

Australia's Economy-wide Price Index Frameworks

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1. Catalysts for change

In recent years, there have been a number of catalysts for the ABS to re-evaluate its prices statistics program. In particular:

- greater government focus on containing inflation as a policy imperative
- strong growth in the service sectors of the economy accompanied by deregulation of many service industries
- increasing demands for high quality national accounts and prices data, both as performance measures in their own right and to support productivity studies, and
- international debate and research into index collection and construction techniques, stimulated in part by the 1996 US Boskin Report.

Major statistical initiatives emanating from the ABS program review include developing a new statistical framework for measuring inflation, presenting producer price indexes within a Stage of Production (SOP) framework and establishing price indexes for the output of service industries and the construction industry.

This paper outlines some of the work the ABS has undertaken in relation to these initiatives, especially the SOP indexes.

2. A new statistical framework for the measurement of inflation

The ABS does not consider that any one single price index measure can adequately support a rigorous analysis of the complex inflation process. Accordingly, we have developed a framework for a system, or family, of price indexes which embraces the entire economy and provides alternative, complementary views of the economy. These proposals are described in detail in

an information paper entitled *An Analytical Framework for Price Indexes in Australia* (ABS Cat. no. 6421.0).

In the context of the lack of a generally agreed, precise macro-economic definition of inflation, the ABS has developed a *market transactions* approach to the construction of price indexes designed for the analysis of inflation.

This approach is based on the premise that inflation in an economy is a phenomenon peculiar to the operation of markets - ie, inflation is a consequence of buyers and sellers interacting in the market place to determine transaction prices (ie, demand and supply factors).

As such, price measures designed for the analysis of inflation should be confined to market activity, and goods and services acquired either free of charge or at economically insignificant prices (as commonly provided by general government), and notional transactions (eg, the national accounts imputed dwelling rent) should be excluded. These are known as non-market transactions.

Taking a micro-economic perspective, it can be argued that a price measure can be defined for each individual institutional unit (eg, each individual household, corporation, etc) based on their own unique pattern of transactions (individual prices and quantities). Then, in theory, a total economy-wide price measure could be built by aggregating all of these individual measures.

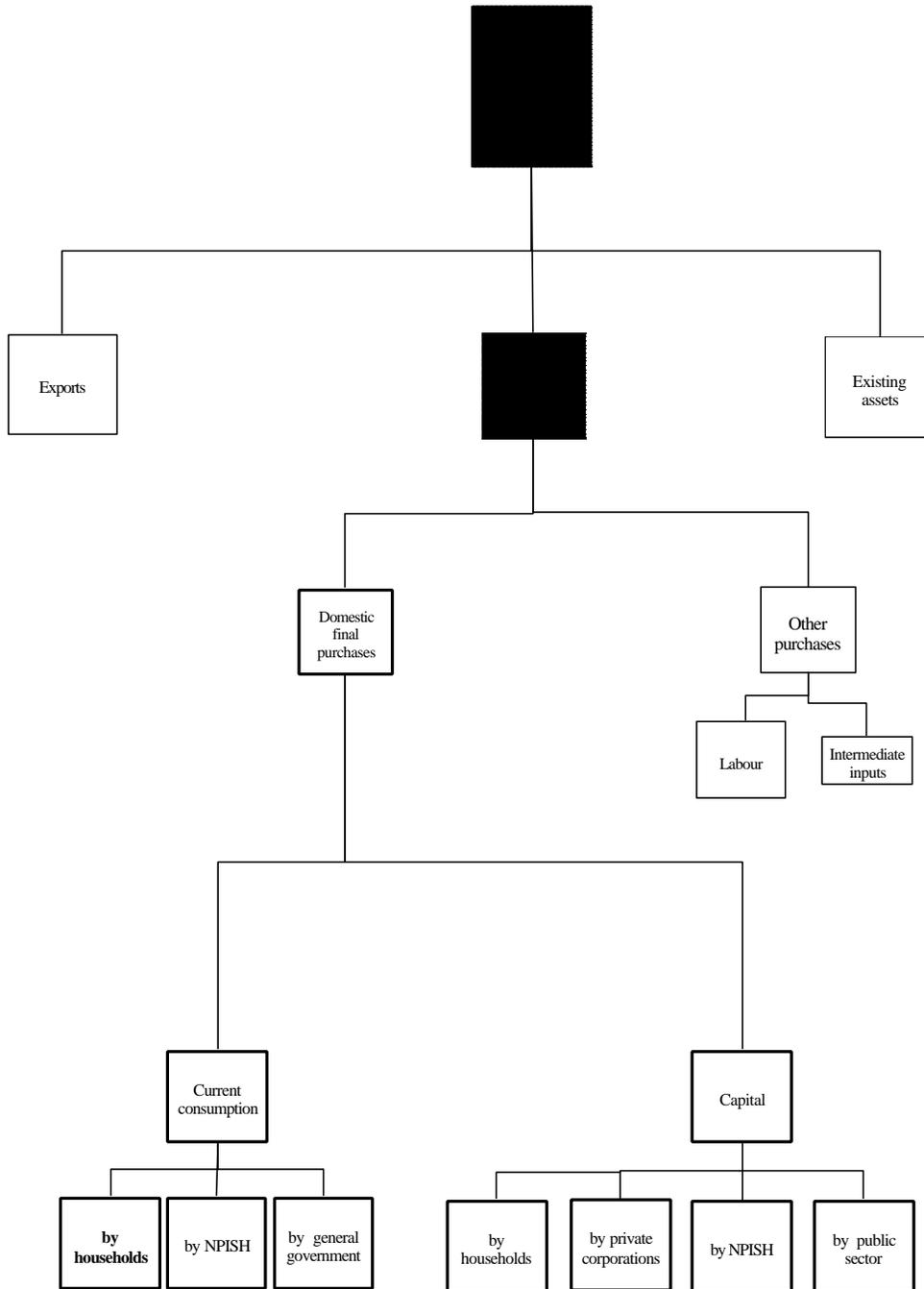
However, such an aggregate measure would be of dubious value because of the multiple counting of price impacts across intermediate and final transactions.

