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Trade Reforms and the Survival of the Passenger Motor Vehicle Industry in Australia

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by

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Abstract

The Passenger Motor Vehicle (PMV) industry in Australia experienced extensive trade reforms in the late 1980s which were expected to promote a competitive PMV industry. This paper tests the hypotheses that decreasing protection have had a significant effect on production, imports, exports, labour productivity and organizational innovations (A1); and this effect is particularly evident since 1988 (A2). We have used cointegration analysis to test the hypothesis (A1) and the Chow test for (A2). Our study confirms our two hypotheses.

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Introduction

The Australian Passenger Motor Vehicle (PMV) industry has traditionally received special treatment from the government and has initiated trade reforms in the late 1980s.[1] The further reductions in tariff rates were postponed in the mid 1990s, mainly due to lobbying by industrial groups. Garnaut (1997:373) argued for further reforms by saying that "the restoration of momentum in reform is a task to which the automotive industry must now contribute. The task is more urgent and important for our prosperity and security than is yet widely understood."

Previous studies have demonstrated positive performances in terms of rationalisation, productivity, quality, exports and lowering prices in the PMV industry during the late 1980s (Owens 1995, Conlon and Perkins 1995). The Australian car industry currently comprises four foreign-owned producers of Passenger Motor Vehicles (PMV) - Ford Motor Company of Australia Ltd., General Motors-Holden Automotive Ltd., Toyota Motor Corporation Australia and Mitsubishi Motors Australia Ltd.- and about 200 firms supplying components[2]. The reforms have reduced 13 PMV models in 1985 to 6 models produced at four plants at the end of 1994. All four assemblers of PMVs are subsidiaries and dependent on parent companies located outside Australia for strategic direction. Fleischmann and Prentice (2001:359) have studied the Australian car industry from 1920 to 2000 and concluded that falling protection drove out high cost plants. Larger plants are associated with lower probabilities to exit. All four plants that exist today can be jointly placed at the lower end of the minimum viable scale operation (Owens 1995:75).[3]

This paper focuses on the statistical evidence regarding the effects of recent trade reforms on the performance of PMV industry. A co-integration analysis is carried out to show the

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[1] The automotive industry is affected by following WTO agreements; the Agreement on Technical Barriers to Trade, the Agreements on Subsidies and Countervailing Duty, the Agreement on Trade Related Investment Measure, the Agreement on Import licensing Procedures and the Agreement on Government Procurement. In addition, Australia has committed to APEC liberalising trade and investment before 2010.

[2] Component suppliers can be divided into first tier component firms and second tier component firms. First tier component firms provide subassemblies to PMV activities such as transmissions, break assemblies and air conditioning units. Second tier component firms provide the rest of unassembled components. About 35 firms supply around 75 per cent of the value of total components (Industry Commission 1997).

[3] In Australia, the production of about 100,000 cars is considered the minimum for a viable scale of operations. Combined volume of currently existing four plants are estimated to be 400,000.

relationship between production, labour productivity, exports, and protection (as represented by nominal and effective protection) and organizational innovations (as represented by the proxy of inventories to sales ratio) between the period 1968 and 2002.[4] To detect structural breaks the Chow test will be used. The second section of the paper discusses trade policy reforms and the PMV industry in Australia focusing on trade policy reforms and industry performance. The third section considers the data and methods. Fourth section analyses the results. The final section draws conclusions.

Trade Policy Reforms and Passenger Motor Vehicle in Australia[5]

For most of the period from 1968 to 1985, the automobile industry received four types of assistance from government in the form of import quotas, tariff protection, local content plans and Export facilitation (Table 1). An import quota restricting the import share of the PMV to 20 per cent and defining the 85 per cent local content on a company weighted average basis were added in the incentive package during 1975.[6] Tariff rates for Passenger Motor Vehicle (PMV) increased to a peak of 57.5 per cent in 1978 and remained at that rate until 1987. The Export Facilitation Scheme (EFS) became functional in 1982. This scheme allowed PMV producers to reduce the level of local content in their vehicles below 85 per cent, conditional on their export performance. The additional duty free entitlements (export credit) could then be used to import components free of duty, or sold to other vehicle producers. It is well known that there was a continuous rise in both nominal and effective protection rates for the whole automobile sector between 1968 and 1985 and for the PMV sector between 1968 and 1989. The effective rate of protection for PMVs increased to the peak of more than 250 per cent until 1988. In a static welfare analysis Anderson and Findlay (1995) conclude that the PMV industry has been guided by a complex range of policies with the combination of local content and EFS supporting component suppliers and car assemblers. The resulting

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[4] Consistent data for the automobile industry is available from 1968.

