Introduction

The car industry is one the industries that most dramatically has been hit by the economic crisis that started in 2008. Demand for car sales declined sharply, deepening the crisis effect on the economy of car producing countries, through the car industry's broad linkages with other sectors. It is therefore not surprising that the governments of many European countries granted financial aids to the (national) car industry to help the country get out of the crisis. The Spanish government has been the largest granter of aids in Europe, in particular on the demand for new automobiles, with an overall budget of €800 million. Spanish data on car sales shows that the decline in the sales of new cars was reversed due to the start-up of government aid in the period between July 2009 and July 2010, but the decline trend re-appeared and remained when the aids were stopped.

At the disaggregated consumer level, the analysis of the Spanish government support to the car industry appears particularly relevant in contributing to the existing literature on car demand, at least given the start-up was totally unforeseeable and exogenous to the consumer. The aid was simultaneously announced and approved by the government on May 19th of 2009, and undertaken a few days later. Then the end of this government support on July of 2010 was also uncertain and therefore exogenous to the consumer.

Literature on car demand is abundantly devoted to the analysis of car travel demand (Dargay, 2007) or car ownership (Matas and Raymod, 2008; Bunch, 2000; De Jong et al, 2004). However, most of the studies in this literature use time-series data on a highly aggregate level. Working with aggregate data has its limitations, because differences between individuals can be very important and cannot be captured with this type of data. Panel data then is the ideal data, because it allows us to follow the same individuals over time (capturing the individual effects), and at the same time, to capture the dynamics of the individual’s behavioural choice. Although the difficulty in finding
panel surveys which reflect all these features, we have a representative sample of Spanish households expenditure data, including expenditure on new cars.

The objective of this paper is twofold. Firstly, we analyse the determinants of the car purchase in Spain using a sample of panel data over the period 2006-2010. This type of data allows us to incorporate the effects of price variation and control for unobserved heterogeneity. Secondly, we investigate the influence of exogenous policy measures on the decision of car purchase. To do this we are going to estimate a system of demand equations where one of them will be the expenditure on car acquisition.

Data

Our study is based on annual data of the 2006-2010 Spanish Family Expenditure Survey (EPF). This survey is used by the National Statistics Institute in order to estimate the general index price (GPI). In the first year of the sample 2,470 small geographical areas were defined, and 10 households were selected for each region. Every year the half of the sample is renewed.

The expenditure of the households is classified in twelve types. We have introduced a new category called new vehicles, where we reflect that the household has purchased a new vehicle. Furthermore we know the exact month when the vehicle was purchased, and we also know whether the household received grants to finance the acquisition of the vehicle.

Methodology

To define the demand equations we consider a functional form for the preferences based on the PIGLOG class (see Deaton and Muellbauer, 1980; Green and Alston, 1990). Then the expenditure function \( e(p, u) \) can be written as follows for utility \( u \) and price vector \( p \):

\[
\log e(p, u) = a(p) + u b(p)
\]

where:

\[
a(p) = \alpha_0 + \sum_{j=1}^{n} \alpha_j \log p_j + \frac{1}{2} \sum_{j=1}^{n} \sum_{k=1}^{n} \gamma_{jk} \log p_j \log p_k
\]
\[ b(p) = \prod_k p_k^{\beta_k} \]

where, \( \gamma^*_j = \gamma^*_{kj} \) by symmetry. And the resulting marshallian share equations are (the called AIDS demand functions):

\[ w_i = \alpha_i + \sum_{j=1}^{n} \gamma^*_i \log p_j + \beta_i \log \frac{M}{P} \]

where \( i = 1, \ldots, j, \ldots, k, \ldots, n \), and \( \log P = a(p) \)

These type of equations have a set of important features: they represent an arbitrary first-order approximation to any demand system, it aggregates perfectly over consumers, it is consistent with household-budget data, restrictions on homogeneity and symmetry can be tested, and welfare measures can be derived.

References


