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Convergence of Consumption Patterns During Macroeconomic Transition: A Model of Demand In Ireland and the OECD

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Abstract: This study uses country-level panel data on consumption in Ireland and seven other OECD countries to examine the evolution of Irish consumption patterns as Ireland underwent rapid macroeconomic growth. Consumption levels obviously increased due to substantially higher incomes, but it is less clear how the shares of different types of goods purchased have changed or whether Ireland's consumption mix has converged with that of other high-income countries. Rankings based on a simple distance measure of consumption similarity suggest that Ireland moved from a "low-income" pattern similar to Portugal or Greece to a "high-income" pattern like that of Canada between 1995 and 2003. Using static and dynamic Almost Ideal Demand System models, we first estimate long- and short-run Irish price and income elasticities for nine categories of commodities between 1976 and 2003. These results provide evidence of substantial habit formation in aggregate consumption. We then estimate a long-run cross-country model covering six aggregate commodity groups between 1975 and 2003. The analysis shows that Ireland's demand parameters remain more similar to those of Greece than to higher-income OECD countries in the sample. Although Ireland has overtaken most other OECD countries in per capita income, it is still converging to a higher-income consumption pattern. We foresee further convergence of Irish expenditure patterns towards a pattern typical of high-income countries.

JEL classifications: D12; E2; F15

Keywords: Macroeconomic transition; Almost Ideal Demand System; Consumption Patterns; Ireland; OECD

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1. Introduction

The three decades from 1975 to 2004 saw immense changes in the Irish economy. Particularly in the last decade of the period, Ireland's growth in output per capita rose dramatically and output levels substantially converged with those in other developed economies. Irish GDP grew by 9% annually between 1994 and 2002 and Irish GDP per capita in 2004 was 5.8 times that of 1960. In GDP per capita, this made Ireland the fourth richest country in the world after Luxembourg, Norway and Switzerland. Moreover, 'between 1960 and 2002, real full consumption per capita rose almost four fold' (O'Hagan, 2005:110).

Most studies of the 'Celtic Tiger' have focussed on production-side factors, such as fiscal policy, inward investment, the labour market or the economics of migration. However, Ireland's transition process has been accompanied by substantial shifts in consumption behaviour that have received less attention. The primary purpose of this analysis is therefore to observe the effects of rapid economic growth on Irish consumption patterns and the evolution of these patterns compared to other OECD countries. How has the rapid income growth affected Irish consumption patterns? Are Irish consumption habits similar to any other OECD countries? Have Irish patterns of consumption converged "fully", or can further catch-up be expected? Is there scope for further significant changes as the country's relative income level continues to rise? The three authors of this study grew up outside of Ireland, in countries where wealth has a long history and where rapid changes in aggregate consumption patterns are unusual. This paper tests the hypothesis that the Irish have a low-income consumption pattern despite having a lot of money.

There have been few estimates of demand systems using Irish data, and they tend to look at a specific sector and not the economy as a whole. Eakins and Gallagher (2003) look at expenditure on three types of alcoholic beverages, namely beer, spirits and wine in Ireland and concentrate on the differences between the long run and short-run elasticity estimates. Conniffe and Scott (1990) examine the price and income elasticities for energy products, in particular gas, electricity, coal, peat, oil and LPG. They find that the GDP elasticities for the various types of fuel, which they show to be quite similar to the associated income elasticities, range from 0.2 to 0.58 while the own-price elasticity for aggregate energy was found to be –0.21. Madden (1996) looks at the effect of tax reform recommendations on consumer demand. He uses disaggregated data and applies four AIDS model specifications to Irish National Income and Expenditure data between 1958 and 1988. The categories examined are very similar to the ones used in this study and are categorised as follows: food, alcohol, tobacco, clothing and footwear, fuel and power, petrol, transport and equipment, durables, and other goods and services. The author's aim, however, is not to examine the income and price elasticities of these categories of goods but to look at their responsiveness to changes in taxes.

International studies of demand systems are more plentiful, although none has specifically looked at consumption patterns in a transition setting. Due to the availability of detailed data on alcohol consumption, AIDS applications on this commodity are popular. In addition to the application to Ireland mentioned above, Huang (2003) looks at the long-run and short-run demand for alcohol in the UK, Chang and Bettington (2001) analyse the demand for wine in Australia and Johnson et al.

(1992) focus on the consumption of alcoholic beverages in Canada. Ogura (2004a, 2004b) looks at the structural change in Japanese consumption between 1980 and 2000 for five categories of goods, food, housing, clothing, fuel-electricity and miscellaneous. The author examines own-price and income elasticities and confirms that the housing, clothing and miscellaneous categories are luxury goods compared to food and fuel-electricity, which are necessities. Tridimas (2000) examines the pattern of consumer demand in Greece between 1958 and 1994. He focuses on four categories of non-durable consumption expenditure and finds positive own-price elasticities for all categories. The focus of his paper is not however on the estimation of elasticities but how well AIDS fits compared to other models. Blanciforti et al. (1986) use a dynamic specification incorporating habit effects to analyse the behaviour of consumers in the United States between 1948 and 1978. They first look at general consumption covering 11 aggregate commodities and then focus on four food groups. Finally, Brenton (1997) applies an AIDS model to the demand for energy but adopts a two-step approach, by first examining the economy as a whole (11 consumption categories) and then looking specifically at the energy sector. This model is applied to cross-country data for 60 countries but only examines consumption in 1980. He finds that there are significant differences in the own-price elasticities for energy across countries and that these tend to be higher in lower income countries than in higher income countries.

We start with a descriptive analysis of output and consumption during the Irish catching-up period. Simple 'distance' measures of similarity between consumption patterns suggest that, between 1995 and 2004, Irish consumption moved from a pattern similar to that of other relatively low-income European countries like Portugal and Greece to one similar to high-income countries such as Canada.

To better understand how changing incomes and prices influenced consumption patterns, we estimate Almost Ideal Demand System (AIDS) models. Our first model focuses on Ireland with as much sectoral disaggregation as the data allow: nine categories of commodities between 1976 and 2003. Our main objective in this section is to obtain a consistent set of income[1] and own-price elasticities for these classes of expenditure, on both a long-run and short-run basis. Our findings have wider policy relevance. For example, the continued relative increase in transport and recreation expenditures may have implications for environmental, fiscal and transport policy.

The scope for modelling consumption on a cross-country basis is constrained by data limitations. Nevertheless, we are able to estimate a long-run cross-country model covering 6 aggregate commodity groups between 1975 and 2003. The analysis shows that not only have Irish consumption *levels* converged with those of other OECD countries but so have expenditure *patterns*, i.e. the budget shares allocated to commodity groups. However, convergence in consumption patterns is still ongoing and Ireland has yet to completely reach the patterns of high-income OECD countries.

The remainder of this paper is as follows. Section 2 outlines the dataset and sources used in the study as well as some data issues. Section 3 provides a descriptive analysis of the changes occurring during the Irish catch-up period. Section 4 presents the methodology used in the estimation of the AIDS models and the related elasticities. Section 5 presents the results of the static and dynamic AIDS models for Ireland. The results of the cross-country analysis are presented in section 6. Finally, section 7 provides a discussion and conclusions.

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[1] In fact, we use total per capita expenditure as a proxy for income to abstract from changes in savings behaviour.

2. Data and Sources

The data used in this study originate from two separate data sources. The Ireland-only model is based on data from the National Income and Expenditure reports published by the Central Statistics Office (2006). This dataset consists of annual expenditures for nine consumption categories between 1976 and 2003 as well as total final consumption expenditure per capita over the same period. For the cross-country model, OECD National Accounts data were used (2004). The OECD National Accounts contain annual data on personal expenditure on various categories of goods and services for 30 countries between 1975 and 2003. However, there are many gaps in these data. A full dataset (i.e. with data for all goods over the period) is available for only seven countries: Australia, Austria, France, Greece, Italy, the United Kingdom and the United States.

The data for Ireland reported in the OECD accounts only covered the period 1995 to 2003. This was not a long enough time span to include Irish OECD figures in the AIDS analysis discussed below. To extend the series, we used Irish Central Statistics Office figures from 1975 to 1994. In order to combine the datasets, it was necessary to establish that the consumption categories of the CSO and the OECD are consistent.[2]

The final cross-country analysis covers six expenditure categories, which are combinations of the nine categories used in the Irish analysis. These are presented in Table 1 below.

Table 1: Consumer expenditure categories used in the analyses

<table>
<tr><th>Code</th><th>Categories used in the Irish analysis (CSO)</th><th>Code</th><th>Categories used in the cross-country analysis (OECD)</th><th>Original OECD Categories</th></tr>
<tr><td>Fo</td><td>Food, beverages and tobacco</td><td>Fo</td><td>Food, beverages and tobacco</td><td>Food and non-alcoholic beverages
Alcoholic beverages, tobacco, and narcotics</td></tr>
<tr><td>Cl</td><td>Clothing and footwear</td><td>Cl</td><td>Clothing and footwear</td><td>Clothing and footwear</td></tr>
<tr><td>Fu</td><td>Fuel and Power</td><td rowspan="3">Ho</td><td rowspan="3">Housing, household equipment and operation, and fuel and power</td><td rowspan="3">Housing, water, electricity, gas and other fuels
Furnishings, household equipment and routine maintenance of the house</td></tr>
<tr><td>Eq</td><td>Household equipment and operation</td></tr>
<tr><td>Ho</td><td>Housing (Rent, local government charges, repairs and decorations)</td></tr>
<tr><td>Tr</td><td>Transport and Communication</td><td>Tr</td><td>Transport and Communication</td><td>Transport
Communication</td></tr>
<tr><td>Re</td><td>Recreation, entertainment and education</td><td>Re</td><td>Recreation, entertainment and education</td><td>Recreation and culture
Education
Restaurants and hotels</td></tr>
<tr><td>Mi</td><td>Miscellaneous goods and services</td><td>Mi</td><td>Miscellaneous goods and services</td><td>Health
Miscellaneous goods and services</td></tr>
<tr><td>Ou</td><td>Expenditure outside the state</td><td></td><td>No data available</td><td>No data available</td></tr>
</table>

[2] There was one discrepancy between the OECD and CSO categories. The sub-category "Alcoholic beverages (total incl. Pubs)" was included in the "Food, beverages and tobacco" category by the CSO and under the "Recreation, entertainment and education" category (which includes restaurants and catering) by the OECD. This sub-category was moved in order to obtain matching datasets.