[5] PMV covers passenger cars, station wagons, panel vans and pick-ups, which are assembled or manufactured in Australia (Department of Industry, Science and Tourism 1996, p.101). In 1990s, PMV represented about 77 percent of total vehicles registered.

[6] By fulfilling the minimum level of local content requirement producers have the right to import the allowable level of imported components duty free. In 1965, local content requirement was established with aim of targeting 95 percent local content. This was reduced to 85% level between 1968-85. Local content requirement was abolished in 1989.

subsidies are at the expense of car buyers.[7] Anderson and Findlay recommended the reallocation of resources away from the PMV industry to other industries in which Australia has a comparative advantage.

The attempt to reduce the level and complexity of assistance to PMV industry started in 1985. However, the effects of these reforms was materialised in 1988 by reducing the effective rate of protection to 233 percent (see Table 1). There has been a consistent fall in nominal and effective protection rates for the PMVs since 1989 and effective protection rates fell to 19 per cent in 2000. In 1985, the Button Car Plan was initiated to reduce the import quota. The Button Plan addressed the incentive issues by broadening EFS by allowing firms to accumulate 'export credits' and use them to offset import duties and by promoting minimum volume output restrictions. The Button Plan generated rationalisation by promoting a minimum viable scale of operation, productivity, quality, exports and lower real prices in PMVs (Owens 1995, Conlon and Perkins 1995). The large depreciation of the Australian Dollar against Japanese Yen and German Mark during 1984 and 1988 gave additional protection to local manufactures. The prices of imported cars rose by 69.5 per cent from 1984 to 1987, which resulted in reducing the number of imported PMVs from 114,525 in 1985 to 52759 in 1987 (Owens 1995:73).

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[7] Feenstra (1985) studied the U.S.-Japan trade restraint on automobile prices and reached a similar conclusion that the restraint has resulted in costs on U.S. consumers by increasing U.S. small car prices to 3 percent per year between 1981 and 1984. Scott (1994) estimated that the restraints increased average prices for all models by less than 4 percent and total sales of domestic autos by about 6 percent between 1981 and 1986.

Table 1   Estimated Rates of assistance (in %): 1966 to 2007

Year	Passenger Motor Vehicle			Automobile industry		Non-tariff and other reforms
	Tariff	NRA *	ERA*	NRA*	ERA*	
1966-72	45	na+	na	34-35	49-50	Local content level was 95% in 1965 and reduced to 85% as an option for models with volume less than 25.000 units.
1974-77	45	na	na	26-34	38-73	Imposed import quotas on PMVs in 1975 and reimposed in 1977 designed to restrict imports to 20% of the market. Local content plan was 85% for all PMV models in 1975.
1978-84	57.5	na	na	42-51	81-135	Introduced Export Facilitation Scheme (EFS) in 1979
1985	57.5	85	>250	49	143	Button car plan to increase import competition, improve volumes and **implement lean production techniques.[8]**
1986	57.5	69	>250	40	125	
1987	57.5	49	>250	28	92	Pricing reforms in the water supply and freight charges
1988	45	38	233	27	88	Import quotas were abolished, reforms in electricity
1989	42.5	36	137	26	72	Local content scheme was abolished. Motor Vehicle Standard Act (1989)
1990	40	34	127	28	52	Reforms in telecommunication
1991	37.5	32	117	26	48	EFS was expanded by removing the ceilings. Linked the export credit to the value of the duty free saving.
1992	35	30	108	24	45	The compulsory superannuation guarantee levy. National Environmental Protection Agency was established
1993	32.5	28	na	22	41	
1994	30	26	na	20	38	
1995	27.5	23	31	19	35	Australian Manufactures Workers Union was formed by reducing the number of unions, award restructuring
1996	25	21	na	17	31	A voluntary code of practice for reducing the fuel consumption of new PMVs
1997	22.5	19	na	15	28	
1998	20	17	na	10	19	
1999	17.5	15	na	na	na	
2000	15	15	19	10	19	
2001-04 2005 2007	15 10 10					EFS replaced by Automotive Competitiveness and Investment Scheme (ACIS). Car producers receive duty credits of about 15 per cent rate on 25 per cent of their value of car production and 10 per cent of the value of new investment in plant and equipment.

