Method for generating forecasts of macroeconomic indicators

Macroeconomic Strategy, Economic Policy Group, Department of Treasury and Finance

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The Department of Treasury and Finance (DTF) monitors economic conditions in the Victorian economy and prepares forecasts of the main economic indicators of those conditions for the budget year and three ensuing years. The economic forecasts underpin the Government's fiscal outlook presented in the *Budget* and *Budget Update*.

The key economic indicators are forecast growth in real gross state product (GSP) and the level of nominal GSP, growth in employment, the unemployment rate, growth in wages (as measured by the Wage Price Index, or WPI), growth in consumer prices (as measured by the Melbourne Consumer Price Index, or CPI) and population growth.

The aim of this paper is to help the reader understand the methods used by DTF to undertake macroeconomic forecasts.

## Approach

A number of methods and sources of information are employed to generate macroeconomic forecasts. These include consideration of recent and current recorded values, government and central bank policy announcements, econometric modelling, trends suggested by leading indicators, economic theory, industry and business liaison, insights provided by other forecasts, and the experience and judgement of DTF analysts.

The forecasting process is iterative. Many of the variables in model equations are common to several models, and dependent variables in one model may be explanatory variables in others, requiring several rounds to ensure convergence. In the process other sources of external information and the judgement and experience of the forecasters are used.

There is a point in recent history where actuals for each of the variables to be forecast are known (notwithstanding that the Australian Bureau of Statistics (ABS) often revises published data). This information provides the starting point for the forecasts.

The forecasts by the end of the forward estimates are anchored by long-run steady-state or trend values. These trend values are derived from economic theory and based on fundamental drivers.[[1]](#footnote-2)

The methodology is reviewed before each forecasting round with new parameters in model equations calculated from updated data, or new model specifications are used. From time to time more extensive reviews of the forecasting process are undertaken.

The following sections describe the methods used to forecast each of the main components of GSP, the labour market, inflation, wages growth and population. Sources of data that are used to construct the models, and adjust for contemporaneous and other influences, are also provided.

## Gross state product

Real GSP is the sum of its expenditure components: household consumption, dwelling investment and ownership transfer costs, business investment, government expenditure, net international trade and the balancing item. Each of the components is forecast separately and aggregated to form a forecast of real GSP.

The trend value of real GSP is projected using estimates of the key long-run drivers of economic growth: population, workforce participation[[2]](#footnote-3) and productivity.

The framework also employs a measure of growth in the price deflator for GSP. This, with the most recent actual value published by the ABS, enables the generation of forecasts of nominal GSP. The GSP deflator forecasts are informed by forecast movements in the CPI.

Household consumption

Definition

Household final consumption expenditure (consumption) consists of the expenditure by households, including imputed expenditure, incurred by consuming goods and services.

Method

Consumption forecasts are based primarily on econometric relationships with key drivers, augmented by consideration of recent performance of indicators.

The long‑run equilibrium level of real consumption is determined by assumptions about population growth, labour income (total real compensation of employees), real net worth and the mortgage rate. In the short run, a regression model is used to forecast consumption, and includes retail sales and consumer sentiment.

Household spending is positively related to labour income: all else equal, households will spend a share of their income, so growth in income leads to greater expenditure. Increases in household net worth are also linked with increased consumption for a given level of income.

Household spending is inversely related to the mortgage rate. Lower mortgage rates imply lower interest repayments on loans, increasing disposable income and boosting expenditure.

The consumption forecasts are generated, then adjusted based on additional information including data on retail trade, monthly spending based on the ABS’ experimental *Monthly Household Spending Indicator*, consumer sentiment, household savings behaviour, the composition of recent consumption spending (e.g. on discretionary and non‑discretionary goods and services), and government policy announcements.

**Data sources**

Historical estimated resident population data is sourced from the ABS, *Australian Demographic Statistics* (catalogue 3101.0). Forecast ERP is sourced from population forecasts produced by the Macroeconomic Strategy team.

Historical real household consumption is the chain volume measure of Victorian household final consumption expenditure obtainable from ABS, *Australian National Accounts*.

