

**CONVERGENCE IN CAR PRICES AMONG EUROPEAN  
COUNTRIES**

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# CONVERGENCE IN CAR PRICES AMONG EUROPEAN COUNTRIES

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## Abstract

This paper contributes to the literature on convergence of prices in Europe by investigating the existence of stochastic and deterministic convergence of car prices in the EU15 countries over the period 1993–2008. For that purpose, we conduct unit root testing by employing the recently developed panel stationarity test of Carrion-i-Silvestre et al. (2005) which assumes a highly flexible trend function by incorporating an unknown number of structural breaks which are searched endogenously without using a priori information.

*Key words:* Market integration, Automobiles, European Union, Stochastic convergence, Deterministic convergence, Panel stationarity.

*JEL classification:* C23, F15, F30.

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## 1. Introduction

During the last five decades, the European Union (EU) has advanced to a closer integration by the removal of trade barriers, the establishment of a single market and the creation of the Economic and Monetary Union (EMU). In addition, there have been attempts towards tax harmonisation and structural reforms in product markets to increase competition and reduce potentially harmful distortions caused by different forms of government intervention. All these initiatives would have enhanced market integration that would have exerted downward pressure on traded goods and services prices, leading to a decline in price dispersion across EU Member States.

One market that has attracted a special attention in both political and academic ambits is the European car market. The existence of large and persistent cross-country price differentials in the automobile industry has been, over the last two decades, an important source of concern under the European Commission's competition policy. The Commission has viewed price differentials as a potential threat to the European market integration. Therefore, since the completion of the single market programme in 1993, the European Commission has monitored the motor vehicle industry (by car price surveys) to check for differences in car prices across EU countries. Additionally, it has commissioned several studies from external consultants to detect factors that were behind car price differentials (see, for example, Degryse and Vervoben, 2000).<sup>1</sup> Among the various explanations suggested by the literature nominal exchange rate volatility and the specific regulatory regime in the car industry have always played a prominent role. However, after the introduction of the euro policy-makers' attention has mainly focused on regulation of the industry, although for non-euro countries exchange rate volatility is still a source of concern since it prevents the full market integration across all EU countries.

On the other hand, a number of academic studies have also investigated price dispersion and price convergence in the European car market (see, for example, Gaulier and Haller, 2000; Lutz, 2004a and 2004b; Goldberg and Verboven, 2001, 2004 and 2005; Gil-Pareja and Sosvilla-Rivero, 2008). The analysis of the impact of the exchange rate volatility and the adoption of the euro on price dispersion motivated most of these papers. Overall, these studies reveal that exchange rate fluctuations explain a large share of the price dispersion dynamics and that the introduction of the euro has had visible effects on cross-country price dispersion even though price convergence has not yet been completed. To the extent that, despite the evidence of convergence, price differences across eurozone countries remain significant after some years from the introduction of the euro, Goldberg and Verboven (2004) and Gil-Pareja and Sosvilla-Rivero (2008) conclude that additional measures to promote integration are needed to achieve full integration of the European car markets. In addition to tax harmonization, one of such measures<sup>2</sup>, often pointed out by researchers, has been the liberalization of the car distribution system in the EU.

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<sup>1</sup> The external studies are provided at [http://ec.europa.eu/competition/sectors/motor\\_vehicles/overview\\_en.htm](http://ec.europa.eu/competition/sectors/motor_vehicles/overview_en.htm).

<sup>2</sup> Nevertheless, there have been important advances in the process of indirect tax harmonization in the EU, such as the Sixth Directive on VAT in 1977 and the adoption in 1992 of a minimal standard VAT rate (15 per cent) and the minimal reduced VAT rate (5 per cent), see Tyc (2008).

Despite the removal of a great part of the barriers within the EU in 1993, some obstacles to cross-border trade have remained until the first half of the 2000s. In particular, the major obstacle to cross-border trade came from the selective and exclusive distribution system authorised by Regulation 123/85 (from 1985 to 1995) and 1475/95 (from 1995 up to 30 September 2002). This distribution system aimed to restrict sales of new cars in the EU to dealers chosen by manufacturers, becoming very difficult for independent wholesalers to buy cars in bulk in one country and resell them in another. An important liberalization of the distribution system was introduced by the Regulation 1400/2002 that became fully operative in October 2005. The new distribution system allows manufacturers to grant either selectivity or territorial exclusivity, but not the combination of both. It remains an open question whether the new system has led to a decrease in absolute price differentials. The sample period considered in previous studies does not allow answering this question.

In this paper we will try to shed some light on the issue by providing empirical evidence on the degree of car price convergence across the fifteen EU member countries (EU15) prior to the 2004 and 2007 enlargements over the period 1993-2008. To this end we use recent developments in econometric theory based on panel data unit root and stationarity tests. Our paper departs from previous studies in this area by using a different approach to examining the European Commission data set and by incorporating the most recent information including several years after the introduction of the new regulatory framework.

To explore whether price convergence in the European car market has been influenced by such events, we apply panel stationarity tests proposed by Carrion-i-Silvestre *et al.* (2005), which assumes a highly flexible trend function by incorporating an unknown number of changes in level and slope. We believe that these tests are the relevant ones since, on the one hand, and as noted by Bai and Ng (2004), for many economic applications, it is more natural to take stationarity as the null hypothesis rather than nonstationarity. In addition, the use panel unit root tests allows us to take advantage of the time series and cross-section dimensions of the data.

The remainder of the paper is organised as follows. Section 2 briefly describes the data and the empirical strategy employed in the analysis. In Section 3 we present the results of the analysis of both stochastic and deterministic convergence across EU15 countries. Finally, Section 4 makes some concluding remarks.

## 2. Data and methodology

### 2.1. Data description

The data used in this paper comes from the car price report published twice a year by the European Commission (EC) since 1993. From May 2007 the report is published once a year. This initiative was launched following numerous complaints from consumers about differences in car prices between Member States and obstacles placed in the way of those consumers that wished to buy in another EU country.

The car price report is based on standardised data provided by European and Japanese car manufacturers in co-operation with their associations (European Automobile Manufacturers' Association and the Japan Automobile Manufacturers Association) and is widely distributed and made available on the EC Directorate General for Competition's website. Prices are given both excluding and including taxes, together with prices for the major options and right-hand-drive supplements. The number of car models included in these surveys ranges from 72 to 91. The prices are adjusted for equipment differences and are given in local currency and in ECU/euros, both before and after tax. It shall be noted that actual retail prices may differ from recommended list prices, as dealers are free to set their own prices.

Although the car price report provides data for all 27 EU Member States, we only analyse data for the EU15, since the sample for those countries that joined the UE in 2004 and 2007 is very small. In particular, we use pre-tax prices for the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom. The car models considered are those with appropriate data in the range of countries and periods for the purposes of this paper. As a result, we have selected a sample of 45 models covering all segments of the market (mini cars, small cars, medium cars, large cars, executive cars, luxury cars and multi purpose and sports utility).

### 2.2. Empirical strategy

Bernard and Durlauf (1995) define time-series convergence between two (or more) countries when the long-run forecasts of difference in the variable of interest (car price in our case) tend to zero as the forecasting horizon tends to infinity:

$$\lim_{k \rightarrow \infty} E(p_{i,t+k}^m - p_{j,t+k}^m / I_t) = 0 \quad (1)$$

where  $p_{i,t}^m$  denotes the log of the price of model  $m$  in country  $i$  at time  $t$  and  $p_{j,t}^m$  is the log of the price of model  $m$  in country  $j$ . Therefore, in our context, tests for the time series notion of convergence require cross-country car price differences to be stationary.

Carlino and Mills (1993) proposed a weaker definition of convergence in time series analysis: *stochastic convergence* or catching-up. In our case, there is stochastic convergence if the log of relative car prices is trend stationary, allowing for permanent differences in car prices across countries through the presence of a linear trend in the deterministic component of the trend function. Without stationarity, shocks in relative car prices could lead to permanent deviations in any tendency towards convergence.

In contrast, Li and Papell (1999) postulated a stronger definition of convergence, called *deterministic convergence*, which in our context implies that the log of relative car prices is mean stationary. This requires the elimination of both deterministic and stochastic trends, thereby entailing the price of a given car model in one country move in parallel over the long run relative to that in the other country (or group of countries). Therefore, deterministic convergence implies stochastic convergence, but not the other way around.

Our empirical strategy is based on investigating both time series definitions of convergence. To that end we take a panel approach, exploiting the time series and cross-section dimensions of the data. As it is well known, standard cross-section analysis focuses on long-run average relationships and ignores the time-series variation in the data. But the variation of variables over time contains additional information, which may be particularly valuable in situations where the cross-section variation in the data is relatively limited, as it is in our case. On the other hand, compared to individual time series tests, panel unit-root tests have higher power. The panel data approach allows us to control for conditional convergence through the inclusion of country-specific effects which proxy for time-invariant compensating differentials among countries.

Moreover, we make use of tests statistics for panel stationarity that allows for the presence of multiple structural breaks recently developed by Carrion-i-Silvestre *et al.* (2005), which assumes a highly flexible trend function by incorporating an unknown number of structural breaks that are endogenously determined. As it is well known, failure to incorporate potential structural change in the deterministic component of the trend function in unit root tests for convergence might lead to bias towards the acceptance of no convergence and to an erroneous interpretation of price movements in our context.

We start by computing, for each observation, the log-difference in the price of a specific car model in a given country relative to the average price level for such model in the sample of EU15 countries:

$$p^m_{i,t} = \ln(P^m_{i,t}) - \ln(\bar{P}_t^m) \quad (2)$$

where  $P^m_{i,t}$  denotes the price of model  $m$  in country  $i$  at time  $t$ ,  $\bar{P}_t^m$  is the average price of model  $m$  for the sample of EU15 countries,  $i=1, \dots, 15$  stands for the number of countries,  $m=1, \dots, 45$  for the number of car models and  $t=1, \dots, 30$  stands for the time periods.

### 2.3. Panel stationary test with multiple structural breaks

The panel stationarity test developed by Carrion-i-Silvestre *et al.* (2005) is a generalization for the case of multiple changes in levels and slope of the panel stationarity test proposed by Hadri (2000), which is computed as the average of univariate Kwiatkowski *et al.* (1992, KPSS hereafter) stationary case.

Let  $\{p^m_{i,t}\}$  be a set of stochastic processes given by:

$$p^m_{i,t} = \alpha_{i,t} + \beta_i t + \varepsilon_{i,t} \quad (3)$$

$$\alpha_{i,t} = \sum_{k=1}^{l_i} \theta_{i,k} D(T_{b,k}^i)_t + \sum_{k=1}^{l_i} \gamma_{i,k} DU_{i,k,t} + \alpha_{i,t-1} + v_{i,t} \quad (4)$$

where  $\varepsilon_{i,t}$  is assumed to be stationary,  $v_{i,t} \sim i.i.d.(0, \sigma_{v,i}^2)$  and  $\alpha_{i,0} = \alpha_i$ , a constant.  $\beta_i t$  represents country-specific linear trends and  $\{\varepsilon_{i,t}\}$  and  $\{v_{i,t}\}$  are assumed mutually independent across the two dimensions of the panel data set. The dummy variables for changes in slope and level are given by  $D(T_{b,k}^i)_t$  and  $DU_{i,k,t}$ , which are defined as follows:  $D(T_{b,k}^i)_t = 1$  for  $T_{b,k}^i + 1$  and 0 elsewhere, with  $T_{b,k}^i$  denoting the  $k$ th date break for the  $i$ th individual,  $k=1, \dots, l_i$ ,  $l_i \geq 1$ . Likewise,  $DU_{i,k,t} = 1$  for  $t > T_{b,k}^i$  and 0 elsewhere.

Under the null hypothesis of a stationary panel, the model given by (3) and (4) becomes

$$p_{i,t}^m = \alpha_{i,0} + \sum_{k=1}^{l_i} \gamma_{i,k} DU_{i,k,t} + \beta_i t + \sum_{k=1}^{l_i} \theta_{i,k} DT_{b,k,t}^* + \varepsilon_{i,t} \quad (5)$$

with the dummy variable  $DT_{b,k,t}^* = t - T_{b,k}^i$ , for  $t > T_{b,k}^i$  and 0 elsewhere,  $k=1, \dots, l_i$ ,  $l_i \geq 1$ . The model (5) includes individual effects, individual structural breaks effects, temporal effects (if  $\beta_i \neq 0$ ) and temporal structural effects (if  $\gamma_{i,k} \neq 0$ ). In this case, non-rejection of the null hypothesis implies stochastic convergence in car prices for all countries, while rejection implies divergence for at least one (but not necessarily all) countries forming the sample.

When investigating deterministic convergence for all countries, we drop from equation (5) both country-specific time trends and slope shifts such that

$$p_{i,t}^m = \alpha_{i,0} + \sum_{k=1}^{l_i} \gamma_{i,k} DU_{i,k,t} + \varepsilon_{i,t} \quad (6)$$

In this case, non-rejection of the null hypothesis implies deterministic convergence in car prices for all countries, while rejection implies divergence for at least one country in the sample.

Carrion-i-Silvestre *et al.* (2005) compute their panel stationary test as the average of univariate KPSS tests:

$$LM(\lambda) = N^{-1} \sum_{i=1}^N (\hat{\omega}_i^{-2} T^{-2} \sum_{t=1}^T \hat{S}_{i,t}^2) \quad (7)$$

where  $\hat{S}_{i,t}^2 = \sum_{j=1}^t \hat{\varepsilon}_{i,j}$  denotes the partial sum process that is obtained using the estimated

OLS residuals from equation (5) or (6), depending on the specification.  $\hat{\omega}_i^2$  represents an autocorrelation and heteroskedasticity consistent estimate of the long-run variance of the residuals which is obtained as in Kurozumi (2002). Equation (7) allows for heterogeneity in the estimation of the long-run variance across countries, but homogeneity can also be imposed, reformulating it as  $LM(\lambda) = N^{-1} \sum_{i=1}^N (\hat{\omega}_i^{-2} T^{-2} \sum_{t=1}^T \hat{S}_{i,t}^2)$  with  $\hat{\omega}^2 = N^{-1} \sum_{i=1}^N \hat{\omega}_i^2$ . For the sake of robustness, we will compute the panel KPSS tests of Hadri (2000) and Carrion-i-Silvestre *et al.* (2005) under both assumptions.