Note: * NRA- nominal rate of assistance, ERA- effective rate of assistance; + not available.

Source: Industry Commission 1995 (pp.126-212) and 1997 (pp. k12-k14).

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[8] See below about organizational innovations and the inventories to sales ratio. The lean production system reduces this ratio over time because of increases in organizational efficiencies generated by this system (see Sanidas, 2001, and Sanidas, 2004, forthcoming).

It was argued that the quantitative import restrictions and increased level of tariffs and subsidies, was mainly put in place to protect the PMV industry from import competition. The quotas built-up over time remained until 1988. Higher tariffs and continuing support by EFS scheme were the other factors that influenced the PMV industry between 1985 and 1988. The complexity of these policy measures has led this industry to remain highly protective until 1988.

By the end of 1988, import quotas were abolished and the tariff rate on PMV was reduced from 57.5 per cent to 45 per cent and scheduled to diminish by 2.5 per cent per year until 1992. The Australian Dollar appreciated against the Japanese Yen, the German Mark and the US Dollar from 1988 to 1992. As an overall effect the real price of imported cars fell by over 10 per cent compared to 5 per cent for locally made cars (Industry Commission 1997:64). In 1989 the local content scheme was abolished. The above steps have been described as a major breakthrough in bringing efficiency and competitiveness in the PMV industry. However, due to lobbying by industrialists further reductions in tariffs have been postponed. In 1997, it was decided to hold tariffs at 15 per cent from 2000-2004. The subsidy equivalent of this 15 per cent PMV tariff would amount to around $840 million (Productivity Commission 2002:125). Tariffs would be reduced to 10 per cent in 2005 and to 5 per cent in 2010.

Removal of quota and phased tariff reductions increased the exposure of these industries to the forces of global competition and required them to restructure in order to be competitive. EFS was made more flexible and market oriented and remained until 2001. In 2001, EFS was replaced by the Automotive Competitiveness and Investment Scheme (ACIS) which makes available duty credits on the basis of production, investment and research and development. Penalties for low volume production were continued until 1996.[9] Other reforms such as industrial relations reform, road freight, electricity, customs

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[9] Producers who produce the models, which did not achieve production volumes of at least 30,000 units a year from 1989, are subject to penalty. This production volume is commonly known as the sanction volume rules. The penalty involved the withdrawal of eligibility for the 15% duty free imports.

clearance procedures, regulatory reforms and taxation reforms that have been implemented between 1988-1995 have positive and negative impacts on the PMV industry.[10] As a result by 2000, the estimates of average effective rate of assistance for PMV had fallen to 19 per cent compared to 5 per cent for all manufacturing.

Australia contributes less than 1 per cent of world automotive production. The Industry Commission (1997: xxii) estimated that the automotive industry accounts for about seven per cent of total manufacturing value added in Australia and about one per cent of GDP. Australia has not reached the world standard yet. The improvement in labour productivity of Australian assemblers was 14 per cent between 1988/89 and 1993/94 compared to 30 per cent for European assemblers for the same period. American and Japanese counterparts have performed far better than European plants (Industry Commission, 1997: xxxi). The scale of domestic production is small by international standards and costs are higher than foreign industry.

Methods

We have two hypotheses to be tested.

(A1) Decreasing protection has a significant positive effect on production, imports, exports, labour productivity and organizational innovations as this can be seen in the last 35 years.

(A2) This effect is particularly evident since 1988 (as discussed above).

Two complementary econometric methods will be used – both related to time-series data – in order to test the above hypotheses:

1   Cointegration analysis (CA) will be carried out to establish trends (or long term relationships) between key variables for four equations (see below) that are of primary importance to this study. With CA (see Maddala and Kim, 1998) the main focus is on determining long-term trends via the establishment of significant

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[10] A survey carried out by Productivity Commission (1996: 47) reveals that respondents consider tariff reductions on materials/components, industrial relations reform and road freight, electricity, customs clearance procedures to be positive reforms and tariff reductions on PMVs, environmental regulations and changes in input taxes/on costs to be negative reforms for the PMV industry.

cointegrating vectors (CVs). Also, CA incorporates an appropriate structure of lags[11] and hence has some bearing on causation (Ibid).

