Export Orientation and Domestic Merger Policy:
Theory and Some Empirical Evidence

Joseph A. Clougherty
Wissenschaftszentrum Berlin (WZB)
Reichpietschufer 50
10785 Berlin
Germany
E-Mail: Clougherty@wz-berlin.de

Anming Zhang *
Sauder School of Business
University of British Columbia
2053 Main Mall, Vanvouver, B.C.
Canada V6T 1Z2
E-Mail: anming.zhang@commerce.ubc.ca

Abstract: The recent ‘open-economy industrial organization’ literature generally finds export-orientation to enhance the weight of post-merger international competitive gains; thereby, favoring lenient domestic merger policy. We observe, however, that mergers seldom generate the 'significant synergies' that are supportive of international competitive gains. Further, we explore a joint-economies of production effect which suggests that domestic mergers tend to generate international competitive losses (not gains). Accordingly, we contend that export-orientation favors strict (not lenient) domestic merger policy. In order to support this contention, we develop a model illustrative of how non-synergistic domestic mergers in the presence of international sales might reduce national welfare and incur stringent merger-reviews. Further, using a panel data set composed of U.S. merger reviews by industrial sector over the 1997-2001 period, we empirically support export-orientation leading to strict merger policy.

* Corresponding author. Tel.: (604) 822-8420; Fax: (604) 822-9574
1. Introduction

Merger policy has traditionally been the purview of relatively large nations—
nations with sizable stakes in securing domestic efficiency (Boner & Krueger, 1991). The trade dimensions of merger policy consequently received scant attention by the economic literature, as trade effects were relatively unimportant for such domestically oriented nations (Richardson, 1999). Two trends appear to be reversing this disconnection between domestic merger policy and international trade orientation. First, a number of relatively small nations (subject to greater trade effects) have introduced or strengthened merger policies over the last two decades (World Investment Report, 2000). For instance, The Netherlands—the epitome of a small open-economy—has recently implemented a relatively sound competition policy (e.g., Canoy & Onderstal, 2003). Second, continued internationalization of the world economy suggests that even large nations are increasingly concerned about trade effects. For instance, the former top U.S. antitrust regulator stated “globalization has radically changed the focus of our work, from almost purely domestic less than 10 years ago to a heavy international component today” (Melamed, 2000). Accordingly, a growing dialogue exists on the design and conduct of merger policy in an open economy setting; see Horn & Levinsohn (2001) for a short review of the budding literature referred to as ‘open-economy industrial organization’.

Central to the above dialogue is the impact of trade-orientation (specifically, the composite export and import orientations) on the optimal tenor of domestic merger policy. The impact of import-orientation is relatively uncontroversial: imports curb the pricing behavior of domestic firms (Levinsohn, 1993; Harrison, 1994); hence, the more import-oriented an industrial sector, the less anxious need antitrust officials be with regard to domestic merger activity (Landes & Posner, 1981; Abbot, 1985; Ghosal, 2002). From this established basis, we get the common argument that trade and competition policies are substitutes. However, the impact of export-orientation on domestic merger policy is somewhat more controversial, as it raises the possibility of strategic merger policy for international competitive gains. While Acquier and Caves (1979) first formally examined the tradeoffs between domestic consumer welfare and international profits,
recent scholarship within the ‘open-economy industrial organization’ literature (hereafter, open-economy IO) has considered the impact of export-orientation on optimal domestic merger policy. Strikingly—and despite invoking various oligopolistic scenarios—these scholars (Barros & Cabral, 1994; Levinsohn, 1997; Sorgard, 1997; Head & Ries, 1997; Yano, 2001; Zhang & Chen, 2002) consistently find export-orientation to conditionally favor lenient domestic merger policy under a national-welfare criterion. The main insight being that international competitive gains have a particularly strong weight vis-à-vis domestic consumer-losses when an economy is a big exporter. Such foundations for strategic merger policy—despite involving more nuance than the classic national champion rationale (e.g., Caves, 1982)—run counter to mainstream economic intuition; yet, only the sketchings of a critique have been lodged (see Bliss, 1997; Horn & Levinsohn, 2001).

We have a few concerns with regard to the open-economy IO literature’s holding that export-orientation favors lax domestic merger policy. First, we know of no empirical work that tests the relationship between export-orientation and actual merger policy; thus, it is time for this theoretical conformity to be tested. Second, such scholarship (e.g., Zhang & Chen, 2002) often posits post-merger synergies despite a sobering literature in finance economics and industrial organization that suggests most mergers do not generate synergies (see Sirower, 1997 and Mueller, 1997 for reviews). For instance, Gugler et.al. (2003) find—in the most comprehensive empirical study to date—only thirty percent of mergers to be efficiency-enhancing in the sense that both merging firms and consumers gain post-merger. Instead, market-power and other (e.g., hubris) motives appear to drive most merger activity. The two concerns above—lack of empirical confirmation and prevalence of synergistic-less mergers—raise the possibility that domestic mergers may commonly lead to international competitive losses (not gains).