Note that  $\lambda$  is used in equation (7) to denote the dependence of the test on the dates of break. For each  $i$ , it is defined as the vector  $\lambda_i = (\lambda_{i,1}, \dots, \lambda_{i,m_i})' = (T_{b,1}^i / T, \dots, T_{b,m_i}^i / T)'$  which indicates the location of the breaks relative to the whole period,  $T$ . This vector of break locations is unknown a priori and must be estimated for each individual time series before the panel statistic can be assembled. Following the suggestion of Carrion-i-Silvestre *et al.* (2005), we determine the breaks location using the procedure of Bai and Perron (1998), which is based on the global minimisation of the sum of squared residuals. Once the dates of all possible  $l_i \leq l^{\max}$ ,  $i=1, \dots, N$ , have been estimated (where  $l^{\max}$  is the maximum number of breaks), we select the appropriate number of structural breaks using the sequential procedure of Bai and Perron (1998).

Once  $\hat{\lambda}_i$  is obtained,  $i=1, \dots, N$ , we compute the normalised test statistic as follows:

$$Z(\hat{\lambda}) = \frac{\sqrt{N}(LM(\hat{\lambda}) - \bar{\xi})}{\bar{\zeta}} \quad (8)$$

where  $\bar{\xi}$  and  $\bar{\zeta}^2$  are computed as averages of individual means and variances of univariate KPSS tests for country  $i$ . Carrion-i-Silvestre *et al.* (2005) show that  $Z(\hat{\lambda})$  has a standard normal distribution.

Finally, note that the computation of the  $Z(\hat{\lambda})$  statistic requires that individual series are cross-section independent. However, this assumption is rarely found in practice, especially in integrated economies like the EU15. In order to account for cross-section dependence of the statistic, we have computed the bootstrap distribution following the bootstrap procedure suggested by Maddala and Wu (1999).

### 3. Empirical results

#### 3.1. Stochastic convergence

Let us start by considering a weaker definition of convergence in time series context, stochastic convergence, which postulates convergence if the log of relative price is trend stationary, as proposed by Carlino and Mills (1993).

As a first exploratory analysis, in Table 1 we present the results of the panel stationary test of Hadri (2000) under the specification with time trends, which corresponds to the notion of stochastic convergence. We also report the p-values for the case of cross-sectional independence and asymptotic normality and the bootstrap critical values allowing for general forms of cross-sectional correlation. For the sake of robustness, the panel KPSS statistics are computed for the case of homogeneity and heterogeneity in the estimation of the long-run variance. As can be seen, they are able to reject the null of joint stationarity at the 1% significance level for the case of cross-independence and asymptotic normality in 20 out of the 45 models considered for the case of homogeneity in the estimation of the long-run variance and in 43 out of the 45 models considered for the case of heterogeneity in the estimation of the long-run variance. Nevertheless, this finding is completely overturned when we compare Hadri's test with the bootstrap critical values, except for the Nissan Primera case when homogeneity is assumed in the estimation of the long-run variance. Therefore, it is noticeable that the assumption of cross-sectional independence led to the spurious rejection of the null as a result of size distortions.

Our findings so far point to stochastic convergence in car prices for our sample of EU15 countries over the 1993-2008 period. However, this may result from the failure to allow for structural change in the deterministic component of the trend function of relative car price which, as stressed by Perron (1989), can lead to misinterpreting stationarity with structural change as a unit root. To deal with this issue, Table 2 reports the results from the panel stationarity test proposed by Carrion-i-Silvestre *et al.* (2005) that allows for multiple level and slope shifts in the trend function. We allow for some structural breaks affecting the time series up to  $l^{\max}=5$  structural breaks and using the modified Schwarz information criterion of Liu *et al.* (1997, LWZ hereafter) to determine the number of structural breaks. As can be seen, with the panel KPSS test assuming normality and cross-independence, we strongly reject the null of regime-wise trend stationarity in car prices at the 1% level, regardless of the car model and of the degree of homogeneity in the estimation of the long-run variance (the only exception being the Citroën AX/saxo/C2 on the homogeneous case). Therefore, there is a clear evidence supporting divergence in car prices for our sample of EU countries. However, this conclusion is radically altered when comparing the test proposed by Carrion-i-Silvestre *et al.* (2005) with the critical values from the bootstrap distribution. As result, we are no longer able to reject the null of stochastic convergence in car prices, suggesting that the (log of) relative prices is trend stationary.

The break points, as identified, vary from model to model and from country to country in general. Recall that these breaks are searched endogenously from the data and our procedure does not rely on pre-test information to determine them, thereby avoiding the possible problem of "data mining". Focusing on the average number of breaks, it goes from 0.46 in the case of the Seat Cordoba to 2.31 for the Honda Accord. As can be seen

in Figure 1, most of the 895 breaks identified occurred in the years 1996 and 2002 and in the 1998-2000 period. The breaks detected in 1996 and 2002 coincide with the implementation of main legislative changes regarding the elimination of the selective and exclusive distribution system authorised by Regulation 123/85 (from 1985 to 1995) and 1475/95 (from 1995 up to 30 September 2002), that allowed manufacturers to fragment the Single Market and artificially keep prices high in certain countries. Special consideration is due to the distribution system introduced by the Regulation 1400/2002 that, although was supposed to become fully operative in 2005, the significance of the 2002 break could be reflecting the fact that car makers anticipated the effects on prices of the greater competition that was expected as a result of such regulation. Furthermore, the 2002 break could also be associated with the euro cash changeover that led to a reduction of information costs and an increase of price transparency. Regarding the breaks found for the 1998-2000 period are associated with the introduction of the Economic and Monetary Union: the fixing of the irrevocable exchange rate with the euro, the switching to a single monetary policy and the existing of the national currencies as unit of account of euro, eliminating the costs of currency exchange and of hedging exchange rates risks. Finally, it is worth noting that institutional idiosyncrasies or economic events may provide plausible explanations of the heterogeneity of break points detected both within models and across countries that will be examined in a future paper.

### 3.2. *Deterministic convergence*

Having established the existence of stochastic convergence in European car prices, we shift the focus to investigate deterministic convergence, the type of time series convergence defined by Li and Papell (1999). Recall that deterministic convergence requires that the log of relative prices be level stationary, as is hence considered to be a stronger notion of time series convergence than stochastic convergence.

Table 3 shows the results of the panel stationary test of Hadri (2000) for the specification without trends. As can be seen, they are able to reject the null of joint stationarity at the 1% significance level for the case of cross-independence and asymptotic normality in 10 out of the 45 models considered for the case of homogeneity in the estimation of the long-run variance and in 35 out of the 45 models considered for the case of heterogeneity in the estimation of the long-run variance. Nevertheless, when we use the empirical distribution obtained through bootstrap methods, we are not able in general to reject such hypothesis (except for the Mercedes 320S/S350 at the 1% level and the Audi A4 at the 1% level in the case of homogeneity and at the 5% level in the case of heterogeneity).

Table 4 reports the results from the panel stationarity test proposed by Carrion-i-Silvestre *et al.* (2005) for the specification with country-specific intercepts and mean shifts. As can be seen, we are able to reject the null of joint regime-wise mean stationarity at the 1% level for the asymptotic case in 21 out of the 45 models considered for the case of homogeneity in the estimation of the long-run variance and in 37 out of the 45 models considered for the case of heterogeneity in the estimation of the long-run variance. Nevertheless, as with the case of stochastic convergence, these results are completely overturned when we compare the panel KPSS statistics with the bootstrap critical values, except for the Toyota Starlet/Yaris case at the 5% level when

assuming homogeneity in the estimation of the long-run variance and the cases of Ford Escort/Focus and the Mercedes 320S/S350 at the 1% level when assuming heterogeneity in the estimation of the long-run variance.

As for the average number of detected breaks, it goes from 0.40 in the case of the Nissan Primera to 2.00 for the Audi A6 and the Mercedes 320S/S350. As can be seen in Figure 2, there is high heterogeneity between series regarding the dates in which the break points are located. Nevertheless, most of the 745 breaks identified occurred in the years 1996 and 2002 and in the 1998-2000 period, been generally in accord with the previously reported breaks for stochastic convergence and been associated as before both with main legislative changes aimed to eliminate major obstacles to cross-border trade and with the implementation of the Economic and Monetary Union.

#### **4. Concluding remarks**

During the past five decades, European countries have made a major effort to integrate their national economies. The signing of the Treaty of Rome establishing the European Community years ago fifty (1957), the establishment of a single market ensuring the free movement of goods, services, capital and people (1993), and the recent introduction of Economic and Monetary Union and the euro (1999) have been landmarks in the process towards a deepening and widening European integration, making Europe a particularly interesting case to study the convergence of price levels.

This paper has offered empirical evidence of price convergence in one market that has attracted special attention during the last decade: the European car market. In particular, we have examined whether the EU15 car market have become more integrated, using a different approach to that employed in previous works, making use of panel stationarity tests with high statistical power which incorporate structural breaks to explore both deterministic and stochastic convergence to analyse the most recent and larger sample. In these techniques, the breaks are searched endogenously without using a priori information. It is also interesting to note that by adopting a disaggregated approach focusing in the car market, we analyse homogeneous categories of goods and therefore taking greater consideration of the issue of comparability that is usually done in the case of available studies that are based on price measures with higher level of aggregation.

Combining tests with and without structural breaks, we find considerable evidence of both types of convergence in our sample of countries and car models, therefore suggesting a tendency for relative prices to equalise over time. In addition, we find considerable evidence regarding the importance in this convergence process of both legislative changes opening up markets in terms of geography, products and competitors taking place in the years 1996 and 2002, and the implementation of the Economic and Monetary Union. Nevertheless, institutional idiosyncrasies or major economic events could be still at play given the heterogeneity of break points detected both within models and across countries. The reason for this heterogeneity is reserved for future work.

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Table 1: Stochastic convergence: Panel KPSS stationary test without structural breaks

Model	$Z(\hat{\lambda})$ (homogeneous)					$Z(\hat{\lambda})$ (heterogeneous)				
	Tests	p-value	Bootstrap critical values			Tests	p-values	Bootstrap critical values		
			10%	5%	1%			10%	5%	1%
Alfa 145/147	-0.6044	0.7272	6.0376	7.0849	9.6118	2.7743	0.0028	9.8544	11.7314	16.4847
Alfa 155/156	2.5303	0.0094	7.7995	9.1655	12.1901	6.4940	0.0000	11.7337	13.4659	17.6976
Audi A4	1.2001	0.1151	6.3763	7.4702	10.8351	7.7300	0.0000	10.7777	12.5352	14.1608
Audi A6	0.5463	0.2924	6.1900	7.2736	9.6719	4.2315	0.0000	10.2387	12.1075	16.3612
BMW 3-series	3.5184	0.0002	6.7757	8.1680	11.3891	9.5465	0.0000	10.3224	12.2426	16.5333
BMW 5-series	2.9784	0.0014	7.0263	8.5492	10.1260	11.2605	0.0000	10.9049	13.1299	18.4953
BMW 7-series	0.6988	0.2423	6.8863	8.4033	12.3009	8.5605	0.0000	9.6642	11.6961	16.9333
Citroën AX/saxo/C2	0.8804	0.1893	4.4645	5.5706	8.2168	0.7277	0.2334	5.5219	6.6885	9.2334
Citroën ZX/ Xsara/C4	1.2934	0.0979	9.3880	11.8429	17.5783	3.1191	0.0009	12.8006	15.6266	22.1095
Citroën Xantia/C5	3.0000	0.0013	6.4950	7.9883	9.4057	5.1470	0.0000	8.8786	10.6320	14.5308
Fiat Cinq./Seicento/Panda	1.5259	0.0635	6.2136	7.3451	9.9469	2.5473	0.0054	10.3773	12.1506	16.0707
Fiat Punto	2.1395	0.0162	6.1520	7.2687	9.5366	6.0574	0.0000	9.8263	11.4693	15.3231
Fiat Bravo/Stilo	3.0157	0.0013	6.1798	7.3149	9.6694	4.7217	0.0000	9.6854	11.2295	14.7763
Ford Fiesta	5.0187	0.0000	6.3470	7.5503	10.1616	11.0966	0.0000	10.2226	12.0958	16.5847
Ford Escort/Focus	5.4462	0.0000	6.0824	7.1818	9.4831	12.1175	0.0000	9.9433	11.6106	15.5620
Ford Mondeo	1.9647	0.0247	6.0073	7.0969	9.5498	7.9430	0.0000	9.8594	11.4250	14.9609
Honda Civic	1.8599	0.0314	6.7044	8.0116	10.9636	5.0731	0.0000	10.0966	11.9670	16.2139
Honda Accord	0.7529	0.2258	6.7835	8.0010	10.8647	3.5505	0.0002	11.6521	13.5684	17.8981
Mazda 3-series	1.5216	0.0641	6.7630	8.0789	11.0620	4.8302	0.0000	10.0381	11.7285	15.4430
Mercedes 180/c180	2.9800	0.0014	7.2336	9.0178	12.7948	9.2184	0.0000	10.5528	12.7629	17.9798
Mercedes 200E/E220	4.2209	0.0000	7.2327	8.7286	11.9107	11.8888	0.0000	11.1641	13.4450	18.6434
Mercedes 320S/S350	7.4440	0.0000	7.3320	8.8211	12.4162	13.3533	0.0000	11.0719	13.0843	17.9745
Nissan Micra	7.7504	0.0000	6.0788	7.1083	9.2860	9.7571	0.0000	9.7883	11.4500	14.9282
Nissan Sunny/Almera	7.0302	0.0000	6.1719	7.3413	9.6948	8.4331	0.0000	9.7378	11.3192	14.8511
Nissan Primera	9.5028	0.0000	5.7021	6.7033	8.6649	10.6227	0.0000	9.7187	11.2784	14.6632
Opel Corsa	1.8338	0.0333	5.5533	6.4150	8.1752	4.0055	0.0000	9.6675	11.0541	14.1740
Opel Astra	2.7096	0.0404	5.4529	6.3031	8.0312	4.7599	0.0000	9.5401	10.9690	14.1724