2   The Chow test will be used to discern structural shifts that will confirm Hypothesis A2 above.

As trade reforms increase labour productivity, exports, imports and production one can expect a negative association between these performance variables and a reduction in tariffs (or effective and nominal protection). Labour productivity is defined as number of cars per worker. The inventories to turnover ratio is the proxy variable which represents the organisational innovations, due to the introduction of the lean production system as mentioned above as a comment to Table 1 (see also below). Our expectation is that the inventories ratio associates negatively with productivity and exports. The higher the imports the higher will be the labour productivity, exports and production as the local industry is exposed to foreign competition.

We estimate the models for the time series data between 1968 and 2001. Data relating to production, sales and number of workers for the PMV industry have been obtained from Australian Automotive Intelligence, 2001. This series have been crosschecked with the ABS data and corrected wherever appropriate. Inventories are obtained from the ABS on request. The estimates of effective and nominal protections rates and tariff rates are available from the Industry Commission. Exports and imports are available from Automotive key Statistics, the ABS (prior to 1984) and the State of the Australian Automotive Industry.[12] Exchange rates, GDP and deflators are available from the *Bulletin of the* Reserve Bank of Australia (various issues). The ABS is the primary source for most of the sources mentioned above.

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[11] The structure of lags incorporated in CA will take into account any adjustment processes between the considered variables.

[12] The State of the Australian Automotive Industry covered the following tariff classifications 8703.21.10, 8703.22.10, 8703.23.10, 8703.24.10, 8703.31.10, 8703.32.10, 8703.33.10 and 8703.90.10 from 1985. The Australian Key Statistics provide consistent exports and imports data. Previous data were obtained from the ABS catalogue number 5416.

Results of Cointegration analysis for long term relationships

The procedure is as follows: first confirm that all variables for CA are Integrated of order one: I(1). This is established with the augmented Dickey-Fuller (ADF) test, which effectively showed that all variables are I(1). Second, establish the vector autoregression (VAR) model (appropriate lag order) and the optimum combination of restrictions on intercepts and trends that confirm at least one CV. Given the shape of the variables involved and after experimentation, the 'restricted intercepts and no trends' option of the Microfit program (see Pesaran and Pesaran, 1997) was found to best explain the CVs. Third, under the restriction of the coefficient of the 'dependent'[13] variable being equal to one, the standard errors of the 'independent' variables are determined. It is important in this CA that the CV provides the right sign and significant coefficients. Fourth, the relevant exogenous variables are indicated for each equation according to economic analysis (see next paragraph). Table 2 summarizes the findings[14]. Figures 1 to 4 show the goodness of fit of the established long-term relationships of the four models under analysis. All the results are satisfactory as seen from Table 2 and Figures 1 to 4, by using three criteria: first the right sign of the independent variables, second the statistical significance of the corresponding coefficients (approximately a standard deviation that is half of the coefficient's magnitude is satisfactory, hence a 5% significance level is indicated), and third a close relationship between actual and predicted or fitted data.

For these estimated equations, it is important to note that during the stage of experimentation, it was desirable to include a price variable (e.g. the price of exports), a protection or liberalization variable (e.g. nominal tariffs), and an efficiency variable (e.g. inventories to turnover ratio) whenever possible. The following comments will assist in further assessing the results.

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[13] In CA there are no dependent and independent variables but it is possible to choose the dependent variable by setting the relevant coefficient of the CV equal to one (see Pesaran and Pesaran, 1997).
[14] These results were obtained after a substantial experimentation to determine the appropriate models according to the steps mentioned above.