The income proxy used was final consumption expenditure, which was also taken from the OECD National Accounts. All prices were logged and included in the regression and for the dynamic version of the Ireland-only analysis all variables were differenced. Summary statistics for all variables are given in Table 6 and Table 12 in the Appendices. The Irish regression consists of eight equations and the cross-country regression consists of five; in order to satisfy the adding-up restrictions, *Outside Expenditure* and *Clothing* were dropped in the Ireland-only and cross-country models respectively.

3. Descriptive Analysis

We compute the distance between the consumption pattern in Ireland and other countries. Distance is here defined as the sum of the squared differences between a country's expenditure share and Ireland's for each category. Data were taken from the OECD National Accounts (2007) for 27 countries. See Figure 1 for 1995. The countries closest to the origin are closer to Ireland with regards expenditure shares and the further we move to the right the less similar to Ireland the countries become. It is apparent from this figure that at the start of the Celtic Tiger boom years, Ireland's economy was similar to that of Spain, Portugal and Greece and quite different from the economies of Sweden, Luxembourg and Switzerland.

[Insert Figure 1 about here]

Figure 2 shows how this pattern changed during the years in which Irish incomes converged most rapidly to the rich country average. It shows the *change* in expenditure share distance *rankings* for all countries compared to Ireland between 1995 and 2003. This figure suggests that Irish consumption has been moving away from patterns that characterise poorer OECD countries, such as Portugal and the Czech Republic, towards patterns defining richer OECD countries, such as Canada and Australia.

[Insert Figure 2 about here]

Figure 3 shows the distance in expenditure patterns from Ireland for 28 OECD countries plotted against the ratio of each country's per capita Gross National Income (GNI) to Ireland's, comparing 1995 (the base of each arrow) to 2003 (the point of each arrow). Most arrows in this chart point right-to-left, because Ireland's GNI grew faster in this period than that of any country in the sample apart from Poland. The area above 1 on the X-axis includes observations where the relevant country had higher income than Ireland in a given period. As expected, most arrows in this zone point downward, representing convergence in consumption patterns as Ireland's relative income grew. Iceland and Norway are the two exceptions. Arrows in the zone below 1 on the X-axis are generally rising; these are observations where Ireland's income exceeded that of the relevant country, and expenditure patterns were diverging.

[Insert Figure 3 about here]

The data behind this illustration suggest that although Ireland has overtaken many countries in terms of per capita income and Irish consumption patterns have moved towards those of richer countries, consumption patterns are still converging. In particular, for most countries that have crossed Ireland's income parity line, the distance measure has continued to fall. The existence of a lag between increased income and changes in consumption patterns suggests that habituation may be an important influence on consumption at national level.

In order to quantify the determinants of Ireland's consumption patterns during macroeconomic convergence, we employ econometric demand models. The next section of this paper sets out the methodology we use to do this, and our results are discussed in Section 5.

4. Methodology

The Almost Ideal Demand System (AIDS) was introduced by Deaton and Muellbauer (1980). It builds on a basic model of demand for a good depending on expenditure or income by including the effects of that good's price and the prices of other goods. It has since been applied to a variety of sectors and commodities ranging from alcoholic beverages, durable and non-durable goods, food, to tourism (Eakins and Gallagher (2003); Conrad and Schröder (1991); Yu et al. (2004) and Li et al. (2004)). The advantages of AIDS over other types of demand systems is that the functional form used is flexible, is easy to estimate and the restrictions imposed by the system can be tested (Poi, 2002). The commodities analysed using AIDS tend to be close substitutes so that the interdependence of budget allocations to different goods can be highlighted. In this study, the consumption of a wide range of goods is examined (encompassing most of an individual's expenditure) none of which are *a priori* considered to be substitutes. Nonetheless, they compete for the same budget, and changes in that budget and in relative prices do induce changes in the consumption pattern.

The AIDS model is defined as follows. It is assumed that the share of consumption of good *i* depends on:

(1) $$S_{it} = \alpha_i + \sum_{j=1}^{N} \beta_{ij} \ln p_{jt} + \gamma_i \ln\left(\frac{x_t}{P_t}\right) + \varepsilon_{it}$$

where S_{it} is the consumption share of good *i* at time *t*, p_{jt} is the price of goods *j* to *N* at time *t*, x_t is final consumption expenditure (or budget) and ε_{it} is a disequilibrium or error term. P_t is normally approximated using a Stone price index, which takes the form

(2) $$\ln P = \sum_i S_i \ln P_i$$

Li et al. (2004) recommend using the Stone price index in this type of system, especially when the prices in the system are collinear. As this is a linear-log functional form, the coefficients from the regression cannot be directly interpreted. However, the coefficients from this estimation can be used to calculate the long-run price and expenditure elasticities. The expenditure elasticity for good *i* is:

(3) $$\eta_i = 1 + \frac{\gamma_i}{S_i}$$

This elasticity can vary widely depending on the type of good being examined and whether it is seen as a necessity or a luxury by consumers. The own-price elasticity of good *i* is then calculated in the following manner:

(4) $$\eta_{ii} = \frac{\beta_{ii} - \gamma_i S_i}{S_i} - 1$$

For most goods, own-price elasticities are expected to be negative.

The next step in the analysis is to estimate the dynamic version of the model, which takes into account habit formation and persistence in consumption patterns. The dynamic version of the model builds on the static version by including a dynamic data generating process, which is estimated using the disequilibrium term from the static model. The lagged estimated residuals from the static model represent consumption's adjustment speed or the extent of consumers' habituation and are what differentiates the two models. Hence the dynamic AIDS takes the following form:

$$(5) \qquad \Delta S_i = \alpha_i + \sum_j \beta_{ij} \Delta \ln P_j + \gamma_i \Delta \ln\left(\frac{x}{P}\right) + \lambda_i \mu_{it-1}$$

where Δ is the first difference operator and μ_{it-1} are the lagged estimated residuals from the static model. The elasticities associated with this model are calculated using the same formulae as above but as they are derived from the dynamic model they are short-run rather than long-run elasticities.

When estimating the AIDS model, there are three restrictions that must be taken into account. Indeed, the theory behind the model is based on the principle of utility maximisation under a budget constraint. This implies cross-equation adding-up restrictions: $\sum_{i=1}^{N} \alpha_i = 1$ and $\sum_{i=1}^{N} \gamma_i = 0$

Adding-up can be easily imposed on the model by omitting one of the equations from the regression. It is then possible to calculate the missing coefficients using the restrictions and the existing results. The other restrictions needed for an AIDS analysis are the homogeneity and symmetry restrictions. Homogeneity implies that for each equation: $\sum_{j=1}^{N} \beta_{ij} = 0$. Symmetry requires that: $\beta_{ij} = \beta_{ji}$

Both of these can be imposed when estimating the model and allow the reconstruction of the coefficients for the missing equation (Poi, 2002).

Available data, which we discuss in the next section, allows us to estimate two AIDS models. First, we estimate an Ireland-only model using both static and error-correction AIDS specifications. This model provides demand parameters on a relatively disaggregated set of sectors, and it allows us to explore the dynamics of demand adjustment. The second model is a static cross-country analysis. It covers fewer sectors, but it facilitates international comparisons.

5. Regression Results for the Ireland-only Model

In this section we report the results of the static and dynamic regression analyses conducted on Irish consumption data. In the interests of brevity, the regression results are included in the Appendix and only the income- and own-price elasticities are presented in this section.

Long-run analysis

Table 2 below presents the long-run own-price and expenditure elasticities for Ireland in 1976 and 2003 as well as with the average budget share over those years. The long-run elasticities are derived from the static model using Equations 3 and 4 above.

Table 2: Long-run expenditure elasticities, Ireland-only model

i	1976 Expenditure elasticity for i	2003 Expenditure elasticity for i	Average Expenditure elasticity for i
Fo	0.583	0.290	0.479
Cl	1.427	1.551	1.466
Fu	1.208	1.356	1.219
Eq	2.413	2.531	2.517
Tr	1.353	1.315	1.311
Re	1.707	1.613	1.563
Mi	0.810	0.904	0.875
Ho	1.079	1.054	1.077
Ou	1.041	1.020	1.032

The expenditure elasticities calculated using the average shares over the period give us an idea of what goods Irish consumers are more likely to buy given an increase in their incomes. *Clothing*, *Transport*, *Recreation*, *Household Equipment*, *Housing* and *Fuel* all have expenditure elasticities that are bigger than one. These are commodities that consumers will be a lot more of if their incomes increase. In contrast, the increase in spending on goods such as Food or Miscellaneous will be smaller.

The change in the expenditure elasticity between 1976 and 2003 indicates how sensitivity to income increases has changed. The first striking result is the change in the expenditure elasticity for *Food*. In 1976, if total Irish consumer expenditure increased by 1%, the value of food purchased would rise by 0.58%. However, by the end of the period this increase in total expenditure led to a rise of only 0.29 in food spending. Other goods, such as the *Clothing*, *Fuel*, *Household Equipment*, and *Miscellaneous* categories were taking up significantly larger shares of consumer expenditure by the end of the period.

The expenditure elasticities thus show that as Irish incomes have increased, consumption choices have also evolved. The proportion of income spent on certain goods such as *Food* (which is considered an essential consumption good) has peaked and will be unlikely to increase in the coming years. In contrast, having now reached a threshold level of income, Irish consumers are now able to spend on less essential goods such as *Household Equipment*. As incomes continue to rise so will the share of spending on these goods.

Nearly all of the own-price elasticities are negative, as expected (see Table 3 below). The demand for *Food* has become slightly more price-elastic over the last 30 years, approaching unit elasticity by the end of the period. *Housing* has also become more price-elastic, perhaps reflecting the substantial increase in this category's share in most household budgets over the period. *Household Equipment* and *Fuel* are relatively inelastic. The *Miscellaneous* category appears to have a positive own-price elasticity in 1976, but due to the fact that so many different goods and services are included in this category, it is not easily interpretable. Finally, the big change observable between 1976 and 2003 is on *expenditure outside the State*. Indeed, in the 1970s, this commodity was very elastic, should its price go up by 1%, demand for the good would fall by 2.6%. This relationship is not as extreme now (-1.7), perhaps because goods such as foreign holidays are seen as less of luxury and more of a necessity.