Opel Vectra	2.0464	0.0204	5.7165	6.7003	8.6960	3.2853	0.0005	9.7373	11.1820	14.3585
Opel Omega/Signum	1.1864	0.1475	6.2297	7.2062	9.1689	5.6688	0.0000	11.3130	13.0026	16.7095
Peugeot 306/307	4.2930	0.0000	6.5050	7.9062	11.0254	5.5314	0.0000	9.3609	11.1950	15.6262
Peugeot 405/406/407	4.4069	0.0000	6.1937	7.4255	10.2322	2.9629	0.0015	9.6055	11.6195	16.3135
Renault Clio	1.6162	0.0520	6.8417	8.1491	10.8293	11.9584	0.0000	11.8843	13.9105	18.5704
Renault 19/Megane	2.7526	0.0030	6.2147	7.3301	9.9556	3.8449	0.0001	10.5354	12.3336	16.4626
Renault 21/Laguna	1.1806	0.1189	7.0053	8.2027	11.1611	2.2590	0.0119	11.4557	13.3496	17.7195
Range Rover	7.7772	0.0000	11.4247	14.4100	21.4726	9.4397	0.0000	23.4436	28.8310	41.6973
Seat Ibiza	-0.0203	0.5081	4.8967	5.7273	7.5675	2.5010	0.0062	7.8967	9.2372	12.12662
Seat Cordoba	1.1794	0.1191	6.3401	7.2430	9.0324	2.4164	0.0078	12.9578	14.8249	19.2161
Seat Toledo	0.3752	0.3508	5.9205	6.9364	9.0907	6.5360	0.0000	9.8265	11.4457	15.2244
Toyota Starlet/Yaris	1.5488	0.0607	5.3668	6.4693	8.9940	6.2587	0.0000	8.7127	10.3359	14.2586
Toyota Corola	2.3834	0.0086	6.4816	8.0297	11.7592	3.3021	0.0005	9.5225	11.4600	15.5901
Toyota Carina/Avensis	2.6594	0.0039	6.6050	8.1702	11.6769	5.8398	0.0000	9.8242	11.9405	17.1511
Volvo 440/s40	0.4863	0.3134	5.6113	6.6075	8.6518	6.4798	0.0000	9.7779	11.5474	15.4348
VW Polo	0.9155	0.1800	6.2071	7.4920	10.2295	6.1663	0.0000	9.7325	11.7700	15.9545
VW Golf	2.3433	0.0096	6.9587	9.3986	11.6220	10.0307	0.0000	10.1805	12.0503	16.1063
VW Passat	1.5994	0.0549	7.9989	9.8149	14.0098	8.4019	0.0000	11.4377	13.5925	19.0059

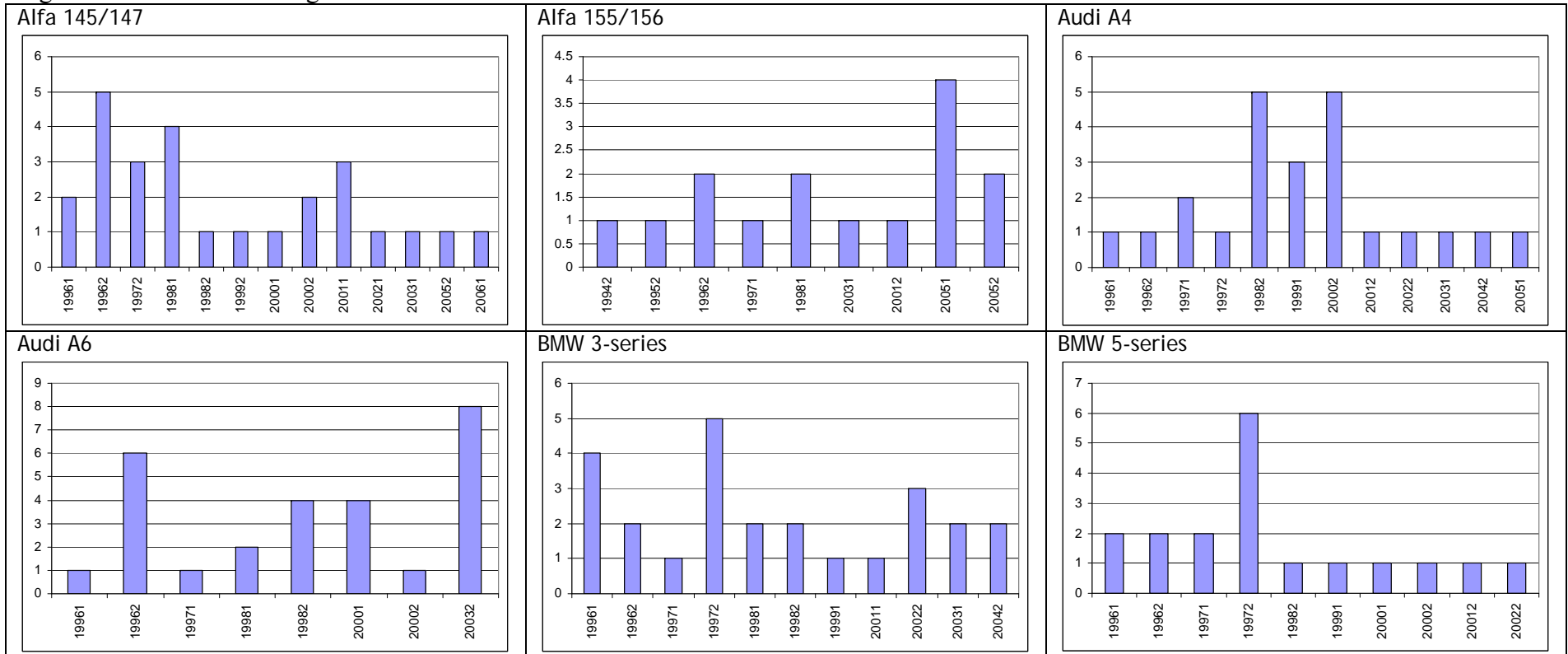


Table 2: Stochastic convergence: Panel KPSS stationary test with structural breaks

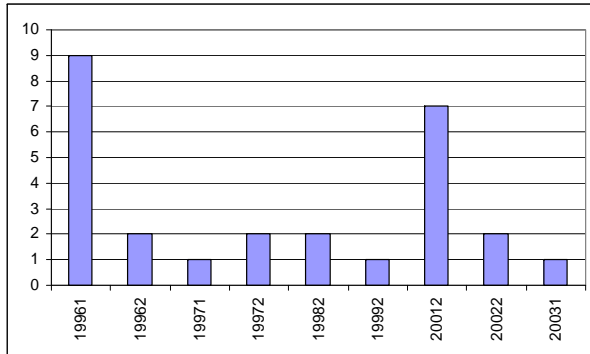
Model	$Z(\hat{\lambda})$ (homogeneous)					$Z(\hat{\lambda})$ (heterogeneous)				
	Tests	p-value	Bootstrap critical values			Tests	p-values	Bootstrap critical values		
			10%	5%	1%			10%	5%	1%
Alfa 145/147	10.0575	0.0000	15.1049	17.1501	21.6199	12.9560	0.0000	31.8311	36.2285	46.1580
Alfa 155/156	9.0849	0.0000	13.4900	15.9553	21.6099	17.7419	0.0000	18.0319	20.4414	25.5264
Audi A4	8.5018	0.0000	20.1185	22.8437	25.9502	32.4404	0.0000	33.5260	38.1383	48.9453
Audi A6	6.1351	0.0000	18.3043	21.3672	28.6048	14.7854	0.0000	36.7194	41.3363	52.2404
BMW 3-series	13.5949	0.0000	20.4320	24.0798	33.1554	18.1414	0.0000	30.6480	38.2202	47.9026
BMW 5-series	7.5138	0.0000	12.3490	14.6031	19.5852	11.8731	0.0000	20.2947	23.5241	30.7345
BMW 7-series	7.7633	0.0000	23.7069	28.2559	39.0826	23.8723	0.0000	40.3344	45.7623	59.3330
Citroën AX/saxo/C2	1.2526	0.1052	11.2551	13.9531	19.9028	7.1908	0.0000	5.3540	19.3505	30.4672
Citroën ZX/ Xsara/C4	4.2217	0.0000	24.4593	29.2742	41.7639	16.6271	0.0000	55.0019	64.9429	89.1282
Citroën Xantia/C5	7.0876	0.0000	11.0841	12.8343	16.6810	19.9059	0.0000	21.0785	24.3558	32.2775
Fiat Cinq./Seicento/Panda	6.5237	0.0000	18.1873	21.1318	27.6727	15.9600	0.0000	44.2399	50.9888	67.2851
Fiat Punto	4.1996	0.0000	9.6947	11.1009	14.0665	6.3823	0.0000	18.1999	20.7382	25.9332
Fiat Bravo/Stilo	6.1791	0.0000	10.4410	11.9812	15.1893	9.7487	0.0000	18.5439	21.1092	26.9148
Ford Fiesta	6.2129	0.0000	10.1996	11.4160	14.1863	17.7386	0.0000	20.3443	22.3443	25.6468
Ford Escort/Focus	13.2310	0.0000	12.0044	13.4584	16.6466	17.0880	0.0000	24.1812	27.2166	34.6583
Ford Mondeo	9.6170	0.0000	11.8151	13.0254	15.9290	16.9809	0.0000	25.7706	29.0749	36.7762
Honda Civic	18.6678	0.0000	16.0759	18.2733	22.9178	64.4946	0.0000	32.9544	37.0700	47.2870
Honda Accord	17.9981	0.0000	25.8938	30.8390	41.6855	32.4838	0.0000	55.5966	65.8596	93.7447
Mazda 3-series	5.9535	0.0000	10.2534	11.6925	14.4564	9.2109	0.0000	19.1983	21.9692	28.3366
Mercedes 180/c180	4.2997	0.0000	12.9748	15.1052	19.9050	10.6713	0.0000	19.7804	22.4613	28.3812
Mercedes 200E/E220	3.4377	0.0003	11.8566	13.9140	18.4347	22.8848	0.0000	23.4719	27.2302	37.0124
Mercedes 320S/S350	10.4022	0.0000	19.0123	22.8351	31.5169	52.9155	0.0000	32.8985	37.7965	49.5313
Nissan Micra	7.3199	0.0000	11.1833	12.7424	16.3514	9.7019	0.0000	21.5370	24.7484	33.8722
Nissan Sunny/Almera	7.8818	0.0000	10.4501	12.1149	15.5882	9.9334	0.0000	19.2858	22.1289	28.9618
Nissan Primera	8.8054	0.0000	10.3814	11.6123	14.5838	14.1598	0.0000	19.8582	22.7210	28.9571
Opel Corsa	6.0895	0.0000	11.9387	13.5948	17.0721	12.6829	0.0000	19.8821	22.5125	27.9026
Opel Astra	6.9591	0.0000	8.6332	9.7623	12.4368	15.1122	0.0000	17.7030	20.1566	25.9628

Opel Vectra	5.9918	0.0000	11.8017	13.5013	17.1391	18.5755	0.0000	20.8119	23.3062	29.4250
Opel Omega/Signum	4.4206	0.0000	12.2514	13.8367	17.3702	15.5610	0.0000	26.4486	30.1777	39.1516
Peugeot 306/307	2.5268	0.0058	11.1295	13.1619	17.8827	12.8351	0.0000	16.1627	18.6900	24.7659
Peugeot 405/406/407	7.7485	0.0000	19.2399	22.4928	30.5181	35.4790	0.0000	43.6203	50.1752	67.0210
Renault Clio	4.2394	0.0000	12.5983	14.3693	18.5958	14.5891	0.0000	26.7532	30.5428	38.9293
Renault 19/Megane	5.6054	0.0000	12.3423	14.4103	19.0955	11.6504	0.0000	24.6751	28.1244	36.8950
Renault 21/Laguna	11.7039	0.0000	14.2095	16.5294	21.3500	16.9757	0.0000	27.8993	31.7878	40.5860
Range Rover	12.9248	0.0000	38.4280	46.9396	68.1298	145.3944	0.0000	183.7544	228.3422	382.0095
Seat Ibiza	4.0873	0.0000	10.5656	12.0531	15.3560	9.9015	0.0000	19.1059	21.6606	27.6314
Seat Cordoba	5.5657	0.0000	10.0198	11.3273	14.2305	9.1113	0.0000	22.4447	25.4979	33.6115
Seat Toledo	7.3870	0.0000	11.9026	13.3338	16.6049	12.3074	0.0000	23.1987	26.3176	33.3570
Toyota Starlet/Yaris	8.6830	0.0000	10.7054	12.5342	16.6993	9.2246	0.0000	19.3857	22.8612	31.1036
Toyota Corola	3.0501	0.0011	11.9719	14.9131	21.1316	5.5108	0.0000	20.3678	23.3408	30.1940
Toyota Carina/Avensis	9.7582	0.0000	12.2232	13.9021	17.5765	12.0321	0.0000	26.2787	29.8183	37.9578
Volvo 440/s40	3.4720	0.0003	10.9367	12.5431	15.8925	9.8519	0.0000	18.8913	21.3713	26.9432
VW Polo	10.2838	0.0000	13.2800	15.5521	20.7887	24.9213	0.0000	30.2544	34.4611	44.0007
VW Golf	14.5081	0.0000	20.8252	24.0230	31.5623	27.9248	0.0000	38.0633	42.6754	53.4940
VW Passat	7.2116	0.0000	15.5328	17.7924	22.7087	17.1996	0.0000	42.1883	49.3055	67.7623

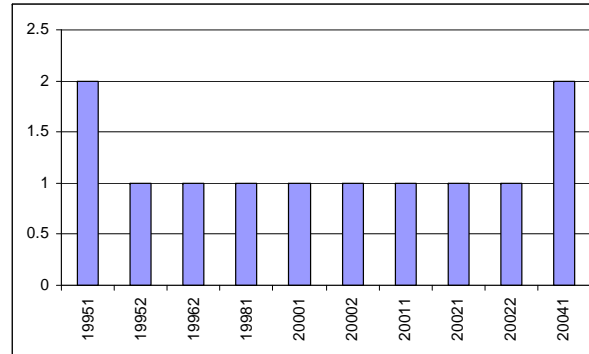
Figure 1: Stochastic convergence: Identified structural breaks