Rather, in order to build up meaningful aggregate measures of inflation, all the individual market transactions should, conceptually, be allocated to the specific market categories illustrated in Diagram 1. This categorisation of markets provides a broad level representation of all market transactions involving Australian residents.

Aggregations of market activity such as *Total domestic purchases* and *All transactions* have little economic meaning because of the multiple counting and are shown for illustrative purposes only. Instead, it is more meaningful to consider the market transactions framework as providing alternative, complementary, views of the economy through focusing on price indexes for each of the different markets.

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MARKET TRANSACTIONS VIEW OF THE ECONOMY



3. Price Index of Domestic Final Purchases

The ABS has commenced work on constructing a Price Index of Domestic Final Purchases (DFP), relating to one of the key market sectors in Diagram 1.

Important characteristics of this new index are that it will:

- include only market transactions
- be based on the *purchasers' perspective*, with a **purchasers' price** valuation basis (ie, reflecting the amount paid by the purchaser inclusive of indirect taxes less subsidies, wholesale and retail trade margins and transport costs)
- have an economy-wide scope
- cover purchases by domestic residents, and thus

include imports, but exclude exports

- relate to final transactions only, and thus be free of multiple counting, and
- reflect current expenditure weights using a chain index formula.

The DFP price index will be broken down into separate indexes for consumption and capital purchases, which will, as far as possible, be further split on an institutional sector basis, as defined in the 1993 *System of National Accounts*, ie households, corporate (private and public), general government and non-profit institutions serving households (NPISH) sectors. These components will be able to be further disaggregated into indexes for key sub-components.

Work being undertaken to develop the new DFP index includes defining and identifying non-market transactions for exclusion from the index, investigating alternative sources of weighting data, exploring different approaches to index chaining and establishing new price collections to fill major data gaps.

Under the market transactions framework, complementary views of inflation are provided by Stage of Production producer price indexes (described below), a Wage Cost Index and an Export Price Index.

4. Stage of Production producer price indexes

4.1 Context

As the scope of the Domestic Final Purchases index is confined to *final* transactions, at purchasers' prices, it cannot provide a complete picture of the price experience of the economy. There is interest in price indexes which enable the identification of price pressures arising from *intermediate* transactions, or earlier pricing points, potentially identifying early inflationary signals.

Such a view is provided by producer price indexes within a Stage of Production (SOP) framework. These are described more fully in an information paper entitled *Producer Price Index Developments* (ABS Cat. no. 6422.0).

