How much of what New Zealanders consume is imported?
Estimates from input-output tables

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NON-TECHNICAL SUMMARY

The impact of movements in the exchange rate on domestic prices is an important issue for forecasting inflation. One aspect of that impact is what proportion of domestic consumption is imported. Households in New Zealand consume imports via two main channels: the first is direct purchases of finished goods, such as cars and televisions; the second is indirectly via the imported inputs used by domestic businesses that produce for local consumption.

There are two measures of inflation in household consumption prices. The first is the implicit deflator for household consumption expenditure in the national accounts, the second is the Consumers Price Index (CPI). This note uses detailed sectoral data published by Statistics New Zealand to estimate the size of the share of imports (both direct and indirect) in the expenditure bases that underpin these two measures of inflation.

There are conceptual differences between these expenditure bases. In particular, national accounts consumption includes the spending by New Zealand tourists overseas and the benefit derived by homeowners from living in their own house as opposed to renting. The expenditure base for the CPI excludes New Zealand tourist spending abroad and captures the net acquisition of housing (the weight for which is calculated as new houses bought by the household sector plus repairs, less depreciation and destruction of old houses). These conceptual differences can result in different import shares for each measure.

Using 2006/07 data, the analysis here suggests that the import shares of the two measures are broadly similar. The import share of the CPI is slightly higher – at around a quarter, compared with just over a fifth for national accounts consumption. This CPI import share is made up of around 15 percent direct imports (for example cars and televisions) and a further roughly 10 percent indirect imports. The import share for tradable CPI expenditure is unsurprisingly higher than for non-tradable CPI expenditure. This higher share is a result of not just the direct imports of tradable goods, but also because domestic tradable businesses use a greater degree of imported inputs than non-tradable businesses.
1 INTRODUCTION

New Zealand is a small open economy, with imports equal to around a third of GDP. This note uses input-output (IO) tables published by Statistics New Zealand to study the import share of national accounts household consumption expenditure – consumption for short – and the expenditure base that underpins the Consumers Price Index (CPI). Consumption accounts for around 60 percent of GDP on an expenditure basis, and is an important component of domestic demand.

Imports are chiefly composed of three types – final consumer items (goods and services), intermediate inputs (e.g. raw materials) used in domestic production, and capital goods used for investment. Changes in the New Zealand dollar prices of imports, whether through changes in the foreign prices or movements in the exchange rate, affect the aggregate price level in New Zealand. Changes in the price of imports relative to the price of domestic output in turn can affect the spending decisions of households.

The Reserve Bank has an inflation target specified in terms of the annual headline CPI inflation. For analytical reasons, this headline CPI is frequently split between tradable and non-tradable components. These two analytical series have notably different properties, particularly in response to movements in the exchange rate (figure 1).

Figure 1: Annual tradable and non-tradable CPI inflation

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1 The author wishes to thank Michael Reddell, Steffi Schuster and Christie Smith for helpful comments.
2 See Parker (2014) for a more detailed discussion of the channels through which domestic prices can be influenced by changes to the world outlook and the exchange rate.
Yet tradable and non-tradable goods are not completely independent of each other. A large part of the price paid by consumers for many tradable goods reflects non-tradable inputs. For example, the final price paid by consumers for imported finished goods like cars and televisions includes domestic storage, transport and the margins of retailers. Similarly, non-tradables may be produced using imported intermediate inputs – raw materials, petrol, etc.

Using IO tables enables the interrelationship between imports, domestic tradable and non-tradable output to be disentangled. IO tables set out the transactions between New Zealand industries and between New Zealand industries and foreign consumers/suppliers, providing information on the share of final products that are imported and how products are used as inputs for other industries. Using the IO tables makes it possible to analyse the indirect channel via imported intermediates. Recent research has highlighted the importance of this indirect channel in the transmission of foreign events to the domestic economy (Eyquem and Kamber, 2014).

Conceptual differences in the exact expenditure bases that underlie the two measures discussed here could result in differences in the respective import shares. This note attempts to allow for these differences, but the estimates presented here are approximations, and based on a snapshot of consumer expenditure in 2006-07. Movements in the exchange rate, along with technological change such as greater use of purchases via the internet may cause the current import share of consumption and the CPI to differ from what is estimated here.

2 INPUT-OUTPUT TABLES

IO tables are a useful tool that describe how the outputs produced by each industry, and imports, are used as inputs to other industries, are consumed by households or the government, or exported. The tables divide economic activity into 106 industries and 205 products (which include both goods and services). The latest tables are based on the year ending March 2007.\textsuperscript{3}

For an example of how the IO tables work, consider the dairy sector. Dairy cattle farming uses labour, capital equipment and a number of intermediate inputs (i.e. those inputs that are outputs of other industries) such as fertiliser. The largest intermediate input is direct

imports, which are not individually split out by industry in the IO tables (table 1). The second largest is agricultural services, and the third largest banking and finance.