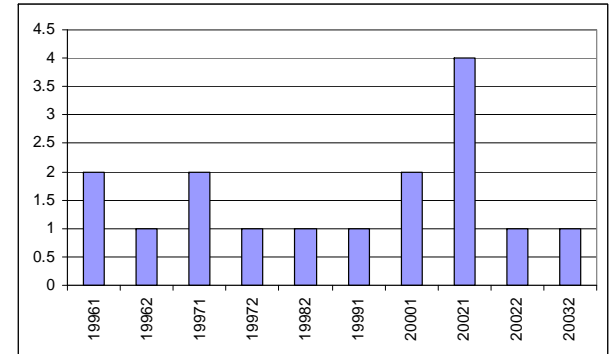
BMW 7-series



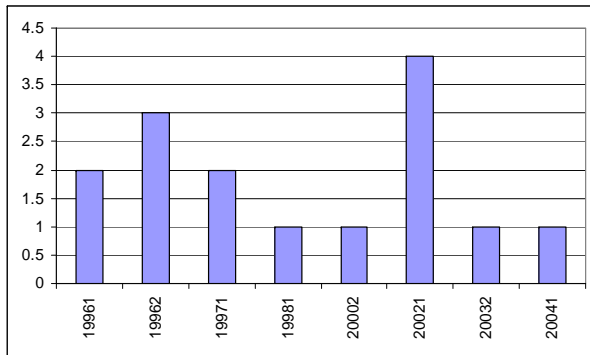
Citroën AX/saxo/C2



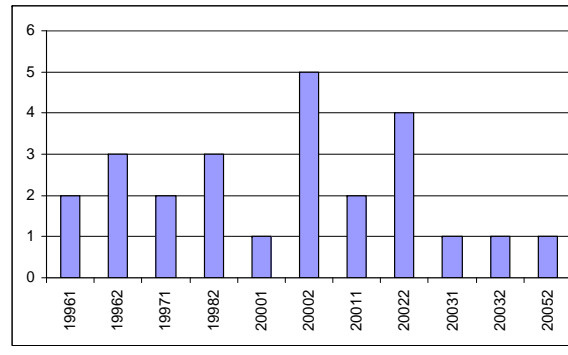
Citroën ZX/ Xsara/C4



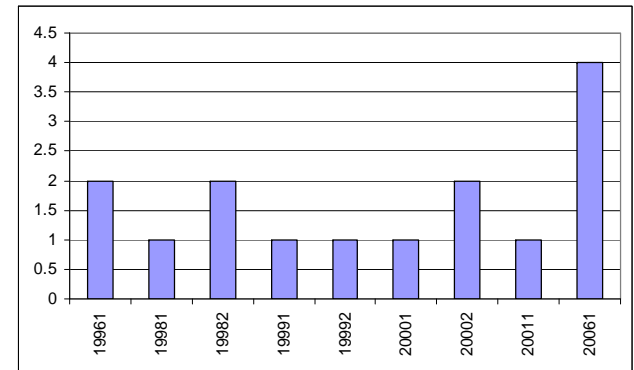
Citroën Xantia/C5



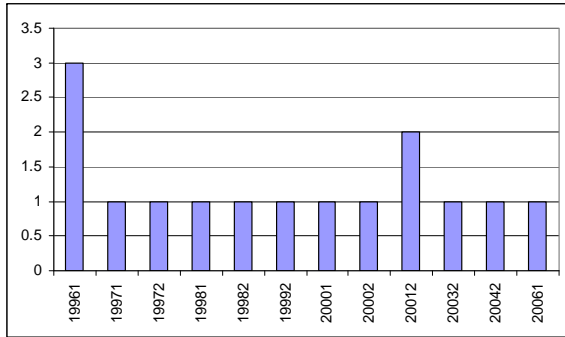
Fiat Cinq./Seicento/Panda



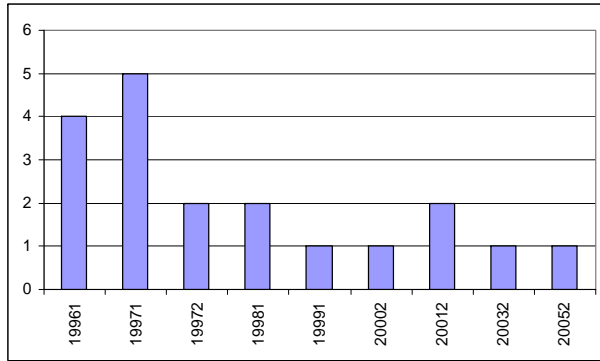
Fiat Punto



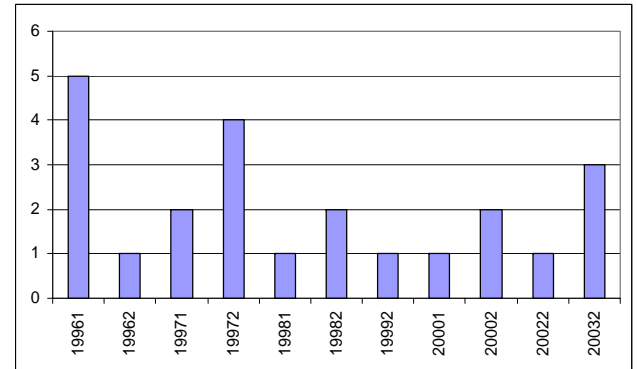
Fiat Bravo/Stilo



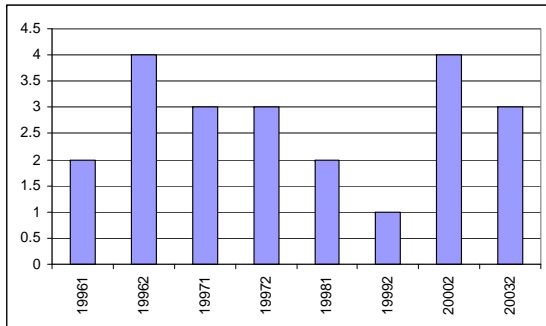
Ford Fiesta



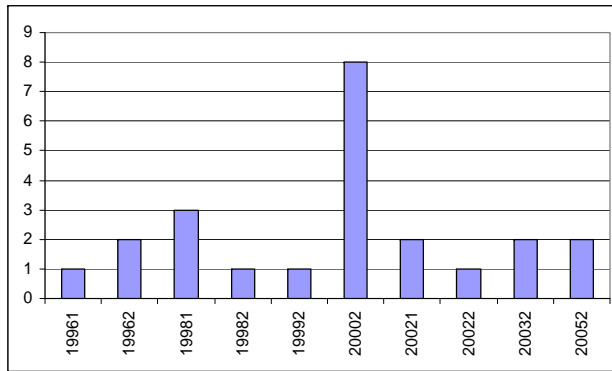
Ford Escort/Focus



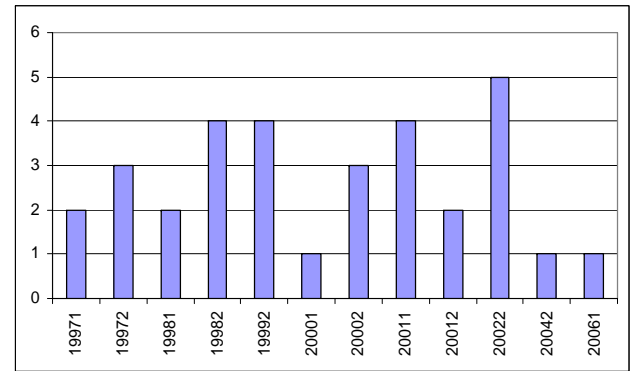
Ford Mondeo



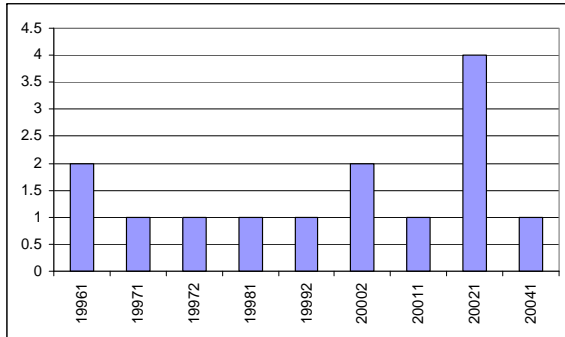
Honda Civic



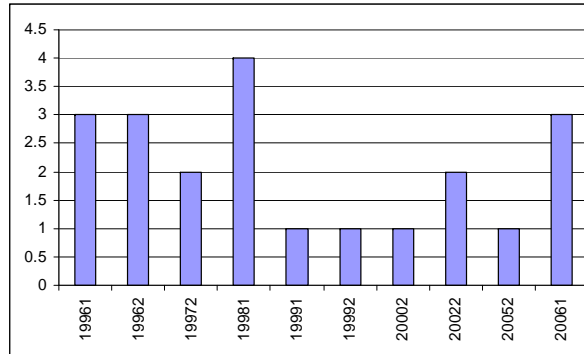
Honda Accord



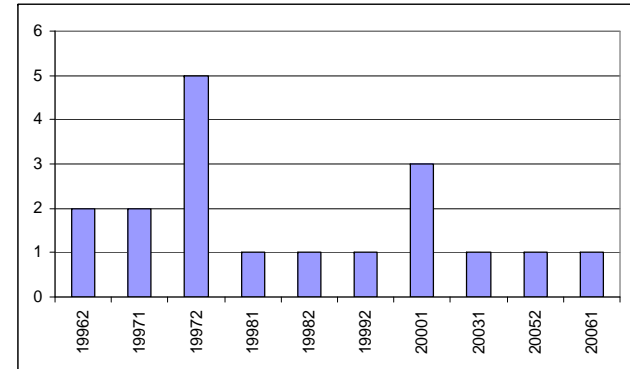
Mazda 3-series



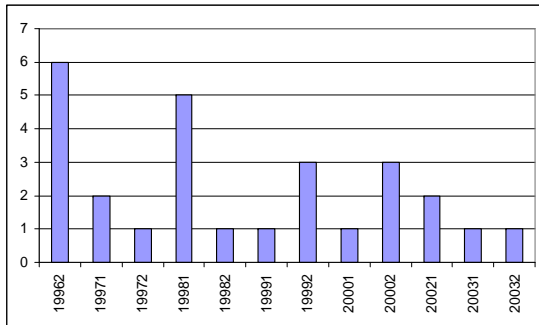
Mercedes 180/c180



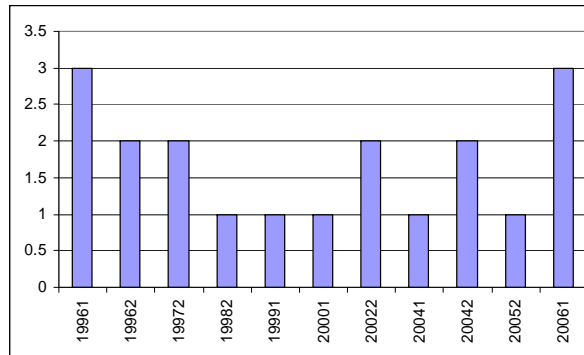
Mercedes 200E/E220



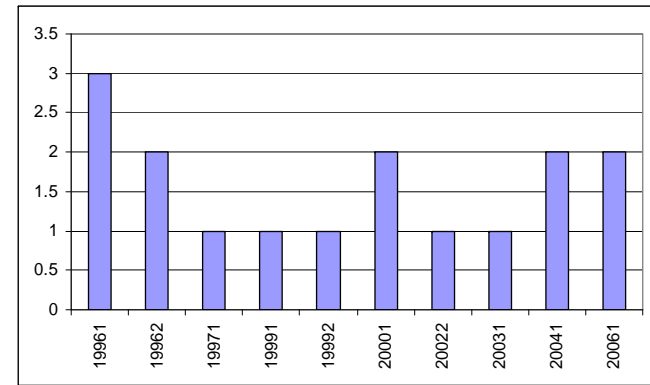
Mercedes 320S/S350



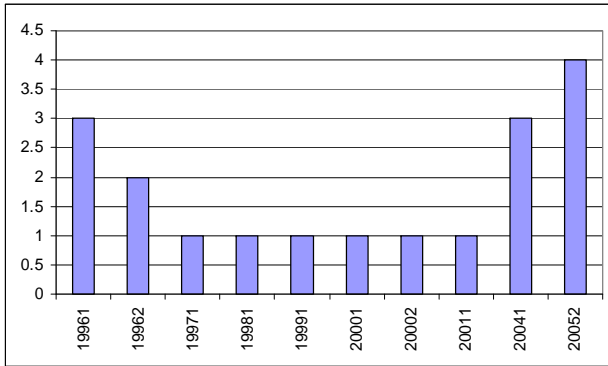
Nissan Micra



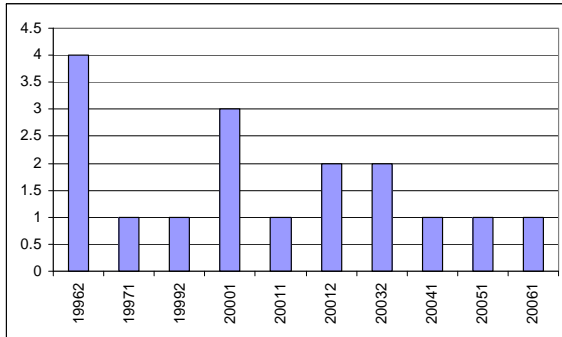
Nissan Sunny/Almera



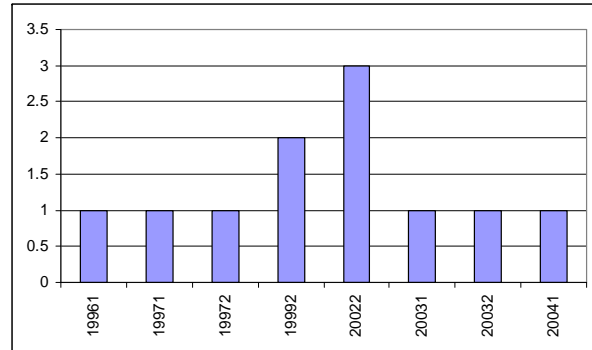
Nissan Primera



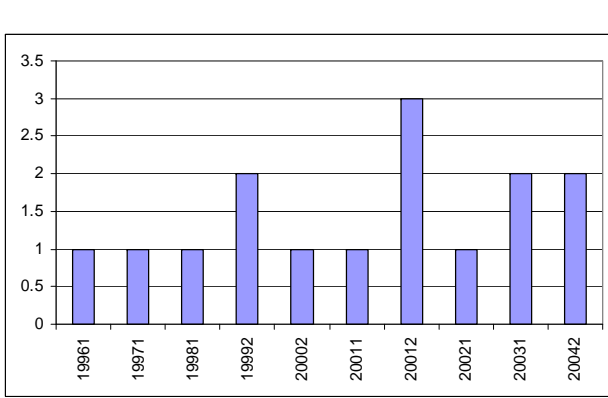
Opel Corsa



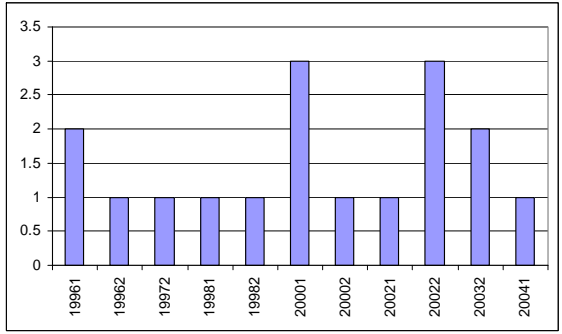
Opel Astra



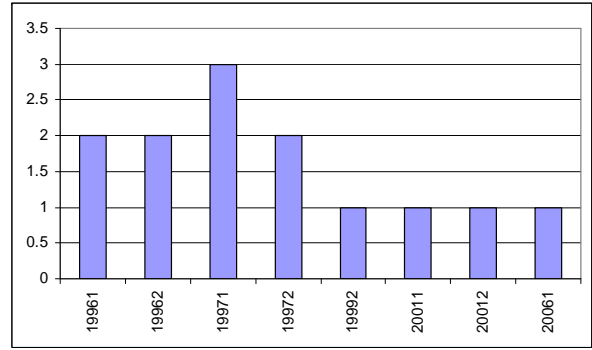
Opel Vectra



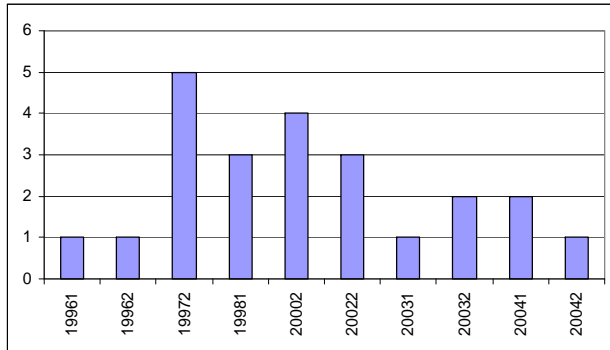
Opel Omega/Signum



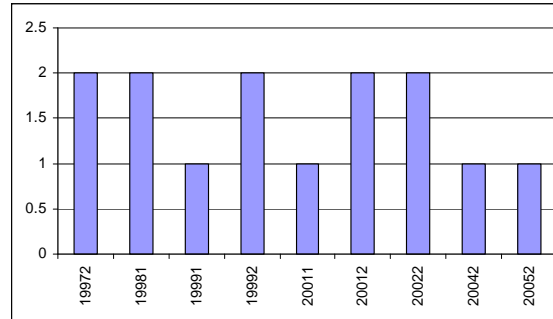
Peugeot 306/307



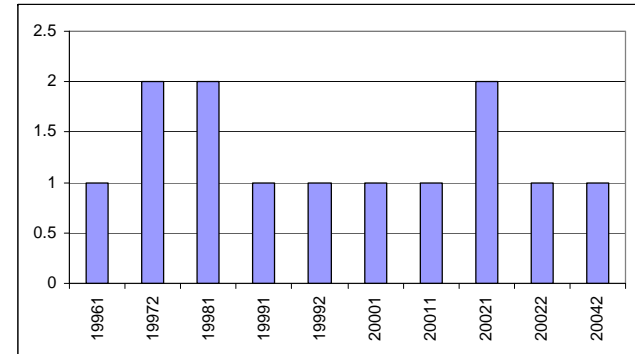
Peugeot 405/406/407



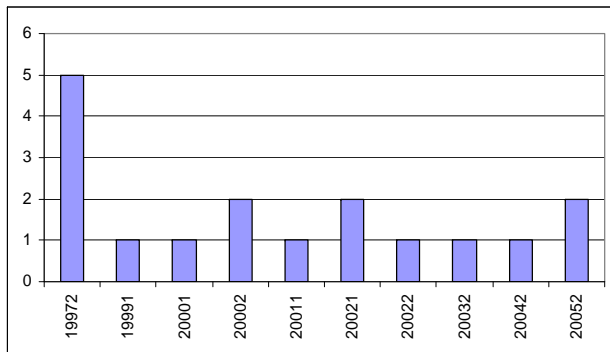
Renault Clio



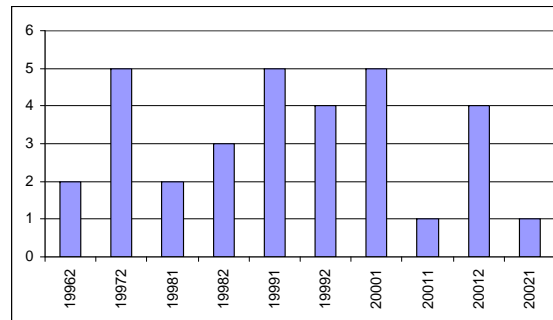
Renault 19/Megane



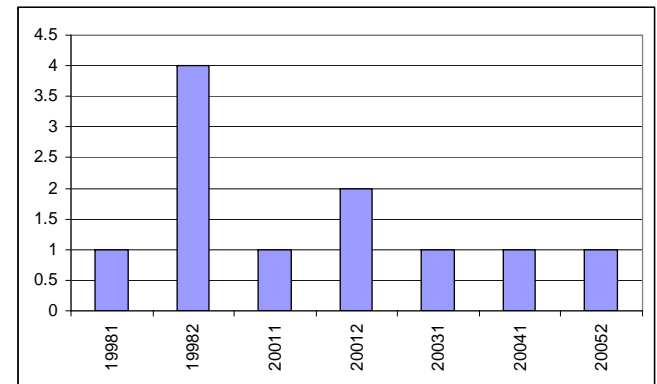
Renault 21/Laguna



Range Rover

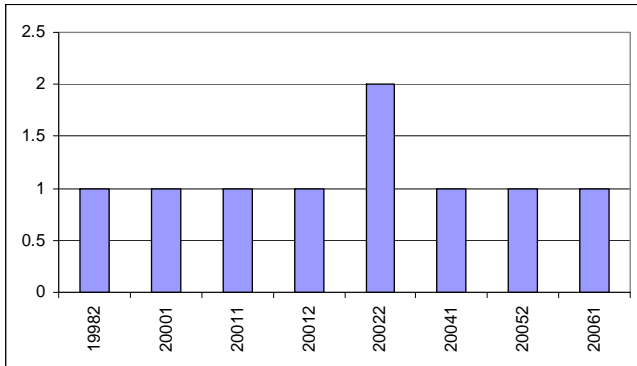


Seat Ibiza

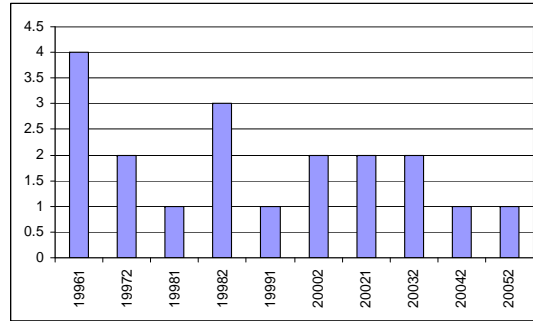




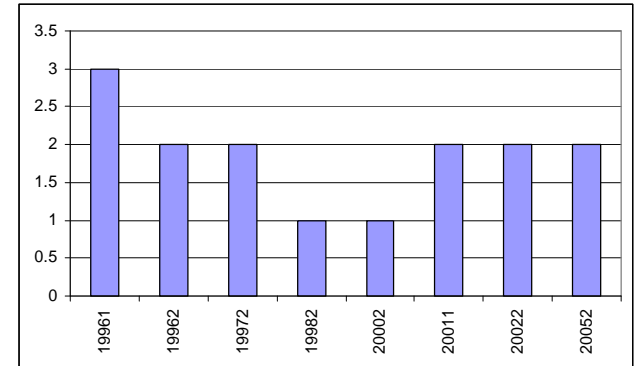
Seat Cordoba



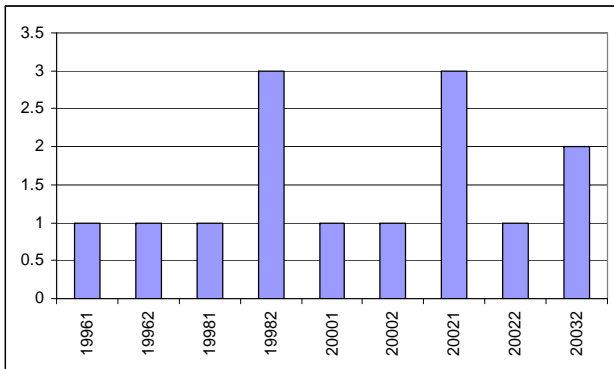
Seat Toledo



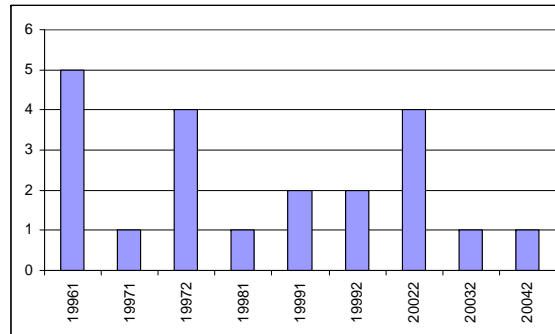
Toyota Starlet/Yaris



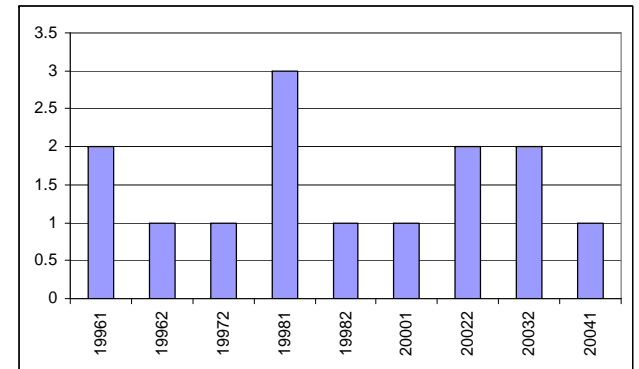
Toyota Corola



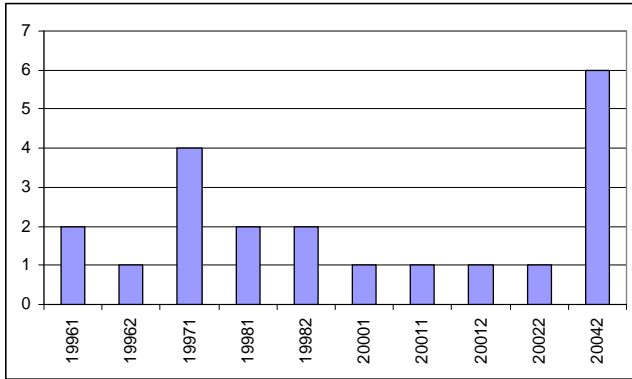
Toyota Carina/Avensis



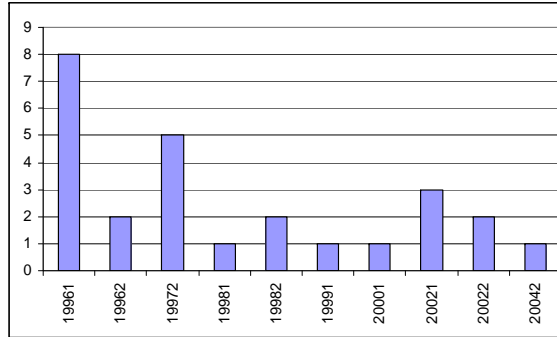
Volvo 440/s40



VW Polo



VW Golf



VW Passat

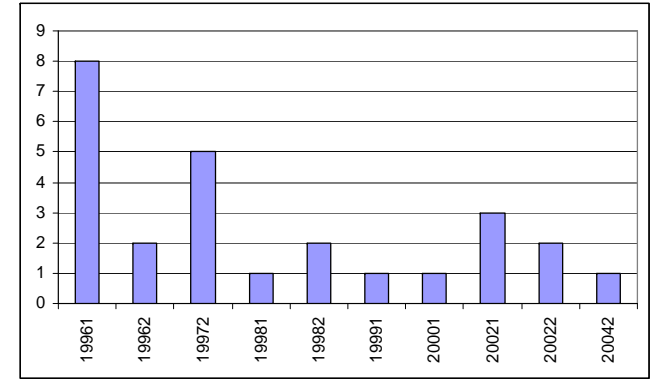


Table 3: Deterministic convergence: Panel KPSS stationary test without structural breaks

Model	$Z(\hat{\lambda})$ (homogeneous)					$Z(\hat{\lambda})$ (heterogeneous)				
