The Impact of Competition Policy on Production and Export Competitiveness: A Perspective from Agri-food Processing

Md. Ashfaqul I. Babool[1]
Michael Reed[2]
Mia Mikic[3]
Sayed Saghaian[4]

Abstract

This study tests the hypothesis that competition policy positively impacts a country's production and export competitiveness. The results show that competition policy has a significantly positive impact on manufacturing production. The results also show that exports for both total manufacturing and food manufacturing are positively related to competition policy.

Keywords: Competition policy, production, export competitiveness

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[1] Ph.D. Candidate, Department of Agricultural Economics, University of Kentucky
[2] Professor, Department of Agricultural Economics, University of Kentucky
[3] Economic Affairs Officer, Trade and Investment Division, UNESCAP, Bangkok, Thailand
[4] Assistant Professor, Department of Agricultural Economics, University of Kentucky

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Introduction:

Over the last 10 years or so, competition policy has emerged as a major issue for the international trade system. Competition policy, simply called competition law, is a set of rules and regulations a country's government pursues to enhance market contestability (Hoekman and Mavriodis). It ensures market competition, protects against monopolies, and maintains sound economic development for the country. When a market exhibits some form of imperfection or monopolistic competition, governments establish competition laws to regulate economic activities in order to ensure that markets operate within the public interest (Kahyarara). According to the official OECD webpage, "Well-designed competition law, effective law enforcement and competition-based economic reform promote increased efficiency, economic growth and employment for the benefit of all."[5]

While competition policy, in economic theory, acts as an efficiency-enhancing factor for economic development, the greater the intensity of competition policy the better the economic performance, many counties are still concerned about competition in product market despite the absence of a formal competition policy. Especially in most developing countries, there is no competition policy. Instead governments in developing countries intervene from time to time if any anti-competitive behavior arises (Singh). Since the governments have control over market behavior and can fix prices, they have a tendency to avoid formal competition policy. However, most economists suggest that competition policy is essential for developing economies because they are increasingly subject to international competition due to trade liberalization and huge foreign merger movements in recent years

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[5] Source: http://www.oecd.org/topic/0,2686,en_2649_37463_1_1_1_1_37463,00.html

(Singh). In developed countries, competition policy, though it has a wide range of variation from country to country, is an effective tool enhancing economic development. In some instances, it is forty per cent more effective than in developing countries (World Bank; cited in Singh). However, due to a lack of strong evidence, there is still considerable disagreement on the nature of competition in emerging markets, and on how intensively competition policy influences economic performance of the country.

A number of empirical studies investigate the impacts of competition policy. Ahn reported that product market competition encourages productivity growth. Kee and Hoekman examined the impact of competition policy on profit margins and concluded that government policies to facilitate entry and exit of firms can have important effects on industry markups. Zhang et al. found that both regulation and competition introduced before privatization positively impact electricity generation. Another useful piece of evidence comes from an interesting study by Kahyarara that examined the role of competition policy in influencing productivity, investment and exports of Tanzanian manufacturing industries. His results suggest that the existence of competition policy positively impacts firm productivity, but the competition, when it is ranked as a production problem, negatively impacts productivity. He also found that competition policy has a positive impact on investment and export flows in the manufacturing enterprise.

Although competition concerns have been around for many years, the formal discussion in WTO was launched in 1997 by establishing a Working Group on competition. The linkage between competition policy and trade has been a growing concern in the last 10 years. There are a number of empirical works that establish the significance of within-firm impacts of competition policy but little attention has focused on the impact of competition

policy for food manufacturing. Competition issues arise in the farm input sector with respect to the market structure of the seed and agro-chemicals industries. Competition issues are also present in the processing sector, particularly for fish and livestock industries. There is a need to assess how global agricultural markets could be better regulated with respect to competition policy. This study examines how competition policy impacts productivity growth and international competitiveness in the manufacturing industry paying special attention to processed food industries. The work is important and helps decision makers to measure the policy impacts of competition regulations. The literature is largely silent regarding its impact on food and processed food products both at the domestic and international levels. This study offers a unique opportunity to contribute to the existing literature.