The ABS has recently commenced the regular release of quarterly SOP producer price indexes in the publication *Stage of Production Producer Price Indexes* (ABS Cat. No. 6426.0).

The SOP indexes relate to the selling prices of the output of Australian industries at **basic prices**, where the basic price is the amount received by the producer exclusive of indirect taxes (less subsidies), and trade and transport margins.

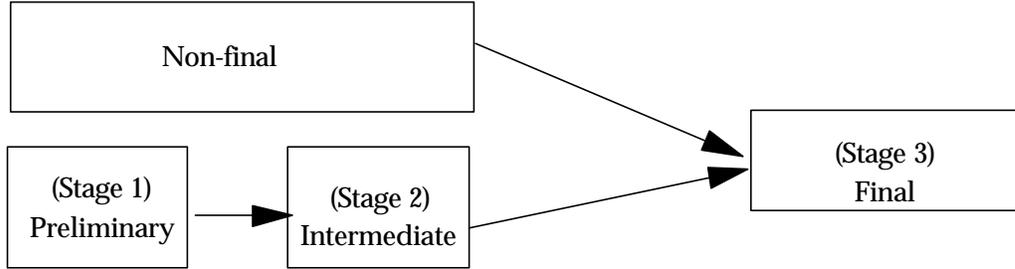
That is, they are output indexes viewed from the *producers'* perspective and, as such, relate to an earlier pricing point in the distribution chain than the DFP index which is at **purchasers' prices**.

4.2 Categorisation

Australia's SOP indexes are based on a categorisation of commodity flows according to their economic destination on a sequential basis along the production chain. The basis for the categorisation is the Australian Input-Output tables.

The initial index categorisation is between *final* commodities (ie, those destined for final consumption, capital formation or export), and *non-final* commodities (ie, those that flow into intermediate consumption for further processing).

However, the non-final commodities can flow into the production of either final or other non-final commodities. Therefore, to aid analysis, the non-final commodities are divided on a sequential basis between Stage 1 (or *preliminary*) commodities and Stage 2 (or *intermediate*) commodities, as illustrated below. This approach generates three separate stages of production.



Preliminary (Stage 1) commodities are used in the production of intermediate (Stage 2) commodities; in turn, intermediate (Stage 2) commodities flow into the production of final (Stage 3) commodities.

The framework allows for analyses of price change as commodities flow through production processes' where price indexes for earlier stages of production may be indicators of possible future price changes for later stages.

4.3 Index scope

In order to provide for more complete analyses, exports as well as domestic usage, of Australia's output have been included within the scope of the SOP index.

Imports have also been incorporated within the framework, recognising that they represent a very important potential source of inflationary pressures. The model therefore allows for the monitoring of the effects of price changes of both domestically produced and imported commodities.

In concept, the scope of the SOP index is economy-wide relating to the output of *all* the goods and services industries. However, there are limits on the availability of price indexes for service industries and coverage is currently restricted to the output of the Transport and Storage, and Property and Business Services, sectors. Similarly, coverage of the Construction sector is confined to indexes for the output of the following industries: House construction, Residential building construction n.e.c., Non-residential building construction and Road and bridge construction. Coverage of the SOP index will be progressively extended as additional service and construction industry collections are established.

