Economic Bulletin.

27 February 2020

Estimating the impact of drought in 2020.

- This summer has seen drought conditions emerge in the upper North Island, with many parts of the rest of the North Island and the upper South Island also very dry.
- Droughts tend to result in a short but sharp hit to GDP, most obviously through lost dairy production.
- The 2013 drought, the most severe in many decades, knocked an estimated 0.2% off GDP in the March quarter and 0.6% in the June quarter, with activity returning to normal levels in September.
- While the current drought is still in its early stages, we've allowed for an impact in our GDP forecasts equal to around half of the 2013 event.

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This year's summer is proving to be another stressful one for New Zealand farmers. The dry conditions are most extreme across the upper North Island, after a month of little or no rain, and a drought has been officially declared in Northland (which allows farmers to tap into government assistance). It's also been extremely dry in the Waikato, a major dairying region, and very dry across much of the rest of the North Island and the upper South Island.

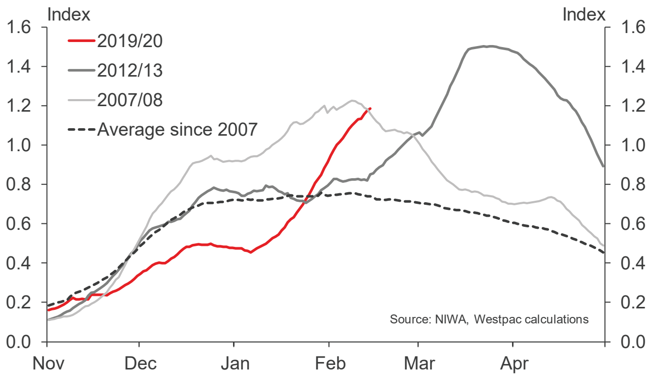
Droughts tend to result in sharp but short-lived hits to GDP. However, it's not easy to disentangle their impact from what's going on in the wider economy. Some of the more severe droughts in recent times have coincided with major economic shocks such as the Asian Crisis in 1997-98 and the Global Financial Crisis in 2007-08. In contrast, the economy continued to grow at a solid pace through the 2013 drought, which was considered the worst in 70 years; the impact on farming was offset by other factors such as the ramping up of the post-earthquake rebuild in Christchurch.

This year, the risk of drought has emerged at a time when the domestic economy was otherwise expected to see a modest pickup in growth. However, it also comes at the same time as the coronavirus outbreak, where the containment efforts and supply chain disruptions are also likely to see a sharp temporary hit to GDP. Put together, we are forecasting March quarter GDP growth to be close to zero, with a good chance that it could turn negative. However, while the drought is likely to have its greatest impact in the June quarter, we don't think this will be enough to see two consecutive quarters of negative GDP growth, the definition of a recession.

The impact of dry weather on agriculture, and therefore on the wider economy, depends on a number of factors. Every summer is dry to some extent; what matters is the severity, the duration, at what point in the season it occurs, and which parts of the country are affected.

We've tried to capture these factors in a single measure using data from NIWA's New Zealand Drought Monitor (NZDM), which incorporates measures such as rainfall and soil moisture deficits. The data is provided on a daily basis at the territorial authority level, which we weight by estimated milk production for each region. The following chart shows how current conditions compare to the average since 2007 (the beginning of the data set), and to the two most severe droughts in that time.

Drought index by year



We can see that the 2007-08 drought was unusual for its duration, with drought conditions emerging as early as November and continuing as late as April. Meanwhile, what made the 2013 drought so damaging was not just its severity (the high reading on our index reflects the fact that it affected almost the entire country) but also how late it extended into the dairying season, not reaching its peak until the end of March.

