Impact of Mergers and Acquisitions on Consumers’ Welfare: Experience of Indian Manufacturing Sector

Pulak Mishra¹, and P V Kiran Kumar²

Abstract—In the context of introduction of deregulatory policy measures and subsequent wave of mergers and acquisitions (M&A) in Indian corporate sector since 1991, the present paper attempts to examine the welfare implications of this wave. It is found that M&A do not have any significant impact on consumers’ welfare. Instead, consumers’ welfare is significantly influenced by exports intensity, imports intensity, advertising intensity, technology related efforts, and past profitability of the firms. While the industries with higher exports orientation or greater product differentiation or better financial performance experience greater loss in consumers’ welfare, it is less in the industries with greater competition from imports or better technology. Hence, the wave of M&A in Indian manufacturing sector in the post-liberalization era may not be a matter of serious concern from consumers’ welfare point of view. Instead, in many cases, M&A can help the firms in consolidating their business and enhancing competitiveness, and this may benefit the consumers in the form of greater efficiency and lower prices.

Keywords—Mergers, acquisitions, concentration, welfare, India

JEL Codes—L1, L2, L4, L5

INTRODUCTION

ECONOMIC reforms initiated in India since July 1991 aimed at enhancing competition in the marketplace to bring in greater efficiency in production and distribution of goods and services so that consumers’ welfare is maximized. While the policy interventions have largely removed various legal and structural entry barriers to facilitate greater market competition, the strategic response by the firms have relied largely on mergers and acquisitions (M&A) to counter the competitive threat [4]. Under the new business conditions, the domestic firms have taken the route of M&A to restructure their business and grow¹, whereas the foreign firms have used the same to enter into and raise control in Indian industry sector² [4]. As a result, there has been a significant increase in the number of M&A in Indian corporate sector in the post-liberalization era [32], [52], [11], [46], [4], [6], [7], [8], [17], [34], [1], [18], [37], [2], [36].

There are two broad theories in industrial organization literature that explain why firms acquire or merge with other firms. The monopoly theory postulates that the firms use the route M&A to raise their market power [49], [12]. The general proposition of this theory is that M&A, especially those of horizontal in nature, generate elements of market power often to the detriment of consumers’ interests through pricing strategies designed to drive the rivals out of the business, and unfair entry deterrence⁶. In other words, the monopoly theory suggests that increase in market concentration following M&A gives the firms an opportunity to charge monopoly prices and thereby leads to losses in allocative inefficiency. In addition, there are also possibilities of wasteful rent-seeking expenditures by firms to secure market power through non-market means⁷, and increasing X-inefficiency due to decline in competitive pressure following M&A [16].

On the other hand, according to the efficiency theory, M&A are planned and executed to reduce costs by achieving scale economies [44], [52]⁸. Such efficiency gains typically originate from synergy effects of the integration of two or more firms into a single entity. These potential gains can include improvements in productive efficiency through a better allocation of resources of the merging firms, etc. Further, if the M&A make the combined entity more competitive, prices can even fall leading to improvement in allocative efficiency. In addition, M&A can enhance innovation and improve dynamic efficiency as well. According to [35], the horizontal mergers that involve combinations of less than 50 percent of the market enhance efficiency.

¹ Although mergers and acquisitions are different in definitions and the statutory procedures, their effects from an economic perspective are the same as in both the cases the control of one company passes on to another. As a result, in the present paper, no distinction is made between the mergers and the acquisitions.

⁶There are evidences of increase in market concentration following M&As. For example, there was rapid concentration of sales in many markets after the mergers waves in the USA in earlier periods [51], [42]. Similarly, in the absence of tight controls, merger activity in the UK had raised sellers’ concentration significantly [28].

⁷In many cases, the firms hire lawyers to defend themselves against antitrust suits. They also persuade the governing authorities of their deservingness of franchises and seek ways to prevent new firms from entering into their market [33], [43].

⁸These scale economies may arise at the plant level [45] or as a result of operating several firms within one firm [48]. In either case, M&As bring together firms, which individually fall short of the minimum efficient scale.
Hence, there are diverse forces following M&A that can affect consumers’ welfare. While the monopoly power arising out of M&A can go against the interests of the consumers, the enhanced efficiency and greater innovation can benefit the consumers in the form of better quality and lower prices. Further, M&A may also fail to increase market concentration in industries that experience entry of a large number of players, greater import competition or considerable expansion of the market. There may be pure M&A with no prospective effect on a particular market structure and many of these M&A may be neutral in terms of welfare [9]. Besides, M&A among the relatively smaller firms may help them to enhance their competitiveness and thereby, to prevent increase in market concentration. The exact impact of M&A on consumers’ welfare, therefore, depends on the relative strength of these diverse forces.

