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Similarities and Differences between the Manufacturing and the Service Sectors: An Empirical Analysis of Japanese Automobile Related Industries[†]

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Abstract

This paper examines the similarities and differences between the manufacturing and the service sectors in terms of market power and productivity dispersion, using data of Japanese automobile manufacturers and dealers. Applying a newly developed approach proposed by Martin (2010), we estimate the firm-specific productivity and mark-up under imperfect competition, and discuss features of them by industry. From those estimates, we find that both industries have similar relations between productivity and mark-up, and their transition probabilities are almost the same. On the other hand, the roles of industries in the production process or the conditions of market competition are different between those industries. In addition, the relations between business scale and productivity are conflicting. As a whole, the implicit assumption that the service industries are structurally different from manufacturing is controversial. However, ignoring the differences in the conditions of their market competition possibly gives significant bias to the policy implications.

Keywords: Productivity, Mark-up, Industrial Structure, Imperfect Competition
JEL Classification：D22, D43, L11

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1. Introduction

Recently, economists and policymakers have devoted a lot of attention to productivity growth in the service sector. For almost four decades since the early 1960s, service industries had been considered less productive or stagnant and this “productivity paradox” was a key topic in empirical economics[1]. However, a revival of economic growth in the U.S. driven by productivity growth in the service sector in the late 1990s and the early 2000s made these views obsolete. It revealed that the service sector is not always stagnant and that productivity growth plays a decisive role in achieving further macroeconomic growth in advanced economies. Many papers have been dedicated to understanding the factors causing this productivity growth, such as information and communication technologies (ICTs), labour market flexibility, and deregulation. In addition, the experiences that other advanced economies in Europe and Japan failed to follow the U.S. sled light on the role of intangible assets[2].

In those papers, many researchers and policymakers consider that manufacturing and service production are different activities. However, that approach is really controversial because the actual production is an intricate process of both manufacturing and service activities. Manufacturing firms usually include service production in their production process. Similarly, many forms of services are provided relying on manufactured products. It indicates that the industry classification should be carefully discussed to reflect these actual production processes at the aggregated levels. In addition, it is meaningful to examine productivity of closely related industries between both manufacturing and service sectors in empirical micro-econometric analysis.

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[1] Canadian Journal of Economics Vol. 32, No.9 (1999)

[2] Corrado, Hulten and Sichel (2006a), Bloom and van Reenen (2007), and Miyagawa et al. (2010)

Without the activity level data in firms, it can be an alternative approach to examine these complicated relationships.

In this paper, we discuss the latter issue using firm-level data of the Japanese automobile related industries: automobile manufacturers including parts and accessories (henceforth, Makers), and automobile dealers (henceforth, Dealers). As is well known, the automobile manufacturing sector is a leading industry in Japan, and is thought to be highly productive and innovative. In addition, Makers and Dealers are closely tied. For example, Makers usually make their production plans following information about customers' preference, in order to assemble vehicles as semi-tailor made products. On the other hand, Dealers propose various plans of purchasing to customers based on production capacity of Makers[3]. Thus examining these industries allows us to further investigate this issue. Applying a newly developed econometric approach by Martin (2010) to these industries, we estimate the firm-specific mark-up and productivity, and examine their dispersion and market structures.

The outline of this paper is as follows. In section 2, we briefly explain the model and estimation method which we apply. Section 3 describes data used. In section 4, we discuss the empirical results and their implications. And the conclusions are in the last section.

2. Model

In this paper, we rely on an estimation method proposed by Martin (2010). To avoid redundancy, we briefly show what the basic idea of this approach is, and what we actually estimate, following his explanation. First, we assume that a firm follows a

[3] This is relevant for new car sales. Dealers also have another market for used cars.

simple form of Hicks neutral production function,

$$Q_i = A_i\left[f\left(X_i\right)\right]^{\gamma} \quad (1),$$

where Q_i, A_i, X_i are quantity of output, Hicks-Neutral technology, a vector of inputs, respectively[4]. γ is the degree of returns to scale and $\gamma > 0$. Applying the mean value theorem, equation (1) is represented as follows,

$$q_i = a_i + \sum_{X_i} \alpha_{X_i} x_i, \quad \text{s.t. } \alpha_{X_i} = \gamma f_{X_i}\left(\overline{X}_i\right)\frac{\overline{X}_i}{f\left(\overline{X}_i\right)} \quad (2)$$

where lowercase means log deviation of each variable from the median firm($q_i = \ln Q_i - \ln Q_*$: * denotes the median firm)[5].

Secondly, the utility of a representative consumer is denoted as the following differentiable non-convex function,

$$U = U\left(\tilde{Q}, Y\right) \quad (3)$$

where $\tilde{Q}$ is a m$\times$1 vector of quality evaluated units ($\tilde{Q}_i$) of the consumed products, and

[4] In this paper , the term, product includes service provided by firms since we examine both manufacturing and service industries.

[5] In this paper, the median firm is selected based on the revenue per unit labour (man-hour).

Y is income[6]. $\tilde{Q}_i = \Lambda_i Q_i$ (the product of consumer's valuation of the quality and the quantity for firm i's product). Suppose each firm faces a downward sloping demand curve conditional on the actions of other firms, then the demand function is written as follows,

$$Q_i = D(P_i) \quad (4)^7.$$

From equation (4), the price elasticity of demand for firm i's product is obtained as $\sigma_i = -\frac{\partial \ln D(P_i)}{\partial \ln P_i}$. Using it, the markup of firm i is defined as $\mu_i = \frac{1}{1-\frac{1}{\sigma_i}}$.