	Tests	p-value	Bootstrap critical values			Tests	p-values	Bootstrap critical values		
			10%	5%	1%			10%	5%	1%
Alfa 145/147	-0.8114	0.7914	3.4536	4.4877	6.6705	2.7694	0.0028	4.8943	6.2720	9.5715
Alfa 155/156	0.5988	0.2746	2.8946	3.7705	5.7766	2.4180	0.0078	3.6408	4.7382	7.0716
Audi A4	7.9180	0.0000	3.9135	5.1526	7.8974	11.0452	0.0000	5.5328	7.1710	11.7173
Audi A6	0.5293	0.2983	3.3215	4.2460	6.3070	3.4224	0.0003	4.9597	6.2264	9.1604
BMW 3-series	2.8924	0.0019	3.6508	4.7843	7.5129	8.2629	0.0000	5.2827	6.7346	10.2797
BMW 5-series	0.5527	0.2902	3.7987	5.0390	7.9823	7.7167	0.0000	5.7140	7.3935	11.6035
BMW 7-series	5.9361	0.0000	3.9468	5.4037	8.7988	6.2712	0.0000	5.0295	6.5427	10.3183
Citroën AX/saxo/C2	1.2990	0.0968	2.7671	3.8546	6.4322	1.1045	0.1347	3.1051	4.0200	6.2138
Citroën ZX/ Xsara/C4	-0.1924	0.5763	4.4548	6.1200	7.9212	2.7428	0.0030	0.0030	5.8597	11.8751
Citroën Xantia/C5	1.5992	0.0549	3.4773	4.7453	7.3498	3.7834	0.0001	4.4146	5.7170	9.0253
Fiat Cinq./Seicento/Panda	-0.8492	0.8021	3.2769	4.2464	6.3338	0.9395	0.1737	4.7910	5.9725	8.6390
Fiat Punto	-0.4682	0.6802	3.3926	4.4591	6.6216	2.8140	0.0024	4.7900	5.9753	8.7880
Fiat Bravo/Stilo	0.1552	0.4383	4.6600	5.7403	8.5110	1.8633	0.0312	4.6604	5.7403	8.5110
Ford Fiesta	4.4868	0.0000	3.7801	5.7118	8.5934	7.276	0.0000	5.2765	6.8317	10.2948
Ford Escort/Focus	2.2393	0.0126	3.3946	4.3705	6.6597	5.6162	0.0000	5.0153	6.3410	9.4151
Ford Mondeo	-0.3290	0.6289	3.3941	4.4052	6.8240	2.6360	0.0042	4.9436	6.1534	9.2524
Honda Civic	0.3207	0.3742	3.7527	4.9718	7.3715	2.6655	0.0038	4.8848	6.0834	8.9359
Honda Accord	0.5290	0.2984	3.7874	4.9212	7.3365	2.5267	0.0058	5.6030	7.1489	10.6877
Mazda 3-series	0.9252	0.1774	3.6381	4.8336	7.5989	2.7254	0.0032	4.8342	6.0840	9.1792
Mercedes 180/c180	1.1752	0.1200	3.8352	5.1191	8.1495	9.0518	0.0000	5.4924	7.3684	12.1724
Mercedes 200E/E220	0.8963	0.1850	3.8312	5.1318	8.1735	8.4695	0.0000	5.9407	7.6120	11.4879
Mercedes 320S/S350	10.0368	0.0000	4.2807	5.8171	9.9652	12.5362	0.0000	5.8885	7.5186	12.0303
Nissan Micra	0.9857	0.1621	3.4076	4.3706	6.4979	6.0008	0.0000	4.9431	6.3306	9.5930
Nissan Sunny/Almera	-0.5291	0.7016	3.4534	4.4239	6.4516	1.5795	0.0571	4.7209	5.8337	8.5119
Nissan Primera	2.4999	0.0062	3.3022	4.2901	6.3777	9.1123	0.0000	5.0433	5.3431	9.5659
Opel Corsa	1.8161	0.1178	3.2728	4.1984	6.1838	1.3234	0.0929	4.6721	5.8072	8.4334
Opel Astra	-0.0178	0.5071	3.0542	3.8766	5.5580	2.0440	0.0205	4.6724	5.7763	8.3677