It is, therefore, necessary to examine how consumers’ welfare is affected by the wave of M&A with adequate control for these diverse forces. Further, since M&A are industry specific activities [40], their impact on market structure and hence on consumers’ welfare may vary across industries depending on the industry-specific characteristics. But, while the existing studies in Indian context basically deal with the issues like trends and patterns of M&A [6], [1], their types and objectives [52], [32], [6], [8], [4], [37], and their impact on market structure and performance [4], [37], [39], the welfare implications of these activities are not adequately explored.

The present paper is an attempt to fill in this gap. The rationale for such attempt lies mainly in the contradictions arising from the two broad theories of industrial organization, viz., the monopoly theory, and the efficiency theory. Besides, bringing in greater competition into the market place is an integral part of economic reforms in India. Accordingly, there have been many important changes in the industry, trade and investment related policies in general and competition policy in particular. An analysis of the welfare implications of M&A will help in having a deeper understanding of the effectiveness of these policy changes, and thereby in designing appropriate policies in the interest of the consumers. The rest of the paper is divided into four sections. Section II gives an overview of the trends and patterns of M&A, and the state of consumers’ welfare. The econometric model estimated to examine the impact of M&A on consumers’ welfare, methodologies applied and the sources of data are presented in Section III. Section IV discusses the regression results and their implications. Finally, Section IV concludes the paper with policy implications.

Majority of the M&A in the post-liberalization were horizontal in nature [32], [46], [17], [4], [6], [34], [1], [37], and the share deals of vertical and conglomerate types were relatively less [1]. Further, a significant part of the participating firms in mergers belonged to the same business group [5], [4], and the proportion increased as one moves from the phase of stagnant merger activity to the third phase of high merger activity [1]. This was so because with increasing market competition, the firms used the route of M&A for consolidation/restructuring of business to correct inefficiencies caused by over-diversification during the regime of regulation and control [4]. Such efforts towards business consolidation were also motivated by the need for increasing controlling block to guard against a takeover or a dilution of control [4].

As the global business environment emerging from the new policy regime facilitates cross-border mergers [8], a large number of MNCs that used the route of M&A to enter into Indian market and strengthen their presence therein. As a result, around 40 percent of the foreign direct investment (FDI) during this period came into the country through cross-border M&As [34], [47]. Dominance M&A in FDI inflows continued in the recent past also with a significant portion of total FDI equity inflows taking the route of M&A, and the share showing an increasing trend over the years. However, the MNC related deals were concentrated mainly in consumer goods industries such as foods, beverages, household appliances, pharmaceuticals, personal care products, automobiles, etc. primarily to explore countrywide established marketing, distribution and service network of these industries.
and [6]. On the other hand, the number of foreign acquisition by Indian firms also increased significantly in recent years, particularly in the sectors like pharmaceuticals, information technology and telecommunications [37], [26], [41] indicating enhanced competitive strength of the domestic firms in the global market.

### Table II

**Distribution of Mergers and Acquisitions by Major Industries, 1992-2009**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Mergers</th>
<th>Acquisitions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Products</td>
<td>11.8</td>
<td>8.7</td>
<td>9.6</td>
</tr>
<tr>
<td>Beverages &amp; tobacco</td>
<td>4.7</td>
<td>2.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Textiles</td>
<td>10.6</td>
<td>8.8</td>
<td>9.4</td>
</tr>
<tr>
<td>Drugs &amp; pharmaceuticals</td>
<td>8.5</td>
<td>9.1</td>
<td>8.9</td>
</tr>
<tr>
<td>Chemicals</td>
<td>21.4</td>
<td>18.8</td>
<td>19.6</td>
</tr>
<tr>
<td>Plastic products</td>
<td>3.2</td>
<td>3.8</td>
<td>3.6</td>
</tr>
<tr>
<td>Petroleum and Poly</td>
<td>2.9</td>
<td>3.2</td>
<td>3.1</td>
</tr>
<tr>
<td>Rubber &amp; Tyre</td>
<td>1.2</td>
<td>1.7</td>
<td>1.5</td>
</tr>
<tr>
<td>Non-metallic mineral products</td>
<td>4.7</td>
<td>6.9</td>
<td>6.2</td>
</tr>
<tr>
<td>Metals</td>
<td>10.1</td>
<td>9.1</td>
<td>9.4</td>
</tr>
<tr>
<td>Machinery</td>
<td>11.5</td>
<td>12.0</td>
<td>11.8</td>
</tr>
<tr>
<td>Electronics</td>
<td>5.3</td>
<td>6.5</td>
<td>6.1</td>
</tr>
<tr>
<td>Automobile</td>
<td>0.9</td>
<td>2.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Automobile ancillaries</td>
<td>3.6</td>
<td>5.3</td>
<td>4.8</td>
</tr>
<tr>
<td>Miscellaneous manufacturing</td>
<td>4.8</td>
<td>7.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Diversified</td>
<td>3.1</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: PROWESS (CMIE)

However, though a large part of the deals were concentrated in the private manufacturing sector\(^\text{10}\), the number of M&A varied significantly across different industry groups depending on the nature and scope for M&A therein and the distribution is highly skewed towards a few industry groups [4], [17], [1], [18], [37]. As it is shown in Table II, majority of deals were concentrated in the industries like food products, textiles, chemicals (especially, in drugs and pharmaceuticals), metals, and machinery. In addition, non-metallic minerals and electronics also had reasonable share in the game of M&A. On other hand, the industries like beverages and tobacco, automobiles, petroleum and rubber had negligible share in the total number of deals of M&A.