Thirdly, firm i's profit (Π_i) is written as follows,

$$\Pi_i = P_i(Q_i)\cdot Q_i - C_i(\mathrm{X}_i) \quad (5),$$

where $C_i(\mathrm{X}_i)$ is the cost function of firm i. Since we assume all firms follow the profit maximisation principle, the following first order condition is obtained,

$$P_i(Q_i)\left(\frac{\gamma Q_i}{f(\mathrm{X}_i)} f_X(\mathrm{X}_i)\right) + P'(Q_i)\frac{\gamma Q_i}{f(\mathrm{X}_i)} f_X(\mathrm{X}_i) Q_i = C_{Xi}(\mathrm{X}_i) \quad (6).$$

Using $C_{Xi}(\mathrm{X}_i) = W_X$ (W_X is the marginal cost of X) and μ_i, equation (6) is rewritten as follows,

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[6] m is the number of differentiated products.

[7] Caplin and Nalebuff (1991)

$$P_i \gamma \frac{Q_i}{f(\mathrm{X}_i)} f_X(\mathrm{X}_i) = \mu_i W_X \qquad (7).$$

From equations (2) and (7), we obtain the following relation,

$$\alpha_{X_i} = \mu_i \frac{W_X X_i}{P_i Q_i} = \mu_i s_{Xi} \qquad (8),$$

where s_{Xi} represents the revenue share of variable X for firm i. Equation (8) indicates that the firm-specific mark-up is obtained as a function of the revenue shares as follows,

$$\mu_i = S(s_{Xi}) = \frac{1}{s_{Xi}} \alpha_{X_i} \qquad (9).$$

On the other hand, firm i's revenue ($R_i = Q_i \times P_i$) is determined by production and demand, and is represented as a function of them, $R_i = R(\mathrm{X}_i, \Lambda_i, A_i)$. Applying the mean value theorem, it is also re-written as follows,

$$r_i = \sum_{\mathrm{X}} \overline{\alpha}_i^X x_i + \overline{\alpha}_i^\Lambda \lambda + \overline{\alpha}_i^A a + \varepsilon_i \qquad (10),$$

where $\alpha_i^X = \frac{\partial \ln R_i}{\partial \ln X_i}$ and $\overline{\alpha}_i^X = \frac{\alpha_i^X + \alpha_*^X}{2}$. ε_i is an iid shock.

Among the input variables, capital (k) is usually assumed to be fixed at least in the short run. For variable factors, $\frac{\partial \ln Q_i}{\partial \ln X_i} \cdot \frac{1}{\mu_i} = \frac{\partial \ln R_i}{\partial \ln X_i} = s_{Xi}$. In addition, the relations, $\frac{\partial \ln R_i}{\partial \ln \Lambda_i} = \frac{\partial \ln R_i}{\partial \ln A_i} = \frac{1}{\mu_i}$ is satisfied because the demand function $D(\cdot)$ is monotone in price and Λ_i is consumption-augmenting. From these relations as well as the relations, $\alpha_{Ki} = \gamma - \alpha_{Li} - \alpha_{M_i}$ and $\alpha_i^X = s_{Xi} = \frac{1}{\mu_i}\alpha_{Xi}$, the revenue function is re-written as follows[8],

$$r_i - \sum_{X \neq K} \bar{s}_{Xi}(x_i - k_i) = \tilde{r}_i = \gamma \overline{\frac{1}{\mu_i}} k_i + \overline{\frac{1}{\mu_i}}(\lambda_i + a_i) + \tilde{\varepsilon}_i \qquad (11)$$

In equation (11), the firm specific quality adjusted productivity ($\omega_i = (\lambda_i + a_i)$) is assumed to follow a Markov process. Using a control function approach, ω_i is estimated as follows,

$$\omega_{it} = \phi_\omega\left(k_{it}, k^*, \ln \prod_{it}, \ln \prod^*\right) \qquad (12)^9,$$

where $\prod$ denotes the net revenue. In addition, equation (9) shows that μ_i is represented as a function of s_{Xi} and inputs,

$$\frac{1}{\mu_i} = s_{xi}\left(\frac{\partial \ln F_i}{\partial \ln X_i}\right)^{-1} = s_{xi}\Psi(\mathrm{X}_i) \qquad (13).$$

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[8] Klette (1999) and Martin (2008)

[9] The following papers use control function approaches: Olley & Pakes (1996), Levinsohn & Petrin (2003), Bond & Söderbom (2005)、Ackerberg et al. (2006), Martin (2008).