Research objectives:

This study aims at developing a better understanding of competition policy and its impact on a country's productivity growth and international trade flows: testing the hypothesis that competition policy positively impacts productivity growth as well as export competitiveness. The specific objectives of this study include:

a. To identify factors that influence productivity growth and trade competitiveness;

b. To develop a model to estimate the impact of competition policy on a country's productivity growth and export flows in particular on agri-food processing;

c. To compare the policy impacts within manufacturing sectors.

Literature Review:

Competition policy concerns in national and global discussions have been around for many years. A number of empirical studies now exist on within-firm impacts of competition

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policy in the literature. However, the literature is largely silent regarding the impact of competition policy in the agri-food manufacturing. The reason behind this insufficient empirical study on competition policy is a shortage of reliable and adequate data. The situation has improved in recent years: some investigators have undertaken surveys to investigate the extent and impact of competition and competition policy. We analyze empirical studies, most of which suggest that competition policy is positively related to domestic production and international competitiveness.

Kahyarara investigated the impact of competition and competition policy on firm performance indicators of productivity, investments, and exports. He surveys the existence of competition within the line of a firm's production in the Tanzanian manufacturing sectors, and investigates if competition is one of the biggest problems that affect firm performance. His empirical result suggests that the existence of competition positively impacts a firm's productivity, but competition, when ranked as major production problem, negatively influences productivity growth of the firm. He also found competition policy has a positive impact on investments and exports in Tanzanian manufacturing sectors.

Kee and Hoekman developed an empirical framework developed by Hall to estimate the impact of domestic and foreign competition on industry markups over time and across a large number of countries. They determined the relative impact of competition policy by using a dummy variable that equals 1 if the competition policy exists in a given year. For the empirical results, they did not find any significant impact of competition policy on industry markups. However, the results suggest that competition policy may impact the industry markups in the long run via its impact on domestic entry.

Zhang et al. investigated the impact of competition and policy reforms in electricity generation. In their empirical study they added a competition dummy that equals 1 if a wholesale market for electricity is introduced, 0 otherwise. In their empirical study, they found that both regulation and competition introduced before privatization increase electricity availability and generation.

Theoretical Model:

To explore the impact of competition and competition policy on productivity growth and international competitiveness, the study uses the Cobb-Douglas production function:

$$Q_{it} = A_{it} K_{it}^{\beta_1} L_{it}^{\beta_2} \tag{1}$$

Where it assumes a firm produces output (Q) with a technology that uses capital (K) and labor (L) inputs in year t. A is an index of total factor productivity or a coefficient that represents the level of technology, and it increases marginal product of all factors simultaneously. β_1 and β_2 are positive parameters satisfying $(\beta_1, \beta_2) > 0; \beta_1 + \beta_2 = 1$ that would imply constant return to scale.

A competition policy variable can be incorporated in the production equation (Kahyarara). The idea behind this incorporation is to ensure that competition enhances market contestability: it leads to improve efficiency, lower prices and higher product quality. Besides that, competition brings wider economic benefits: if firms are efficient, their international competitiveness will improve, which causes a country's exports to increase and imports to decline.

To test the hypothesis that competition policy positively impacts productivity growth and export competitiveness, we incorporate competition policy in the production equation. The competition policy is used as a dummy variable (C), which equals 1 if competition

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policy exists in a given year. Including competition policy variable, the production equation has the following form:

$$Q_{it} = A_{it} K_{it}^{\beta_1} L_{it}^{\beta_2} e^{\gamma C_{it}} \qquad (2)$$

Transforming the above equation (2) into logarithms allows linear estimation where the dependent variable is directly related to explanatory variables. Taking logs and appending an error term, we can write:

$$\ln Q_{it} = \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + \mu_{it} \qquad (3)$$

where, we assume that the error term (μ_{it}) satisfies all assumption of the classical regression model. Given the above equation, we can calculate an OLS estimate for the error term μ_{it}, provided the coefficients are consistently estimated. But the problem is that the estimation suffers from simultaneity problems, which means that the regressors and the errors are correlated, and thus, this problem makes OLS estimates biased. In fact, in addition to the exogenous variables used in equation (3) there exist other exogenous factors that affect production. If these factors cause the error terms in the equation (3) to be correlated across all periods for particular country or among countries for a given period, simple OLS estimates that ignore these correlation will be inefficient. Fortunately, panel regression can solve this problem by adequately capturing both cross-sectional and time variations in the data.