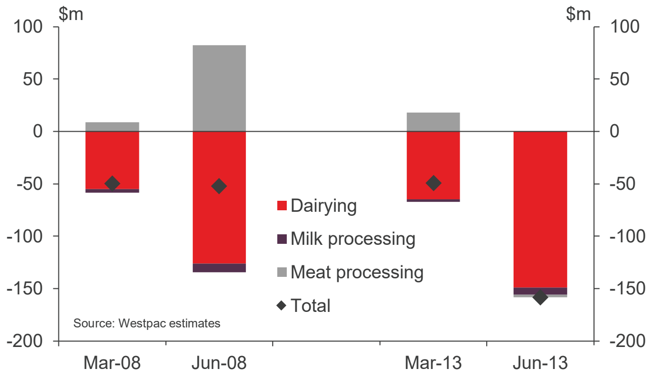
On this measure, the current drought is still at a relatively early stage. Nationwide conditions were actually less dry than average in the early part of summer, but have become much more severe in the last month or so. That means the impact could still go either way. If significant rain arrives soon, the impact on activity could prove to be modest, but the longer that the rain holds off, the more that this could start to resemble the 2013 event. (Note that the chart hasn't been updated to reflect last weekend's rainfall.)

Tracing the impact that previous droughts have had on GDP requires some guesswork. The most directly measurable impact is on milk collections – with less pasture, farmers start to dry off their herds earlier. This reduces production over the tail end of the season from February to May, which normally accounts for about 30% of full-season production. There is also a small additional hit to milk processing.

The impact on sheep and beef is a little more complex. The typical response is that farmers send their stock to the freezing works earlier than usual, which largely amounts to a timing shift – actually boosting GDP during the first quarter of a drought, with a corresponding shortfall in the next quarter. While the 2013 drought fit that description, the 2008 drought was more unusual – there was a massive cull of sheep that left the national flock permanently lower (more accurately, it accelerated a long-running decline). As a result, meat processing actually lifted GDP over 2008, at the expense of lower output over the following years.

In principle the GDP figures should include a hit to on-farm production of sheep and cattle, due to lower animal weights and the cost of imported feed. However, in practice this is not well-measured in on quarterly basis, and there was no discernible impact on the GDP figures during the two previous droughts.

Estimated GDP impact from previous droughts



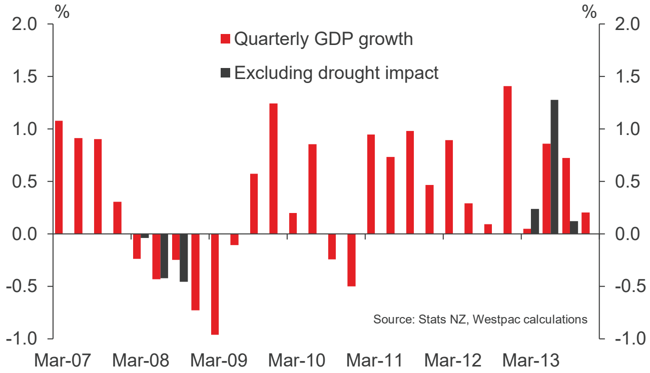
A drop in agricultural output will have knock-on effects for a range of connected industries, such as transport, wholesaling, equipment hire, veterinary services and other business services. For dairying, these second-round effects may be softened by the fact that the impact on dairying revenue tends to be more neutral – world prices rise when New Zealand's milk production falls short. For sheep and beef farmers, however, it's all bad news, with a hit to both volumes and prices as meat processors face a glut of supply.

While we can't measure the second-round effects on the economy, we estimate that they could be as large again as the direct impact on farm output.

Altogether, we estimate that the 2008 drought knocked 0.2% off GDP for two quarters, with activity returning to normal by the September quarter. Adjusting for this impact makes it clear that the drought alone wasn't responsible for the New Zealand economy's slide into recession; it was already heading that way as the Global Financial Crisis escalated.

The more severe 2013 drought knocked an estimated 0.2% off GDP in the March quarter and 0.6% off the June quarter, with activity again returning to normal by September. Even so, the economy avoided a recession: while GDP was close to flat in the March quarter, it rebounded by 0.9% in the June quarter, even with a sharp drop in agricultural output. (That is, however, with the benefit of several years of revisions to the GDP data. At the time, March and June quarter growth were reported as 0.3% and 0.2%, with the rebound not occurring until the second half of the year.)

Drought impact on quarterly GDP growth



In our most recent quarterly *Economic Overview* we made a modest allowance for the impact of drought, knocking 0.1% off our forecast of March quarter GDP. In light of developments since then, we've decided to make a larger allowance, taking an additional 0.3% off our forecast for the June quarter (with a correspondingly larger rebound in the September quarter). Put together, that's equivalent to half of the impact of the 2013 drought. We'll continue to review this estimate as the season progresses and more hard data becomes available.

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