From this equation, $\gamma\left(\frac{\overline{1}}{\mu_i}\right)$ can also be written as a function of s_{Xi} and X_i. That is,

$$g_{\mu}\left(\ln \mathrm{X}_{it}, \ln \mathrm{X}_0^*, s_{xit}, s_{x0}^*\right) = \frac{\gamma}{2}\left[s_{xit}\Psi\left(\ln \mathrm{X}_{it}\right) + s_{x0}^*\Psi\left(\ln \mathrm{X}_0^*\right)\right] \qquad (14).$$

Finally equation (11) is estimated as follows,

$$\tilde{r}_{it} = \phi_r\left(\ln \mathrm{X}_{it}, \ln \mathrm{X}_t^*, s_{xit}, s_{xt}^*, \ln \prod_{it}, \ln \prod_t^*\right) \qquad (15)$$

where $\phi_r(\cdot)$ is an unknown function and approximated by a polynomial. From equations (11) and (14), ω over γ is obtained as follows,

$$\frac{\hat{\omega}_{it}}{\gamma} = \frac{\hat{\phi}_{rit}}{g_{\mu}\left(\ln \mathrm{X}_{it},\ \ln \mathrm{X}_0^*,\ s_{xit},\ s_{x0}^*\right)} - k_{it} \qquad (16)$$

where $\hat{\phi}_{rit}$ is an estimate of $\phi_r(\cdot)$ obtained in the second stage of equation (15). The estimates of ω rescaled by γ are also used to recover v_{it}, using the following equation,

$$\frac{\hat{\omega}_{it}}{\gamma} = \left(\frac{\hat{\omega}_{it-1}}{\gamma},\ \hat{P}_{it}\right) + v_{it} \qquad (17),$$

where $\hat{P}_{it}$ is the predicted exit probability which is estimated at the first stage of this estimation procedure. Since the shock, v_{it} is independent of all predetermined variables including capital, we can use the following moment restrictions to estimate the remaining parameters,

$$E\left\{\left[X_{it-1} \times k_{it}\right]' v_{it}\right\} = 0 \qquad (18).$$

3. Data

For this research, we construct the dataset based upon the Basic Survey of Business Structure and Activity (BSBSA) for the period between 1995 and 2005[10]. This is a complete enumeration for firms whose workers are more than 50 or capital is over 30 million Japanese yen in manufacturing and various service industries. From this statistics, we use total sales as data of total revenues of firms. The proxy of accumulated capital is the tangible fixed assets. Labour input is calculated as man-hours[11]. Following Morikawa (2010), we separately calculate regular and contingent workers and add them up. In addition, the total wage is used as the labour cost. As a proxy for intermediate inputs, the amount of purchase is sometimes used. However, we do not follow it because that data includes many zeros and blanks. Instead we construct that variable from financial data following Tokui, Inui and Kim (2007) and Kim, Kwon and Fukao (2007),

$$Intermediate\ Input = COGS + SGA - (TW + Dep + T\ \&\ D),$$

where *COGS*, *SGA*, *TW*, *Dep* and *T&D* are the cost of goods sold, the selling and

[10] This statistics is annually compiled by the Ministry of Economy, Trade and Industry (METI) Japan.
[11] The data of working hours are available from Monthly Labour Survey.

general administrative expenses, the total wages, the depreciation and the tax and dues, respectively. In constructing our dataset, we rule out the firms that report zero or negative values as the number of regular workers, the tangible fixed assets, total wage, or intermediate inputs. In many existing papers, capital stock data are constructed by subtracting the land from the tangible fixed assets. However we do not follow them because we consider the location of (or access to) business possibly has a crucial role in production, and the land value can capture such information.

4. Empirical Results

In this section, we discuss empirical results and their implications. We focus on the following issues: 1) Are there some differences in the distributions of productivity and mark-up levels between Dealers and Makers, 2) What relations can we find between productivity and market power, 3) Are there some differences in the transition dynamics between them, and 4) Is business scale or employment structure related to productivity and pricing power?[12]. From these analyse, we discuss similarities and differences of Dealers and Makers, and obtain reliable implication.

The first issue is related to the question of whether productivity of manufacturing firms is higher than that of service firms as generally believed. Although this view widely prevails, it is somewhat controversial because of conceptual and methodological problems. In order to examine this issue, we estimate productivity and mark-up using a combined data of Dealers and Makers. Figures 1-1 and 1-2 show the distributions of them. They indicate that productivity distributions are similar between Dealers and

[12] The foreign capital ratio is not examined because most of the firms in Dealers do not accept foreign capital at all and comparison between domestic and foreign firms is somewhat controversial.

Makers while mark-up distributions are very different. Obviously, Makers obtain higher pricing powers than Dealers[13]. It might reveal that Dealers and Makers have different roles in sets of production processes if both firms are highly correlated. In this case, the above largely accepted view is meaningless because the lower TFP of the service sector in conventional approaches such as an index number approach only means that it does not have roles to obtain higher pricing power in the whole production process.

On the other hand, it possibly reflects the differences of the conditions on competition between Dealers and Makers. If it is even more difficult for Dealers to differentiate their products than Makers, the mark-up levels of Dealers tend to be lower than those of Makers. This view seems to be reasonable to some extent because Makers likely specialise certain technologies or products while Dealers usually compete each other in more generalised markets including used car markets. Even in this case, the general view is less supported as well because productivity of Dealers is not significantly lower than that of Makers. These discussions reveal that productivity analysis might give an irrelevant implication if the mark-up is ignored.

For the second issues, we estimate both performances industry by industry. Figures 2-1 and 2-2 show the results. They reveal that the correlations between mark-up and productivity are similar between Dealers and Makers. It means that these industries have the similar properties on the profit maximisation activities. As a whole, the productivity levels of firms with respect to their mark-ups are scattered as inverse U-shape distributions in both industries. In addition, the dispersion of productivity levels is larger for the firms with higher mark-ups than those with lower ones.