### Consumers’ Welfare:

The potential welfare implications of M&A can be examined in terms of loss in consumers’ surplus following the deals. There exists a wide body of literature [29], [14] and [15], [20], [22], [23], [54] that theoretically derive alternative measures of potential losses of consumers’ welfare following increase in monopoly power and inefficiency. In the present paper, we measure loss of consumers’ welfare following [19]. The measure is based on [29] triangle\(^\text{11}\) and Lerner Index is used as a proxy of welfare loss. The Lerner Index measures relative margin, i.e., the disparity between price and marginal cost as a percent of price, and is used extensively in empirical research. If we assume a linear demand function and constant returns to scale so that average costs are constant and are equal to marginal costs, \(\Delta ABC\) (the Harberger triangle) in Figure 1 stands for welfare loss due to inefficiency associated with imperfect competition and \(\Delta ACPc\), i.e., \(2\Delta ABC\) refer to welfare loss as a result of market power. Although there are several criticisms of this measure including the use of the profit data, the assumption of linear demand and unitary elasticity of demand for all industries, etc., we use it as it is simple for computation and interpretation.

Now, \(\Delta ABC = \frac{1}{2} (P_m - P_c) Q_m\) \(\text{(1)}\)

Or, \(\Delta ABC = \frac{1}{2} \left(\frac{P_m - MC}{P_m}\right) R_m\) \(\text{(2)}\)

This follows from the first-order condition of profit maximization under perfect competition, i.e., \(P_c = MC\). Since \(MC = AC\) under assumption of constant returns to scale, we can therefore write,

\[
\frac{\Delta ABC}{R_m} = \frac{1}{2} \left(\frac{P_m - AC}{P_m}\right) \text{ (3)}
\]

Since, \(\left[\frac{P_m - AC}{P_m}\right]\) stands for the Lerner Index (LI) of market power (under constant returns to scale), we may write

\[
\frac{\Delta ABC}{R_m} = \frac{1}{2} LI \text{ (4)}
\]

The above expression represents social inefficiency caused by imperfect competition per unit of sales. Similarly, loss of consumer surplus per unit of sales due to market power can be measured as

\[
\frac{2\Delta ABC}{R_m} = \left[\frac{P_m - AC}{P_m}\right] = LI \text{ (5)}
\]

Therefore, total loss of welfare \((WL)\) associated with imperfect competition relative to firms’ revenue \((R_m)\) can be measured as,

\[
\frac{WL}{R_m} = \frac{\Delta ABC + 2\Delta ABC}{R_m} = \frac{3\Delta ABC}{R_m} \text{ (6)}
\]

\[
\frac{WL}{R_m} = \frac{3}{2} \left[\frac{P_m - AC}{P_m}\right] = \frac{3}{2} LI \text{ (7)}
\]

\(^\text{10}\)While three-fourth of these activities were concentrated in the manufacturing sector, the remaining one-fourth were in services and other related areas [4], [17].

\(^\text{11}\)[29] Estimate the deadweight loss arising out of market power for 73 United States manufacturing industries under the assumption of unitary price elasticity of demand.
In the present paper, we have used price-cost margin (PCM) as a proxy for Lerner Index of market power. The PCM in industry \( j \) in year \( t \) is measured as

\[
PCM_{jt} = \frac{VA_{jt} - WS_{jt}}{VO_{jt}}
\]

(8)

Here, \( PCM \) = price-cost margin, \( VA \) = value added, \( WS \) = wages and salaries, and \( VO \) = value of output. Hence, loss of consumers’ welfare per unit of sales in industry \( j \) in year \( t \),

\[
\left[ \frac{LW}{Rm} \right]_{jt} = \frac{3}{2} PCM_{jt} = \frac{3}{2} \left[ \frac{VA_{jt} - WS_{jt}}{VO_{jt}} \right]
\]

(9)

We compute the extent of welfare loss in major industries by using the above formula and compare the same across the industries by using relative measure. In order to compare the loss of welfare across industries, we calculate the average of PCM for each of the 34 major industry groups in two sub-periods, viz., 1996-97 to 2000-01 and 2001-02 to 2008-09. These averages are standardized by changing their origin with respect to the mean (\( \mu \)) and their scale with respect to the standard deviation (\( \sigma \)). The extent of welfare loss in an industry is considered as relatively high if the standardized value is greater than unity, i.e., \( Z_i = \frac{X_i - \mu}{\sigma} > 1 \) and as relatively low if it is less than minus one, i.e., \( Z_i = \frac{X_i - \mu}{\sigma} < -1 \).