Table 2   Results of Cointegration Analysis: 1968 - 2001

Equation for production (PROD)	Equation for exports (EXPO)	Equation for imports (IMP)	Equation for labour productivity (LAPR)
VAR order=2	VAR order=1	VAR order=2	VAR order=2
PROPR=-26.3 (3.6)	EXPPR= -3.55 (0.65)	IMPPR= -23.5 (7.8)	PROPR= -5.15 (2.5)
TAR= -0.35 (0.07)	TARI[15]= -335.4 (37.6)	TARN=-1243.1 (604.6)	IMP = 0.51 (0.067)
INV= -0.74 (0.34)	LAPR= 0.74 (0.05)		INV= -0.94 (0.23)
GDP= 0.66 (0.3)		GDP= 3.92 (0.58)	
	EXCD=-9681.9 (8955.5)		
Intercept=980218.5 (112253)	Intercept = 10512.1 (18547.5)	Intercept=41926.2 (45155.6)	Intercept= 309895.2 (75182.9)
Exogenous: GDP[16]	Exogenous: TARI, EXCD	Exogenous: GDP	Exogenous: none

Note: Standard errors are in brackets.
PROD = Production, IMP = Imports, EXPO = Exports, LAPR = Labour productivity, INV = Inventories to turnover ratio, PROPR = Real price of production, EXPPR = Real price of exports, IMPPR = Real price of imports, EXCD = Exchange rate of A$ to U$, EXCY = Exchange rate of A$ to Yen, TAR = Effective tariffs for PMVs, TARI= Effective tariffs for the automobile industry, TARN = Nominal tariffs for PMVs, GDP = Gross domestic product.

For the production (PROD) equation, as expected the price variable PROPR is significant[17] and with a negative coefficient, the liberalization or protection variable (TAR) is also highly significant with a negative coefficient, the proxy for organizational innovations and efficiency (INV) is also significant and with a expected negative coefficient. This result confirms the incentives set to improve the organizational structure and ability of car producers in Australia according to the consequences of adopting the lean production system. The proxy INV to capture this system has been successfully used by Sanidas (2001, 2004 forthcoming) and others in similar type of analyses as the one presented here. Finally, the exogenous variable GDP is significant and with a positive coefficient. The fit of this long-term trend is good as Figure 1 shows[18]. It is worth

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[15] The other tariff variables TARN and TAR (replacing TARI) were also significant in the same equation. However TARI was finally kept in the Exports model as this tariff variable represents the whole automobile industry, thus taking into account intra-industry linkages.

[16] Even without the exogenous variable GDP, the estimated equation for PROD yields similar results to that with the inclusion of GDP (though the coefficients of the other variables are adjusted accordingly).

[17] These standard errors are asymptotic according to the assumptions of large samples. Unfortunately in most economic research, we do not have the luxury of such samples. Hence it can be said that the use of time series of relatively short size (N=35), especially for cointegration analysis, is in general a disadvantage.

[18] Under CA, there is no direct measurement of OLS performance indicators such as the R^2 and the F-statistic.

stressing the result that the lower the tariffs (TAR) according to liberalization measures the higher the production of vehicles, thus confirming both hypotheses A1 and A2. Figure 1 also shows forecasts for 5 years; a steady increase is predicted corresponding to a steady increase in GDP given constant INV, PROPR, and TAR except for 2005-7 when the government has the intention to decrease TAR. Note that the approximate production of 400000 predicted in this way for the later part of the first decade of 2000 constitutes a minimum efficient market for the operation of the existing 4 plants.
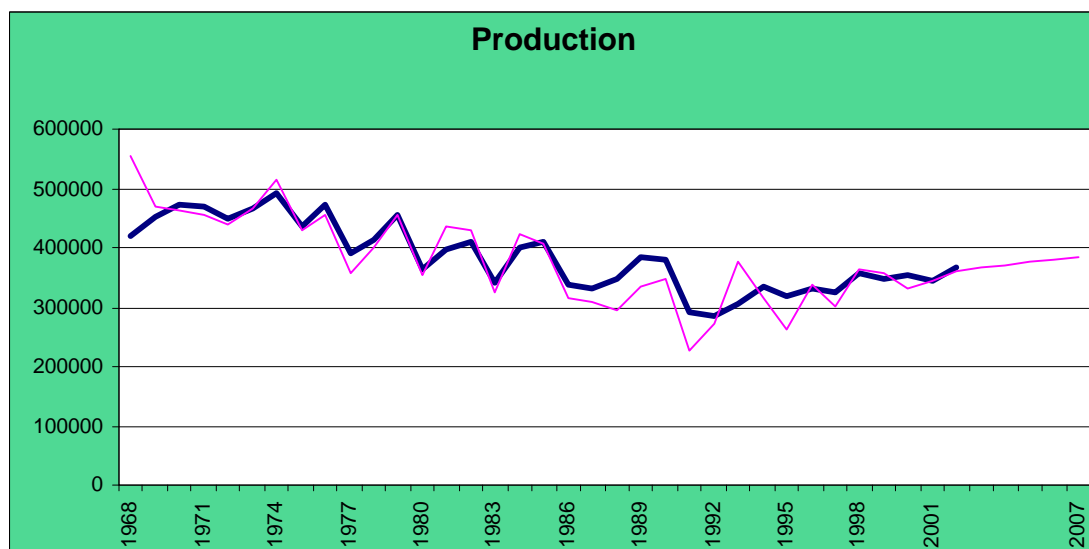
Figure 1: Production
Note: The thick line is the original data