Total compensation of employees is the only source of household income available on a quarterly basis at the state level. Data are sourced from ABS, *Australian National Accounts*. Total compensation of employees is projected using the wage price index and employment forecasts (see below).

Real Victorian compensation of employees is calculated as Victorian compensation of employees divided by the Victorian implicit price deflator (IPD) for household consumption. The Victorian IPD for household consumption is derived by dividing Victorian nominal household consumption by Victorian real household consumption.

Australian real household net worth is calculated as the difference between Australian household assets less liabilities divided by the Victorian implicit price deflator for household consumption. Data on the Australian household assets and liabilities are sourced from the Reserve Bank of Australia (RBA), *Household and Business Balance Sheets*, Table E1.

The mortgage rate is the standard variable loan rate that Australian banks set. Data on the standard variable loan rate is obtainable from the RBA, *Indicator Lending Rates*, Table F5.

The Victorian implicit price deflator for household consumption is projected based on consumer price index forecasts (see below).

Private investment

Definitions

The term ‘private investment’ is used here as shorthand for the National Accounts category of private gross fixed capital formation. Private investment comprises dwelling investment, ownership transfer costs and business investment.

Dwelling investment and ownership transfer costs

Definitions

Dwelling investment is the value of acquisitions of new dwellings, home improvements (alterations and additions), and conversions from non-dwellings to dwellings (as defined by the ABS, *Australian System of National Accounts: Concepts, Sources and Methods*,2020-21 financial year).

OTC consist of fees paid to lawyers; fees and commissions paid to real estate agents and auctioneers; stamp duty; title office charges; and local government charges (as defined by ABS, *Australian System of National Accounts: Concepts, Sources and Methods, 2020-21 financial year*).

Method

Dwelling investment is forecast using an average of several econometric models, comprising error-correction and semi-structural specifications.

The error-correction models use demand and supply-side factors such as Melbourne established house prices and dwelling approvals. An increase in the residential property price index is expected to lead to an increase in dwelling investment. The intuition for this is that when potential house builders see the price of established houses rising, they will be encouraged to make an investment in housing. There will be immediate effects, but depending on the characteristics of the households, there will also be lagged effects to account for the time taken for households to obtain finance, get building permits approved, select builders and other requirements before the full impact of house prices start to flow through to investment. Dwelling approvals is a leading indicator for supply, providing an indication of the level of building activity in the pipeline. The semi-structural model uses dwelling approvals which are forecast and then mapped to dwelling investment.

In the long run, dwelling investment is largely driven by demographic factors. An increase in the population leads to an increase in dwelling investment, due to the related increase in demand for housing. A fall in average household size implies an increase in the number of households and, consequently, in the number of houses.

The ownership transfer cost (OTC) forecasts are based on consideration of recent data, judgement and some econometric modelling. The econometric model is a simple linear relationship between the volume of OTC and the volume of land transfer duty transactions. An increase in land transfer duty volumes will lead to both concurrent and lagged increases in ownership transfer costs. The lagged response possibly reflects real estate agents charging and receiving fees sometime after a property transaction is finalised.

Data sources

Dwelling investment for Victoria is sourced from ABS, *Australian National Accounts*.

The residential property price index for Melbourne is from the CoreLogic Hedonic Home Value Index. The use of a hedonic series is useful in overcoming the issue of compositional bias associated with median price and repeat sales measures.

Dwelling approvals for Victoria are sourced from ABS, *Building Approvals*.

Ownership transfer costs for Victoria are sourced from ABS, *Australian National Accounts*. Land transfer duty volumes are sourced from the in‑house land transfer duty model used for tax revenue forecasting.

Business investment

Definition

Business investment comprises four components: non‑dwelling construction, machinery and equipment, intellectual property products, and biological cultivated resources.

Non‑dwelling construction contributes significantly to the volatility of business investment and reflects the lumpy nature of major long‑term projects, while machinery and equipment investment is relatively short‑term in nature and can therefore also exhibit significant volatility. Intellectual property products exhibit relatively stable growth over time.

Method

Victorian business investment is forecast using a combination of methods, including the output of an econometric model modified with adjustments informed by partial indicators and qualitative analysis.