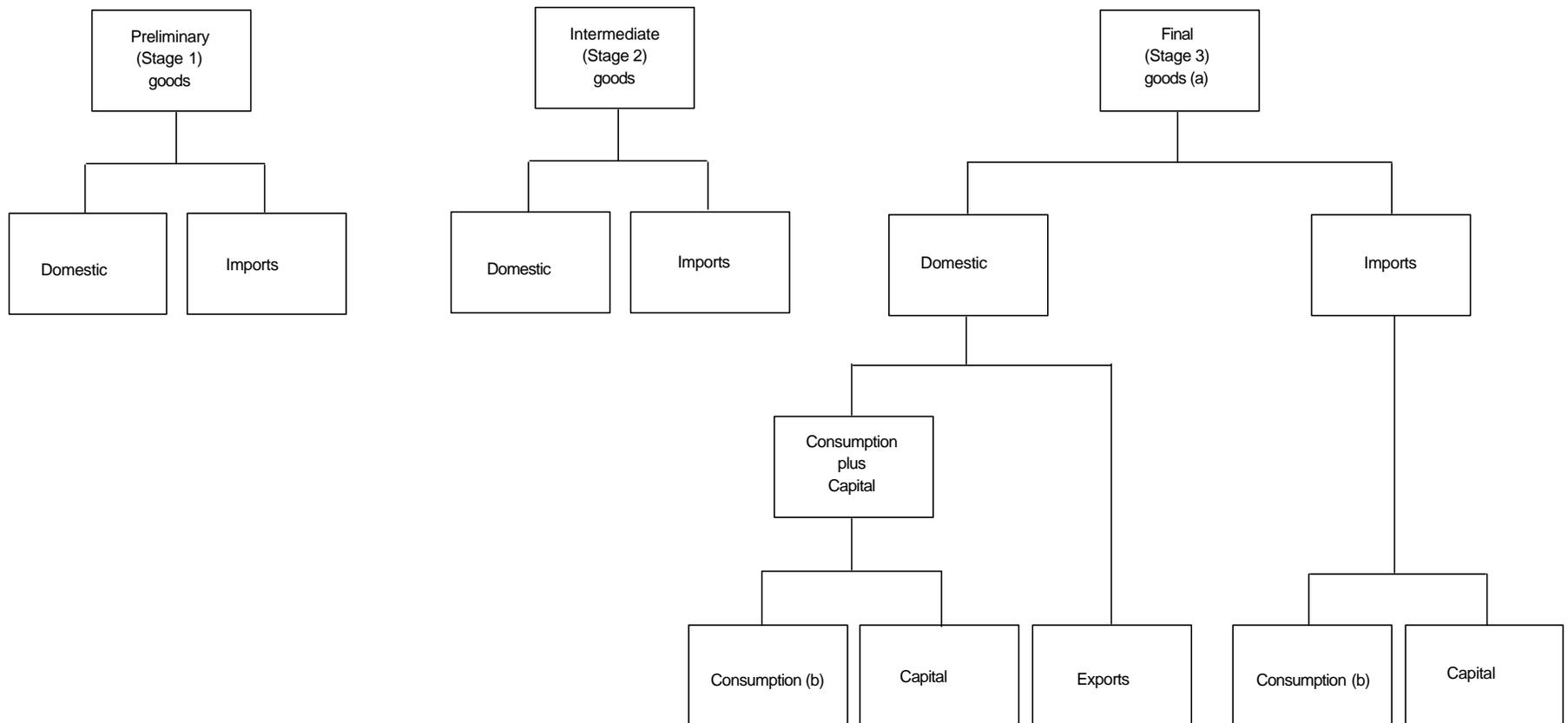
The SOP index model consists of the major aggregates shown in Diagram 2 below. In order to avoid a multiple counting of transactions, the three stages are not aggregated.

For each of the three stages, commodities can be categorised into domestic production and imports. The Final (Stage 3) commodities can be further divided between capital, consumption and exports.

For many analyses, the focus will be on the domestic economy, with exports treated as a leakage. For such purposes, the relevant Final (Stage 3) goods index is *exclusive* of the Exports component of Domestic goods (that is, the Domestic Consumption plus Capital goods aggregate).