For the exports (EXPO) equation, as expected the price variable EXPPR is significant and with a negative coefficient (the lower the export price the higher the demand for exports- lower prices represents the competitiveness), the liberalization or protection exogenous variable (TARI) is also highly significant with a negative coefficient, the proxy for efficiency (LAPR) is also significant and with a positive coefficient. Finally, the other exogenous variable exchange rate for USA dollars EXCD has the expected negative sign but it is not significant, probably because of two reasons. First we have used the combination of fixed exchange rate (before 1983) and flexible exchange rate (after 1983) in our analysis. Second, PMV firms are multinationals and it is likely that

they use transfer pricing by not considering the exchange rate variations.[19] The fit of this long-term trend is good as Figure 2 shows. It is worth stressing again the result that the lower the tariffs (TARI) according to liberalization measures the higher the demand for exports of Australia made vehicles, thus confirming both hypotheses A1 and A2. More precisely, during the 1990s decade when the vehicle industry has been more efficient due to the incentive of trade liberalization, foreign demand for Australian cars has substantially increased. There may be other factors such as reductions in tariffs in the importing countries that have caused the sudden rise in exports in 1989/90 and after 1995.[20] As Figure 2 shows exports are expected to grow in a similar way to that of the last 10 years because of a continuous improvement in labour productivity, and a reduction in tariffs from 2005 to 2007, given a constant exchange rate in relation to US$ and a constant export price.
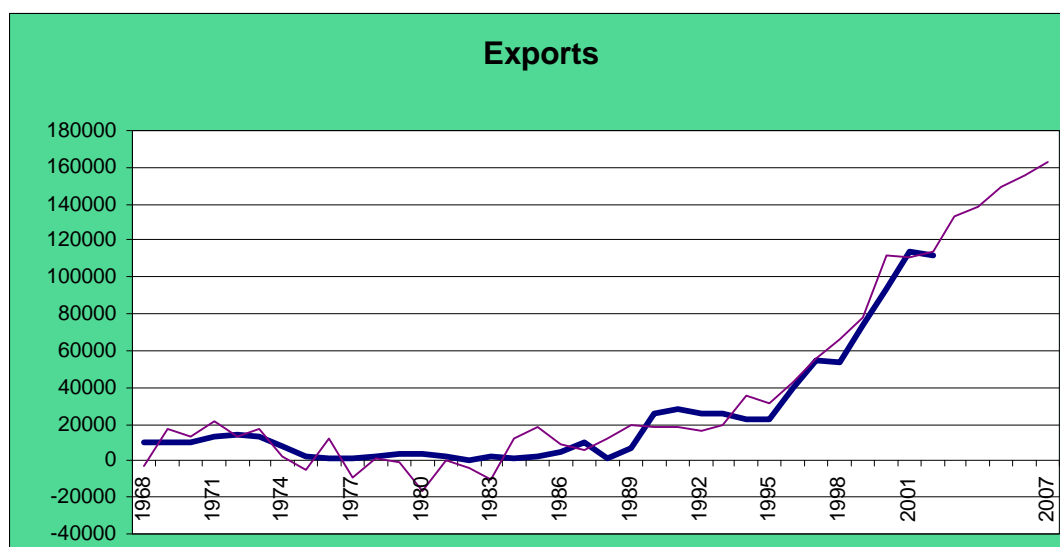

Figure 2: Exports
Note: The thick line is the original data

For the imports (IMP) equation, as expected the price variable IMPPR is significant and with a negative coefficient, the liberalization or protection variable (TARN) is also highly significant with a negative coefficient. Finally, the exogenous variable GDP is significant and with a positive coefficient. The fit of this long-term trend is good as Figure 3 shows.