Table 1: Main intermediate inputs and uses for dairy cattle farming (share of industry output)

<table>
<thead>
<tr>
<th>Top five intermediate inputs</th>
<th>Top five uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct imports</td>
<td>Dairy product manufacturing 9.0</td>
</tr>
<tr>
<td>Agricultural support services</td>
<td>Meat &amp; meat product manufacturing 5.7</td>
</tr>
<tr>
<td>Banking and finance</td>
<td>Sheep, beef cattle, grain farming 4.8</td>
</tr>
<tr>
<td>Fertiliser / pesticide</td>
<td>Exports 3.5</td>
</tr>
<tr>
<td>Sheep, beef cattle, grain farming</td>
<td>Dairy cattle farming 3.1</td>
</tr>
</tbody>
</table>

Almost 90 percent of the output from dairy cattle farming is used as an intermediate input by the ‘dairy product manufacturing’ industry – in other words dairy farmers produce milk which is supplied to dairy companies, who then turn it into milk powder, yoghurt, cheese, etc. This input accounts for almost half of the total output of dairy product manufacturing (table 2). Nearly three quarters of the gross output of dairy product manufacturing is directly exported. A further 14 percent is consumed by New Zealand households.

Table 2: Main intermediate inputs and uses for dairy product manufacturing (share of industry output)

<table>
<thead>
<tr>
<th>Top five intermediate inputs</th>
<th>Top five uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy cattle farming</td>
<td>Exports 46.8</td>
</tr>
<tr>
<td>Dairy product manufacturing</td>
<td>Household consumption 9.7</td>
</tr>
<tr>
<td>Direct imports</td>
<td>Dairy product manufacturing 3.7</td>
</tr>
<tr>
<td>Road transport</td>
<td>Fruit, oil, cereal &amp; other food manuf. 2.7</td>
</tr>
<tr>
<td>Banking and finance</td>
<td>Food &amp; beverage services 2.6</td>
</tr>
</tbody>
</table>

The focus of this note is on imports. As Tables 1 and 2 show, in dairy farming 9 percent of the intermediate inputs are direct imports, and in dairy product manufacturing direct imports account for 3.7 percent of intermediate inputs. However, the dairy product manufacturing sector’s total use of imports includes the imports that went into producing the almost 90 percent of dairy farming production that represents an input to dairy product manufacturing.

The true import share of consumption and the CPI also includes the share of capital (e.g. machinery and equipment) used in the domestic production process that is imported. A large proportion of New Zealand’s capital goods are imported. Unfortunately, the IO tables do not
provide a breakdown of how much of the capital stock was previously imported. To the extent that capital is fixed in the short term, transactions are more important in determining the marginal cost of production. Marginal costs, in turn, are more likely to have an impact on price dynamics.

3 HOUSEHOLD CONSUMPTION EXPENDITURE

This section considers the import share of household consumption. Household consumption expenditure is the spending carried out by New Zealand resident households, both in New Zealand and abroad. Households obtain goods and services from five broad sources:

- **Direct imports** – purchases directly from foreign businesses, or purchases of imported items made via domestic retailers or wholesalers, are classed as (direct) imports.
- **Domestic tradable businesses** – these are domestically incorporated businesses that produce goods that are tradable in international markets. For the analysis in this note, the tradable sector is assumed to be composed of agriculture, mining, manufacturing and air transport.
- **Wholesalers and retailers (distributors)** – these specialised non-tradable businesses provide a service by distributing the outputs of tradable businesses, both foreign and domestic, to households and other businesses.
- **Domestic non-tradable businesses** – these businesses are domestically operated and provide products which are in general not traded internationally. These products are generally services.
- **Owner-occupied dwelling occupation (OOH)** – this is the service (which can be roughly thought of as ‘shelter’) derived by households living in their own home, as opposed to renting from someone else. Renting from companies falls under non-tradable business.

Beyond these five sources, consumers also pay taxes on products, chiefly GST (on most items) and additionally excise duty on such items as alcohol, tobacco and petrol. These taxes are embedded in the final product prices of most goods and services. Around a third of consumption is from domestic non-tradable businesses (figure 2). Taxes account for around a tenth of household spending, with the other categories having roughly equal shares. In this note, the focus is on the import component itself, so indirect taxes are identified separately rather than being included in the prices of the various components of consumption.
As noted above, industries use intermediate inputs as part of the production process, and some of these intermediate inputs are imported. Consumption of goods and services produced by domestic businesses consequently also include imports, providing an indirect channel for imports in consumption.