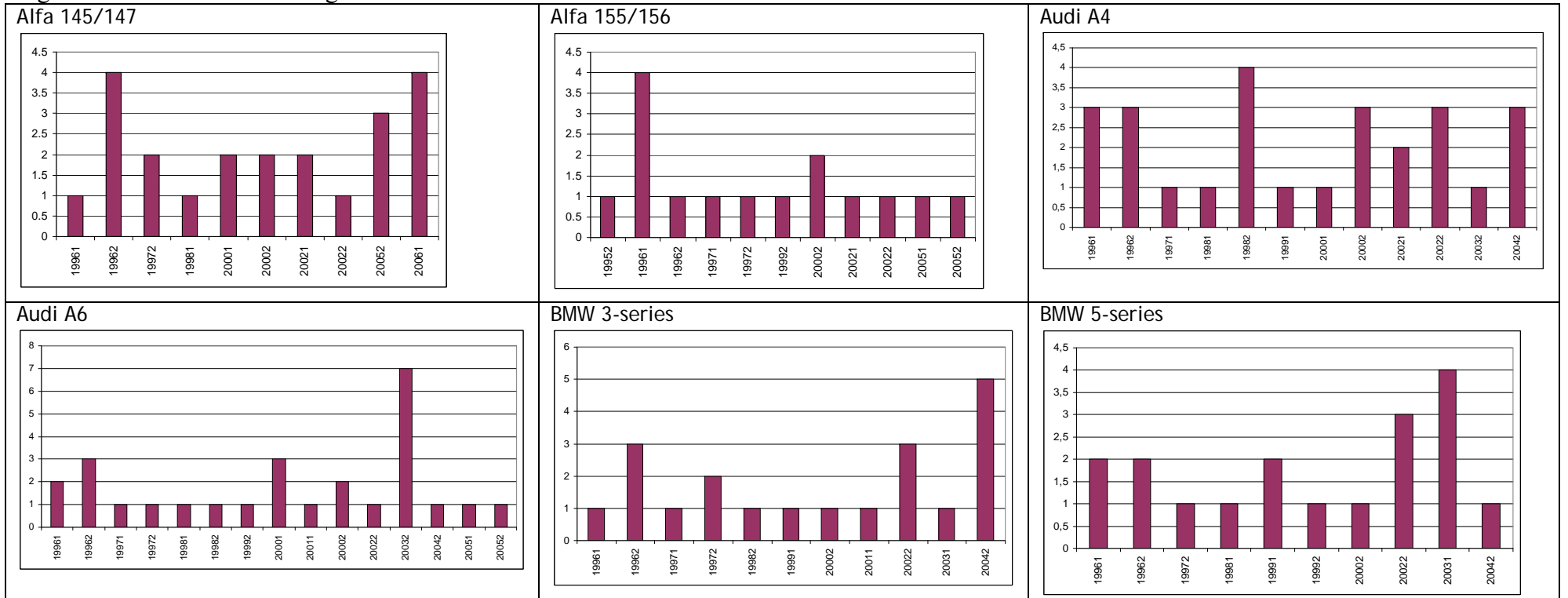
Opel Vectra	1.1395	0.1272	3.1513	4.0010	5.8776	1.1346	0.1283	4.6492	5.7323	8.2018
Opel Omega/Signum	0.3330	0.3696	3.2157	3.9805	5.6972	2.6773	0.0037	5.2188	6.3215	9.2374
Peugeot 306/307	0.1740	0.4309	3.8571	5.1006	6.3273	1.2656	0.1028	4.7581	6.0776	9.3541
Peugeot 405/406/407	-0.6800	0.7517	3.5464	4.6897	6.9932	-0.4775	0.6835	4.8028	6.1331	9.3561
Renault Clio	0.7142	0.2376	3.5112	4.5352	5.5078	2.8284	0.0023	5.3541	6.6109	9.8625
Renault 19/Megane	1.0009	0.1584	3.4211	4.4065	6.3822	2.2915	0.0084	5.1385	6.4107	9.435
Renault 21/Laguna	0.0733	0.4708	3.6843	4.7743	7.2364	1.8584	0.0316	5.5534	6.8496	10.1430
Range Rover	4.1595	0.0000	5.9438	8.1512	13.7348	2.6143	0.0045	10.4959	13.2541	19.5337
Seat Ibiza	3.0399	0.0012	3.3245	4.3948	6.7327	3.2327	0.0006	4.0286	5.1216	7.6561
Seat Cordoba	6.3968	0.0000	3.8923	4.9962	7.3995	3.7335	0.0001	5.8628	7.1782	10.2979
Seat Toledo	0.5268	0.2992	3.2670	4.1882	6.1019	3.7339	0.0001	4.7360	5.8828	8.6916
Toyota Starlet/Yaris	0.9822	0.1630	3.1459	4.1730	6.6965	3.8343	0.0001	4.5299	5.9089	9.3786
Toyota Corola	-0.0449	0.5179	3.4538	4.5743	7.2122	4.4746	0.0000	5.0069	6.5016	10.2328
Toyota Carina/Avensis	2.4862	0.0065	3.8025	5.0417	7.7693	3.5326	0.0002	5.0687	6.4257	9.9809
Volvo 440/s40	1.1984	0.1154	3.2258	4.1842	6.0905	5.2644	0.0000	4.9219	6.1908	9.4209
VW Polo	0.2778	0.3906	3.5556	4.6757	7.0119	3.0377	0.0012	4.8771	6.2972	10.0501
VW Golf	-0.2856	0.6124	3.9358	5.3089	8.5102	4.5684	0.0000	5.2382	6.7636	10.6094
VW Passat	0.9744	0.1649	4.1405	5.5397	9.1124	4.1243	0.0000	5.5726	7.0171	10.7904

Table 4: Deterministic convergence: Panel KPSS stationary test with structural breaks

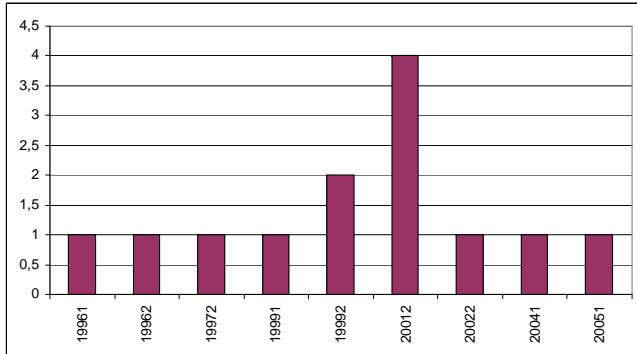
Model	$Z(\hat{\lambda})$ (homogeneous)					$Z(\hat{\lambda})$ (heterogeneous)				
	Tests	p-value	Bootstrap critical values			Tests	p-values	Bootstrap critical values		
			10%	5%	1%			10%	5%	1%
Alfa 145/147	1.2811	0.1001	5.3770	6.3610	8.8201	4.1669	0.0000	7.3780	8.6907	11.8821
Alfa 155/156	1.1229	0.1307	3.9848	4.7798	6.4437	1.0917	0.1375	5.6636	6.7086	9.3900
Audi A4	0.8834	0.1885	9.3920	11.4134	16.3980	5.9889	0.0000	8.4352	9.8539	13.1866
Audi A6	-0.2968	0.6167	7.9385	9.6036	13.4348	4.7119	0.0000	8.5736	10.0712	13.8510
BMW 3-series	4.4515	0.0000	6.8145	8.5277	12.6888	6.6990	0.0000	8.6905	10.3223	14.0421
BMW 5-series	6.7838	0.0000	7.8287	10.3491	16.0799	6.2057	0.0000	8.2402	10.1644	14.9226
BMW 7-series	4.8111	0.0000	4.9393	6.4680	10.0551	7.8100	0.0000	7.0335	8.9604	13.1972
Citroën AX/saxo/C2	-0.3547	0.6386	3.4484	4.2219	5.9104	0.1287	0.4488	4.2376	5.1823	7.5259
Citroën ZX/ Xsara/C4	1.5490	0.0607	7.8127	10.3193	16.3767	5.9157	0.0000	5.9975	7.3667	10.7838
Citroën Xantia/C5	1.0105	0.1561	10.1125	13.7502	23.7160	5.9531	0.0000	10.0276	11.8065	15.9572
Fiat Cinq./Seicento/Panda	1.7661	0.0387	6.4217	7.8909	11.1701	8.8648	0.0000	8.4638	10.1197	13.9716
Fiat Punto	-0.4130	0.6602	7.9925	10.0628	14.5913	0.1638	0.4349	7.3529	8.6707	11.6804
Fiat Bravo/Stilo	-0.4542	0.6752	4.4028	5.5086	8.0179	4.6755	0.0000	5.8363	7.0846	9.9913
Ford Fiesta	4.5181	0.0000	6.0798	7.5773	10.8330	7.4411	0.0000	8.0974	9.6913	13.4821
Ford Escort/Focus	3.5107	0.0002	5.0329	6.3665	9.6228	12.1652	0.0000	6.6887	8.2229	11.9750
Ford Mondeo	2.9322	0.0017	5.9415	7.5795	11.4737	4.9662	0.0000	6.4180	7.8023	11.1003
Honda Civic	2.9291	0.0017	5.6923	6.6763	8.7000	4.2069	0.0000	7.6089	8.8651	11.6570
Honda Accord	1.3850	0.0830	6.8307	8.4019	12.0775	0.6636	0.2535	10.0416	11.9551	16.2667
Mazda 3-series	3.0018	0.0013	4.8317	6.0159	8.6014	2.5320	0.0057	6.6793	8.0040	11.4559
Mercedes 180/c180	4.7436	0.0000	5.1903	6.8743	11.0204	4.0384	0.0000	5.9920	7.5679	11.0812
Mercedes 200E/E220	7.0474	0.0000	6.4651	8.3418	12.7930	7.6664	0.0000	7.6730	9.7583	14.2630
Mercedes 320S/S350	6.2350	0.0000	7.5567	9.4348	14.1550	19.9740	0.0000	10.8074	12.9553	18.4234
Nissan Micra	0.1130	0.4550	4.0887	5.1677	7.4274	5.3849	0.0000	5.2946	6.5156	9.4002
Nissan Sunny/Almera	2.0771	0.0189	3.6110	4.3902	6.1261	6.3104	0.0000	6.2545	7.3745	10.0110
Nissan Primera	3.8167	0.0001	4.1750	5.2968	7.8888	4.8940	0.0000	6.0614	7.4138	11.0149
Opel Corsa	2.9797	0.0014	4.9753	6.1313	8.5299	2.7336	0.0031	5.9714	7.0959	9.6776
Opel Astra	1.1203	0.1313	5.0812	6.1406	8.7234	3.0250	0.0012	7.6188	8.9658	11.9371

Opel Vectra	0.5995	0.2744	4.5734	5.5890	7.9748	1.6527	0.0492	6.2503	7.5002	10.4881
Opel Omega/Signum	0.0199	0.4921	5.2724	6.4517	8.9414	3.1210	0.0009	6.6478	7.9161	11.0713
Peugeot 306/307	0.0478	0.4810	4.2953	5.5003	8.5757	0.8291	0.2035	6.0802	7.5061	11.2231
Peugeot 405/406/407	-0.3515	0.6374	4.9037	6.1277	9.1010	0.7614	0.2232	6.3560	7.8318	11.6661
Renault Clio	-0.0077	0.5031	5.0108	5.9706	8.1590	3.7327	0.0001	7.7931	9.2412	12.9551
Renault 19/Megane	1.9251	0.0271	5.4642	7.0434	10.7953	3.2957	0.0005	7.4159	8.9789	12.7255
Renault 21/Laguna	-1.0670	0.8570	6.7192	8.7191	13.3277	0.1768	0.4298	7.1882	8.8035	12.6467
Range Rover	2.5187	0.0059	11.1261	16.5915	27.4000	3.6060	0.0002	15.3723	18.7831	25.9916
Seat Ibiza	0.4875	0.3130	3.1858	3.9404	5.4912	3.4517	0.0003	4.9991	5.9584	8.5155
Seat Cordoba	5.1654	0.0000	5.9163	7.1483	9.7657	7.1729	0.0000	8.6017	10.0739	13.7430
Seat Toledo	2.5903	0.0048	5.1179	6.2183	8.5974	5.3924	0.0000	6.3436	7.4481	10.0409
Toyota Starlet/Yaris	9.9406	0.0000	6.8189	8.9864	14.8644	5.7499	0.0000	6.3482	7.9209	11.4175
Toyota Corola	2.4852	0.0065	5.5855	7.6539	12.1794	2.8603	0.0021	7.4112	9.2348	13.3794
Toyota Carina/Avensis	2.6051	0.0046	3.9168	4.8516	7.0224	3.3202	0.0004	7.6520	9.3629	13.0244
Volvo 440/s40	6.1218	0.0000	5.6873	7.2772	12.0075	6.3015	0.0000	6.7256	8.0051	11.1010
VW Polo	2.4284	0.0076	7.6802	9.9520	15.6727	4.8937	0.0000	7.0270	8.7641	13.6186
VW Golf	4.5681	0.0000	11.1080	15.2777	26.4963	7.1335	0.0000	7.6770	9.1673	12.9726
VW Passat	1.9075	0.0282	8.7564	11.8048	19.9021	4.1922	0.0000	7.4264	9.0850	13.4762