We can estimate panel regressions using two common techniques: Fixed effects model, and Random effects model. This classification depends upon alternative assumptions about error terms and about how the coefficients change over cross sections or time. In fixed effect models, differences over cross-sectional sectors are assumed to be reflected in the intercept term that accounts for time invariant attributes, while in random effects models, this attribute is divided into mean intercept and a group specific error and treated as a random

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variable in the model. These two models are again divided into two groups: (a) one way model that does not consider a time specific effect; and (b) two way model that includes the time specific effect. The assumptions underlying these estimates are somewhat restrictive.

Given equation (3), the alternative models are:

Fixed effects model:

(a) One way model:

$$\ln Q_{it} = \beta_{0i} + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + \mu_{it} \tag{4}$$

Where β_{0i} is an individual special attribute that is constant over time and μ_{it} is a classic error term with $E(\mu_{it}) = 0$ and $V(\mu_{it}) = \sigma^2$.

(b) Two way model:

$$\ln Q_{it} = \beta_0 + \beta_{0i} + v_t + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + \mu_{it} \tag{5}$$

Where β_{0i} is a group effect and v_t is a time effect for each period.

Random effect model:

(a) One way model:

$$\ln Q_{it} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + u_i + \mu_{it} \tag{6}$$

Where β_0 is a constant and u_i is an error characterizing the ith observation and constant over time, with $E(u_i) = 0$, and $V(u_i) = \sigma^2$, $E(u_i u_j) = 0$ for $i \neq j$, and $Cov(u_i, \mu_{it}) = 0$.

(b) Two way model:

$$\ln Q_{it} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + u_i + \mu_{it} + w_t \tag{7}$$

Where w_t is an error reflecting the time effect for each period.

Both the fixed and random effects models are recognized econometric techniques to solve simultaneity problems but each has its own caveats and can produce quite different results. The issue of preference of one over the other is highly arguable. In the fixed effects model, the unit-specific effect (β_{0i}) is correlated with the other regressors, whereas the random effects are uncorrelated with the explanatory variables. So the fixed effects model is substandard to the random effects model in terms of degrees of freedom. (Greene).

Empirical Model:

Given the framework discussed in the previous section (Equations (4), (5), (6) and (7)), the study explores the impact of competition policy on a country's manufacturing production and exports, including production and exports in the food and food product industries. The study develops the following regression equations:

$$MP_{it}^{S} = f\left(\overset{+/-}{E_{it}}, \overset{+}{C_{it}}\right) + \mu_{it} \qquad \text{(For manufacturing production)} \qquad (8)$$

$$MX_{it}^{S} = f\left(\overset{+/-}{E_{it}}, \overset{+}{C_{it}}\right) + \mu_{it} \qquad \text{(For manufacturing exports)} \qquad (9)$$

where, the *MP* represents gross output in the manufacturing industry of a country and *MX* is exports in manufacturing sectors of the country. The dependent variable of the above equations is determined by the explanatory variable *E* that includes gross fixed capital formation (*K*), labor force (*L*) and import penetration (*M*); *C* denotes competition policy used as a dummy variable, which equals 1 if competition policy exists in a given year; μ are error terms; *s* is the sector, either total manufacturing or manufacturing for food and food products; *i* represents country, and *t* is time (1980-2003). In these econometric equations, the signs above the explanatory variables are the expected direction of their impact on output production and export flows. It is expected that factor inputs (capital and labor) positively or

negatively impact both production and exports. According to Kee and Hoekman, the import penetration is negatively related to production and exports. This study adds this variable in both regression equations to see its relationship with production and export flows. The relationship between import penetration and production and exports is expected to be negative. The sign for competition policy indicates that there is a positive relationship between competition policy and a firm's production as well as exports. If a country introduces competition policy, it is expected that the competition policy enhances competitions among firms (both domestic and foreign), and thus increases production of the firm and exports.