Table 3: Long-run own-price elasticities, Ireland-only model

i	1976 Own price elasticity for i	2003 Own price elasticity for i	Average Own price elasticity for i
Fo	-0.903	-0.947	-0.919
Cl	-0.689	-0.590	-0.658
Fu	-0.274	0.262	-0.227
Eq	-0.169	-0.091	-0.100
Tr	-0.475	-0.535	-0.540
Re	-0.542	-0.610	-0.647
Mi	0.392	-0.291	-0.056
Ho	-0.537	-0.685	-0.547
Ou	-2.600	-1.759	-2.249

The regression results in the Appendices indicate whether goods are substitutes (positive coefficients) or complements (negative coefficients). *Household Equipment* and *Housing* have negative coefficients in their alternate regressions indicating that they are complements. On the other hand, *Recreation* is a substitute for *Clothing* and *Household Equipment*, indicating that at times when the relative price of recreation increases, people will be more likely to switch to spending on these goods.

These results indicate that Irish consumers have indeed oriented their consumption towards luxury goods. Not only are they less sensitive to price changes in these goods but they are also allocating a greater share of their budget to them. However, the fact that luxury items are substitutes for each other indicates that there is still room for change in Irish consumption patterns. As Irish consumers adjust to their newfound wealth their consumption of luxury goods might be expected to stabilise, giving some of this expenditure 'necessity' characteristics.

Short-run analysis

The short-run elasticities are derived from the coefficients from the dynamic model and Equations 3 and 4 in Section 3. The detailed tables with these elasticities are presented in the Appendices. For this model, all commodity groups show statistically significant (1% level) positive coefficients on the error correction term. This λ captures the speed of adjustment towards the long-run equilibrium. If this coefficient is large or close to one in absolute value, which is not the case with any of the equations in this analysis, then there is rapid adjustment. In our case, the coefficients range between 0.08 and 0.12. These small coefficients indicate that a disturbance to the system takes time to pass through; there is a slow adjustment back to the long run equilibrium. For instance, the error correction term coefficient for Housing is 0.11. This implies that 11% of the disturbance to the long-run equilibrium in the previous period is corrected or adjusted back to the long-run equilibrium in this period. The half-life of a disturbance is 7 years, that is, 50% of a shock is still present after 7 years, and 25% after 14 years. While the speed of adjustment for this commodity is quite slow, it is still faster than those estimated for most commodities in our model. Regardless of the commodity examined, return to the long run equilibrium will always take time as the coefficients are all smaller than 0.15, which corresponds to a half-life of 5 years. This is an indication of habit persistence in Irish consumption.

The short-run expenditure elasticities using 2003 shares are smaller than the long-run elasticities for all commodity groups except *Clothing*, *Transport* and *Miscellaneous*.

This may be due to the fact that these groups contain commodities that, if estimated separately, would have very different elasticities. However, the results for the other commodities conform to prior expectations and their short-term elasticities are smaller than their long-run elasticities. The same can be said for the own-price elasticities for *Food, Clothing, Transport, Housing* and *Expenditure outside the State*.

It is clear from these results that Irish consumption has evolved significantly since the 1970s. But are these changes in line with income growth? By comparing the evolution of Irish consumption to that of other OECD countries over the same period we shed light on the reasons behind any changes and clarify whether Irish consumption is converging or diverging from that of its neighbours.

6. Regression Results for OECD Cross-country Analysis

This section presents the results of the cross-country analysis. Detailed results are available in Appendix 2. The estimated regressions are based on Equation 1 in Section 3. The explanatory power of the system is encouraging, with many price and expenditure coefficients significant at the 5% level. For Ireland, 28 out of 40 variables are significant at the 5% level. As expected, we find that most own-price elasticities are negative and elasticities with respect to total expenditure tend to fall between zero and two.

Expenditure

These results help explain the process of demand convergence we have outlined earlier. To see how, we start with the effects of total expenditure on demand. Figure 4 illustrates relative income changes between Ireland, Austria, Australia and Greece over the period. Although incomes have been rising between 1995 and 2005 in all countries in this chart, Irish final consumption expenditure has risen much faster than elsewhere. Changes in income affect consumption levels of different goods at varying rates. Over time, this leads to a change in the pattern of consumption. As shares of goods in total consumption change, this may in turn affect the sensitivity of goods to subsequent changes in income. We outline the chain of causation below.

[Insert Figure 4 about here]

First, the direct income effect is an increase in expenditure *levels* on the different commodities. For example, it is evident from the high expenditure elasticity of 1.08 (evaluated using average shares) that expenditure on *Transport* in Ireland increased substantially over the sample period. In Greece, with an expenditure elasticity on *Transport* of only 0.45, transport expenditures grew far less. The *Housing* figure for both countries is close to one: growth in expenditure on this commodity broadly followed national growth rates.

Income-driven increases and decreases in particular categories imply changes in the pattern of consumption. Increased income has had the effect of changing consumers' relative preferences for goods. For example, in Ireland income effects have favoured expenditures on *Transport*, *Housing* and *Miscellaneous,* at the expense of *Food* and *Clothing*.

The AIDS framework assumes a non-linear relationship between expenditure shares and elasticities for each good. This implies that categories with shares that change over time will also experience changes to the relevant elasticities. Comparing expenditure elasticities evaluated at 2004 shares to those using average shares over the sample period, we find that changes due to this effect were limited. The elasticity on *Food* fell in most countries, as did the one for *Clothing* in some cases (although it rises in others).

Overall, the expenditure elasticities for Ireland look most similar to those of Greece, both when evaluated at average and 2004 shares. This impression is confirmed by applying the simple “distance” measure discussed in Section 2 above to the elasticities evaluated at 2004 shares (see Figure 5 below). The relationship between incremental income and expenditure in Ireland remains closer to a “low-income” pattern than a “high-income” one.

[Insert Figure 5 about here]

Expenditure elasticities differ widely between countries. With regards to *Food*, Australian and French consumers are the most responsive to changes in income and UK and US consumers are the least responsive. In all the countries, *Food* has the lowest or second lowest elasticity among the commodities. Increased income will have a very small effect on expenditure on *Clothing* in the Austria and Australia, but a high impact in the US and Italy. Housing tends to have an elasticity of at least 1, except in the UK (0.69), whereas for *Recreation* Italy is relatively low and Greece relatively high. In contrast, the elasticity of *Transport* expenditure in Greece (0.45) is by far the lowest in the sample. For goods generally considered to be necessities, such as *Food* and *Housing*, the average expenditure elasticities for Ireland are very similar to those of Greece. However, when looking at items such as *Recreation* and *Miscellaneous* (which includes some travel expenses) Irish consumption resembles that of Italy.

Prices

We now turn to the effects of changing prices on expenditure patterns. In order to compare the change in the elasticities across countries, we first examine how prices have evolved in each of these countries. Overall prices as measured by a consumer expenditure deflator grew fastest in Greece, Italy and Ireland during this period.

Table 4: Average annual growth in the price of consumer expenditures, weighted by expenditure shares, 1975-2004

Ireland	5.68%
Australia	2.56%
Austria	2.83%
France	4.52%
Greece	12.36%
Italy	7.67%
UK	5.59%
US	3.70%

Table 5 below shows the relative price change between 1975 and 2004 for each commodity in each country. Compared to other OECD countries, the price index for *Food* in Ireland has been falling the fastest. The results in Appendix 2 show that Ireland also has the highest price elasticity for the *Food* category among the countries in our sample. This implies that the income effect whereby *Food* is falling as a share of total expenditure is being partly offset by a positive price effect. Irish consumers are buying a lot more *Food*, but it is falling as a share of their budgets.

Table 5: Real annualised growth in consumer expenditure share by category and country, 1975-2004

	Food	Clothing	Housing	Transport	Recreation	Miscellaneous
Ireland	-1.22%	-3.51%	-1.11%	-0.83%	0.30%	0.80%
Australia	3.54%	1.42%	2.46%	1.87%	2.49%	-3.29%
Austria	-0.61%	-0.58%	0.50%	0.07%	0.15%	0.68%
France	0.03%	-0.44%	0.28%	0.15%	-0.18%	-0.09%
Greece	-0.30%	0.38%	-0.46%	9.89%	1.01%	-0.48%
Italy	-0.61%	0.05%	1.02%	-0.05%	0.47%	-0.08%
UK	-0.27%	-3.42%	1.29%	0.01%	0.16%	1.31%
US	-0.03%	-2.74%	0.43%	-0.48%	-0.38%	1.05%

In the case of *Transport*, Ireland has an expenditure elasticity greater than 1, but demand is relatively price inelastic. This pattern is broadly similar to those for the UK and the US. The relative increase in *Transport* expenditures in Ireland can be almost entirely attributed to rising incomes.

The price of *Housing* (which includes household durables) has also been falling and Ireland has a middling level of sensitivity to changes in these prices akin to the position in France, Greece and the UK.

The price elasticity results are less readily classified across country income groups than the expenditure elasticities are. However, as with the expenditure elasticities discussed above, the overall pattern of category own-price elasticities for Ireland (evaluated at 2004 expenditure shares) appear to be more similar to those for Greece than for any other country in the sample. See Figure 6 below for an illustration of this. We shall see in the next sub-section that differences in price elasticities do not contribute greatly to cross-country variations in expenditure patterns. Nevertheless, the finding that Greece is the closest comparator for Ireland's pattern of price responsiveness reinforces the impression that Ireland possesses consumption preferences more similar to those of relatively low-income countries than to high-income ones.

[Insert Figure 6 about here]

Relative importance of price and total expenditure elasticity effects in determining consumption patterns

The AIDS model estimated in this section allows us to predict how consumption patterns will react to changes in prices or income in each country analysed. We now look at how different consumption patterns would be in OECD countries if they were faced with Irish prices or enjoyed per capita total expenditures equal to those in Ireland. This provides an indication of the relative importance of price and total expenditure effects.

First we maintain each OECD country's per capita expenditure level but substitute Irish prices for the country's prices. Figure 7 shows the results based on the same distance ranking used in Section 2 (defined as the sum of the squared differences between a country's expenditure share and Ireland's for each category) with the base case being that country's own prices and income.

