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The national accounts - a note on the treatment of losses
resulting from natural disasters

by J W Prinsloo

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The national accounts – a note on the treatment of losses resulting from natural disasters

by J W Prinsloo

Introduction

Losses suffered on account of natural disasters caused by fires, droughts and floods are not explicitly accounted for in the national accounts. The cost of flood damage in Mpumalanga, the Northern Province and other regions since the beginning of 2000 and the severe damage earlier this year caused by wildfires in the Western Cape, nevertheless call for some quantitative assessment of the likely impact of these catastrophes on economic activity generally. To this end, the national accounts present a useful framework for deriving estimates of the extent of the damage caused by natural disasters.

This note outlines how the consequences of a natural disaster are captured in the production and expenditure accounts. The treatment of capital stock and aid provided by general government are also briefly analysed. The final section contains a few graphs and some concluding remarks.

Production and expenditure

It is difficult to determine the overall impact of natural disasters on national income and production aggregates. Firstly, most of the effects are embedded in the source data. If, for example, a disaster has temporarily curtailed residential and other construction work, or some mining production, then the data on capital formation or production statistics would be lower than they would otherwise have been. This shortfall cannot easily be isolated from the effects of other factors that may also have influenced investment or production activities. Secondly, the reduction in production and incomes in the areas hit by a disaster may be at least partly offset by increases in production and incomes elsewhere in the economy. Thirdly, rebuilding efforts may, perversely, boost production, income and employment in the areas affected by disasters.

A sensible assessment of the damage caused by natural disasters should be based on a comparison of output estimates under "normal" conditions and the ex post estimates of actual disaster-affected output. In the case of agriculture, surveys based on intended acreage planted, projections of prospective yields, actual acreage planted and prospective yields should provide an estimate of the output that would have been recorded had there been no disaster. This clearly indicates that it is virtually impossible to quantify precisely the total impact that disasters could have had on the national accounts aggregates.

Losses in production arising from damage to stocks and production capacity, including the loss of production time, will as a rule be captured by a decline in the value added by the specific sector and region. Inventory losses will be accounted for in the calculation of the gross value added by industry, and on the expenditure side of the accounts by a decline in inventories. This will bring into equilibrium the production and expenditure estimates of the gross domestic product. The total destruction of residential buildings should be accounted for through the adjustment of the rental value of houses at current and constant prices. However, because of the lack of accurate data on the actual value of the houses destroyed, the rental values forfeited can be assessed only with a considerable margin of error.

As soon as conditions start returning to normal after a disaster, increases may be record-

ed in expenditure components such as household final consumption expenditure (especially on durable goods), fixed capital formation and the accumulation of inventories. However, the impact that these changes have on investment and expenditure will depend on the availability of financial resources and possible constraints resulting from infrastructural bottlenecks and supply limitations in the region. The empirical estimates of the economic consequences of a natural disaster will therefore be captured in the national production and expenditure estimates over an extended time, and not necessarily in the period immediately following the disaster. Furthermore, output from a disaster region will be lower than normal until such time as production capacity is fully restored in that region. By contrast, other unaffected regions could temporarily benefit from the increased demand from devastated areas.

Capital stock

In the case of losses of capital stock, the estimated damage should be deducted from total capital stock. The method used by the South African Reserve Bank to calculate the consumption of fixed capital provides indirectly for this. In accordance with international guidelines, the Bank uses the straight-line method to provide for the consumption of fixed capital by type of asset, using different asset lifetimes. This means there is a mechanism that implicitly provides for the gradual decay of physical assets and that some assets might have been written off in their entirety even before they were devastated by a disaster.

In practice, the capital stock is calculated fairly conservatively because assets with a lifetime longer than the period used for writing them off, remain part of total capital stock and are used in the production process, even though they are no longer part of the estimated capital stock. As stated in the recommendations of the System of National Accounts: "It seems reasonable, however, to value consumption of fixed capital on a straight-line basis with reference to the expected economic lifetime of the individual assets. The estimates of the expected economic lifetime of fixed capital should take account of the average (normally expected) amount of accidental damage to fixed assets which will not be made good by repair or replacement of parts, for example, damage arising from fire or floods."

The total cost of the flood damage caused by cyclone Eline in the Northern Province and Mpumalanga has not yet been finalised. Preliminary estimates of the flood damage in the agricultural sector as at the end of June 2000 amounted to more than R550 million. This does not include crop losses and insured or insurable damages. If, for example, an aggregate figure of between R3,0 and R4,0 billion is used, the total cost of the disaster would amount to less than 0,5 per cent of South Africa's gross domestic product. Although the influence of a natural disaster will be concentrated in some local authorities and provinces, the net effect on the overall economy (depending on the magnitude of the disaster), phased in over several quarters, would probably be negligible.