These results imply that increasing in the firm specific mark-up does not always

[13] The differences of the price levels between industries are not crucial because they are relatively stable during the examined period.

result in improving the productivity level. Rather, firms seem to have various strategies to pursue their profit maximisation. Some firms focus on improving their productivity at the expense of their pricing power. These firms are thought to provide more standardised or substitutable products. Others put much weight in obtaining larger pricing powers through differentiation. Those firms possibly use less efficient technologies for mass production[14]. In both manufacturing and service industries, both groups of firms coexist. On the other hand, firms with relatively smaller market powers are also less productive in both industries. It implies that there is a threshold point of the mark-up levels to join the pricing power or productivity competition for each industry. In addition, the finding that the mark-up distribution for Makers is larger than that for Dealers is thought to support the hypothesis in the previous paragraph that Makers are more likely differentiated than Dealers.

The third issue is examined by transition matrices. Tables 1-1 and 1-2 obviously show that the transitions of firms are similar between both industries with respect to productivity. In both industries, neither a leapfrogging nor a free fall is detected. It means that relative levels of firm-specific productivities are persistent. In particular, the probabilities on the top and bottom edges of the diagonal are higher than those on the middle. These tables also imply that such persistency is not affected by a business cycle because the transition probabilities are not significantly changed between the later half of the 1990s (recession) and the early half of the 2000s (boom). These results cast doubt on views that manufacturing industries are Schumpeterian-innovative while service industries are more stagnant.

As well as productivity, relative levels of firm-specific mark-ups are also persistent.

[14] For example, firms providing luxury brand items seem to follow this strategy.

Tables 2-1 and 2-2 show the transition probabilities of them. In particular, firms in the bottom group of Makers are more likely to stay the same group. It means that it is quite difficult for firms to slip out of the position where their price making power is lowest once they fall in. In addition, this finding implies that it is difficult for those firms to take the productivity strategy since they are also less productive as we discussed. Interestingly, the percentage that firms continue to stay in the bottom range is higher in Makers than Dealers. It indicates that the fetters of poor pricing powers are tighter in the former than the latter.

As the fourth issue, we examines if the larger firms are more productive than the smaller ones and if increase in contingent workers has a positive correlation with productivity. For the first question, there is a complicated view. It is not always thought that the productivity of the small firms is lower than that of the large firms in the manufacturing sector while the small firms which account for the lion's share in the retail trade industry are considered to make that industry less productive[15]. On the other hand, the second question is highly related to the issue of the structural change of the employment. To discuss them, we separate firms in each industry into three groups with respect to their business scale and their shares of contingent workers.

Figures 3-1 and 3-2 show the kernel density of those groups. In these figures, 1, 2 and 3 are corresponding to small, medium and large, respectively. T and M also represent TFP and Mark-up, respectively. These figures give complicated views. For business scale, the productivity of the large firms is higher than those of others in Makers while Small > Medium > Large in Dealers. On the other hand, the large firms have the higher mark-up levels than those of others in both industries. Although the interpretation of

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[15] McKinsey Global Institute (2000)

these results is limited because our data do not include the firms whose workers are less than 50 or whose capital are less than 30 million Japanese yen, they imply that the view that the small firms are less productive is not always confirmed for the retail trade industry. The results indicate that the large firms have advantages for pricing powers rather than productivity.

For the second question, Figure 3-2 reveals that increase in the contingent workers is not positively correlated with productivity or market power in both industries. Instead, for Makers, the larger share of the contingent workers seems to be negatively correlated with the performances. This finding gives an important implication. Although firms have expanded the share of the contingent workers to reduce costs, those efforts do not yield better performances in more differentiated markets. For Dealers, it is difficult to find a consistent relation between them. It implies that those efforts do not always result in higher performances even in more generalised markets. These findings should be noted for further discussion about the reform of the labour market

5. Concluding Remarks

In this paper, we estimate the firm-specific mark-up and productivity under imperfect competition for automobile manufacturers and dealers, and discuss the similarities and differences between them using those estimates. Our findings reveal the basic properties on their profit maximisation activities and the transition dynamics are very similar each other. Some firms pursue the profit maximisation through productivity improvement for mass production while others do it through increasing their pricing powers. Since their profit maximisation activities are significantly diversified, we should carefully consider for what groups of firms a certain policy supports in devising industrial policies. In addition, the relative positions of firms with respect to both productivity and mark-up are very persistent. It indicates that the view that the manufacturing sector is more Schumpeterian-innovative than the service sector is very controversial. It also gives a bias to the policy implication of the productivity analysis if ignored.

On the other hand, our estimates also show that the distributions of the firm-specific pricing powers are very different between Makers and Dealers although those of the productivity are not much different. It might reflect the difference of their roles in the whole production process or the differences in the conditions of their market competition. In addition, the correlations between business scale and productivity are heterogeneous between them as well. The relations between the employment structure and the firm performances are not consistent between them, either.

These findings imply that the simple separation between the manufacturing and the service sectors in the productivity analysis are not much meaningful. Instead, it is important to examine it by carefully considering the roles of the industry in the whole production process and the structures of their markets.