The effect of this change is relatively modest, particularly in the cases of consumption patterns for France and the US. The distance from Ireland's pattern increases for all countries when Irish prices are substituted for local ones.

[Insert Figure 7 about here]

Now we turn to the effect of per capita expenditures. Figure 8 repeats the base case scenario for each country, but this time adds one in which prices remain unchanged but the country has Irish levels of per capita expenditure. This change has the effect of increasing the consumption pattern significantly for all countries other than the UK (which falls). Figures 7 and 8 are on the same scale, and it is clear that total expenditure effects outweigh price effects in determining the similarity of consumption patterns between Ireland and the other countries in our sample.

[Insert Figure 8 about here]

7 — Discussion and conclusions

This study examined consumption in Ireland and seven other OECD countries in order to explore the effects of rapid economic growth on Irish consumption patterns and the evolution of these patterns compared to other OECD countries. We were particularly interested in discovering whether Irish consumption behaviour has converged to a "rich country" pattern in parallel with the country's rapid income growth. A second goal was to identify likely future trends in Irish consumption behaviour.

Our initial descriptive analysis, employing simple "distance" measures of consumption pattern similarity, suggests that Ireland moved from a pattern of consumption similar to that of relatively low-income OECD countries like Portugal and Greece to one more akin to higher-income countries like Canada and Australia during a period when Ireland enjoyed high relative growth (1995-2003). We also note that consumption patterns seem to continue converging for some years after Ireland had reached income parity with a given country.

To investigate the factors behind this change and to evaluate how complete it is, we estimated a set of demand system models. Starting with static and dynamic AIDS models for Ireland alone, we obtained own-price and total expenditure elasticities for nine categories of consumption expenditure.

The Ireland-only results show that category-level expenditures adjust very slowly to external shocks. This is indicative of significant habituation in Irish consumption. In the long-term, we find Irish consumption of household durables and fuel to be price-inelastic, but food and expenditures outside the State are relatively price-elastic. Elasticity of demand with respect to total expenditure (our proxy for income) is well above 1 for household equipment, clothing, recreation and fuel; food and miscellaneous goods are below 1.

A cross-country AIDS model was estimated to identify the drivers of differences in consumption patterns in Ireland and seven other OECD countries. These results suggest that cross-country differences in consumption patterns arise from the total expenditure side (i.e. income effects) rather than the price side. That is, the failure of consumption patterns in Ireland to catch up with consumption patterns in countries that are now poorer is not because of differences in relative prices but because of habituation in consumer choice.

We also find that Ireland's demand parameters (both with respect to prices and total expenditures) remain similar to those of Greece, rather than some of the higher-income OECD countries in the sample. Taken together with our findings on slow adjustment of category expenditures, this suggests that Irish consumption is likely to continue to converge gradually towards a high-income pattern, even after income convergence is complete. In essence, as the rise in wealth and incomes has been very quick, consumers have not yet adjusted their spending habits and there is still room for convergence in consumption patterns. Although the Irish no longer have low incomes, they still behave, to a certain extent, as if they have.

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FIGURES

Figure 1: Distance rank comparing countries' category expenditure shares to Ireland's shares in 1995

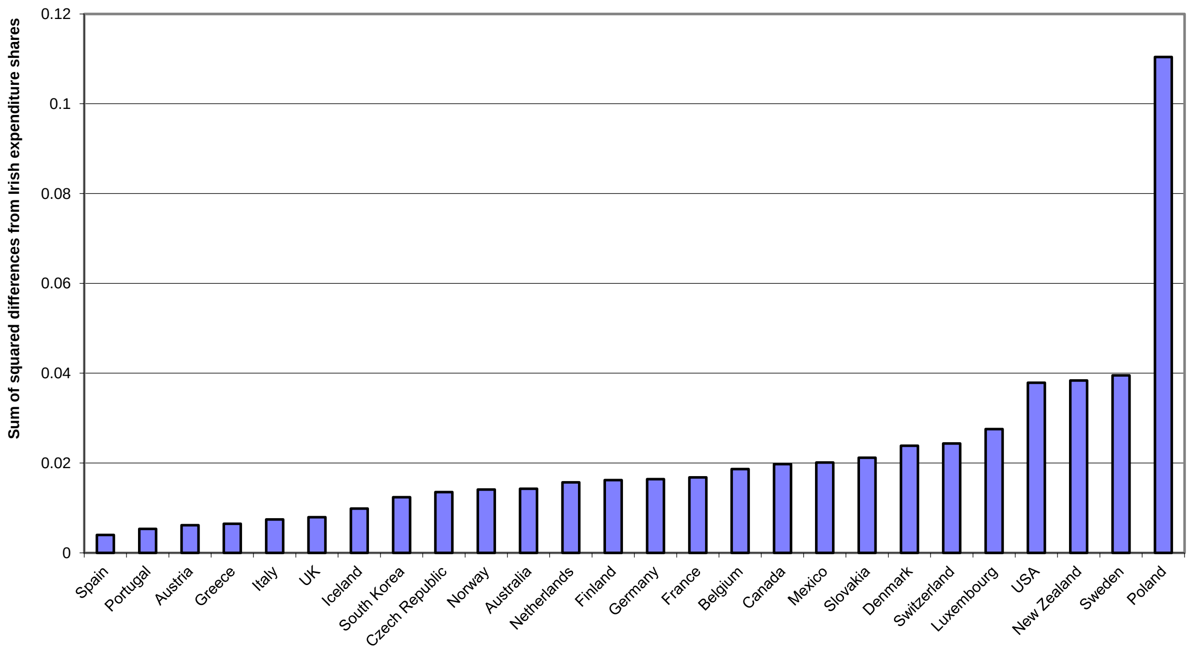


Figure 2: Change in expenditure share distance rankings between 1995 and 2003

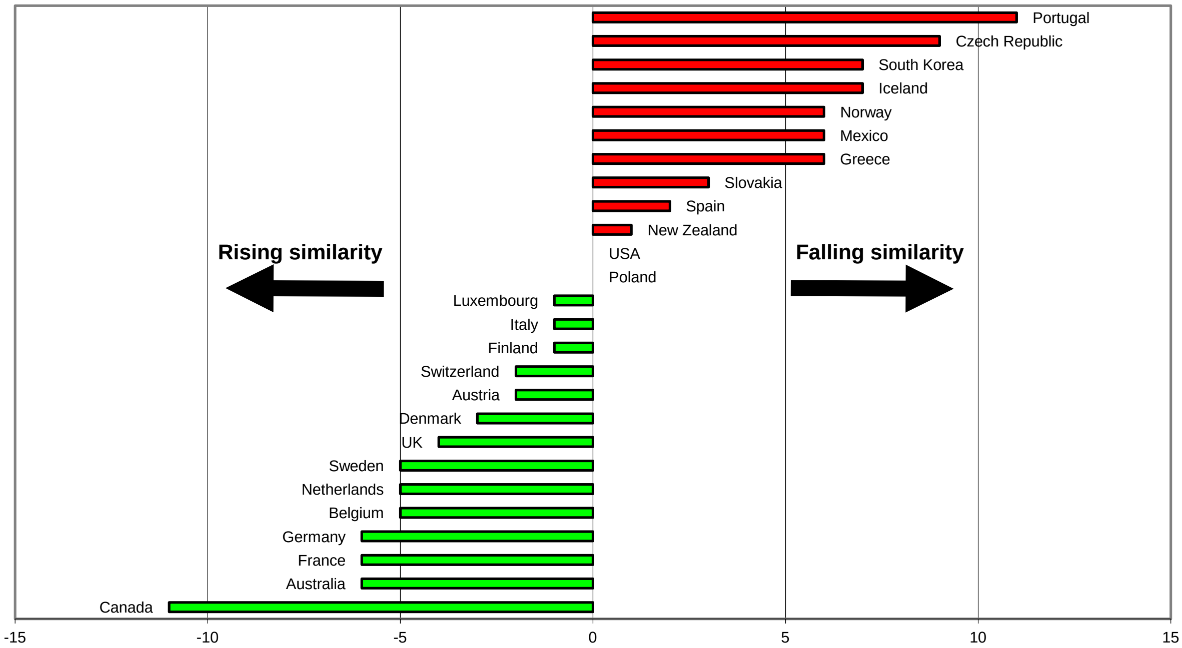
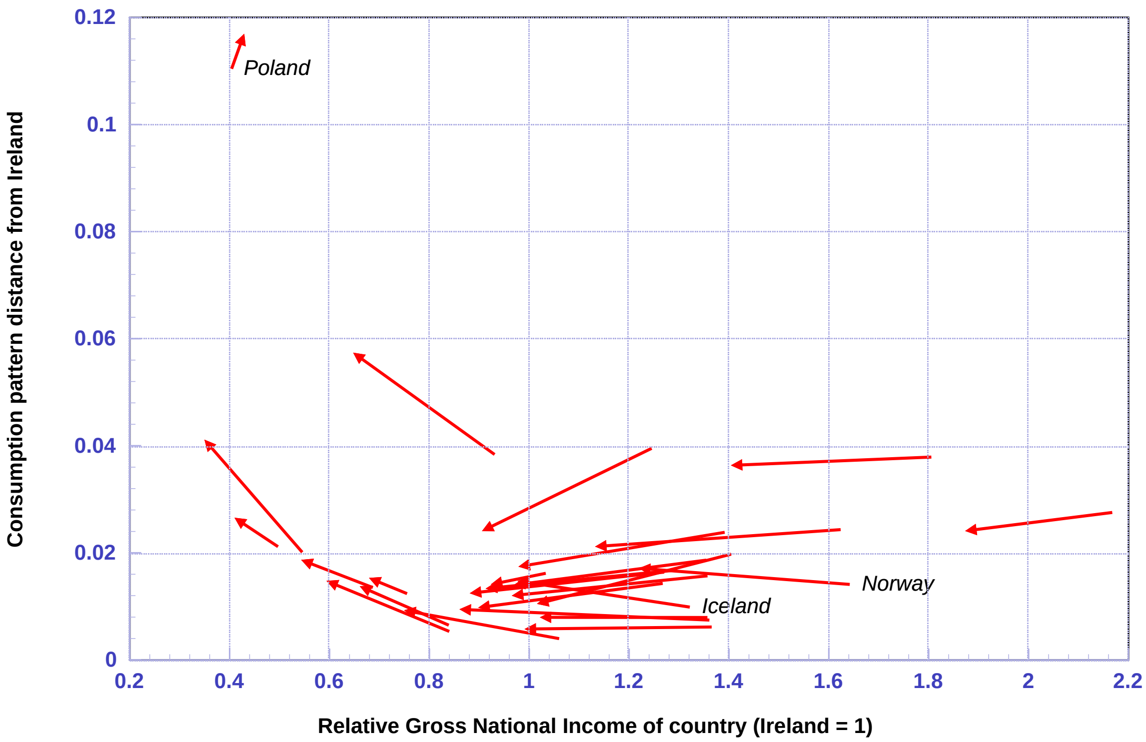


Figure 3: The distance in expenditure patterns from Ireland's for 28 OECD countries as a function of the ratio of each country's per capita GNI to Ireland's, comparing 1995 to 2003

Note



Note: each arrow starts at the 1995 value and ends at the 2003 value.