Econometric analysis is undertaken with a single equation ordinary least squares model. Business investment forecasts are explained by changes to the lending margin for investment in Australian business and movements in the risk‑free cost of capital (the cash rate). Victorian business conditions and historical levels of Victorian business investment are the other explanatory variables.

The lending margin is the difference between the cost of borrowing for a small business and the risk‑free rate of return. The small business weighted‑average rate on credit outstanding is sourced from the RBA and the official cash rate is used as a proxy for the risk‑free cost of capital. A decrease in the lending margin indicates that lenders require a lower rate of return to invest in Australian business. Lower required rates of return will have a positive effect on business investment. A decrease in the official cash rate leads to lower borrowing costs, and positively affects business investment.

When the economy is performing well and business conditions are good, business investment tends to grow. Survey data from the National Australia Bank (NAB) is used as the measure of business conditions in Victoria.

A large component of business investment is long‑term, so business investment in the previous quarter is correlated with current levels of business investment. Investment inertia is included in the form of last quarter's growth in Victorian business investment.

Because business investment is highly volatile and there are limited explanatory variables of statistical significance, DTF uses a number of other indicators to inform the forecasts. These include business capacity utilisation (from the NAB business survey), investment intentions information (from the Deloitte Access Economics *Investment Monitor*), survey data about profitability (from NAB business survey), building activity (from ABS), the ABS survey of investment intentions (*Private New Capital Expenditure and Expected Expenditure, Australia*) and information from business liaison.

The trend growth rate of business investment is informed by the historical average and the projected strength of the economy.

Data sources

Business investment data are sourced from ABS, *Australian National Accounts*; official interest rates are obtained from the RBA; and data on the cost of borrowing for small businesses are obtained from the RBA, *Indicator Lending Rates*, Table F5. Business conditions are obtained from the NAB Monthly Business Survey (available on subscription).

Government expenditure

Definition

Government expenditure (public final demand) represents activity generated by various levels of government (Commonwealth, state and local) within the economy through its consumption of goods and services and gross fixed capital formation (i.e., investment).

Method

Public final demand forecasts are based on announced policy and spending intentions of the Commonwealth Government, and Victorian Government spending commitments in the current budget. The forecasts are informed by, but not limited to, policy announcements, election commitments, industry intelligence, information from within DTF and financial information in budget documents. This information is used to formulate an outlook for likely future government expenditure.

In the near term, proxies for ABS components of government expenditure are constructed from the latest ABS data and published financial statements in the latest available budget or budget update for the Commonwealth and Victorian governments. The proxies are used, along with forecasts of population growth and other information about government spending intentions, to inform the growth rate forecasts.

Later in the forward estimates, the trend growth rate dominates the forecast. The trend growth rate of government expenditure is estimated to correspond closely to the trend growth rate of GSP.

Data sources

Forecasts by governments of their own expenditure – as contained in the latest published budget and budget update documents – are an important source of information for estimating public demand.

Annual government expenditure is obtained from ABS, *Australian National Accounts: State Accounts*. Quarterly data are obtained from ABS, *Australian National Accounts*. Additionally, the ABS *Government Finance Statistics* are used to provide historical government fiscal data on a basis consistent with the ABS National Accounts, as well as for disaggregation of state versus local consumption and gross fixed capital formation.

Historical population data are sourced from ABS, *Australian Demographic Statistics* (catalogue 3101.0). Victorian estimated residential population on 30 June is taken to represent population for the preceding financial year. The population forecast methodology is described later in this document.

Net international trade

Net international trade is total goods and services exports less total goods and services imports.

International goods trade

Definition

Goods exports and imports comprise the volume of movable goods that change ownership between residents and non‑residents and are generally valued at the boundary of the exporting country. They do not include shipping costs between countries (which are counted as trade in transportation services).

Method

As with other macroeconomic variables, DTF uses a mixture of formal (econometric) and informal methods to forecast volumes of traded goods. Econometric models capture the historical relationship between trade volumes and indicators of demand, supply and price and provide guidance about future activity.