### Table III

<table>
<thead>
<tr>
<th>Year</th>
<th>Extent of Welfare Loss</th>
<th>Number of Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996-2001</td>
<td>High 5(14.7)</td>
<td>Beverages &amp; tobacco, Cosmetics &amp; toiletries, Petroleum products, Mining, Electricity</td>
</tr>
<tr>
<td></td>
<td>Moderate 27(79.41)</td>
<td>Food Products, Synthetic textiles, Readymade garments, Other Textiles, Inorganic chemicals, Alkalis, Fertilizers, Pesticides, Paints &amp; varnishes, Dyes &amp; pigments, Drugs &amp; pharmaceuticals, Organic chemicals, Other chemicals, Polymers, Plastic products, Tyres &amp; tubes, Rubber &amp; rubber products, Non-metallic mineral products, Ferrous metals, Non-ferrous metals, Non-electrical machinery, Electrical machinery, Electronics, Automobile, Automobile ancillaries, Misc. Manufacturing, Diversified</td>
</tr>
<tr>
<td></td>
<td>Low 2(5.88)</td>
<td>Cotton Textiles, Textile processing</td>
</tr>
<tr>
<td>Total</td>
<td>34 (100.0)</td>
<td></td>
</tr>
<tr>
<td>2001-2009</td>
<td>High 5(14.7)</td>
<td>Beverages &amp; tobacco, Cosmetics &amp; toiletries, Drugs &amp; pharmaceuticals, Mining, Electricity</td>
</tr>
<tr>
<td></td>
<td>Moderate 24(70.58)</td>
<td>Food Products, Readymade garments, Other Textiles, Inorganic chemicals, Alkalis, Pesticides, Paints &amp; varnishes, Dyes &amp; pigments, Organic chemicals, Other chemicals, Polymers, Plastic products, Tyres &amp; tubes, Rubber &amp; rubber products, Non-metallic mineral products, Ferrous metals, Non-ferrous metals, Non-electrical machinery, Electrical machinery, Electronics, Automobile, Automobile ancillaries, Misc. Manufacturing, Diversified</td>
</tr>
<tr>
<td></td>
<td>Low 5(14.7)</td>
<td>Cotton Textiles, Synthetic textiles, Textile processing, Fertilizers, Petroleum products</td>
</tr>
<tr>
<td>Total</td>
<td>34 (100.0)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in parentheses indicate percentage share to total number of industries.
Source: Prowess, CMIE

It is observed that the extent of welfare loss is neither very high nor very low for most of the industries (Table III). The industries that recorded relatively high welfare loss over the years include beverages & tobacco, cosmetics & toiletries, mining, and electricity. Interestingly, although the market of Indian pharmaceutical industry is considered to be competitive, the extent of welfare loss was relatively high during 2001-2009. On the other hand, the loss of welfare is relatively low in the industries like cotton textiles and textiles processing. However, the number of industries experiencing low extent of welfare loss has increased during 2001-02 to 2008-09 as compared to that during 1996-97 to 2000-01, though that with high loss of welfare remained the same.
Table IV shows the correlation coefficient between the average number of M&A and the average level of welfare loss per year for two sub-periods, viz., 1996-97 to 2000-01 and 2001-02 to 2008-09. We find that the correlation coefficient is negative for both the sub-periods indicating an inverse relationship between the two. We assume that the extent of loss of consumers’ welfare depends on a set of variables relating to structure of the market (MS), conduct of the firms (FC), their performance (FP) and policies of the government (GP), i.e.,

\[ WL = f(MS, FC, FP, GP) \] (10)

If we include the degree of sellers’ concentration (CN) and growth of industry sales (GRS) to control structural aspects of the market, mergers and acquisitions (M&A), efforts towards product differentiation and image advantage through advertising (ADVT), technology strategies (TECH), exports intensity (EXP) and imports intensity (IMP) for behaviour of the firms, and profitability (PROF) for their performance, the above functional relationship can be rewritten as,

\[ WL = f(CN, GRS, M & A, ADVT, TECH, EXP, IMP, PROF) \] (11)

Here, in addition to firms’ conduct, EXP, IMP and TECH also capture policies of the government. While TECH can capture policies relating to technology, EXP and IMP can account for policies relating to international trade.

Possible Impact of the Independent Variables

Mergers and Acquisitions (M&A): M&A can affect consumers’ welfare in three possible ways. First, M&A may result in greater monopoly power and hence higher prices and lower output compared to what might have occurred in a competitive market without M&A. Second, the decline in market competition following M&A may result in X-inefficiency as, in the absence of competition, firms may become complacent about cost management and the cost may rise as well above the minimum possible level. However, there are potential offsets to these possible sources of loss. In many cases, M&A can help the firms to reap the benefits of large-scale production and hence to lower costs and prices of the products. Increase in monopoly power may also result in greater technological progress and innovation yielding new and better products as well as lowering costs and prices. The exact impact of M&A on consumers’ welfare is, therefore, an empirical issue.