Figure 4: Evolution of final consumption expenditure in Australia, Austria, Greece and Ireland from 1995 to 2005

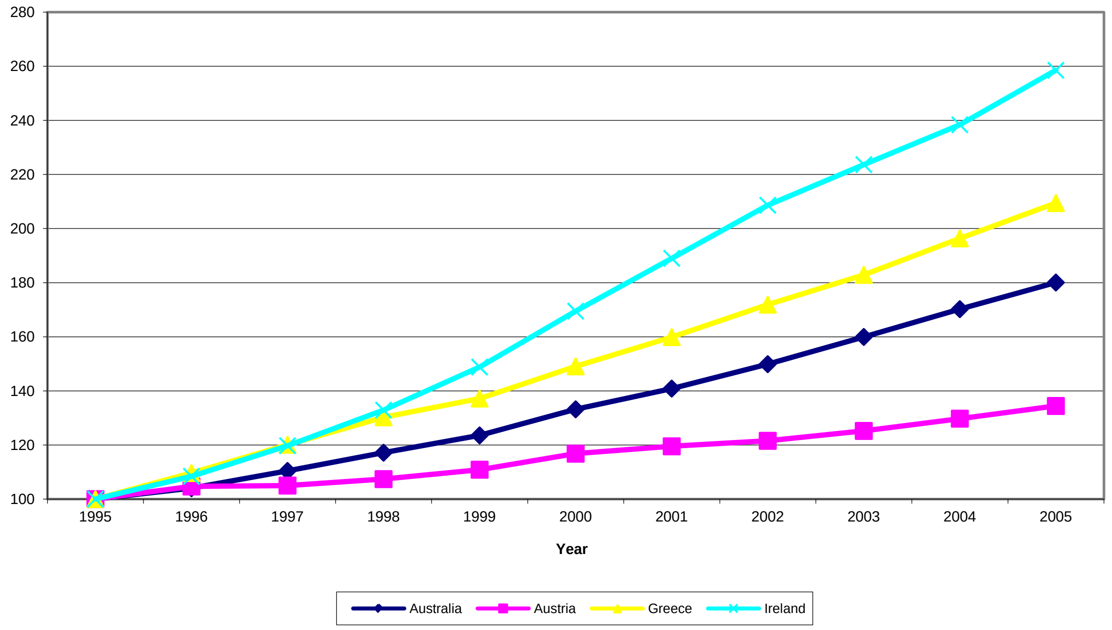


Figure 5: Sum of Squared Differences between Category Expenditure Elasticities for Ireland and Countries in the Sample (evaluated using 2004 expenditure shares)

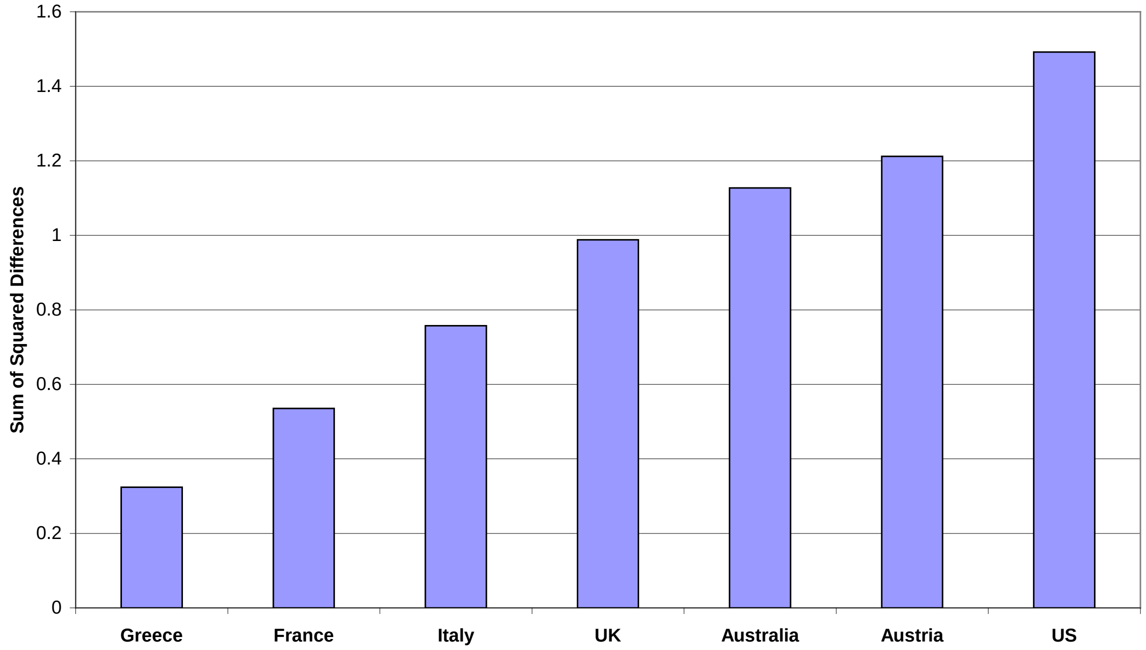


Figure 6: Sum of Squared Differences between Category Own-Price Elasticities for Ireland and Countries in the Sample (evaluated using 2004 expenditure shares)

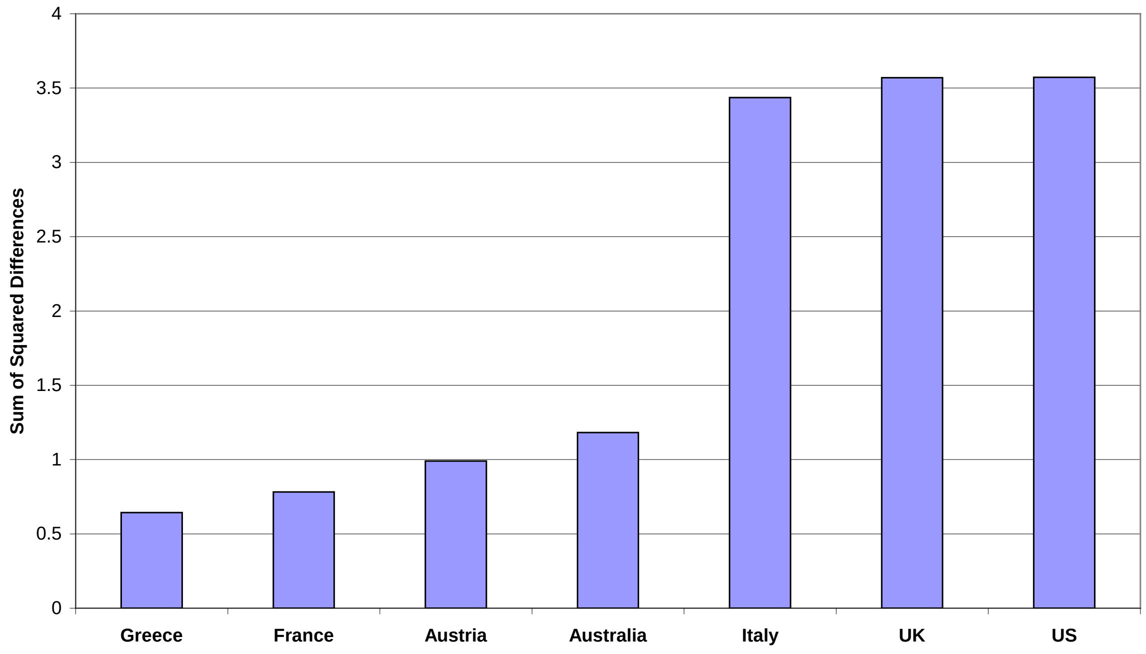


Figure 7: Effects of Substituting Irish Prices for Country Prices on Consumption Pattern Distance (sum of squared differences in 2004 expenditure shares)