Informal information includes contemporaneous data such as knowledge of current and prospective weather conditions affecting Victoria’s crop production, which can then be expected to flow through to exports. Similarly, information about global demand will inform export forecasts, while information about the strength of household demand and business investment will inform forecasts of imports.

Merchandise exports

The merchandise exports model proxies the decisions by Australian producers to either sell their products on the domestic or the international market. This decision is driven by the difference in relative prices. An increase in the relative price of exports to domestic sales leads to an increase in the relative volume of exports to domestic sales. The model also accounts for the cost associated with firms selling to export markets through a profit-maximisation function.

Export prices are driven by the rural commodity prices (in foreign currency) and the exchange rate. This is because the majority of Victoria’s merchandise exports are agricultural. Rural commodity prices are sourced from the RBA.

Merchandise imports

Forecasts of Victorian import volumes are made using an error-correction model. Long‑run imports are determined by the price of imports relative to domestic production and the level of economic activity in Victoria. The same variables also appear in the short‑run relationship allowing them to have different effects in the short and long run.

Import prices are driven by world inflation and the exchange rate. This is because Victoria is relatively small compared with the global economy. The price of domestic production is proxied by the producer price index for the manufacturing industry. This is because the bulk of Victoria’s imports are manufactured goods. The price of domestic production is driven by the cost of its inputs to production, namely capital and labour. The cash rate is used as a proxy for the cost of capital, while average compensation of workers is used as a proxy for the cost of labour.

The calculation of the trend growth rates of merchandise exports and imports is informed by the long‑term average growth rates of merchandise exports and imports derived from available ABS data.

Data sources

The ABS is the main source of merchandise trade data. Data from the International Monetary Fund *World Economic Outlook Database* are used in computing changes in relative prices and relative demand between Victoria and the rest of the world. The RBA provides time series data for commodity prices and exchange rates which are also used in the models.

Other sources of information are drawn on as required. Examples include estimates of Victorian crop yields and business liaison. It is important that trade forecasts can be justified against the backdrop of world events, and this means that information from a wide range of sources is used to apply judgement to the outputs of the econometric models.

International service exports

Definition

Services are intangible goods. Exports of services encompass those services rendered by Victorian residents to non‑residents. The main service exports for Victoria are education and tourism. Education is the largest service export category, while tourism is the second-largest category of service exports in Victoria.

Method

International service exports involve a combination of elements including a review of historical data, consideration of indicator variables, and econometric analysis and judgement.

Econometric analysis is undertaken with an ordinary least squares model. Growth in services exports is explained by the number of temporary visitor arrivals to Victoria and the number of student visa grants in Australia. These dependent variables are forecast using ordinary least squares models with ARIMA errors. Temporary visitor arrival forecasts are driven by relative prices, as tourism is price‑sensitive. Student visa grants are driven by student visa applications.

The COVID‑19 pandemic had a profound effect on Victoria’s services exports, as closed national borders prevented inbound tourism and many international students studied remotely from their home countries. The forecast model uses a dummy variable to account for this period econometrically.

DTF also monitors several indicator variables to inform judgement. These include the stock of student visa holders within and outside of Australia, student visa arrivals into Victoria, international card spend in Australia, and the trade‑weighted index and other relative price measures.

Data sources

Data on Victorian service exports is obtained from the quarterly ABS *Balance of Payments and International Investment Position* release. Input variables are obtained from the monthly ABS *Overseas Arrivals and Departure* release, as well as student visa data from the Commonwealth Department of Home Affairs. Other ABS releases such as *International Trade in Services by Country, by State and by Detailed Services Category* also provide further detail on the breakdown of service exports by type and by country.

International service imports

Definition

Service imports encompass those services (that is, intangible goods) rendered by non‑residents to Victorian residents. The main service import for Victoria is tourism: that is, overseas holidays taken by Victorian residents.

Method

Forecasts of service imports and exports are drawn from a variety of sources, including a review of recent and historical data, consideration of forward indicators and other information, judgement and econometric analysis. The additional information sourced from outside of the econometric analysis are included as adjustment factors to forecasts generated by the model, so that the pattern of forecasts accords with the overall assessment of the service import sector.