Market Concentration (CN): In a concentrated market, the firms are expected to exercise their monopoly power. This in turn results in higher prices and loss of consumers’ welfare. In other words, the industries with high market concentration are likely to suffer from greater loss in consumers’ welfare. However, when greater market concentration enhances efficiency and competitiveness, the consumers may be bettered in the form of lower prices and better quality of the products.

Growth of Industry Sales (GRS): In the present paper, GRS is used as a proxy for growth of market demand. It is expected to influence consumers’ welfare in three possible ways. First, high GRS is likely to create opportunities for the existing firms to expand their business and thereby, to achieve greater efficiency through economies of large-scale operations. Secondly, high GRS induces new players to enter into the industry. This reduces the level of concentration and PCM. Finally, high GRS may raise input and hence output prices. The ultimate impact of GRS on consumers’ welfare, therefore, depends on the relative strengths of these diverse forces.

Advertising Intensity (ADVT): Advertising intensity captures firms’ efforts towards product differentiation and building up image advantage. Image related entry barriers and product differentiation through advertising help the incumbents to exercise their monopoly power. Therefore, the consumers in industries with greater advertising efforts by the firms are expected to suffer from higher loss in welfare.

Technology Intensity (TECH): The variable technology intensity is used to control for the impact of in-house R&D efforts as well as the firms’ efforts towards acquiring foreign technology on consumers’ welfare. It is expected that greater efforts towards technology helps the firms in introducing new products and new processes. While new products give the consumers a wider range of choices, new processes reduce the cost of production. In either way, the consumers are likely to

\[ \text{Note: Figure in parentheses indicate the level of significant} \]

Source: Prowess, CMIE

<table>
<thead>
<tr>
<th>Year</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996-97 to 2000-01</td>
<td>-0.1129 (0.465)</td>
</tr>
<tr>
<td>2001-02 to 2008-09</td>
<td>-0.369 (0.014)</td>
</tr>
</tbody>
</table>

\[ \text{In addition, there are also social costs associated with defending and maintaining monopoly power arising out of M&A.} \]

\[ \text{Such new products of better quality serve a useful social purpose by giving consumers a variety of choices, particularly, when the information on product quality and reliability is not free.} \]
be benefitted. However, greater technology efforts may also act as entry barrier restricting market competition, and this may go against the interests of the consumers in the long run.

Exports Intensity (EXP): Export markets provide the domestic firms opportunities to move towards the optimum scale of operation particularly when the demand in the domestic market is limited. This helps the firms to reduce their costs of operations and the consumers are benefitted if this decline in costs results in lower prices. However, if the exporting firms exercise international price discrimination due to tariff protections, higher exports intensity may result in greater loss in consumers’ welfare in the domestic market.

Imports Intensity (IMP): In industries with greater import intensity, it is perceived that the consumers have access to products of better quality. On the other hand, greater import intensity of a firm may strengthen its position in the market vis-à-vis the rivals. It may also restrict entry of new firms into the market. Hence, the nature of impact of import intensity on consumers’ welfare depends on which of the diverse forces outweighs the others.

Profitability (PROF): It is commonly perceived that higher profitability of the existing firms in an industry comes from their greater market power and the consumers in such industries are expected to suffer from loss in welfare. It is also possible that greater profitability encourages new firms into enter into the industry and thereby increases competition and benefits the consumers in the long run. The nature of impact of profitability on consumers’ welfare, therefore, depends on relative strength of these diverse forces.

IV. METHODOLOGY AND DATA

The above function is estimated by applying panel data estimation techniques for a set of 34 broad industry groups in Indian manufacturing sector over the period from 2001-02 to 2008-09. Use of panel data not only helps in raising the sample size and thereby enhancing the degrees of freedom and efficiency of the estimates considerably, it also incorporates the changing dynamics in different industries over the period of time. This is very important in having a better understanding of a complicated issue like welfare implications of M&A.

We estimate the pooled regression model, the fixed effects model (FEM), and the random effects model (REM). The pooled regression model assumes that the intercept as well as the slope coefficients are the same for all the 34 industries. On the other hand, in the FEM the intercept is allowed to vary across the industries to incorporate special characteristics of the cross-sectional units. In the REM, it is assumed that the intercept of a particular industry is a random drawing from a large population with a constant mean value. In other words, the REM is very important as it largely influences conclusions on the individual coefficients.

We carry out the restricted F-test to make a choice between the pooled regression model and the FEM. The restricted F-Test validates the FEM over the pooled regression model on the basis of the null hypothesis that there is a common intercept for all the industries. If the computed F-value is greater than the critical F-value, choice of the FEM is made over the pooled regression model. We also apply Breusch and Pagan [10] Lagrange Multiplier test to make a choice between the pooled regression model and the REM. The test is based on the null hypothesis of no random effect and uses a test statistic that follows the \(\chi^2\) distribution. Rejection of the null hypothesis suggests that there are random effects in the relationships, and therefore the REM is better suited as compared to the pooled regression model. Finally, in the event the FEM and the REM are selected over the pooled regression model following the restricted F test and the Breusch and Pagan [10] Lagrange Multiplier test respectively, we apply the Hausman [30] test to select between the FEM and the REM. The test is based on the null hypothesis that the estimators of the FEM and the REM do not differ significantly and uses a test statistic that has an asymptotic \(\chi^2\) distribution. If the null hypothesis is rejected, the FEM is better suited than the REM.