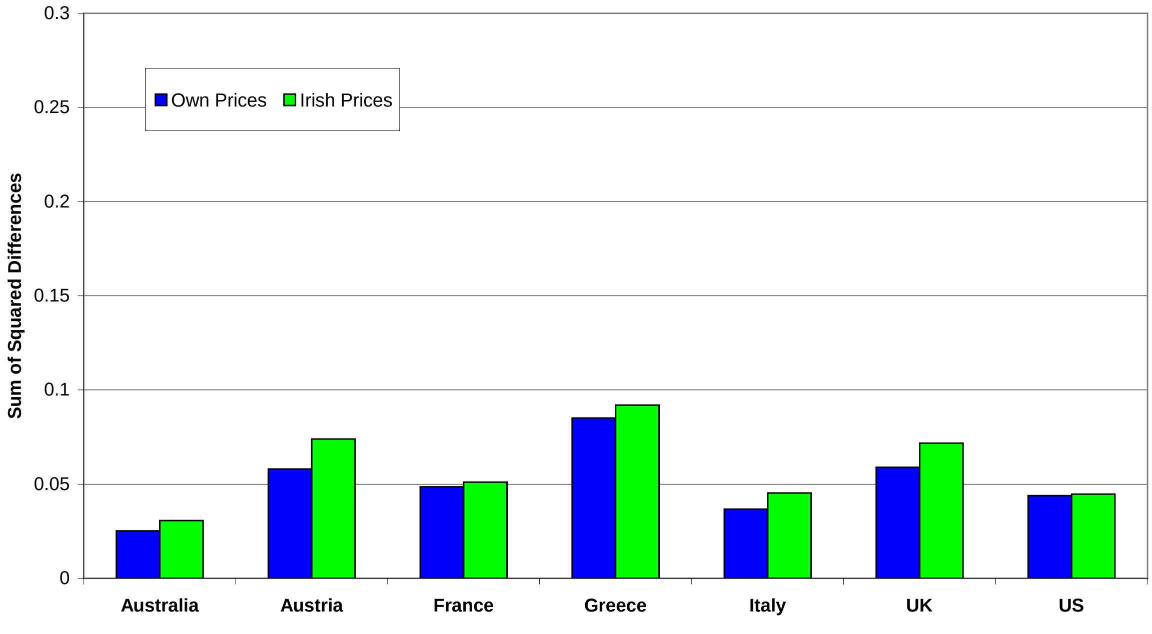
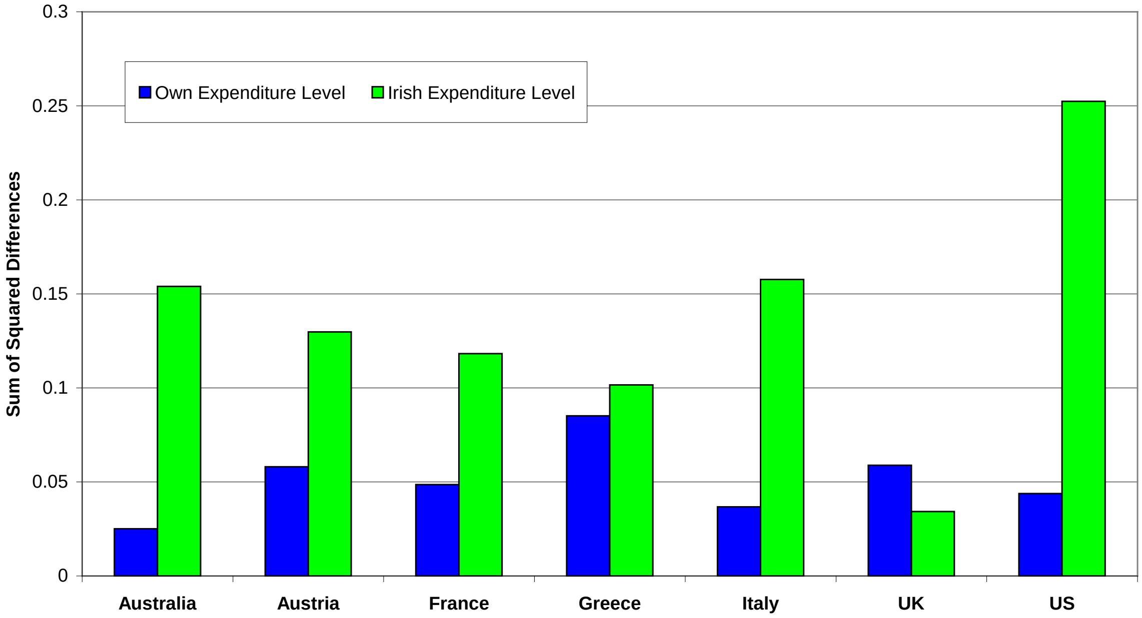


Figure 8: Effects of Substituting Irish Expenditure Levels for Country Expenditure Levels on Consumption Pattern Distance (sum of squared differences in 2004 expenditure shares)



APPENDIX 1 — IRELAND-ONLY REGRESSION RESULTS

Table 6: Summary statistics of variables used in the Ireland-only analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
sfo	28	0.307	0.045	0.225	0.384
scl	28	0.065	0.004	0.055	0.074
sfu	28	0.043	0.009	0.027	0.056
seq	28	0.069	0.004	0.061	0.076
str	28	0.126	0.007	0.111	0.141
sre	28	0.101	0.007	0.081	0.111
smi	28	0.140	0.033	0.089	0.188
sou	28	0.033	0.008	0.025	0.055
sho	28	0.116	0.018	0.092	0.166
pfo	28	77.528	31.124	21.172	129.150
pcl	28	77.460	21.577	29.042	101.073
pfu	28	85.775	26.691	26.296	118.234
peq	28	81.671	26.714	26.596	117.793
ptr	28	79.183	27.946	20.591	106.351
pre	28	76.677	31.153	19.173	123.610
pmi	28	76.520	34.644	16.108	137.985
pou	28	75.488	31.499	20.086	127.711
pho	28	84.985	52.545	22.479	218.379

Table 7: Results from the static regression – Ireland-only

sfo	Coef.	z
lnpfo	-0.024	-0.6
lnpcl	-0.023	-2.09**
lnpfu	0.002	0.17
lnpeq	0.045	2.79***
lnptr	-0.015	-0.74
lnpre	-0.010	-0.43
lnpmi	-0.029	-0.92
lnpou	0.048	2.34**
lnpho	0.006	0.48
lnyp	-0.160	-7.39***
_cons	1.968	8.65***

scl	Coef.	z
lnpfo	-0.0223	-2.09**
lnpcl	0.024	3.39***
lnpfu	0.004	0.93
lnpeq	0.022	3.59***
lnptr	0.005	0.56
lnpre	0.007	0.73
lnpmi	-0.012	-1.04
lnpou	-0.024	-3.3***
lnpho	-0.003	-0.75
lnyp	0.030	3.42***
_cons	-0.253	-2.74***

sfu	Coef.	z
lnpfo	0.002	0.17
lnpcl	0.004	0.93
lnpfu	0.034	6.11***
lnpeq	-0.010	-1.7*
lnptr	0.020	2.57***
lnpre	-0.005	-0.59
lnpmi	-0.030	-2.5**

seq	Coef.	z
lnpfo	0.045	2.79***
lnpcl	0.022	3.59***
lnpfu	-0.010	-1.7*
lnpeq	0.069	4.84***
lnptr	0.025	2.31**
lnpre	0.069	5.59***
lnpmi	-0.158	-8.65***

lnpou	-0.002	-0.25		lnpou	-0.035	-3.16***
lnpho	-0.013	-2.93***		lnpho	-0.028	-3.68***
lnyp	0.010	1.19		lnyp	0.104	8.3***
_cons	-0.061	-0.73		_cons	-1.027	-7.78***

str	Coef.	z
lnpfo	-0.015	-0.74
lnpcl	0.005	0.56
lnpfu	0.020	2.57***
lnpeq	0.025	2.31**
lnptr	0.063	3.2***
lnpre	-0.024	-1.5
lnpmi	-0.020	-0.91
lnpou	-0.070	-5.18***
lnpho	0.017	2**
lnyp	0.039	2.73***
_cons	-0.292	-1.94*

sre	Coef.	z
lnpfo	-0.010	-0.43
lnpcl	0.007	0.73
lnpfu	-0.005	-0.59
lnpeq	0.069	5.59***
lnptr	-0.025	-1.5
lnpre	0.041	1.53
lnpmi	-0.019	-0.71
lnpou	-0.003	-0.2
lnpho	-0.054	-6.01***
lnyp	0.057	3.4***
_cons	-0.494	-2.81***

smi	Coef.	z
lnpfo	-0.029	-0.92
lnpcl	-0.012	-1.04
lnpfu	-0.030	-2.5**
lnpeq	-0.158	-8.65***
lnptr	-0.020	-0.91
lnpre	-0.019	-0.71
lnpmi	0.129	2.8***
lnpou	0.139	6.62***
lnpho	-0.0003	-0.03
lnyp	-0.018	-0.64
_cons	0.355	1.2

sho	Coef.	z
lnpfo	0.007	0.48
lnpcl	-0.003	-0.75
lnpfu	-0.013	-2.93***
lnpeq	-0.028	-3.68***
lnptr	0.017	2**
lnpre	-0.054	-6.01***
lnpmi	-0.0003	-0.03
lnpou	0.021	2.69***
lnpho	0.054	7.23***
lnyp	0.009	0.89
_cons	0.025	0.24

Table 8: Results from the dynamic regression – Ireland-only

dsfo	Coef.	z
dlnpfo	0.0477	-2.72***
dlnpcl	0.0183	-2.55**
dlnpfu	0.0170	-0.68
dlnpeq	0.0100	2.28**
dlnptr	0.0273	6.51***
dlnpre	0.0353	-2.61***
dlnpmi	0.0656	-3.23***
dlnpou	0.0455	0.49
dlnpho	0.0178	1.54
dlnyp	0.0371	-5.46***
l.rfo	0.0916	-15.27***
_cons	0.00300	2.34**

dscl	Coef.	z
dlnpfo	0.0200	2.57***
dlnpcl	0.00749	3.2***
dlnpfu	0.00693	1.5
dlnpeq	0.0415	0.32
dlnptr	0.0112	-4.58***
dlnpre	0.0147	-1.12
dlnpmi	0.0268	0.29
dlnpou	0.0189	-0.7
dlnpho	0.00734	-4.08***
dlnyp	0.0155	3.8***
l.rcl	0.0959	-14.55***
_cons	0.00126	-0.62

dsfu	Coef.	z
dlnpfo	0.0116	-4.02***
dlnpcl	0.00451	-0.09
dlnpfu	0.00413	1
dlnpeq	0.0254	2.37**
dlnptr	0.00633	-0.62
dlnpre	0.00854	3.2***
dlnpmi	0.0163	-2.82***
dlnpou	0.0110	1.37
dlnpho	0.00429	4.04***
dlnyp	0.00971	-4.24***
l.rfu	0.152	-10.45***
_cons	0.000742	-0.44

dseq	Coef.	z
dlnpfo	0.0249	4.27***
dlnpcl	0.0094	0.74
dlnpfu	0.0087	0.48
dlnpeq	0.0513	-0.19
dlnptr	0.0141	-5.62***
dlnpre	0.0181	3.66***
dlnpmi	0.0335	-1.34
dlnpou	0.0237	-0.79
dlnpho	0.00929	-2.04**
dlnyp	0.0193	2.73***
l.req	0.0943	-14.87***
_cons	0.00155	-1.34