Victorian services imports are forecast using an error-correction model. In the long run, growth in services imports is determined by domestic demand and the relative price between imported services and domestic services. In the short run, growth is determined by lagged demand and relative prices. Services imports prices are driven by world inflation and the trade‑weighted exchange rate.

DTF monitors several indicator variables to inform judgement. These include consumer confidence, overseas departures, airport traffic data, and internet search statistics on use of travel‑related search terms.

Data sources

Data on Victorian service imports are obtained from the quarterly ABS *Balance of Payments and International Investment Position* release and the quarterly ABS *National Accounts* release. Other ABS releases such as *International Trade in Services by Country, by State and by Detailed Services Category* also provide further detail on the breakdown of service imports by type and by country.

Forecast data from TRA on annual estimates of outbound departures are sourced from its website.

Balancing item

Definition

The balancing item contains components of expenditure that are difficult to measure. Notionally it captures net interstate trade in goods and services, changes in inventories and other miscellaneous components. The ABS estimates GSP on the income side and the balancing item is, in effect, the difference between the income measure and all other components of the expenditure measure of GSP.

Method

Forecasts for the balancing item are informed by forecasts of GSP growth for the other states and Victorian state final demand growth. However, as Victoria’s balancing item comprises a large and volatile part of its GSP, balancing item forecasts are ultimately reconciled with views of the overall growth rate for Victorian GSP in the context of economic developments.

## Employment and unemployment rate

DTF forecasts three components of the labour market: employment, the unemployment rate and the participation rate.

Definition

The labour market refers to the interaction between the supply and demand for labour. The ABS classifies the status of an individual as employed, unemployed or not in the labour force.

Employed persons are those who undertook paid work for one or more hours in the reference week, typically the week before they were surveyed by the ABS. Unemployed persons are those who did not work in the survey week but were actively looking for work and were available to start work. The unemployment rate is the ratio of unemployed persons to the labour force (the labour force is the sum of employed and unemployed persons). The participation rate is the ratio of the labour force to the civilian population aged 15 years and over.

Method

Employment and the unemployment rate are explicitly forecast using a combination of econometric models and judgement. The participation rate is calculated as a residual.

The long-term forecasts for employment are based on historical trends and projected demographic and structural shifts in the labour force (e.g., population ageing). The short-term forecasts for employment are based on a linear model that considers surveyed hiring intentions and household consumption expenditure. Judgement is used to account for factors that are not fully captured by the model such as job vacancies, job advertisements, surveyed unemployment expectations and the effects of government policy changes.

The unemployment rate is estimated using a linear model that considers the unemployment gap. The unemployment gap is the difference between the unemployment rate and the estimated trend rate of unemployment. The trend rate of unemployment is estimated using a model that considers structural factors in the labour market.

Judgement is used to reconcile the labour market forecasts with the overall economic outlook as labour is an important factor of production.

Data sources

The working-age population and its components (employed, unemployed and those not in the labour force) are included in the ABS Labour Force Survey. The data are released monthly. Forecasts of population growth are underpinned by population projections described below.

Job vacancies data reported in the ABS Job Vacancies series and the Commonwealth Department of Jobs and Small Business monthly Internet Vacancy Index. Average weekly earnings data are sourced from the ABS publication of the same name. Measures of firm hiring intentions (quarterly, original data) are sourced from the NAB Business Survey, and consumer unemployment expectations (monthly, original data) are sourced from the Westpac-Melbourne Institute Consumer Sentiment survey.

## Wages growth

Definition

The Wage Price Index (WPI) is the ‘total hourly rate of pay excluding bonuses index’. It is based on a weighted combination of ordinary time hourly wage and salary rates and overtime hourly rates. As a result, it reflects changes in both the ordinary time and overtime hourly rates. Bonuses are excluded since they, and commission payments, can reflect changes in the quality of work performed.

Method

Adjustments to the wage growth forecasts are made with reference to a number of labour market estimates from the ABS as well as forward indicators. Given lags involved in wage setting, employment growth and the unemployment rate provide a guide to future wage growth. In addition, leading indicators used include the Commonwealth Department of Jobs and Small Business *Trends in Federal Enterprise Bargaining* report and ABS *Job Vacancies* (catalogue 6354.0).