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[19] New Zealand, NAFTA and the Middle East are the major importers of Australian cars. Hence, it is appropriate to use exchange rate for US dollars.
[20] We haven't taken this into account in our export model mainly because of lack of data.

Hence, as one would have expected, more competition from overseas due to trade liberalisation causes imports to increase. As Figure 3 shows imports are predicted to increase steadily (although accelerating during 2005-2007 when tariffs are reduced) according to a steady increase in GDP growth and a constant import price.
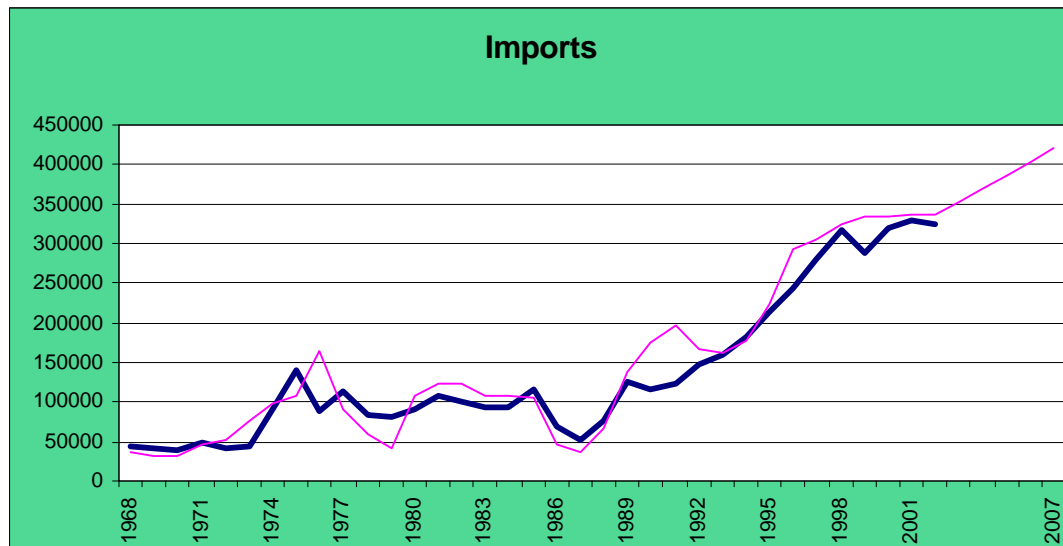

Figure 3: Imports
Note: The thick line is the original data

For the labour productivity[21] (LAPR) equation, as expected the price variable PROPR is significant with a negative coefficient, the liberalization or protection variable proxy[22] imports (IMP) is also highly significant with a positive coefficient, and the proxy for organizational innovations and efficiency (INV) is also significant and with an expected negative coefficient. The fit of this long-term trend is good as Figure 4 shows. As shown in this Figure, labour productivity is predicted to steadily rise according to organizational innovations (as represented by INV which in turn is predicted to remain constant at the 2000 level approximately), according to a constant production price, and according to increasing imports which function as an incentive to be more productive overall. Also

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[21] Labour productivity depends on imports, which is used as a proxy for an incentive to become more productive in order to compete with imported cars. Also note that the 'exports' equation depends on the labour productivity variable, which in turns depends on imports. This circular dependence might suggest that we have a system of simultaneous equations to estimate. Cointegration analysis has inherently the element of simultaneity and causation (Maddala and Kim, 1998), however, the small sample does not permit to estimate cointegrating vectors with a much larger number of variables in each VAR equation than it is done at present (the aim would have been to estimate several cointegrating vectors with more lags than one cointegrating vector for each VAR equation).