Although this paper provides some additional contributions for productivity analysis, there are still some remained problems. First, the assumption of the identical degree of returns to scale is somewhat controversial. For further discussion of productivity analysis, we should examine the possibility that is varies between and within industries. Secondly, we do not directly examine the causal relations between the performances and properties of firms by a regression analysis because of some methodological problems. But, it is better to devise an econometric analysis to obtain more robust implications. Furthermore, we should integrate our analysis into the input-output analysis and obtain a comprehensive view. All of them are the future research topics.

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Table 1-1: Transition Matrix of Productivity for Dealers

90s	5	4	3	2	1	exit
5	**0.6722**	0.1002	0.0093	0.0094	0.0045	0.2045
4	0.0726	**0.4913**	0.1588	0.0445	0.0144	0.2185
3	0.0121	0.1651	**0.4018**	0.1917	0.0445	0.1848
2	0.0033	0.0535	0.1938	**0.3922**	0.1766	0.1807
1	0.0000	0.0194	0.0467	0.1712	**0.5080**	0.2547
entry	0.2384	0.1579	0.1778	0.1739	0.2521	

00s	5	4	3	2	1	exit
5	**0.6830**	0.0869	0.0220	0.0103	0.0051	0.1927
4	0.1020	**0.5379**	0.1646	0.0342	0.0100	0.1514
3	0.0065	0.1615	**0.4420**	0.1917	0.0344	0.1639
2	0.0076	0.0342	0.1815	**0.4576**	0.1488	0.1702
1	0.0038	0.0126	0.0380	0.1515	**0.5555**	0.2386
entry	0.2128	0.1791	0.1639	0.1657	0.2785	

Table 1-2: Transition Matrix of Productivity for Makers

90s	5	4	3	2	1	exit
5	**0.6853**	0.1711	0.0171	0.0023	0.0012	0.1231
4	0.1756	**0.5402**	0.1508	0.0080	0.0012	0.1242
3	0.0194	0.1516	**0.5621**	0.1176	0.0023	0.1471
2	0.0034	0.0104	0.0857	**0.5993**	0.0912	0.2101
1	0.0000	0.0011	0.0012	0.0602	**0.6543**	0.2832
entry	0.1265	0.1317	0.2032	0.2369	0.3017	

00s	5	4	3	2	1	exit
5	**0.7276**	0.1522	0.0146	0.0060	0.0000	0.0995
4	0.1404	**0.5586**	0.1524	0.0131	0.0025	0.1329
3	0.0241	0.1549	**0.5488**	0.0994	0.0012	0.1716
2	0.0049	0.0132	0.1256	**0.5996**	0.0518	0.2049
1	0.0012	0.0000	0.0000	0.0740	**0.6692**	0.2556
entry	0.1194	0.1430	0.1797	0.2385	0.3194	

Table 2-1: Transition Matrix of Mark-up for Dealers

90s	5	4	3	2	1	exit
5	**0.6277**	0.1657	0.0249	0.0067	0.0011	0.1739
4	0.1706	**0.4551**	0.1603	0.0296	0.0000	0.1844
3	0.0246	0.1655	**0.4514**	0.1519	0.0056	0.2009
2	0.0059	0.0183	0.1638	**0.5056**	0.0900	0.2164
1	0.0024	0.0000	0.0033	0.0972	**0.6295**	0.2676
entry	0.1604	0.1865	0.1841	0.1942	0.2747	

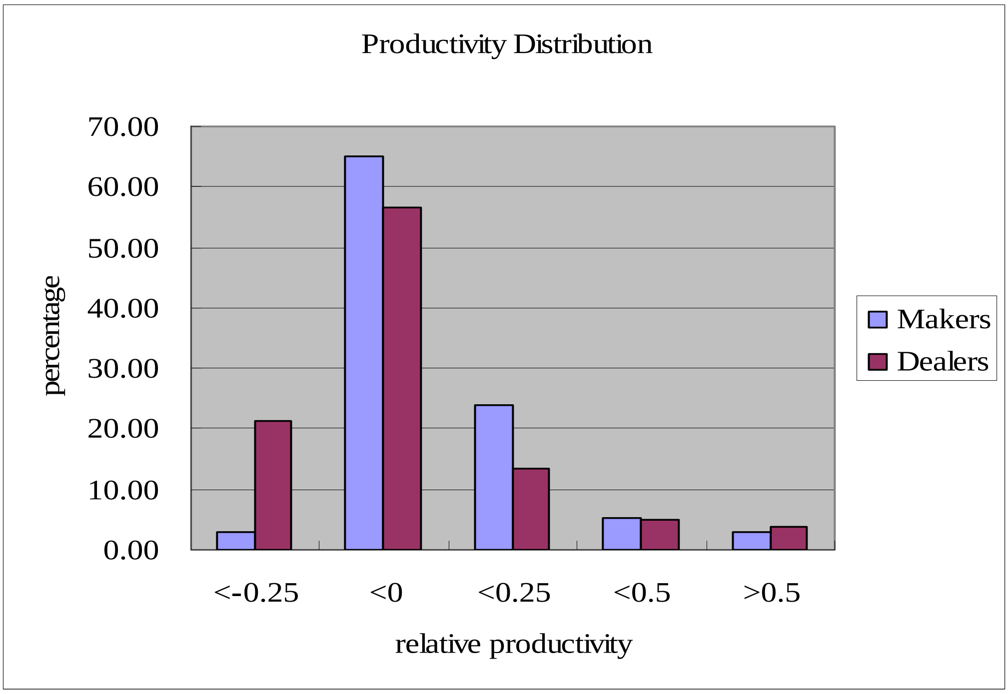
00s	5	4	3	2	1	exit
5	**0.6294**	0.1745	0.0305	0.0037	0.0000	0.1619
4	0.1509	**0.4808**	0.1933	0.0178	0.0000	0.1573
3	0.0243	0.1796	**0.4664**	0.1486	0.0077	0.1747
2	0.0050	0.0308	0.1339	**0.5234**	0.1168	0.1888
1	0.0000	0.0012	0.0051	0.1214	**0.6380**	0.2342
entry	0.2071	0.1414	0.1871	0.2017	0.2626	