2

STAGE OF PRODUCTION INDEX MODEL

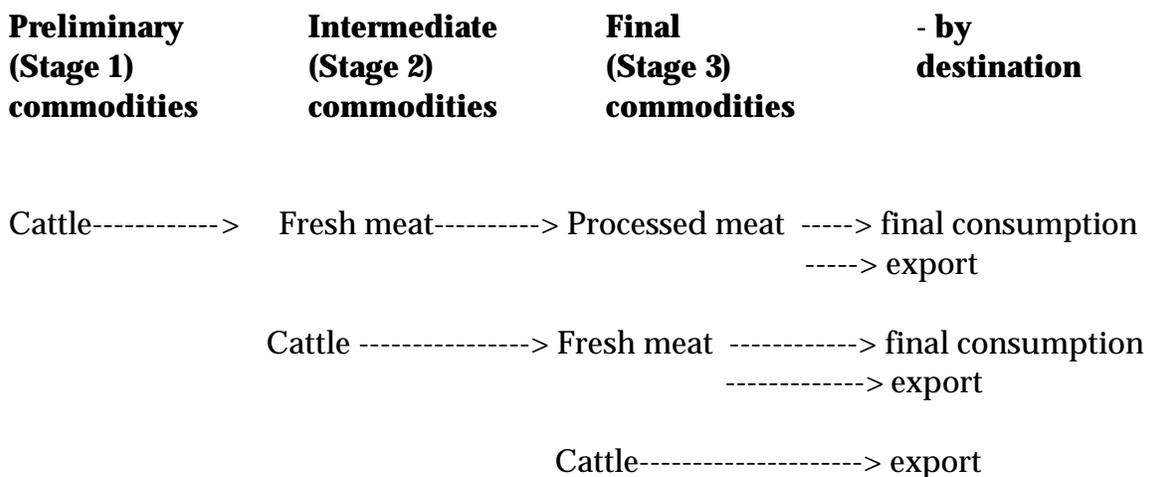


(a) Including and excluding exports

4.4 Market transactions approach

Under the ABS' *market transactions* approach, in concept it is the individual transactions in a given commodity - as defined by the particular buyer and seller interacting in the market, the specifications of the product, and the terms and conditions of the sale - which are assigned to the relevant market within the production chain.

Therefore, a particular “commodity”, within the index classification system, can be assigned to more than one stage, on the basis of the usage pattern of that commodity in the input-Output tables. The rationale is that there are different patterns of transactions in relation to a given “commodity”. Examples are provided below.



In the first example, Cattle is a Preliminary (Stage 1) commodity as an input into the production of Fresh meat. In turn Fresh meat is an Intermediate (Stage 2) commodity used to produce Processed meat, a Final commodity (destined for final consumption or the export market).

In the next example, Cattle is an Intermediate (Stage 2) commodity, used to produce Fresh meat which flows to final consumption or is exported as a Final (Stage 3) commodity.

Under the third example, Cattle sold direct to the export market without further processing in Australia is a Final (Stage 3) commodity.

Alternative *degree of fabrication* or *principal destination* approaches to SOP categorisation are employed by statistical agencies in some other countries. These

alternative approaches tend to result in the allocation of a particular commodity, or industry output, to one, and only one, stage.

This would present particular problems for Australia because of our very open economy in which exports (and imports) measure about 20% of Gross domestic product. Australian production of commodities such as wheat, wool and iron ore are exported in large volumes as well as being further processed locally. The allocation of such commodities to a single stage would, by necessity, be very arbitrary.

5. Analytical capability

While the release of the experimental SOP indexes has increased the usefulness of the available price data, it represents a very incomplete picture of the inflation process because of limitations in both the scope, and the coverage, of the indexes.

Firstly, data availability has limited the coverage of the current SOP indexes to a subset of the services and construction industries, pending the establishment of additional collections.

Further, the scope of a fully comprehensive data model would incorporate *all* the key aggregates contained in the Input-Output framework. Thus, in addition to industry output and imports, the scope of a complete model would include primary inputs - ie, labour costs, gross operating surplus (GOS) and indirect (or product) taxes - as each of these elements represent an important potential source of inflationary pressure.