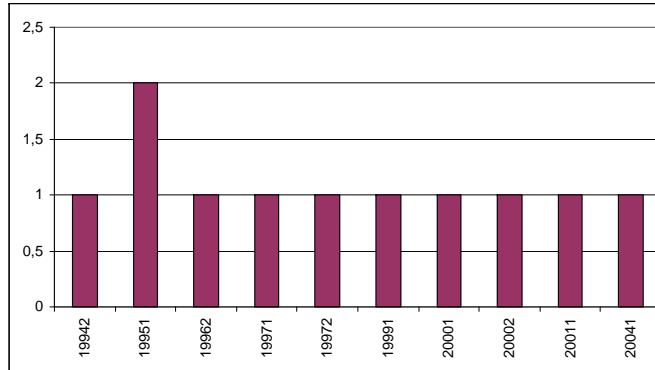
Figure 2: Deterministic convergence: Identified structural breaks



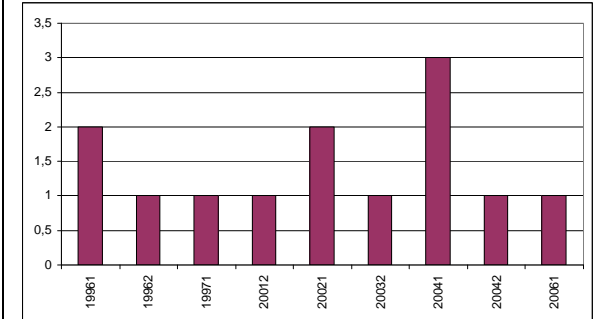
BMW 7-series



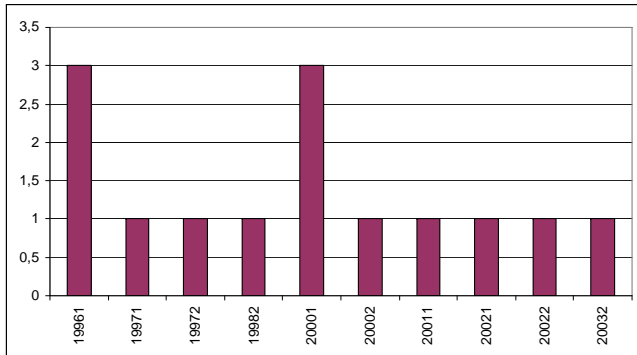
Citroën AX/saxo/C2



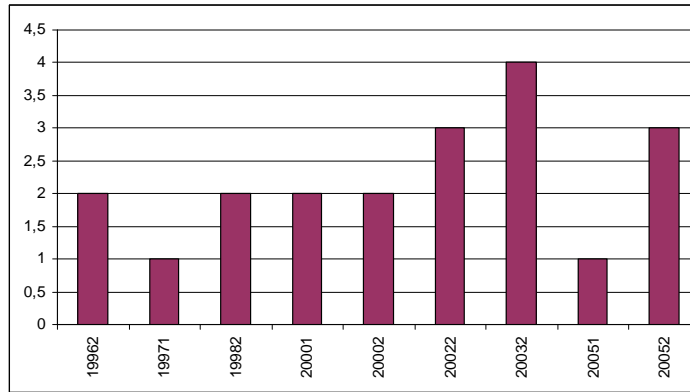
Citroën ZX/ Xsara/C4



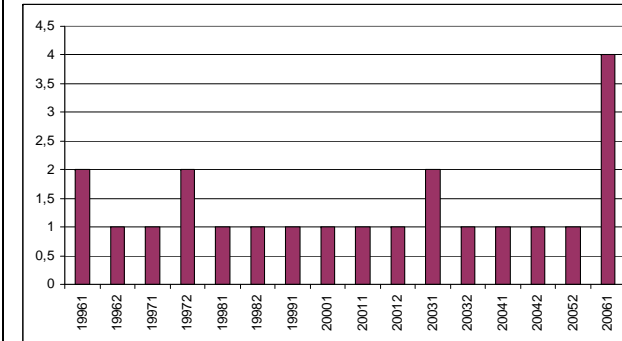
Citroën Xantia/C5



Fiat Cinq./Seicento/Panda

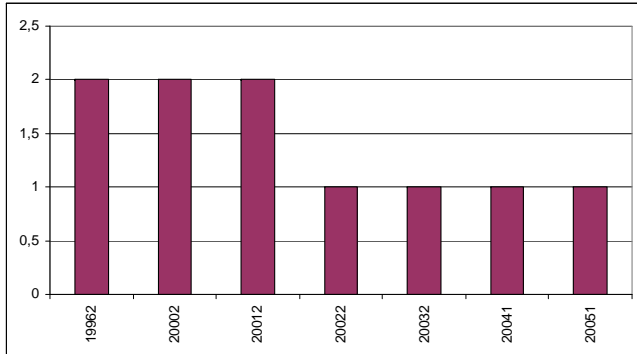


Fiat Punto

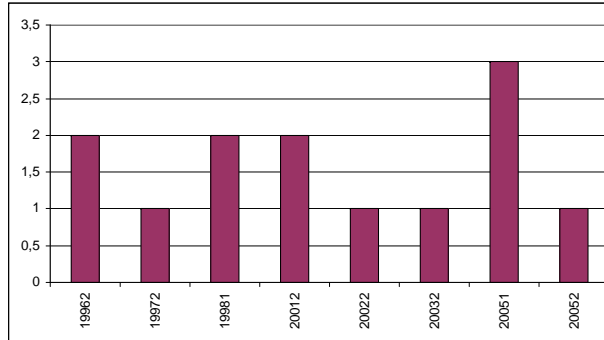




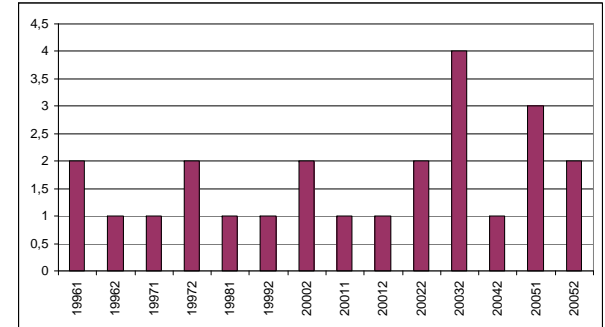
Fiat Bravo/Stilo



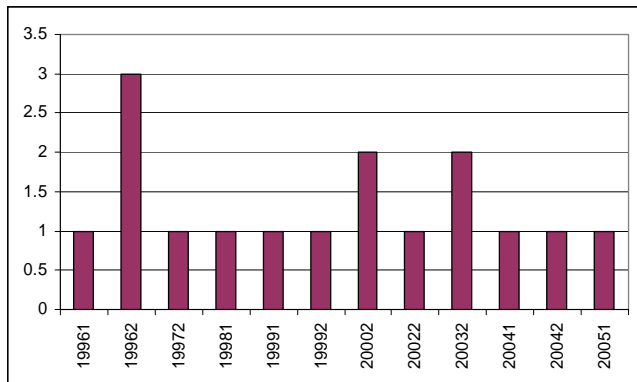
Ford Fiesta



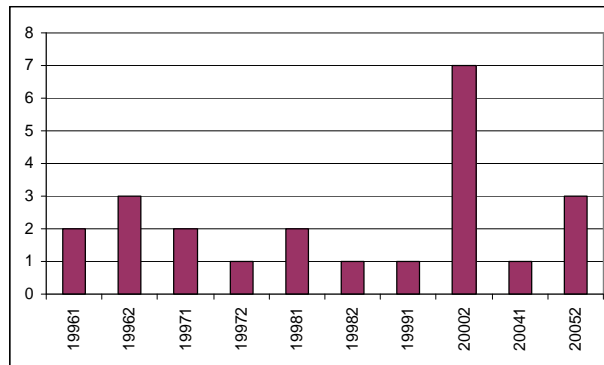
Ford Escort/Focus



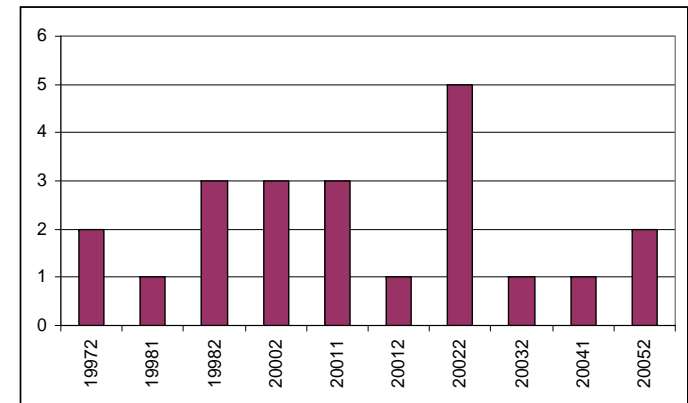
Ford Mondeo



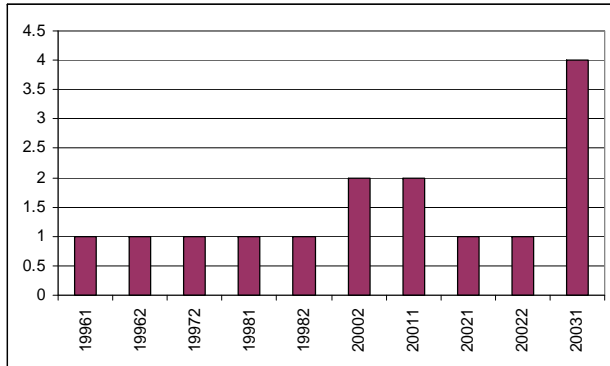
Honda Civic



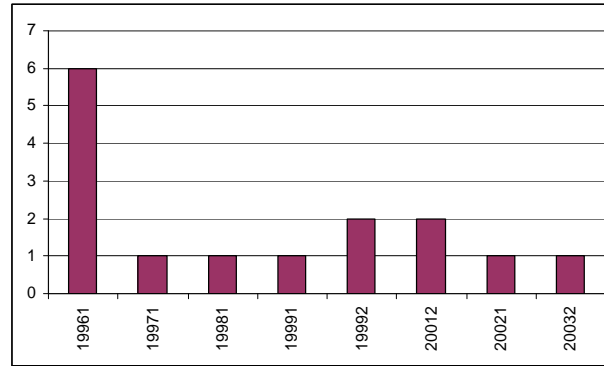
Honda Accord



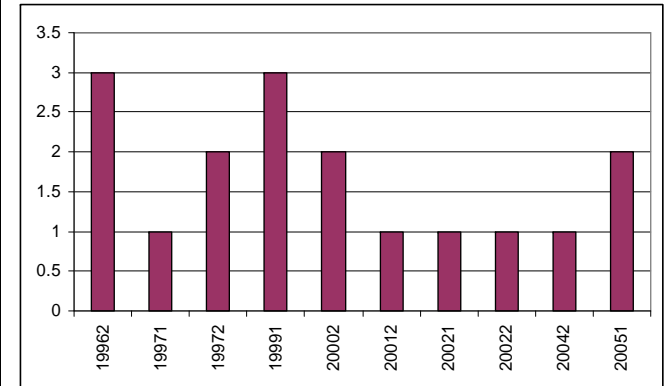
Mazda 3-series



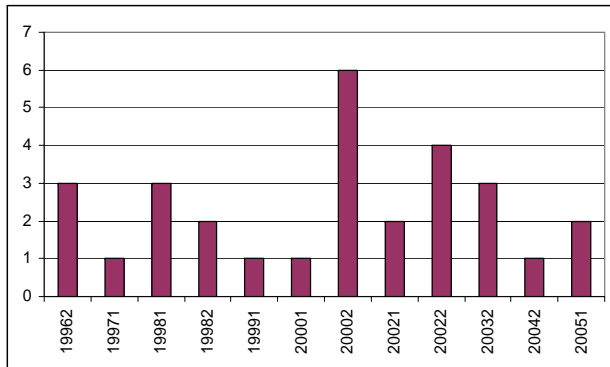
Mercedes 180/c180



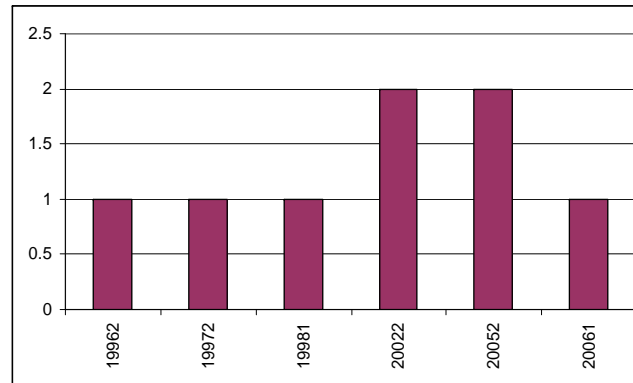
Mercedes 200E/E220



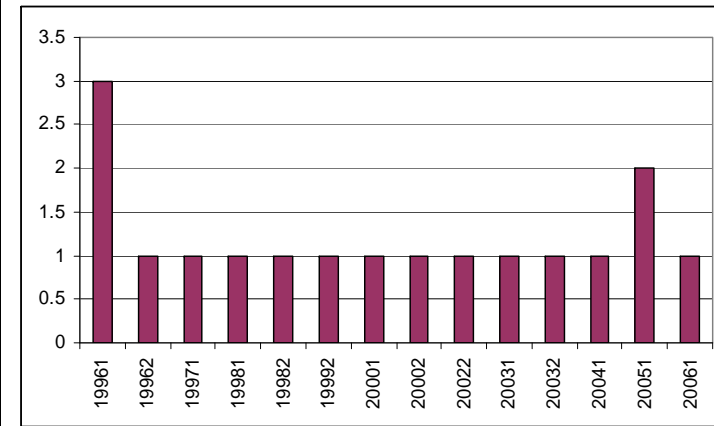
Mercedes 320S/S350



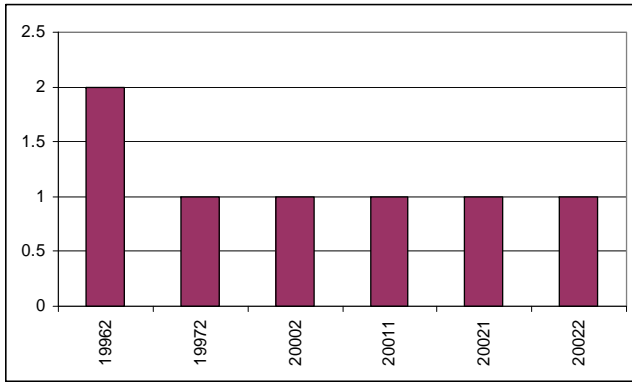
Nissan Micra



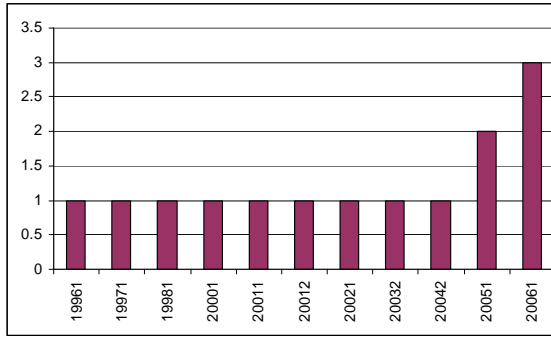
Nissan Sunny/Almera



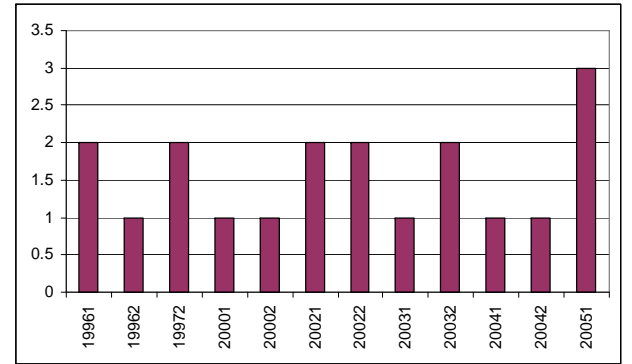
Nissan Primera



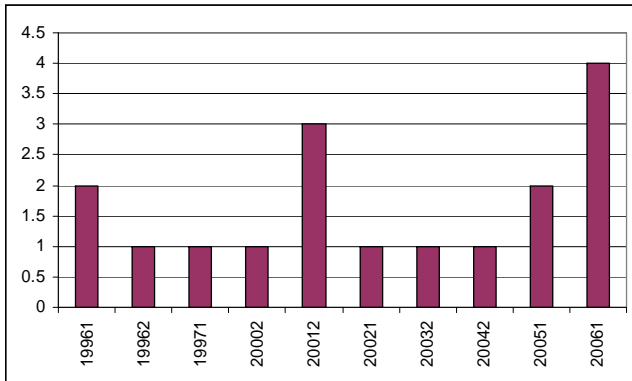
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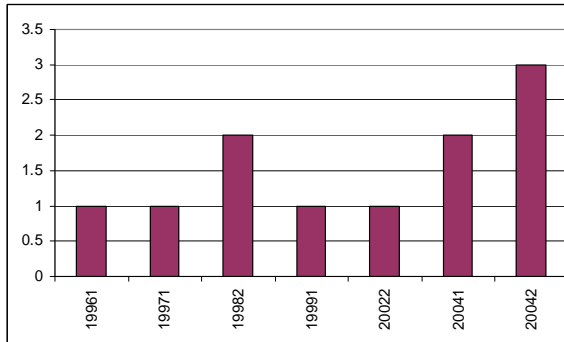