DTF forecasts quarterly movements of the WPI with an augmented Phillips‑curve model which has the wage price index as a function of inflation, inflation expectations and the unemployment rate.

Higher inflation means higher living costs, which leads to higher wage claims. It also enables businesses to afford to pay their workers higher wages. A lower unemployment rate reflects strong demand for labour and more firms bargaining to attract suitable employees with higher wages. The model has a dummy variable for the September quarter (the period when annual minimum wage decisions typically come into effect).

The trend value of wage growth is given by the trend growth for inflation plus average growth in labour productivity.

Data sources

Historical values of the WPI index are sourced from ABS. Inflation data are sourced from the ABS, *Consumer Price Index* and are released on a quarterly basis. The unemployment rate is sourced from ABS, *Labour Force* and converted from a monthly to a quarterly basis. The methods for making inflation and unemployment rate forecasts are described elsewhere in this paper. Inflation expectations are derived using Commonwealth 10‑year bond and indexed bond yields. The projection method is described below.

The value of the minimum wage dummy is determined by the timing of the annual minimum wage decision made by Fair Work Australia. Their National Minimum Wage Orders generally come into operation on 1 July. For the first quarter in which the decision will affect wages (September quarter), the value is one; for all other quarters the value is zero.

## Consumer prices growth

Definition

Inflation is the general increase in the prices of goods and services over time. It is measured by changes in the Melbourne Consumer Price Index (CPI), which captures the price movements of a fixed basket of goods and services consumed by metropolitan households. For DTF’s forecasting purposes, the CPI categories for Melbourne have been differentiated into market goods and services (excluding volatile items) and all other items.

Market goods and services captures the types of goods and services typically driven by market factors (excluding volatile items) and consists of all CPI groups except for the following: automotive fuel, fruit and vegetables, utilities, property rates and charges, childcare, health, other services in respect of motor vehicles, urban transport fares, postal services, and education. The excluded items represent those which are more heavily influenced by non-market factors (such as administered price changes) or exhibit volatility as a result of supply‑side factors (automotive fuel, and fruit and vegetables).

The trend value of consumer price growth is estimated to correspond to the mid-point of the RBA’s inflation target band of 2 to 3 per cent.

Method

Headline inflation forecasts are developed using these CPI basket subsets. A combination of econometric modelling, extension of historical trends, and judgement based on partial information underpin the forecasts.

Inflation in market goods and services is forecast using an average of two econometric models: an auto-regressive integrated moving average (ARIMA) model and a quarterly Phillips Curve model.

The Phillips Curve model is dependent on a lag of market goods and services inflation, the unemployment gap, and the exchange rate as measured by the trade-weighted index. The ARIMA model is dependent on recent inflation outcomes.

Beyond the market goods and services segment, the remaining segment of the CPI basket – comprised of administered and other seasonal or volatile items – is forecast using a bottom‑up approach based on historical trends and partial information (including the ABS monthly CPI indicator and other sources), and informed by judgement of future trends and leading indicators.

The headline inflation forecast for Victoria is based on the sum of the contributions to growth from inflation in market goods and services and the other seasonal/volatile items. Adjustments are made based on additional information such as recent movements in the value of the Australian dollar, developments in oil markets and relevant government policies.

Data sources

Historical values of the CPI are sourced from ABS, *Consumer Price Index*. The econometric model for inflation in market goods and services relies on unemployment rate forecasts and Trade-weighted index (described elsewhere). A range of other data sources are used to inform forecasts of other seasonal or volatile items, including the ABS *Producer Price Index*, ABS *Monthly CPI Indicator,* wholesale electricity and gas prices from the Australian Energy Regulator, retail electricity and gas prices, ASX electricity futures data, oil price futures data, and other indicators of global inflation and supply-chain pressures.

## Population

Method

Forecasts of aggregate population growth are based on expected changes in the components of population growth, which are natural increase, net overseas migration and net interstate migration. High‑level forecasts are developed jointly by the Department of Transport and Planning (DTP) and DTF and are underpinned by a cohort‑component model for population projections constructed by DTP. This model projects population by age, sex and region of Victoria for up to 40 years.