Table 2-2: Transition Matrix of Mark-up for Makers

90s	5	4	3	2	1	exit
5	**0.5890**	0.1093	0.0194	0.0046	0.0000	0.2776
4	0.1347	**0.5138**	0.1447	0.0160	0.0011	0.1897
3	0.0170	0.1847	**0.4768**	0.1154	0.0046	0.2015
2	0.0012	0.0149	0.1624	**0.6141**	0.0754	0.1321
1	0.0011	0.0023	0.0057	0.0990	**0.8043**	0.0876
entry	0.3020	0.1991	0.2218	0.1696	0.1229	

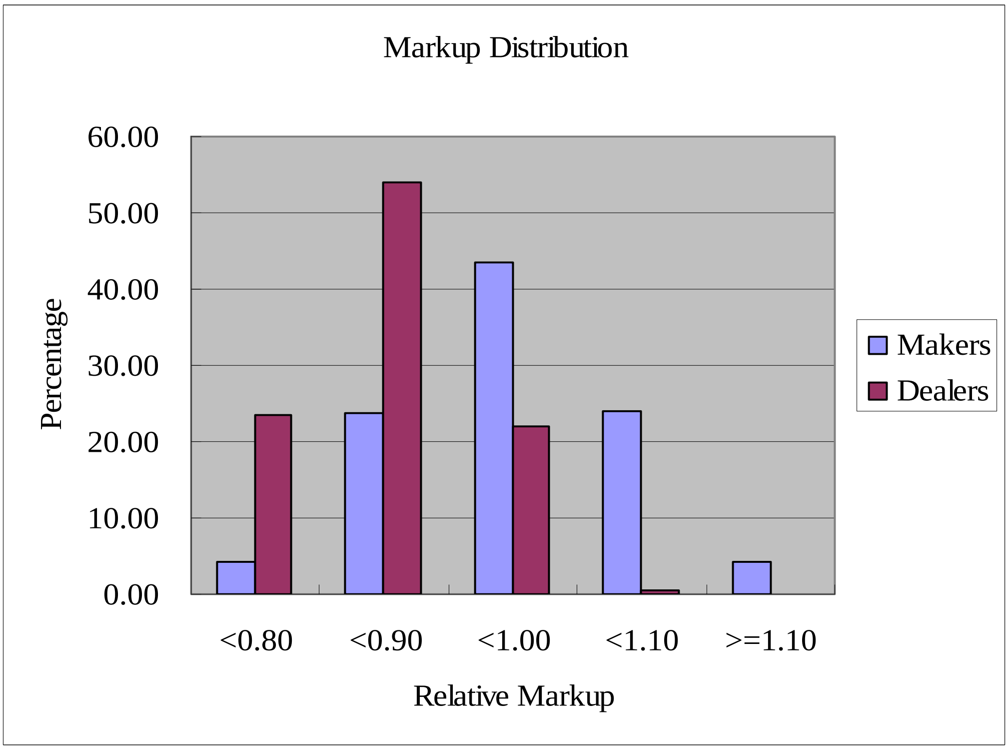
00s	5	4	3	2	1	exit
5	**0.5824**	0.1453	0.0145	0.0061	0.0000	0.2516
4	0.1152	**0.5029**	0.1689	0.0290	0.0025	0.1815
3	0.0096	0.1413	**0.5078**	0.1665	0.0095	0.1653
2	0.0048	0.0180	0.1525	**0.5783**	0.0955	0.1498
1	0.0000	0.0012	0.0097	0.0747	**0.7987**	0.1169
entry	0.3285	0.2245	0.1683	0.1668	0.1107	