In order to examine the relationship between competition policy and a country's manufacturing production and exports, we employ all the four panel models, fixed effects one way (*FIXONE*), fixed effects two way (*FIXTWO*), randon effect one way (*RANONE*), and random effects two way (*RANTWO*) models discussed in the previous section. The functional forms of the model for manufacturing production and exports are as follows:

For manufacturing production:

$$\textit{FIXONE: } \ln MP_{it}^{S} = \beta_{0i} + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 M_{it} + \gamma C_{it} + \mu_{it} \qquad (10)$$

$$\textit{FIXTWO: } \ln MP_{it}^{S} = \beta_0 + \beta_{0i} + \nu_t + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 M_{it} + \gamma C_{it} + \mu_{it} \quad (11)$$

$$\textit{RANONE: } \ln MP_{it}^{S} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + \beta_3 M_{it} + u_i + \mu_{it} \qquad (12)$$

$$\textit{RANTWO: } \ln MP_{it}^{S} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + \beta_3 M_{it} + u_i + \mu_{it} + w_t \quad (13)$$

For manufacturing exports:

$$\textit{FIXONE: } \ln MX_{it}^{S} = \beta_{0i} + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 M_{it} + \gamma C_{it} + \mu_{it} \qquad (14)$$

$FIXTWO:$ $\ln MX_{it}^{S} = \beta_0 + \beta_{0i} + v_t + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 M_{it} + \gamma C_{it} + \mu_{it}$ (15)

$RANONE:$ $\ln MX_{it}^{S} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + \beta_3 M_{it} + u_i + \mu_{it}$ (16)

$RANTWO:$ $\ln MX_{it}^{S} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \gamma C_{it} + \beta_3 M_{it} + u_i + \mu_{it} + w_t$ (17)

Data sources and description:

The country panel data utilized in this model are collected for twenty four years, 1980-2003, on OECD countries. Data for all variables come from World Development Indicators (WDI) and OECD STAN Database.

Total manufacturing is the production of total manufacturing industries in each country, and food manufacturing is the total production of food products, beverages and tobacco in each country. Annual data for total manufacturing for 20 countries (Australia, Austria, Canada, Denmark, Finland, Hungary, Ireland, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, United Kingdom and the United States), and the data for food manufacturing for 11 countries (Austria, Denmark, Finland, Hungary, Italy, Netherlands, Norway, Portugal, Spain, Sweden and the United States) are collected from OECD STAN Database for Industrial Analysis. Annual data for total export of goods in manufacturing industries, and data for exports of goods in food products, beverages and tobacco sectors are also collected from OECD STAN Database for Industrial Analysis.

The import penetration for total manufacturing and manufacturing exports are calculated as the values of imports as a percentage of total production. Import penetration for food products, beverages and tobacco are collected directly from the OECD STAN Database for Industrial Analysis. Capital is the gross capital formation (Constant 200 US$) for total

manufacturing and manufacturing exports, and labor is the total labor force for total

manufacturing and manufacturing exports; both of the data set were collected from World

Development Indicator (WDI). But the capital for food manufacturing and food

manufacturing exports is the gross capital formation collected from OECD STAN Database

for Industrial Analysis. The labor for food manufacturing and food manufacturing exports is

only skilled labor, which is calculated by the formula developed by Branson and Monoyios,

and collected from OECD STAN Database for Industrial Analysis. The competition policy

variable is used as a dummy variable in this study, which equals 1 if competition policy

exists in a given year. The data for the adoption year of competition policy for 20 countries

are collected from Kee and Hoekman.