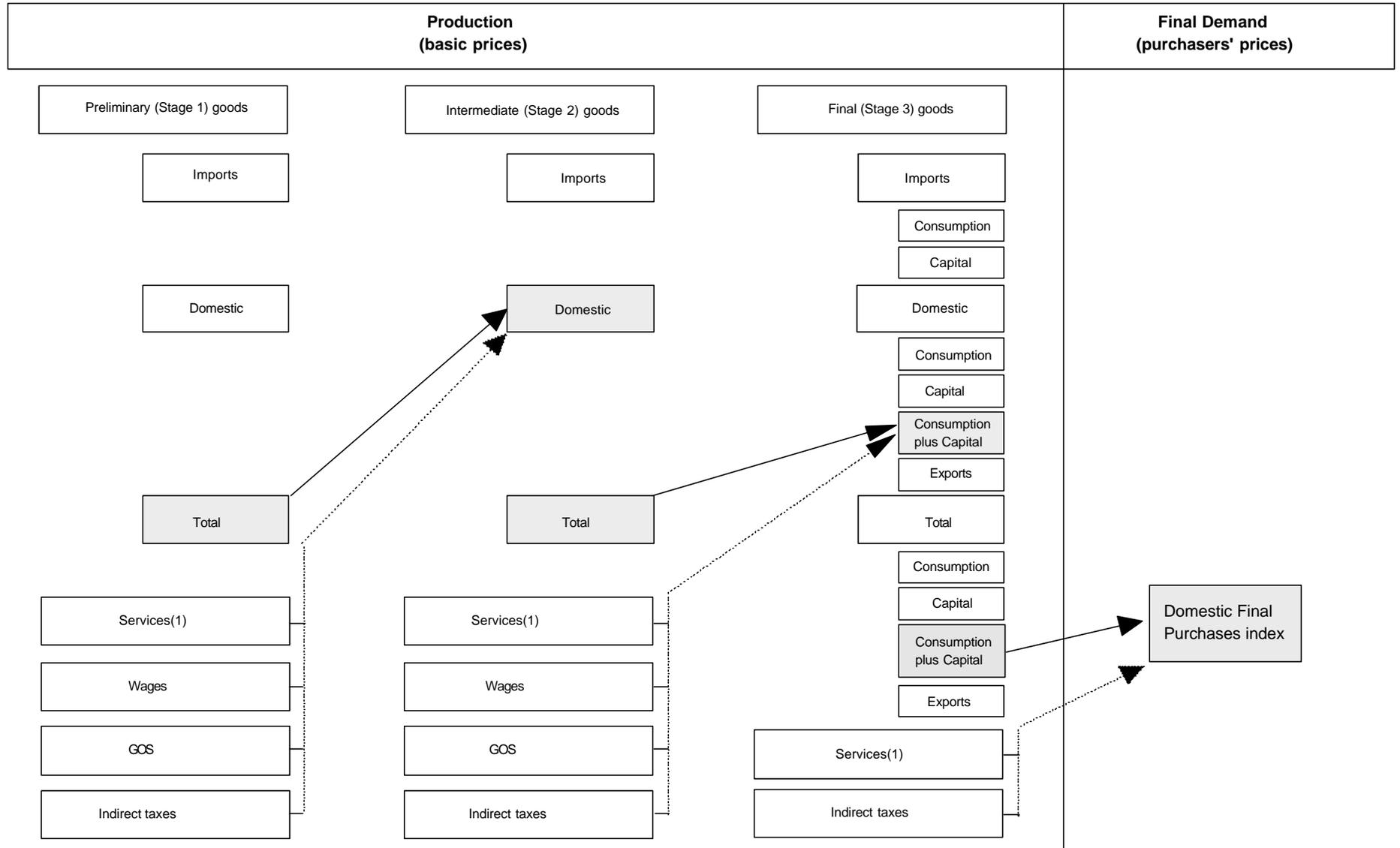
Diagram 3 provides a summary of such a comprehensive model.

While wages can readily be represented by data from the ABS' new Wage Cost Index, changes in the rate of GOS are more problematic as it is not directly measurable.

In Diagram 3, potential price transmission linkages between Stage 1, Stage 2 and Stage 3 SOP index aggregates, and the future Domestic Final Purchases index, are represented by solid arrows joining shaded boxes. Other possible linkages are shown by broken arrows and provide for the future introduction of additional information that would form part of a more complete analysis.

3

COMPREHENSIVE STAGE OF PRODUCTION DATA MODEL



(1) Includes trade and transport services which are margins representing the difference between basic prices and purchasers' prices.

A potential leading indicator of economy-wide inflation, as measured by the Domestic Final Purchases index, would be the SOP index aggregate "Final commodities - Total Consumption plus Capital commodities". A full study would also embrace measures of price change for *all* final Services, in particular trade and transport margins, and Indirect taxes.

In reconciling the behaviour over time of these particular SOP and DFP index aggregates, it is particularly important to acknowledge the difference between the valuation bases of the respective measures of final commodities. That is, the difference between **basic prices** (the SOP index) and **purchasers' prices** (the DFP index) comprises:

- indirect taxes less subsidies
- wholesale and retail trade margins, and
- transport charges.

As coverage of service industries extends into the "margin" industries - ie, wholesale and retail trade and transport - the comprehensive data model will provide a full articulation of the inflation transmission processes along the economic production and distribution chain. This will allow for rigorous empirical analyses to support well informed public policy and commercial decision making.

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