Figure 1-1: Distribution of Productivity Levels



P-value (Makers = Dealers): 0.000

Figure 1-2: Distribution of Mark-up Levels



P-value (Makers = Dealers): 0.000

Figure 2-1: Correlation between TFP and Mark-up for Dealers

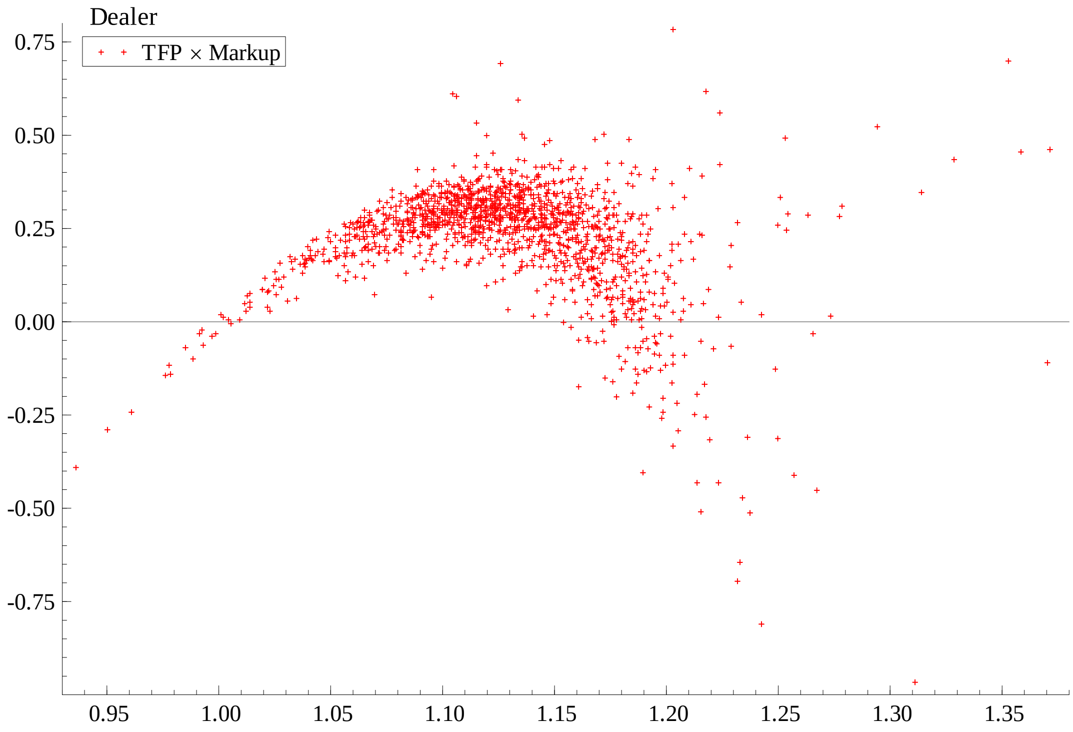


Figure 2-2: Correlation between TFP and Mark-up for Makers

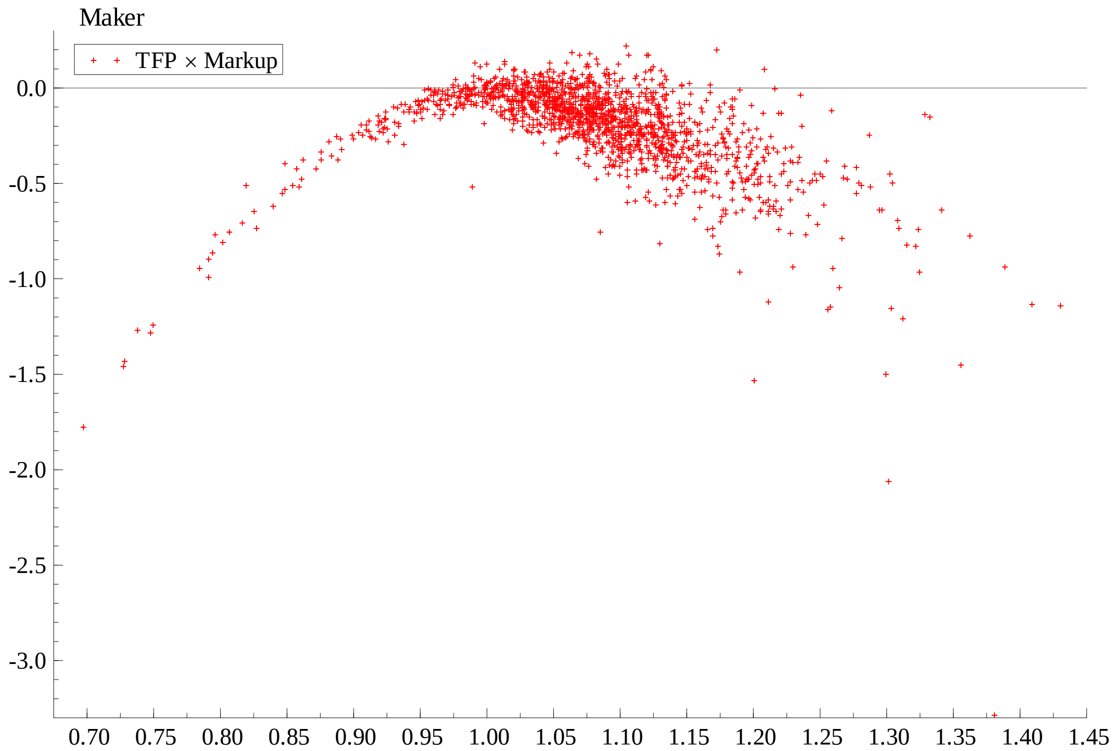
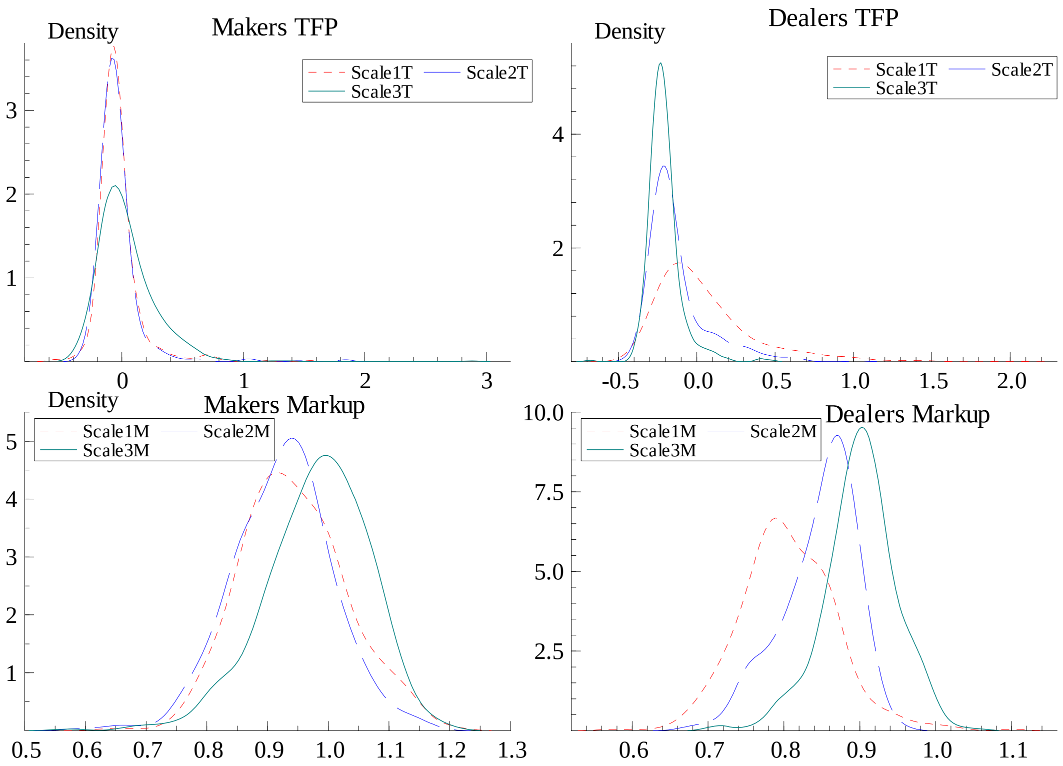