dstr	Coef.	z
dlnpfo	0.0373	-0.95
dlnpcl	0.0145	2.87***
dlnpfu	0.0133	1.39
dlnpeq	0.0777	1.54
dlnptr	0.0207	2.6***
dlnpre	0.0276	-1.42
dlnpmi	0.0513	-0.79
dlnpou	0.0355	-2.32**
dlnpho	0.0140	-1.31
dlnyp	0.0289	4.04***

dsre	Coef.	z
dlnpfo	0.0297	-0.95
dlnpcl	0.0114	5.43***
dlnpfu	0.0105	-1.38
dlnpeq	0.0613	2**
dlnptr	0.0162	-2.8***
dlnpre	0.0217	0.3
dlnpmi	0.0404	-0.2
dlnpou	0.0285	-2.22**
dlnpho	0.0113	0.15
dlnyp	0.0235	-0.53

l.rtr	0.0829	-17.3***		l.rre	0.128	-10.72***
_cons	0.00231	-0.02		_cons	0.00183	1

dsmi	Coef.	z
dlnpfo	0.0496	0.71
dlnpcl	0.0188	-0.77
dlnpfu	0.0174	-0.5
dlnpeq	0.103	-3.31***
dlnptr	0.028	-2.87***
dlnpre	0.037	2.56***
dlnpmi	0.0672	2.7***
dlnpou	0.0472	3.41***
dlnpho	0.0186	-2.34**
dlnyp	0.0384	2.15**
l.rmi	0.109	-10.12***
_cons	0.00308	-1.56

dsho	Coef.	z
dlnpfo	0.0163	-1.29
dlnpcl	0.00639	-10.9***
dlnpfu	0.00580	-1.44
dlnpeq	0.0342	-3.54***
dlnptr	0.00924	5.95***
dlnpre	0.0121	-3.37***
dlnpmi	0.0224	4.53***
dlnpou	0.0156	0.68
dlnpho	0.00614	11.36***
dlnyp	0.0127	-5.25***
l.rho	0.110	-12.06***
_cons	0.00101	-0.37

Table 9: Dickey-Fuller unit root tests

Z(t)	Test statistic	1% Critical Value	5% Critical Value	10% Critical Value
rfo	-4.808	-3.736	-2.994	-2.628
rcl	-5.951	-3.736	-2.994	-2.628
rfu	-5.975	-3.736	-2.994	-2.628
req	-5.668	-3.736	-2.994	-2.628
rtr	-5.67	-3.736	-2.994	-2.628
rre	-5.948	-3.736	-2.994	-2.628
rmi	-3.59	-3.736	-2.994	-2.628
rho	-5.541	-3.736	-2.994	-2.628

Table 10: Short-run expenditure elasticities

i	1976 Expenditure elasticity for i	2003 Expenditure elasticity for i	Average Expenditure elasticity for i
Fo	0.177	-0.403	-0.029
Cl	2.328	2.715	2.449
Fu	0.550	0.222	0.521
Eq	2.328	2.438	2.426
Tr	2.028	1.918	1.909
Re	1.337	1.293	1.269
Mi	1.981	1.493	1.661
Ho	0.144	0.413	0.162
Ou	0.606	0.814	0.693

Table 11: Short-run own-price elasticities

i	1976 Own-price elasticity for i	2003 Own-price elasticity for i	Average Own-price elasticity for i
Fo	-0.459	-0.301	-0.403
Cl	-0.548	-0.389	-0.498
Fu	-0.554	-0.244	-0.527
Eq	-1.473	-1.504	-1.500
Tr	0.027	-0.095	-0.106
Re	-0.617	-0.671	-0.700
Mi	-1.021	-1.056	-1.044
Ho	-0.434	-0.581	-0.444
Ou	-2.603	-1.754	-2.249

APPENDIX 2 — CROSS-COUNTRY REGRESSION RESULTS

Table 12: Summary statistics of variables used in the cross-country analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
sfo	272	0.189	0.063	0.080	0.363
scl	272	0.074	0.026	0.033	0.151
sho	272	0.230	0.018	0.185	0.272
str	272	0.121	0.039	0.004	0.161
sre	272	0.176	0.032	0.124	0.265
smi	272	0.210	0.071	0.091	0.415
pfo	272	0.657	0.330	0.020	1.185
pcl	272	0.721	0.323	0.019	1.334
pho	272	0.625	0.335	0.0244	1.202
ptr	272	0.639	0.345	0.001	1.079
pre	272	0.646	0.335	0.015	1.193
pmi	272	0.697	0.414	0.019	2.957
fce	272	820981	1759965	970.8	1.07E+07

Table 13-Table 20 Expenditure and own-price elasticities per consumption category and per country in 2004 and on average.

Table 13: Cross-country model results for Ireland

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.627	-0.707	0.391	-0.573
Clothing	0.820	-0.857	0.724	-0.788
Housing	1.044	-0.846	1.041	-0.857
Transport	1.079	-0.380	1.080	-0.371
Recreation	0.925	-0.501	0.924	-0.495
Misc	1.559	-0.660	1.35	-0.820

Table 14: Cross-country model results for Australia

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.705	-0.532	0.647	-0.449
Clothing	0.193	-0.390	-0.231	-0.091
Housing	1.26	-0.801	1.266	-0.795
Transport	0.885	-1.133	0.885	-1.133
Recreation	1.038	-0.196	1.035	-0.259
Misc	1.146	-1.021	1.129	-1.023

Table 15: Cross-country model results for Austria

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.334	-0.380	0.104	-0.203
Clothing	0.069	-1.415	-0.281	-1.601
Housing	1.085	-0.779	1.083	-0.783
Transport	1.064	-0.640	1.060	-0.661
Recreation	1.229	-0.737	1.208	-0.765
Misc	1.643	-0.969	1.542	-0.992

Table 16: Cross-country model results for France

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.638	-0.470	0.588	-0.406
Clothing	0.337	-0.726	0.071	-0.633
Housing	1.086	-0.408	1.079	-0.457
Transport	1.137	-0.076	1.128	-0.141
Recreation	1.144	-1.080	1.133	-1.075
Misc	1.196	-0.406	1.199	-0.394

Table 17: Cross-country model results for Greece

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.566	-0.273	0.362	0.0126
Clothing	0.744	-0.993	0.661	-1.001
Housing	0.941	-1.125	0.930	-1.152
Transport	0.445	0.206	0.812	-0.578
Recreation	1.447	-0.770	1.344	-0.842
Misc	1.737	-0.842	1.592	-0.893

Table 18: Cross-country model results for Italy

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.380	-0.144	0.106	0.171
Clothing	1.456	-2.203	1.525	-2.378
Housing	1.200	-0.708	1.174	-0.751
Transport	1.202	-0.745	1.173	-0.785
Recreation	0.843	-0.864	0.860	-0.876
Misc	1.303	-0.979	1.286	-0.983

Table 19: Cross-country model results for the UK

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.182	0.173	-0.276	0.747
Clothing	0.620	-0.747	0.544	-0.701
Housing	0.689	-0.087	0.702	-0.122
Transport	1.185	-0.541	1.170	-0.573
Recreation	0.999	-1.526	0.999	-1.478
Misc	2.153	-1.366	1.968	-1.342

Table 20: Cross-country model results for the US

i	Expenditure elasticity for i (average shares)	Own price elasticity for i (average shares)	Expenditure elasticity for i (2004 shares)	Own price elasticity for i (2004 shares)
Food	0.284	0.108	0.001	0.514
Clothing	1.635	0.087	1.858	0.481
Housing	0.934	-0.412	0.927	-0.351
Transport	1.084	-0.565	1.092	-0.523
Recreation	0.911	-1.175	0.916	-1.166
Misc	1.178	-0.498	1.148	-0.593

Table 21: Results from the cross-country regressions

	Ireland		Australia	
sfo	Coef.	z	Coef.	z
lnpfo	0.046	1.45	0.066	3.92***
lnpcl	0.033	3.06***	0.035	2.7***
lnpho	0.033	2.3**	-0.128	-7.53***
lnptr	-0.011	-0.58	0.052	4.6***
lnpre	-0.081	-4.61***	-0.012	-0.51
lnpmi	-0.019	-0.87	-0.014	-3.94***
lnfcep	-0.081	-13.78***	-0.046	-7.32***
_cons	1.052	16.71***	0.745	8.96***
sho	Coef.	z	Coef.	z
lnpfo	0.033	2.3**	-0.1275	-7.53***
lnpcl	-0.036	-6.4***	0.017	1.02
lnpho	0.038	4.37***	0.058	1.69*
lnptr	0.020	1.91*	0.059	3.79***
lnpre	-0.019	-2.26**	-0.030	-0.96
lnpmi	-0.034	-3.12***	0.023	6.39***
lnfcep	0.010	2.93***	0.058	8.21***
_cons	0.125	3.39***	-0.544	-5.83***
str	Coef.	z	Coef.	z
lnpfo	-0.011	-0.58	0.052	4.6***

lnpcl	-0.009	-1.08
lnpho	0.020	1.91*
lnptr	0.079	3.74***
lnpre	-0.054	-4.4***
lnpmi	-0.025	-1.28
lnfcep	0.010	1.73*
_cons	0.016	0.27

lnpcl	-0.021	-1.41
lnpho	0.059	3.79***
lnptr	-0.019	-1.37
lnpre	-0.069	-4.17***
lnpmi	-0.003	-0.77
lnfcep	-0.015	-2.71***
_cons	0.326	4.52***

sre	Coef.	z
lnpfo	-0.081	-4.61***
lnpcl	0.024	4.07***
lnpho	-0.019	-2.26**
lnptr	-0.054	-4.4***
lnpre	0.099	5.64***
lnpmi	0.032	2.06**
lnfcep	-0.015	-4.19***
_cons	0.374	9.48***

sre	Coef.	z
lnpfo	-0.012	-0.51
lnpcl	-0.045	-2.62***
lnpho	-0.030	-0.96
lnptr	-0.069	-4.17***
lnpre	0.151	3.42***
lnpmi	0.005	1.35
lnfcep	0.007	0.94
_cons	0.108	1.1

smi	Coef.	z
lnpfo	-0.019	-0.87
lnpcl	-0.020	-2.08**
lnpho	-0.034	-3.12***
lnptr	-0.025	-1.28
lnpre	0.032	2.06**
lnpmi	0.067	2.52**
lnfcep	0.088	13.11***
_cons	-0.753	-10.45***

smi	Coef.	z
lnpfo	-0.014	-3.94***
lnpcl	-0.016	-3.56***
lnpho	0.023	6.39***
lnptr	-0.003	-0.77
lnpre	0.005	1.35
lnpmi	0.004	0.53
lnfcep	0.037	3.71***
_cons	-0.211	-1.64