The present paper uses secondary data collected from the Centre for Monitoring Indian Economy (CMIE), Mumbai, India. While the information on M&A is compiled from the Business-Beacon database of CMIE, the data on rest of the variables are sourced from the Prowess database. Appendix A gives the measure of each of these variables.

V. RESULTS AND DISCUSSIONS

The summary statistics of the variables used in regression analysis are presented in Table V, whereas, Table VI gives the regression results for the pooled regression model, the FEM and the REM. It is observed that the F-statistic of the pooled regression model and the FEM, and the Wald-\(\chi^2\) of the REM are statistically significant. This means all the estimated models are statistically significant. On the other hand, while the explanatory power of the OLS model is reasonably high, that of the REM is low and it is very low for the FEM. However, this does not necessarily indicate that the estimated models are not acceptable [4]. According to Goldberger [25], \(R^2\) has a very modest role in regression analysis. Nothing in

\[ R^2 = \frac{\text{SST}-\text{SSE}}{\text{SST}} = 1 - \frac{\text{SSE}}{\text{SST}} \]

This is so because when the number of cross-sectional units is large and the number of time-series units is small, as it is in the present case, the estimates obtained by the FEM and REM can differ significantly [27].

\[ F = \frac{R^2_{UR} - R^2_{FEM}}{d - 1} - F_{(d - 1), (n - d - k)} \]

The test uses the following test-statistic:

\[ F = \frac{R^2_{UR} - R^2_{REM}}{n - (d + k)} \]

Here, \(R^2_{UR}\) stands for goodness-of-fit of the unrestricted model (the FEM), \(R^2_{REM}\) for goodness-of-fit of the restricted model (the pooled regression model), \(d\) for the number of groups, \(n\) for the total number of observations, and \(k\) for the number of explanatory variables.

\[ R^2 = \frac{\text{SST}-\text{SSE}}{\text{SST}} = 1 - \frac{\text{SSE}}{\text{SST}} \]

\[ F = \frac{R^2_{UR} - R^2_{FEM}}{d - 1} - F_{(d - 1), (n - d - k)} \]

\[ F = \frac{R^2_{UR} - R^2_{REM}}{n - (d + k)} \]

15This is so because when the number of cross-sectional units is large and the number of time-series units is small, as it is in the present case, the estimates obtained by the FEM and REM can differ significantly [27].

16The test uses the following test-statistic:
classical linear regression model (CLRM) requires that the value of \(R^2\) should be high. Neither is a high value of \(R^2\) evidence in favour of a model nor is a low value of \(R^2\) evidence against it.

We apply the Lagrange multiplier test as suggested by Breusch and Pagan [10]. We find that the test statistic (\(\chi^2\)) is not significant. This means that there is no systematic difference in the coefficients and the REM is a better fit than the FEM. As such, we consider the regression results of the random effects model to explain the implications of the individual coefficients.

We find that in the REM the z-statistic of EXP, IMP, ADVT, TECH and PROF are statistically significant (Table VI). This means that inter-industry variations in loss of consumers’ welfare are caused by variations in exports intensity, competition from imports, efforts towards advertising, technology strategies and financial performance of the firms. Further, while the coefficient of IMP, ADVT and PBIT are positive, that of EXP and TECH is negative. In other words, the consumers in the industries with greater import competition, advertising intensity and better financial performance suffer more from loss of welfare. On the other hand, loss of consumers’ welfare is less in the industries with greater penetration in the exports market and high technology strategies.

This implies that mergers and acquisitions, degree of sellers’ concentration and expansion of the market do not have any statistically significant impact on loss of consumers’ welfare.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Stat</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.43469</td>
<td>22.16*</td>
<td></td>
</tr>
<tr>
<td>CN</td>
<td>0.43590</td>
<td>2.63**</td>
<td>1.84</td>
</tr>
<tr>
<td>GRS</td>
<td>0.00365</td>
<td>0.90</td>
<td>1.60</td>
</tr>
<tr>
<td>MA</td>
<td>0.00043</td>
<td>3.17**</td>
<td>1.93</td>
</tr>
<tr>
<td>IMP</td>
<td>2.09043</td>
<td>5.26**</td>
<td>1.48</td>
</tr>
<tr>
<td>EXP</td>
<td>-0.11446</td>
<td>-1.66**</td>
<td>1.10</td>
</tr>
<tr>
<td>ADVT</td>
<td>3.74096</td>
<td>5.24**</td>
<td>1.35</td>
</tr>
<tr>
<td>TECH</td>
<td>-2.24381</td>
<td>-4.08*</td>
<td>1.25</td>
</tr>
<tr>
<td>PROF</td>
<td>1.72645</td>
<td>5.59*</td>
<td>1.72</td>
</tr>
</tbody>
</table>

We compute variance inflation factors (VIF) for each of the explanatory variables to examine the severity of multicollinearity problem. It is found that the VIF of all the explanatory variables is less than 2. This means that the estimated models do not suffer from severe multicollinearity problem. Further, the t-statistics and z-statistics for the individual coefficients are computed by using White’s [53] robust standard errors to control for the problem of heteroscedasticity and autocorrelation.