Empirical results:

   The study hypothesizes that a country's production and export competitiveness are positively

related to competition policy. We used aggregate data for countries' total manufacturing sectors to

regress a competition policy variable with control variables such as capital stock, labor force and

import penetration on manufacturing production and exports. Since the impact of competition

regulation depends upon the particular circumstances of the industry to which the policy is applied,

we examine how competition policy impacts production and exports of a specific sector, in

particular the agri-food processing sector. We estimated equations with a panel regression model for

twenty four years for the period 1980 to 2003 with the full sample of 20 OECD countries for total

manufacturing industries and 11 OECD countries for food manufacturing.

   The estimation results using the fixed effects and the random effects model are

reported in four different tables (Table 1-4). The F values for all regression equations are

statistically significant at the 1% level. The R^2 values indicate that the overall goodness of fit

of the regressions is quite good. According to the test statistics, F values for all fixed effects models are significant at the 1% level. The F test compares the pooled OLS and fixed effects model. Hence, the F statistics rejects the null hypothesis that all dummy parameters (country and/ or year) except one are zero. We may conclude that the fixed effects model is better than the pooled OLS model (we present and discuss the preferred model).

To compare a fixed effects and a random effects model, Hausman specification (HS) test is the classical test. This test compares the fixed effects and random effects model under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model. If there is such correlation (the null hypothesis is rejected), the random effects model would be inconsistently estimated and the fixed effects model would be the model of choice. As shown in the results, the Hausman statistic is high enough to reject the null hypothesis so we adopt the estimates of the fixed effects model. In fact, there are no big differences between fixed effects and random effects models.

Table 1 displays the regression analyses for production of countries' total manufacturing, and the estimators of the fixed effect models (Equation 10 & 11) are presented in column 2 and 3. The results show that the policy variable has a significantly positive coefficient as expected in the regression model (Equation (10)): a competition policy leads to an increase in the manufacturing production by 35 percent. This result suggests that competition policy enhances competition by reducing entry barriers, and makes a favorable endowment shock that may cause firms to produce more output with lower prices. The coefficient value on the import penetration is negatively related to the countries' total manufacturing output, and the result implies that 0.38 per cent decrease in import penetration results in a one per cent increase in total output production in the total manufacturing sectors.

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That is, increased production of a good may satisfy the domestic demand of that good, and as a result, the import demand of that good may decline. The results also show that the coefficient for labor is positively related to manufacturing production, but the coefficient of capital is not statistically different from zero. The policy variable has a significantly positive coefficient for the two way model (Equation (11): competition policy leads to an increase in manufacturing production by 10 per cent as expected.

Table 1: Regression results of total manufacturing production in OECD countries, 1980-03

Variables	Fixed Effects Model		Random Effects Model	
	One Way	Two Way	One Way	Two Way
Intercept	-75.95 [a]	-32.74 [a]	-38.61 [a]	-16.64 [a]
	(3.79)	(4.90)	(3.03)	(3.11)
Import penetration	-0.38 [a]	-0.49 [a]	-0.42 [a]	-0.51 [a]
	(0.03)	(0.03)	(0.03)	(0.03)
Capital	-0.003	-0.22 [a]	0.05	-0.18 [a]
	(0.05)	(0.04)	(0.05)	(0.47)
Labor	4.92 [a]	2.98 [a]	3.18 [a]	-2.20 [a]
	(0.22)	(0.25)	(0.20)	(0.19)
Competition policy	0.35 [a]	0.10	0.47 [a]	0.17 [a]
	(0.07)	(0.07)	(0.09)	(0.08)
R2	0.93	0.96		
F	280.02 [a]	167.19 [a]		
HS			510.88 [a]	22.80 [a]

Notes: [a] and [b] indicate significant at 1% and 5% level, respectively. Standard errors are given in parenthesis. All the variables except competition policy are in logs.