Figure 3 shows consumption with these indirect imports split out. The intermediate use of non-tradables in domestic tradable output, and vice versa, is not split out here given the focus on imports in this note. Of total consumption, 13 percent is directly imported (in the sense used in this note). An additional 9 percent of consumption is accounted for by indirect imports, raising the overall import share of consumption to 22 percent. Taxes on products account for 11 percent of household spending.\(^4\)

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\(^4\) It is not possible to allocate taxes on products between tradable and non-tradable consumption using the IO tables, so an even split is assumed. There are no taxes on OOH.
Figure 3 also splits out consumption between tradable and non-tradable components. Unsurprisingly, a greater proportion of tradable consumption is imported. Overall, just over half of tradable consumption is imported, compared with around a tenth of non-tradable consumption. A markedly higher proportion of domestic tradable firms’ output that is accounted for by imported inputs when compared with non-tradable firms. Imports of non-tradables (as counter-intuitive as the term may appear) relate mostly to purchases of accommodation, transport and catering – essentially tourist spending overseas by New Zealanders.

4 CONSUMERS PRICE INDEX

The CPI aims to capture the price of goods and services paid by New Zealand resident households in New Zealand. There are a number of conceptual differences in the exact definition of household spending underlying the calculation of the CPI and national accounts consumption. Notably, the CPI excludes the purchases made overseas by New Zealand tourists that are included in household consumption, and there are differences in the treatment of housing. To adjust for the differences in coverage and scope the IO data are adjusted here to:

- Exclude imports of hotels, meal services, beverages services and passenger road transport services, the most likely areas of New Zealand tourist spending overseas.
- Exclude owner occupied dwelling operation.

For a detailed explanation of the differences in scope, coverage and calculation, see Liyange (2007).
Include an estimate of net acquisition of housing. As an approximation, half the value of the contribution of residential construction to gross fixed capital formation is used (it is not possible to estimate housing depreciation and destruction using the IO tables). This results in a weight of housing acquisition roughly in line with the 2011 weight in CPI (3.97 percent here versus 4.01 percent in CPI).

Account for the fact that domestic distribution margins are added to the price paid by consumers for tradable goods, whereas non-tradables are sold directly to the consumer.

Figure 4 shows the breakdown of the CPI-equivalent measure by constituent parts. For headline CPI, the import share is a little higher than household consumption, at around a quarter. This is composed of 14 percent direct imports and a further 11 percent indirect imports. For tradables CPI, 37 percent is imported compared with 13 percent of non-tradables. This higher share derives from not just the greater degree of direct imports, but also from the greater use of imported intermediates in domestic production.

Figure 4: Import content of the Consumers Price Index (percent)

The weights derived from the IO tables for tradable and non-tradable consumption differ from the weights used in calculating the CPI. Re-weighting the tradable and non-tradable series using the CPI weights still results in an import share of around a quarter (see the bar titled ‘CPI weights’).

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6 The CPI uses a more finely graded definition of tradable and non-tradable than is possible using the IO tables. See Consumers Price Index Tradable and Non-tradable Series.
5 CHANGES SINCE 2007

The IO tables were calculated on transactions that took place in the year to March 2007, and represent a point-in-time snapshot of the import share. A number of changes have taken place since then that would likely change the findings here to some extent. Chief among these changes are:

- **Large movements in the exchange rate.** By changing the relative price of domestic and foreign goods, movements in the exchange rate could affect the import share. In practice, the nominal share of imports to GDP is roughly similar now to its level in 2007, suggesting the analysis here remains valid.

- **Greater coverage of low value imports in National Accounts.** Recent revisions have resulted in a substantial upward revision to the volume of low-value imports. These imports, such as small purchases over the internet, are less likely to attract GST or domestic distribution margins. This would act to increase the import share of consumption. Online purchases made in New Zealand from overseas retailers are within the scope of the CPI.

- **Increase in GST to 15 percent in October 2010.** This increased the component of the final price paid by consumers, consequently lowering the import share of CPI.

6 CONCLUSION

This note studies the import share of household consumption expenditure and the consumers price index, splitting out direct imports and the indirect consumption of imports via the use of intermediate inputs of domestic businesses. The analysis here suggests that the two import shares are broadly similar. The import share of the CPI is slightly higher – using 2006/07 data around a quarter, compared with just over a fifth for household consumption.

This import share of a quarter for the CPI is composed of around 15 percent direct imports and a further roughly 10 percent indirect imports. The import share of tradable CPI is much higher than for non-tradables. In part this reflects the greater share of direct imports, but it is also a result of the greater use of imported intermediate inputs by domestic tradable firms.
REFERENCES