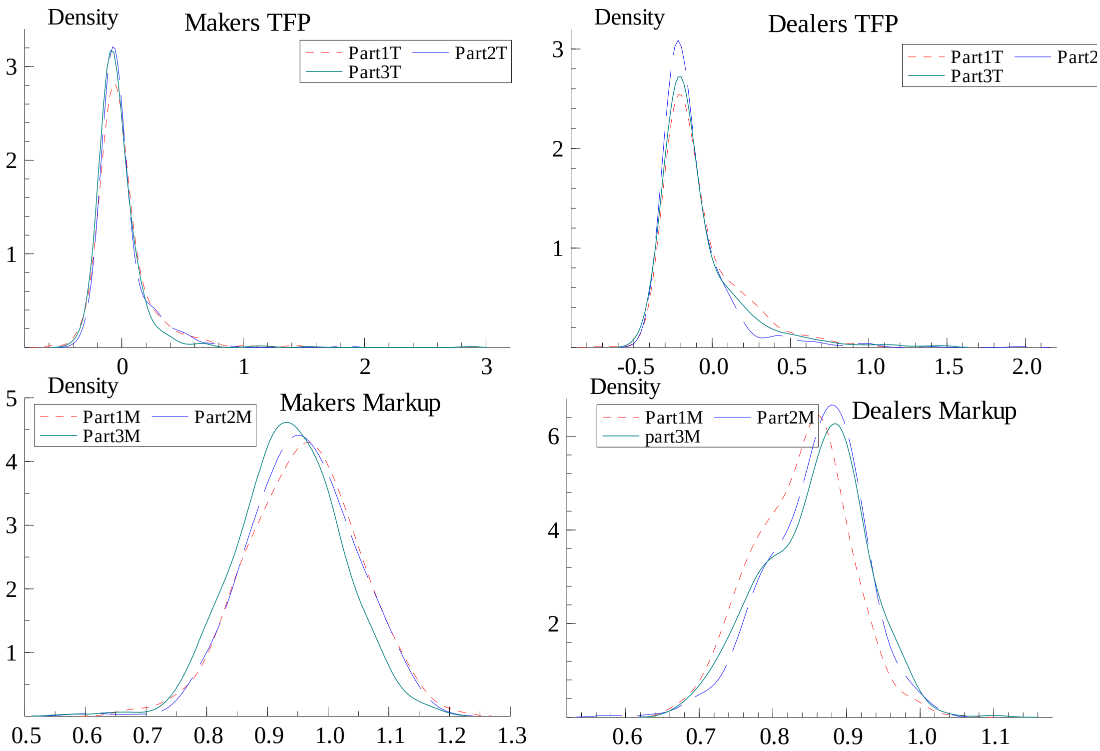
Figure 3-1



TFP	**Makers**	**Dealers**
P(1T=2T)	0.5934	0.0000
P(2T=3T)	0.0000	0.0000
Mark-up	**Makers**	**Dealers**
P(1M=2M)	0.0004	0.0000
P(2M=3M)	0.0000	0.0000

Welch's t –test

Figure 3-2



TFP	**Makers**	**Dealers**
P(1T=2T)	0.6840	0.0017
P(2T=3T)	0.0335	0.0437
Mark-up	**Makers**	**Dealers**
P(1M=2M)	0.7107	0.0000
P(2M=3M)	0.0001	0.7972

Welch's t –test