Estimated results for Equation (14) and Equation (15), presented in Table 2, show that the existence of competition policy for the one way model has a significantly positive impact on manufacturing export: competition policy leads to an increase in manufacturing exports by 137 per cent. This result is consistent with the finding with Kahyarara. Both coefficients of capital and labor have positive signs, and are statistically significant at the 1%

level: a 1 per cent increase in capital and labor leads to an increase in total manufacturing exports by 1.1 and 2.8 per cent, respectively. The import penetration coefficient is statistically significant at 1% level, and negatively related to the manufacturing export. The relationship between competition policy and manufacturing exports is also significantly positive in the two way model presented in column 3.

Table 2: Regression results of total manufacturing exports in OECD countries for 1980-03

Variables	Fixed Effects Model		Random Effects Model	
	One Way	Two Way	One Way	Two Way
Intercept	-69.76 [a]	3.04	-31.08 [a]	-5.91 [b]
	(5.65)	(7.13)	(3.54)	(3.53)
Import penetration	-0.19 [a]	-0.37 [a]	-0.23 [a]	-0.34 [a]
	(0.04)	(0.04)	(0.05)	(0.04)
Capital	1.14 [a]	0.80 [a]	1.18 [a]	0.86 [a]
	(0.07)	(0.06)	(0.07)	(0.06)
Labor	2.75 [a]	-0.57	0.78 [a]	-0.25
	(0.32)	(0.36)	(0.24)	(0.21)
Competition policy	1.37 [a]	0.85 [a]	1.50 [a]	0.98 [a]
	(0.11)	(0.10)	(0.12)	(0.10)
R2	0.88	0.92		
F	141.32 [a]	91.16 [a]		
HS			82.94 [a]	52.46 [a]

Notes: [a] and [b] indicate significant at 1% and 5% level, respectively. Standard errors are given in parenthesis. All the variables except competition policy are in logs.

Table 3 displays the estimated results of food manufacturing production that is explained by competition policy with other variables used in the model (Equation 10-13). In column 2 and column 3, we interact countries food manufacturing production with competition dummies using one way and two way models. It is shown that the parameter estimates on the policy variable are positive and statistically significant at the 1% level for both the regressions. In the one way model, the results suggest that food manufacturing

production in the post-competition policy period is about 31 per cent higher than the export in the pre-competition period. This positive sign implies that the production for food manufacturing is higher when competition policy is introduced than the production when competition policy is not introduced.

Table 3: Regression results of food manufacturing production in OECD countries, 1980-03

Variables	Fixed Effects Model		Random Effects Model	
	One Way	Two Way	One Way	Two Way
Intercept	5.47 [a]	8.42 [a]	3.78 [a]	5.47 [a]
	(0.60)	(0.73)	(0.46)	(0.57)
Import	0.16 [a]	-0.11	0.08	-0.07
penetration	(0.08)	(0.09)	(0.07)	(0.09)
Capital	0.40 [a]	-0.03	0.46 [a]	0.19 [a]
	(0.06)	(0.09)	(0.06)	(0.08)
Labor	0.17 [a]	0.26 [a]	0.18 [a]	0.23 [a]
	(0.04)	(0.0.04)	(0.04)	(0.04)
Competition	0.31 [a]	0.29 [a]	0.25 [a]	0.25 [a]
policy	(0.07)	(0.07)	(0.07)	(0.07)
R2	0.98	0.98		
F	21.07 [a]	9.02 [a]		
HS			7.43 [a]	22.80 [a]

Notes: [a] and [b] indicate significant at 1% and 5% level, respectively. Standard errors are given in parenthesis. All the variables except competition policy are in logs.

The results also show that the coefficients of capital and labor are 0.40 and 0.17, respectively, and significantly positive at 1% level. The coefficient of import penetration (0.16) is significant at the 1% level and has a positive sign. This positive sign for import penetration is unexpected and difficult to explain in the one way model. Competition policy is positively correlated to food manufacturing production: the estimated coefficient of competition policy implies that the production increases almost 29 per cent   in the two way when competition policy exists.