For analysis of the individual coefficients, first we make a choice between the pooled regression model and the FEM by using restricted F test. As it is shown it Table VII, the F-statistic is significant. This means that the REM is a better choice vis-à-vis the pooled regression model. Similarly, in order to choose between the pooled regression model and the REM we apply the Lagrange multiplier test as suggested by Breusch and Pagan [10]. We find that the test statistic (\(\chi^2\)) is significant implying that the REM is a better fit as compared to the pooled regression model. Finally, we make a choice between the FEM and the REM by applying the Hausman test. However, the Hausman test statistic (\(\chi^2\)) is not significant. This means that there is no systematic difference in the coefficients and the REM is a better fit than the FEM. As such, we consider the regression results of the random effects model to explain the implications of the individual coefficients.

We find that in the REM the z-statistic of EXP, IMP, ADVT, TECH and PROF are statistically significant (Table VI). This means that inter-industry variations in loss of consumers’ welfare are caused by variations in exports intensity, competition from imports, efforts towards advertising, technology strategies and financial performance of the firms. Further, while the coefficient of IMP, ADVT and PBIT are positive, that of EXP and TECH is negative. In other words, the consumers in the industries with greater import competition, advertising intensity and better financial performance suffer more from loss of welfare. On the other hand, loss of consumers’ welfare is less in the industries with greater penetration in the exports market and high technology intensity. However, the z-statistic of CN, GRS and M&A are not statistically significant.
The findings discussed above have three important implications. First, a concentrated market does not necessarily result in greater loss of consumers’ welfare. In other words, there is no significant difference in loss of consumers’ welfare between a concentrated market and a relatively competitive market in Indian manufacturing sector. This may be so as in a concentrated market, the firms can reap the benefits of scale economies and hence sell the product at a lower price in the market and this may outweigh the adverse effect of greater market power of the firms. Besides, in a welfare state like India, the government regulates the price in a concentrated market by setting the ceiling for the interest of the consumers. This undermines the possible loss of consumers’ welfare due to higher in market concentration.

Second, mergers and acquisitions do not necessarily result in any significant change in loss of consumers’ welfare possibly due to weak association between mergers and acquisitions and market concentration. In fact, the wave of M&A in the 1990s did not have any significant impact on market concentration in Indian manufacturing sector [37]. This is so because impact of M&A on market concentration depends on a variety of other factors like the initial level of market concentration, extent of entry, expansion of the market and growth of import competition, etc. [37]. Besides, a merger or an acquisition may not necessarily aim at gaining greater market power and, therefore, may not be detrimental to consumers’ interests. Using a set of 97 mergers and 79 acquisitions that took place during 1992-98, [37] finds that the mergers were directed mainly by the need of business restructuring and to some extent to rehabilitate the sick business units, whereas the basic objective of acquisitions, particularly those by the foreign firms, was market entry and strengthening presence in the marketplace [37]. A considerable portion of the deals was also for expansion of business or strengthening research and development (R&D) base [38]. On the other hand, consolidation of business and strengthening market presence by the domestic firms through M&As can restrict emergence of monopoly power of the MNCs and hence loss of consumers’ welfare. Similarly, expansion of R&D base through M&A can reduce cost of production and provide and wider range of choices to the consumers. However, any specific conclusion in this regard requires further investigation [39].

Third, under policy induced market competition, other business strategies like exports, imports, advertising and technology are more important in respect of consumers’ welfare. While greater imports strengthens the market presence of a firm vis-à-vis the rivals, advertising restricts market competition through product differentiation and image advantage. In either case, the consumers suffer. On the other hand, higher exports and better technology benefits the consumers in the form of greater efficiency and competitiveness of the firms, and lower prices and more varieties of the products. However, since these strategies are policy driven, trade, technology and competition (in respect of restricted business practices) related policies have very significant role to protect the consumers’ interest in the emerging markets.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

Thus, despite the wave of M&A, Indian manufacturing sector has witnessed a decline in the extent of loss of consumers’ welfare in majority of the industries in the post liberalization era. There are a variety of factors like export intensity, import intensity, efforts towards advertising and technology by the firms and their financial performance that significantly affect the extent of loss of consumers’ welfare in an industry. While loss of consumers’ welfare is more in industries with higher import intensity, greater efforts towards advertising and better financial performance raises, it is less in industries with larger penetration in the export market and greater technology efforts by the firms. On the other hand, mergers and acquisitions and the structural aspects like the degree of sellers’ concentration and expansion of the market do not have any significant impact on loss of consumers’ welfare.