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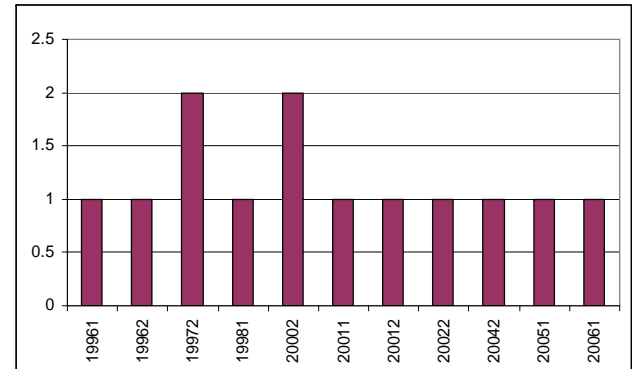
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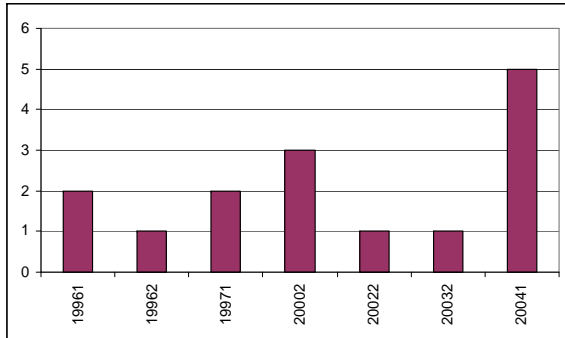
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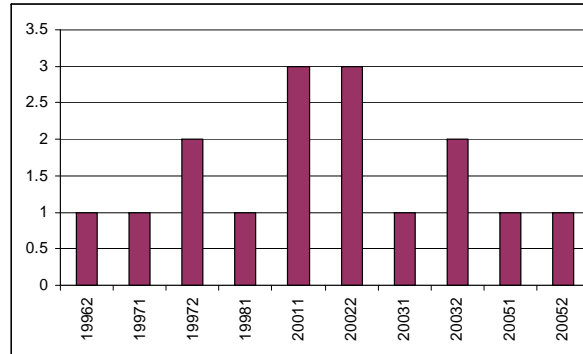
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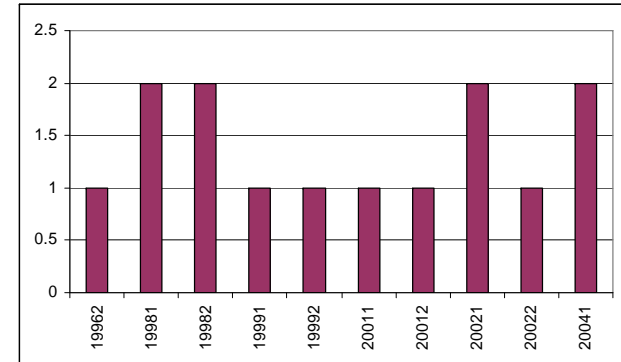
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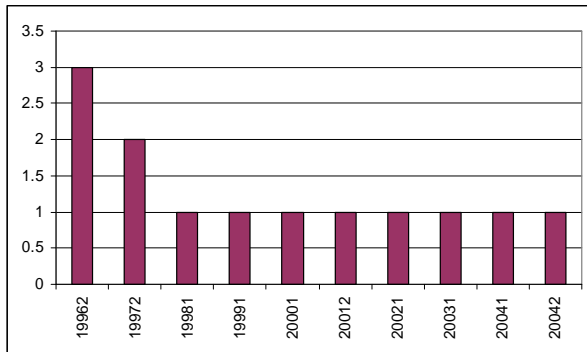
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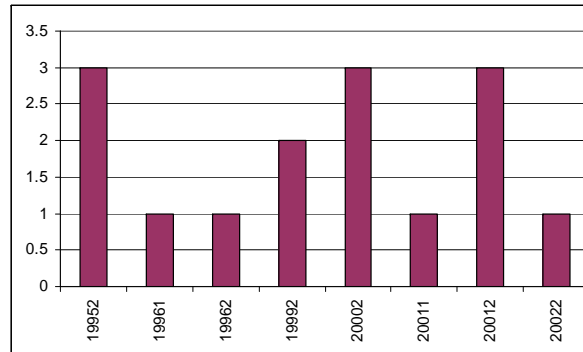
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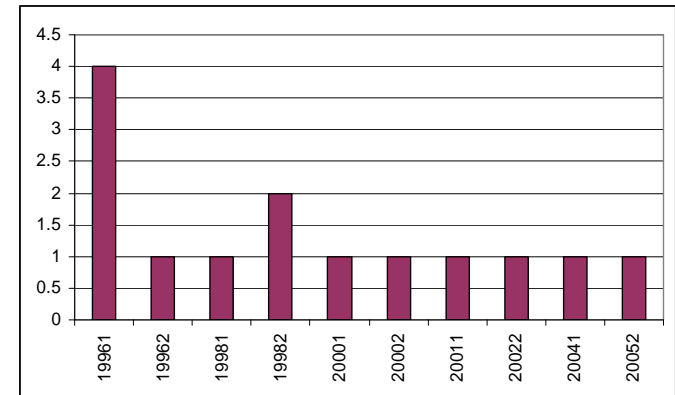
Renault 21/Laguna



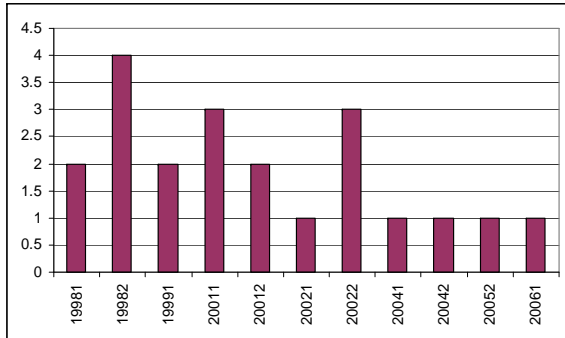
Range Rover



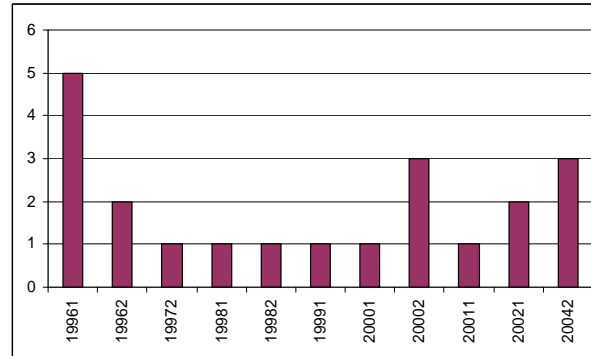
Seat Ibiza



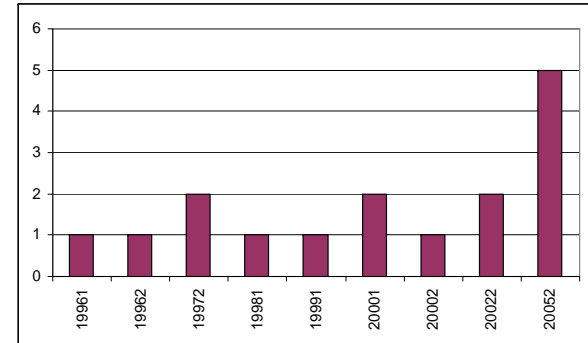
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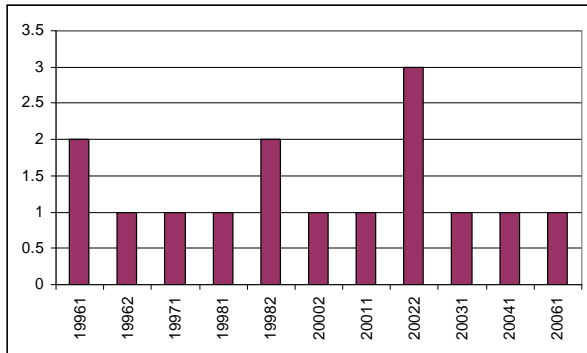
Seat Toledo



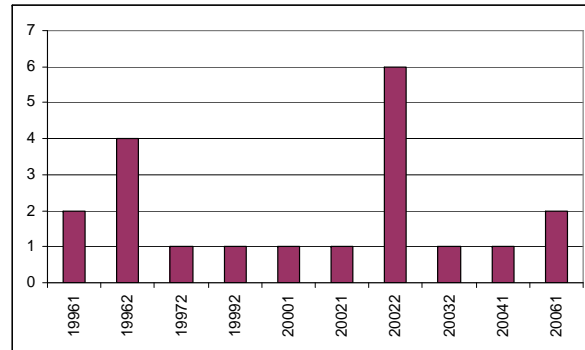
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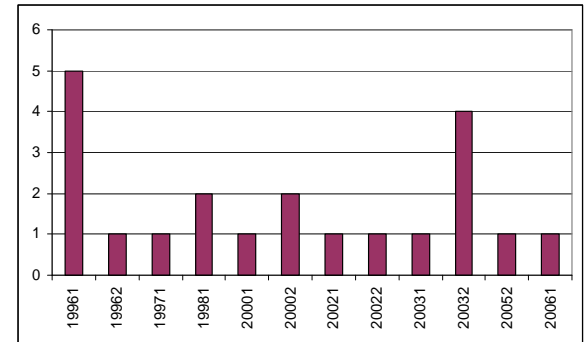
Toyota Corola



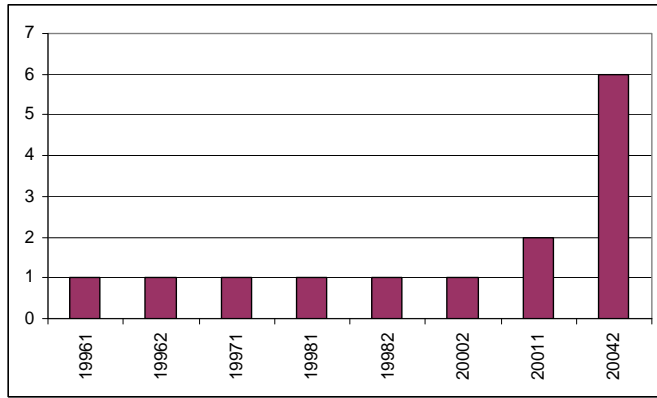
Toyota Carina/Avensis



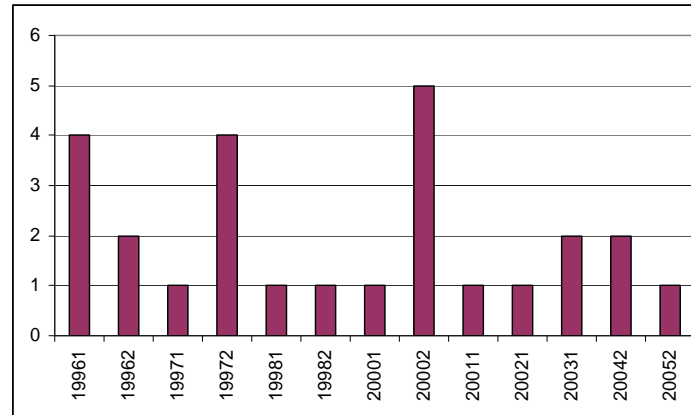
Volvo 440/s40



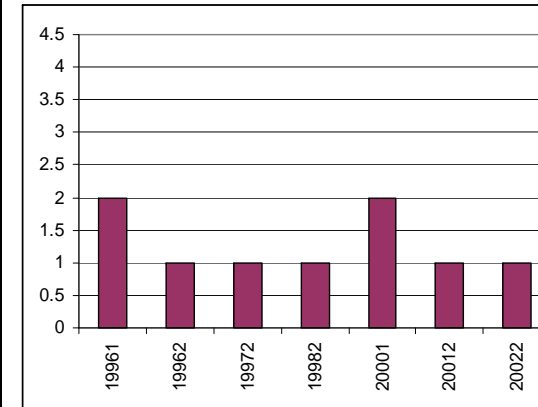
VW Polo



VW Golf



VW Passat



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