Aid

General government normally provides aid during and after a disaster, through increased government spending, current transfers to households and capital transfers to business enterprises. These types of expenditure are fully accounted for in the national accounts. Aid given to households by business enterprises in the private sector is treated as transfers from the corporate sector to the household sector. Transfers and aid among households are not recorded because these transactions reflect only a redistribution of

income in the household sector. If households and non-profit institutions serving households are treated as independent institutions, aid in the form of grants and donations between these two institutions should be shown as current transfers.

General government

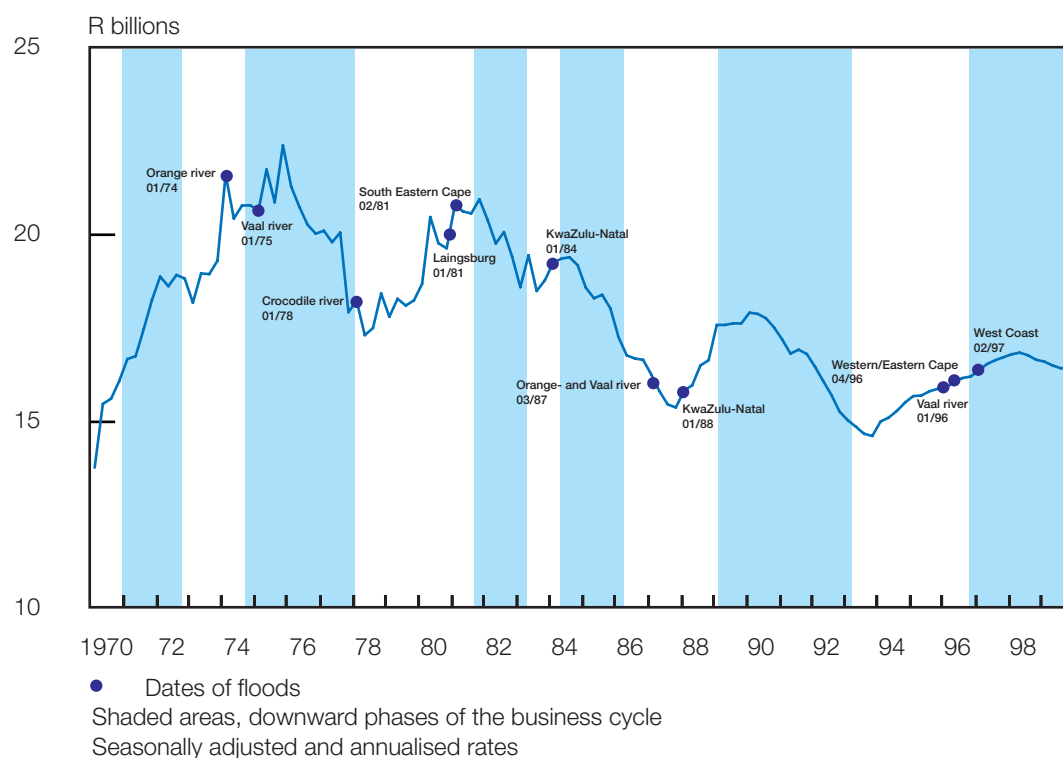
The direct losses suffered by general government will normally be due to damage to infrastructure such as roads, dams, bridges and irrigation canals. Provision for the consumption of fixed capital embodied in these assets forms part of total consumption expenditure by general government. Work to repair the damage caused by a disaster will be captured as part of consumption expenditure by general government. By contrast, the replacement of equipment and infrastructure is part of gross capital formation by all levels of general government, namely central government, provincial government and local authorities. Emergency supplies provided by general government and the cost of rescuing flood victims are treated as part of current expenditure by general government.

Concluding remarks

In the accompanying graphs the dates of some of the major floods in South Africa since 1970 are plotted along with the estimated real gross domestic fixed capital formation and the real value added by the construction industry. It seems that the South African economy has almost always been in a cyclical upswing when flood disasters occurred. This, and the fact that the total cost of disasters was small in relation to aggregate gross domestic product, complicate the empirical assessment of the implications that natural disasters have for growth and investment.

The overall consistency of the national-accounts estimates will be intact because increases in capital formation, consumption and the change in inventories following exogenous

Real value added by the construction industry



Real gross fixed capital formation



shocks are captured along with endogenously determined changes in production levels, employment and the compensation of employees. In addition, the national-accounts estimates should reflect the underlying trends in production and expenditure activities and indicate the direction in which aggregate economic activity is moving. If a “complete” record of the cost of disasters coupled with reliable estimates of potential output under “normal” conditions could be obtained, it should be possible to assess with the aid of a quantitative macroeconomic model the most likely impact that a natural disaster would have on activity and growth in the economy.