Austria

sfo	Coef.	z
lnpfo	0.084	4.33***
lnpcl	0.001	0.08
lnpho	-0.066	-4.31***
lnptr	-0.012	-0.6
lnpre	0.007	0.29
lnpmi	-0.014	-0.67
lnfcep	-0.110	-8.98***
_cons	1.441	9.81***

sho	Coef.	Z
lnpfo	-0.066	-4.31***
lnpcl	-0.061	-3.35***
lnpho	0.059	1.63
lnptr	0.085	3.2***
lnpre	0.017	0.64
lnpmi	-0.033	-1.56
lnfcep	0.021	1.55
_cons	0.008	0.05

str	Coef.	z
lnpfo	-0.012	-0.6
lnpcl	0.033	1.32

France

sfo	Coef.	z
lnpfo	0.083	10.89***
lnpcl	0.034	5.08***
lnpho	-0.047	-5.95***
lnptr	-0.021	-2.9***
lnpre	0.018	3.44***
lnpmi	-0.067	-12.2***
lnfcep	-0.064	-26.48***
_cons	1.054	31.51***

sho	Coef.	z
lnpfo	-0.047	-5.95***
lnpcl	-0.030	-3.3***
lnpho	0.151	11.55***
lnptr	-0.040	-3.72***
lnpre	0.037	4.74***
lnpmi	-0.071	-10.44***
lnfcep	0.021	7.66***
_cons	-0.032	-0.83

str	Coef.	z
lnpfo	-0.021	-2.9***
lnpcl	-0.041	-4.19***

lnpho	0.085	3.2***
lnptr	0.048	1.11
lnpre	-0.115	-3.31***
lnpmi	-0.038	-1
lnfcep	0.008	0.42
_cons	0.035	0.15

sre	Coef.	z
lnpfo	0.007	0.29
lnpcl	0.019	0.73
lnpho	0.017	0.64
lnptr	-0.115	-3.31***
lnpre	0.063	1.22
lnpmi	0.010	0.3
lnfcep	0.047	2.61***
_cons	-0.341	-1.6

smi	Coef.	z
lnpfo	-0.014	-0.67
lnpcl	0.050	2.12**
lnpho	-0.033	-1.56
lnptr	-0.038	-1
lnpre	0.010	0.3
lnpmi	0.025	0.6
lnfcep	0.113	5.45***
_cons	-1.148	-4.62***

lnpho	-0.040	-3.72***
lnptr	0.137	9.53***
lnpre	-0.039	-4.38***
lnpmi	0.004	0.54
lnfcep	0.020	7.13***
_cons	-0.123	-3.18***

sre	Coef.	z
lnpfo	0.018	3.44***
lnpcl	0.015	1.64*
lnpho	0.037	4.74***
lnptr	-0.039	-4.38***
lnpre	-0.008	-0.72
lnpmi	-0.023	-5.12***
lnfcep	0.019	10.49***
_cons	-0.128	-5.02***

smi	Coef.	z
lnpfo	-0.067	-12.2***
lnpcl	0.008	1.16
lnpho	-0.071	-10.44***
lnptr	0.004	0.54
lnpre	-0.023	-5.12***
lnpmi	0.149	19.96***
lnfcep	0.046	20.59***
_cons	-0.400	-13.14***

Greece

sfo	Coef.	z
lnpfo	0.166	8.77***
lnpcl	0.004	0.45
lnpho	-0.014	-0.99
lnptr	-0.011	-7.9***
lnpre	-0.062	-3.79***
lnpmi	-0.082	-4.24***
lnfcep	-0.118	-15.48***
_cons	1.588	17.64***

sho	Coef.	z
lnpfo	-0.014	-0.99
lnpcl	-0.002	-0.15
lnpho	-0.034	-1.71*
lnptr	-0.014	-7.4***
lnpre	0.020	1.14
lnpmi	0.044	2.49**
lnfcep	-0.014	-1.4
_cons	0.387	3.2***

str	Coef.	z
lnpfo	-0.011	-7.9***
lnpcl	-0.006	-5.03***
lnpho	-0.014	-7.4***

Italy

sfo	Coef.	z
lnpfo	0.165	5.59***
lnpcl	0.087	3.1***
lnpho	0.002	0.16
lnptr	-0.041	-3.23***
lnpre	-0.162	-8.15***
lnpmi	-0.051	-4.02***
lnfcep	-0.143	-11.8***
_cons	2.129	12.74***

sho	Coef.	z
lnpfo	0.002	0.16
lnpcl	-0.130	-8.72***
lnpho	0.075	7.44***
lnptr	0.070	7.17***
lnpre	0.032	2.14**
lnpmi	-0.049	-4.58***
lnfcep	0.045	7.84***
_cons	-0.364	-4.64***

str	Coef.	z
lnpfo	-0.041	-3.23***
lnpcl	0.021	1.13
lnpho	0.070	7.17***

lnptr	0.041	30.87***
lnpre	-0.002	-1.48
lnpmi	-0.008	-5.4***
lnfcep	-0.019	-3.9***
_cons	0.330	5.61***

lnptr	0.036	2.23**
lnpre	-0.074	-4.39***
lnpmi	-0.012	-0.78
lnfcep	0.026	4.03***
_cons	-0.209	-2.37**

sre	Coef.	z
lnpfo	-0.062	-3.79***
lnpcl	-0.010	-0.96
lnpho	0.020	1.14
lnptr	-0.002	-1.48
lnpre	0.059	2.8***
lnpmi	-0.005	-0.26
lnfcep	0.085	9.65***
_cons	-0.771	-7.45***

sre	Coef.	z
lnpfo	-0.162	-8.15***
lnpcl	0.107	3.21***
lnpho	0.032	2.14**
lnptr	-0.074	-4.39***
lnpre	0.016	0.45
lnpmi	0.081	4.55***
lnfcep	-0.023	-2.21**
_cons	0.474	3.34***

smi	Coef.	z
lnpfo	-0.082	-4.24***
lnpcl	0.017	1.44
lnpho	0.044	2.49**
lnptr	-0.008	-5.4***
lnpre	-0.005	-0.26
lnpmi	0.035	1.39
lnfcep	0.099	11.28***
_cons	-1.016	-9.75***

smi	Coef.	z
lnpfo	-0.051	-4.02***
lnpcl	0.016	0.83
lnpho	-0.049	-4.58***
lnptr	-0.012	-0.78
lnpre	0.081	4.55***
lnpmi	0.014	0.59
lnfcep	0.056	7.56***
_cons	-0.564	-5.57***

United Kingdom

sfo	Coef.	z
lnpfo	0.184	3.97***
lnpcl	-0.027	-1.72*
lnpho	0.022	0.84
lnptr	-0.018	-6.04***
lnpre	-0.066	-2**
lnpmi	-0.095	-2.02**
lnfcep	-0.147	-5.96***
_cons	2.115	6.29***

sho	Coef.	z
lnpfo	0.022	0.84
lnpcl	-0.044	-4.59***
lnpho	0.183	7.9***
lnptr	-0.017	-8.18***
lnpre	-0.031	-1.41
lnpmi	-0.114	-4.07***
lnfcep	-0.067	-4.14***
_cons	1.135	5.12***

str	Coef.	z
lnpfo	-0.018	-6.04***
lnpcl	-0.010	-4.12***
lnpho	-0.017	-8.18***
lnptr	0.071	20.83***

United States

sfo		Coef.	z
	lnpfo	0.115	11.07***
	lnpcl	-0.019	-1.63
	lnpho	-0.031	-3.57***
	lnptr	-0.019	-2.02**
	lnpre	0.007	0.55
	lnpmi	-0.052	-5.18***
	lnfcep	-0.080	-6.76***
	_cons	1.351	7.2***

sho	Coef.	z
lnpfo	-0.031	-3.57***
lnpcl	-0.006	-0.52
lnpho	0.123	8.74***
lnptr	0.022	2.37**
lnpre	-0.007	-0.5
lnpmi	-0.101	-9.08***
lnfcep	-0.014	-1.27
_cons	0.422	2.41**

str	Coef.	z
lnpfo	-0.019	-2.02**
lnpcl	0.008	0.64
lnpho	0.022	2.37**
lnptr	0.056	3.66***

lnpre	-0.015	-5.77***		lnpre	-0.011	-0.73
lnpmi	-0.011	-2.75***		lnpmi	-0.057	-4.33***
lnfcep	0.026	4.93***		lnfcep	0.011	0.82
_cons	-0.20	-2.77***		_cons	-0.051	-0.25

sre	Coef.	z		sre	Coef.	z
lnpfo	-0.066	-2**		lnpfo	0.007	0.55
lnpcl	0.021	1.64		lnpcl	-0.011	-0.65
lnpho	-0.031	-1.41		lnpho	-0.007	-0.5
lnptr	-0.015	-5.77***		lnptr	-0.011	-0.73
lnpre	-0.110	-2.73***		lnpre	-0.028	-1.09
lnpmi	0.201	4.16***		lnpmi	0.050	3.78***
lnfcep	-0.0002	-0.01		lnfcep	-0.013	-0.85
_cons	0.231	0.77		_cons	0.364	1.49

smi	Coef.	Z		smi	Coef.	z
lnpfo	-0.095	-2.02**		lnpfo	-0.052	-5.18***
lnpcl	0.046	2.44**		lnpcl	-0.034	-2.36**
lnpho	-0.113	-4.07***		lnpho	-0.101	-9.08***
lnptr	-0.011	-2.75***		lnptr	-0.057	-4.33***
lnpre	0.201	4.16***		lnpre	0.050	3.78***
lnpmi	-0.028	-0.39		lnpmi	0.194	10.27***
lnfcep	0.213	6.3***		lnfcep	0.061	3.61***
_cons	-2.673	-5.8***		_cons	-0.575	-2.13**

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