The findings of the present paper have three important policy implications. First, as higher market concentration does raise welfare loss, rather reduces the same, though not significantly, the degree of sellers’ concentration should not be a matter of serious concern while designing the competition policies. Rather, a market concentrated up to a certain degree may even benefit the consumers by reaping the scale economies and encouraging the firms towards innovation. Therefore, there should be policy induced flexibility towards growth in a particular line of business. This can reduce the possibility of over diversification and hence inefficiencies. Further, the restrictive business practices like advertising should be effectively regulated to restrict loss of consumers’ welfare.

Second, considering that large number of M&A does not necessarily raise the extent of loss of consumers’ welfare in an industry, a merger or an acquisition should not be controlled solely on the basis of its size as it is mentioned in the Competition Act 2002. There should be adequate space in the competition policy framework for evaluating the role of a merger publicly made statements. The actual objectives may be quite different from the revealed ones.
or an acquisition in respect of competitiveness as well. Further, policy measures should also provide the firms proper guidance for correcting their inefficiencies and/or enhancing efficiency to improve their competitiveness through such integration. In other words, competition policy should encourage the M&A that are aimed not at gaining market power but achieving competitiveness through business restructuring.

Third, given that other business strategies have significant influence on consumers’ welfare and these strategies are policy induced, the policies relating to technology, trade and competition require serious scrutiny. As greater export intensity reduces loss of consumers’ welfare and these strategies are policy induced, therefore, appropriate incentive structure may be combined with necessary subsidies to promote exports and encourage the firms towards technology purchase. The technology purchase should have enough scope in this regard.

In the present paper, three-year average values of the independent variable, although three-year averages are used. The extent of Mergers and Acquisitions (M&A) in an industry in a particular year is measured as the total number of M&A:

\[
M_{jt} = \sum_{i=1}^{n} M_{i,j} + \sum_{i=1}^{n} M_{i,j-2} + \sum_{i=1}^{n} M_{i,j-3}
\]  

Here, M&A is number of deals by firm i in the industry. Such a lag structure allows adequate gestation period to capture the process of adjustment following M&A.

**CON**: The Herfindahl-Hirschman Index (HHI) is used as the measure of seller’s or market concentration. This index satisfies all the desirable properties of a concentration measure as it combines both the number and size distribution of firms in the industry. It also measures the potential impact of corporate restructuring activity on industry concentration.

\[
CON_{jt} = \frac{\sum_{i=1}^{n} s_{i,j-1}^2 + \sum_{i=1}^{n} s_{i,j-2}^2 + \sum_{i=1}^{n} s_{i,j-3}^2}{3}
\]  

Here, CON is the degree of sellers’ concentration in industry j in year t and si stands for market share of the ith firm in the industry. The market share of a firm (si) is defined as the ratio of the firm’s sales (Si) to total industry sales (S).

**ADVT**: The present paper measures ADVT as the ratio of advertising expenditure (A) to sales (S), i.e.,

\[
ADVT_{jt} = \frac{\sum_{i=1}^{n} A_{i,j} + \sum_{i=1}^{n} A_{i,j-2} + \sum_{i=1}^{n} A_{i,j-3}}{3}
\]

Here, SELLjt stands for the selling intensity in industry j in year t.

**TECH**: The ratio of total expenditure on technology (including expenditure on in-house R&D and technology purchase) (TE) to sales (S) is used as a measure of technology intensity.

\[
TECH_{jt} = \frac{\sum_{i=1}^{n} TE_{i,j} + \sum_{i=1}^{n} TE_{i,j-2} + \sum_{i=1}^{n} TE_{i,j-3}}{3}
\]

**PROF**: In the present paper, we measure PROF as the ratio of profit before interest and tax (PBIT) to sales (S), i.e.,

\[
PROF_{jt} = \frac{\sum_{i=1}^{n} PBIT_{i,j} + \sum_{i=1}^{n} PBIT_{i,j-2} + \sum_{i=1}^{n} PBIT_{i,j-3}}{3}
\]

**EXP**: The variable EXP is defined as the ratio of exports (EX) to sales (S), i.e.,

\[
EXP_{jt} = \frac{\sum_{i=1}^{n} EX_{i,j} + \sum_{i=1}^{n} EX_{i,j-2} + \sum_{i=1}^{n} EX_{i,j-3}}{3}
\]

**IMP**: The variable IMP is defined as the ratio of imports (IM) to sales (S), i.e.,

When precise data on the market shares of very small firms are unavailable, the resulting errors are not large.

---

20 Another advantage of using HHI is that by squaring market shares the HHI weights more heavily the values for large firms than for small ones. Therefore, when precise data on the market shares of very small firms are unavailable, the resulting errors are not large.
$IMP_t = \left( \frac{\sum_{j=1}^{n} IM_{t-j-1} + \sum_{j=1}^{n} IM_{t-j-2} + \sum_{j=1}^{n} IM_{t-j-3}}{3} \right)$

REFERENCES


