after the dam expansion, however, US exports had not reached the models projections due to various factors. These factors included occurrences such as a decrease in corn exports to Thailand and Korea that resulted from the foot-and-mouth disease (FMD) outbreak throughout their swine industry, and a decrease in European grain and soybean imports due to concerns regarding genetically modified (GM) crops.

In 1996, every USDA crop forecasts models predicted a world crop price increase and an increase in US grain exports. This spike didn't occur in part due to the Asian economic crisis. As explained here, the 1996 Farm Bill had based all its price support calculations on these forecasts. The 2002 Farm Bill later had to include 'countercyclical' support in order to correct these type of mistakes.

For Australia, a prime example is the ABS using the ABARES crop production outlook data when publishing the quarterly Australian GDP estimates. In December 2010, the calculation for agriculture GDP misguided Australia's economic outlook when the unforeseen weather events of late 2010 significantly changed the output volumes and values for some of Australia's agricultural commodities. If the risk of these events had been factored into the calculation, it would have dragged the overall GDP contribution from agriculture lower resulting in a small recessionary period for Australia (see further information here).

The ways in which Agricultural projections are calculated is complex. There are generally many equations, interrelations, assumptions, expert opinions, and a few 'caution' warning statements. Wisner et al (2002) highlighted that mid-term projections are not supposed to be used when making investment decisions, and are only supposed to be used as a tool for policy analysis. The review by Wisner et al also highlighted different error sources in model provisions. First and foremost, the technological changes can significantly increase the error in projections. An historic example is the one of Malthus in the 18th century. Malthus predicted an optimistic future for farmers and a poor one for consumers as demand for food would follow the population growth which would increase more rapidly than food supply. However, technological developments were supportive for food supply, which led to quite the opposite conclusion that Malthus had predicted. Secondly, outlook models often use the correlation between income and consumption for projecting demand; however, it is difficult to project shifts in consumption when events such as FMD in Asia and GM opposition in Europe change trade conditions.

Among other macroeconomic assumptions, the currency exchange rates also have a significant impact on trade conditions. Predicting currency changes is extremely difficult. For example, in 1999 the USDA baseline assumptions for forecasting agricultural exports did not include the devaluation of the Brazilian Real (Baumel, 2001). Ultimately, Brazil's agriculture was dealt an export advantage as their commodities were seen as more affordable than most other agricultural exporters once the currency devalued.

In theory the limitations mentioned in this article should prevent investors making onerous mistakes when relying on economic projections or forecasts. With this in mind, there are researchers that propose 'corrective methods' for using these outlook models. An article from Sanders Dwight R. et al (2009) presents a statistical approach to correct the monthly data provided by the USDA cotton production forecasts. The article discusses how the data are 'smoothened' when cotton production forecasts in October are corrected in September using recently collected production data. However, the main projection still relies on, although not always intentionally, the projected trend established in August. The research article proposes that a graphical technique is adopted which identifies if forecasts are smoothened with a regression line to correct data. The article encourages all investors to follow the corrective method before making costly business investment decisions.

Some researchers also now assert that 'the recent price upsurge is only the logical consequence of expectation errors and the unstable character of the market equilibrium point' (Boussard J,M et al 2008, see here). Their 'corrective model' lead them to assert 'Yet, it might happen that the increased volatility leads to an average price higher than during the state involvement, contrary to policy makers expectations.'

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Agricultural models for forecasting appear to be increasing in their reliability due to improvements in model assumptions. This has meant that these models provide a useful and affordable tool for policy analysis as long as everything remains the same (ceteris paribus). Purposely, these models illustrate possible outcomes if variables change however, they do not predict how the variable will change. For policy-makers and agricultural industry leaders wanting to use ag-economist outlooks, it is highly advised that a large panel of sources are compared, and the underlining assumptions for the outlook model are explained.