Natural increase (that is, births less deaths) is a relatively stable component of population growth. Assumptions underpinning the natural increase forecasts also concern mortality rates, and are based on projections by the ABS, adjusted for recent outcomes.

Net overseas migration measures the difference between overseas arrivals and departures for permanent and long‑term people movements. It has been the most volatile component of population growth over the past decade and judgement is used to inform the impact the reopening of national borders after a period of closures during the COVID-19 pandemic on people flows.

Net interstate migration has been a relatively small component of population growth for Victoria over the past decade, but volatility has increased in recent years. DTF and DTP use recent population movements data and expected relative state economic performance to inform a likely level of net interstate migration over the forecasting horizon.

Data sources

Official estimates of Victoria’s estimated resident population are obtained from ABS, *National, state and territory population*. The ABS population projections, which are used as a base for assumptions underpinning Victoria’s population projections, can be found in ABS, *Population Projections, Australia, 2017 (base) to 2066*. DTP prepares its own population projections, going out 40 years for Victoria, metropolitan Melbourne and regional Victoria (and 20 years for small areas), for the purposes of government planning. The latest population projections are contained in *Victoria in Future 2019*.

## Input series

This section lists data series used as inputs to several of DTF’s forecasting models

Method

Oil prices (West Texas Intermediate) are assumed to follow futures pricing.

Exchange rates (in US dollar and trade-weighted terms) are assumed to remain at their latest quarterly average values.

Petrol prices are assumed to follow the sum of the oil price (adjusted for AUD‑USD exchange rate), petrol excise (indexed biannually) and GST (10 per cent of oil price component and petrol excise).

The cash rate is assumed to broadly follow market economists’ expectations.

The standard variable mortgage rate is assumed to follow the cash rate plus a fixed lending margin based on its latest quarterly value.

Commonwealth bond yields (10-year maturity) are projected using forward rates for the cash rate published by the Reserve Bank of Australia.

Inflation expectations are calculated as the difference between standard and indexed bond yields at a maturity of 10 years.

In the short run, household financial assets are projected using an econometric model based on the All Ordinaries Index, reverting to long-run average growth thereafter.

## Data sources

ABS, *National, state and territory population*

ABS, *Australian National Accounts: National Income, Expenditure and Product*

ABS, *Australian National Accounts: State Accounts*

ABS, *Balance of Payments and International Investment Position*

ABS, *Labour Force,* Australia

ABS, *Wage Price Index*

ABS, *Job Vacancies*

ABS, *Consumer Price Index*

*ABS, Monthly Consumer Price Index Indicator*

*ABS, Monthly Household Spending Indicator*

*ABS, Private New Capital Expenditure and Expected Expenditure, Australia*

ABS, *Building approvals*

ANZ, *Job Advertisement series*

Commonwealth Department of Jobs and Small Business, *Internet Vacancy Index*

Attorney General’s Department, *Trends in Federal Enterprise Bargaining* *report*

CoreLogic, *Residential Home Value Index*

Deloitte Access Economics, *Investment Monitor*

Federal Reserve Bank of St. Louis, *Crude Oil Prices: West Texas Intermediate (WTI) – Cushing*

International Monetary Fund, *World Economic Outlook Database*

National Australia Bank, *Business Survey data*

Australian Institute of Petroleum, *Victorian State Average*

RBA, *Interest Rates* *and Yields – Money Market – Monthly,* Table F1.1*,*

RBA, *Capital Market Yields – Government Bonds – Monthly,* Table F2.1

RBA, *Indicator Lending Rates,* Table F5

RBA, *Exchange Rates – Daily – 2014 to Current – F11.1*

RBA, *Zero-coupon Interest Rates – Analytical Series – 2009 to Current – F17*

Westpac-Melbourne Institute, *Consumer Sentiment Index*

1. Fundamental drivers of nominal growth include population, productivity, workforce participation and inflation. [↑](#footnote-ref-2)
2. This term is defined as the product of the labour force participation rate of the working-age population, the employment rate of the labour force, and average working hours per employed worker, and it is conceptually equivalent to overall labour utilisation in the economy. [↑](#footnote-ref-3)