note that, as shown in Figure 4, the actual LAPR is lower than predictions consistently during the 1990s decade. This is probably due to a variable that is not included in the model, for example, it might be better to consider the LAPR for the whole industry and not just the final product of vehicles (PMV) produced.
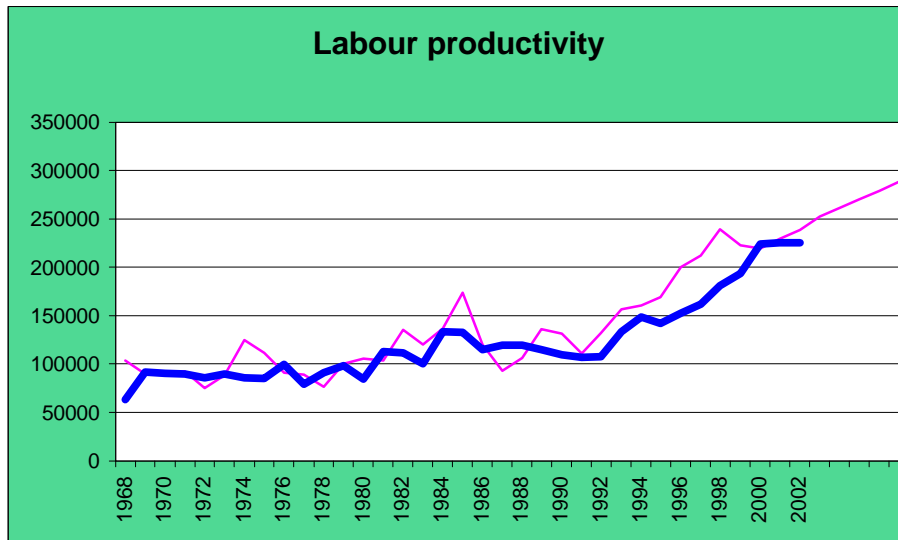

Figure 4: Labour Productivity
Note: The thick line is the original data

Chow test[23] for structural shifts

Figures 1-4 clearly show that the PMV industry has come across a structural shift in the beginning of the 1990s and this structural shift is associated with the trade reforms and organisational innovations. We have used the Chow test to validate our arguments. For the Chow test to be computed, it was first necessary to estimate a straight-line trend for each series. Table 3 summarizes the results. The evidence is strong that a structural shift in all series took place at the beginning of the 1990s decade. Also some lags are evident: the break in production took place 2-3 years later than the break in imports, and so on.

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[22] The tariff variable itself was found to be either insignificant or more often with the wrong sign.
[23] The Chow test is commonly used to show the structural change (Gujarati, 2003:275). The program SHAZAM (version 9) is used for the Chow test.

Table 3   Structural breaks*

Data series	Production	Imports	Exports	Labour productivity
Period examined	1971-2002[24]	1962-2002	1968-2002	1950-2002
Period of significant[25] persistent peak in the test	1990-1993	1987-1991	1995-1997 (also a sudden increase in the statistic: during 1990-1993)[26]	1989-1992

* Note: Depending on data availability we have examined the variables by incorporating more observations. For example, imports 1962-2002, labour productivity 1950-2002.

Conclusions

Our statistical analysis unambiguously shows that PMV industry in Australia has experienced a structural shift in the early 1990s. The result tends to indicate resource allocation in response to of elimination of quotas and removal of tariffs in the traditionally protected PMV industry. A sharp rise in exports, productivity, organisational innovation, imports and production as a result of tariff and non-tariff reforms is an indication for the competitiveness of PMV industry and an indication that the industry can survive and grow while government support is reduced.

In general, the results offer support for the hypothesis that declining protection is associated with rising labour productivity, exports, organisational innovations, imports and production in the PMV industry and thus the greater liberalisation tend to generate better performance in PMV industry. One can notice the similarity between our work and that of Jayanthakumaran (2002). This author has disaggregated the manufacturing sector into liberalisers (automobile and textiles, clothing and footwear industries) and others and found that the association between the liberalisation variables and performance variables

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[24] This period was chosen because there is another break around the beginning of the 1970s (hence the sample would not have been large enough to detect two breaks if the whole period from 1950 to 2002 was used).

[25] The actual statistic is not shown in the Table but it is highly significant (the significance level is less than 1%).

[26] As Figure 2 clearly shows the exports series seems to be a step function with significant steps occurring in 1990 and 1996 in the most recent period.

(productivity and exports) is stronger among the liberalising branches. Our study, in brief, confirms our two hypotheses[27] and the existing literature.[28]

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[27] Some points have not been enough stressed in this brief paper. For instance, it is important to note that we have not explicitly taken into account the types of models produced locally and those imported. However, regarding this point, all cars produced locally were introduced in the Australian market before the 1980s, and all these cars are rather larger than those imported.

[28] Models also need to be developed to capture the external factors such as tariff reforms in importing countries that determine external demand for Australian cars. However, despite this omission our results for exports are indicative enough to support our hypotheses.

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