Table 4 shows the regression analyses (Equation 14-17) for countries' food

manufacturing exports as influenced by competition policy with other factor variables.

Table 4: Regression results of food manufacturing exports in OECD countries for 1980-03

Variables	Fixed Effects Model		Random Effects Model	
	One Way	Two Way	One Way	Two Way
Intercept	2.14 [a]	4.62 [a]	0.02	1.23 [b]
	(0.62)	(0.73)	(0.55)	(0.63)
Import	1.19 [a]	0.88 [a]	1.14 [a]	0.97 [a]
penetration	(0.08)	(0.09)	(0.08)	(0.09)
Capital	0.45 [a]	013	0.47 [a]	0.34 [a]
	(0.07)	(0.09)	(0.06)	(0.08)
Labor	0.09 [a]	0.14 [a]	0.10 [a]	0.11 [a]
	(0.04)	(0.04)	(0.04)	(0.06)
Competition	0.69 [a]	0.65 [a]	0.65 [a]	0.65 [a]
policy	(0.07)	(0.07)	(0.07)	(0.07)
R2	0.99	0.99		
F value	110.82	43.71		
HS			8.95	22.01

Notes: [a] and [b] indicate significant at 1% and 5% level, respectively. Standard errors are given in parenthesis. All the variables except competition policy are in logs.

As shown in the one way model, the coefficient of competition has a positive sign and

is significant at the 1% level. This indicates that food manufacturing export in the post-

competition policy period is about 69 per cent higher than the export in the pre-competition

period. Kahyarara investigated the competition policy impact on exports but he finds positive

policy impacts on exports but the results are not statistically significant. The coefficient of

import penetration for the exports in the food manufacturing sector is significantly positive at

the 1% level. This result of a positive sign is difficult to explain conceptually. The

coefficients of capital and labor are significantly positive for food manufacturing exports: a 1

per cent increase in capital and labor results in an increase in food manufacturing exports by

0.45 and 0.09 per cent, respectively. In the two way model, the policy variable has a significantly positive sign: competition policy leads to an increase in food manufacturing exports by 65 per cent.

Conclusion:

The pupose of this study is to examine the impact of competition policy on a country's production and export competitiveness. We derive our empirical regression model from a Cobb Douglas production function that considers that production and exports are influenced by competition policy along with factors endowments. We hypothesise that competition policy is positively related to a country's production and export flows. With the framework, we tested these hypotheses using panel data for total manufacturing and food manufacturing for 20 countries during 1980-2003. We employ fixed effects and random effects models in our regression analyses. Since the impact of competition regulation depends upon the particular circumstances of the industry to which the policy is applied, we examine how competition policy impacts productivity growth and exports of a specific sector in particular in the agri-food processing sector.

The results show that existence of competition policy has a significantly positive impact on manufacturing production. The food manufacturing production is higher when competition policy is introduced than the export when competition policy is not introduced. This result suggests that competition policy enhances competition by reducing entry barrier. The results also show that exports for both total manufacturing and food manufacturing are positively related to competition policy: in both cases exports in the post-competition policy period is higher than the export in the pre-competition period. So competition policy enhances productivity growth as well as leads to an increase in export flows. The increased

production caused by competition policy decreases the import demand of the firm, and thus, the country's import flows decline in the post competition policy period.

In this study, we had difficulties in finding reliable data for the competition policy variable. We are not confident enough about the impact of the competition policy because we use a dummy variable for this policy variable in our regression analyses. The major difficulty lies in trying to measure the exact influences that a policy imposes on manufactures. Many efficiency-enhancing factors that the firm might have along with competition policy factors may influence a country's production and exports. It would be very difficult to separate competition policy's impact from other factors that explain the firm's performance. Moreover, we use aggregate data for both manufacturing production and exports but the impact of competition regulation exclusively depends upon the particular circumstances of the industry to which the policy is applied. So, we recommend further research be focused on the harmonization of competition policy, factor intensity, and relative factor abundances of countries, rather than the consideration of competition policy in isolation.

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