Accordingly, we question—and empirically test—the prevailing relationship between export-orientation and optimal merger policy, and contend that export-orientation generally favors more stringent (not more lenient) domestic merger policy. In delivering on our contention that export-orientation leads to strict domestic merger
policy, we first develop a model to illustrate that domestic mergers—under conditions of no-synergies and joint-economies of production between domestic and international markets—generate international-competitive-losses: what we term a joint-economies effect. Next, testing for consistent empirical evidence on comprehensive panel data for U.S. merger policy, we find industrial sectors characterized by greater export-orientation to experience stricter merger policy.

In sum, we contend that the intuition behind 'the optimality of lenient merger policy in exporting sectors' may be mistaken; or better said, the intuition may be correct but the conditions may not often hold. Instead of resulting in international competitive gains and enhanced national welfare, lenient merger policy may result in international competitive losses and reduced national welfare. This negative welfare effect will be particularly strong when nations are big exporters; hence, suggesting the optimality of strict merger policy in exporting sectors. The remainder of the paper is organized as follows to support the main contention. Section 2 sets up the basic model, and Section 3 examines the effects of a domestic merger on output, price, profit and national welfare. Section 4 presents the empirical analysis and results. Section 5 provides concluding remarks.

2. The Basic Model

We consider a two-country model that is likely to be the simplest structure in which our main problem can be addressed. In country 1 (the “domestic” market), there are initially two firms, A and B, competing with each other. Of the two firms, firm A also competes with a foreign firm, C, in Country 2 (the “foreign” market). Let \( q_1 \) and \( q_2 \) denote, respectively, firm A’s outputs in countries 1 and 2, \( q_3 \) firm B’s output, and \( q_4 \) firm C’s output. Firms A and B produce differentiated, imperfectly substitutable products, with (inverse) demand functions in the domestic market being given by \( p_1(q_1, q_3) \) and \( p_3(q_1, q_3) \). For simplicity, assume that \( q_2 \) and \( q_4 \) are homogeneous in the foreign market, with \( p_2(q_2 + q_4) \) being the demand function and \( p_2'(\cdot)(= dp/dq) < 0 \).
Using $c_i$ to denote total costs for firm $i$ ($i = A, B, C$), the profits of the three firms may be written as:

\[
\begin{align*}
\pi_A(q^1, q^2, q^3, q^4) &= p^1(q^1, q^4)q^1 + p_2(q^2, q^4)q^2 - c_A(q^1 + q^2), \\
\pi_B(q^1, q^3) &= p^3(q^1, q^3)q^3 - c_B(q^3), \\
\pi_C(q^2, q^4) &= p_2(q^2 + q^4)q^2 - c_C(q^4).
\end{align*}
\]

We assume that there are joint economies in firm A’s production:\footnote{More generally, the total cost of firm A may be written as $c_A(q^1, q^2)$. Then condition (4) becomes $\frac{\partial^2 c_A}{\partial q^1 \partial q^2} < 0$. That is, an increase in $q^1$ will reduce the marginal cost of $q^2$ and vice versa, which suggests joint-economies (or economies of scope) in firm A’s production of two outputs. Our results in this paper extend to this more general case.}

\[
\pi_{12}^A = -c_A''(\cdot) > 0. \tag{4}
\]

Suppose that firms choose quantities to maximize their profits and that the exporting firm, firm A, regards each country as a separate market.\footnote{This means that it chooses the profit-maximizing quantity for each country separately, so our set-up is a two-country model with segmented markets (e.g., Brander, 1981; Brander and Krugman, 1983).} Prior to a merger between A and B, therefore, firm A chooses $q^1$ and $q^2$, firm B chooses $q^3$ and firm C chooses $q^4$ to maximize their respective profits. This would yield a pre-merger Cournot-Nash equilibrium.

The merger between A and B is conceived and modeled as follows. In general, when merging firms produce differentiated products, the merger less likely leads to the shutdown of the respective production facilities of the acquiring and target firms. Specifically, firms A and B continue to produce their outputs post-merger, but rather than choose their outputs non-cooperatively, they choose outputs to maximize joint profit. We focus then on the type of merger in which participants continue to produce their
respective products, but coordinate their post-merger pricing and output decisions. With this as a backdrop, we go on to explore how a joint-economies effect suggests that lenient merger policy for such mergers might result in international competitive losses and reduced national welfare.

As an aside, additional effects may link lenient merger policy with international competitive losses and reduced national welfare. For instance, Bliss (1996) and Horn and Levinsohn (2001) point out that the recent open-economy IO literature under-appreciates how the number of domestic firms may positively impact export levels. Thus if firms compete à la Cournot, then reducing the number of home competitors in international markets—via lenient merger policy—would result in decreased exports and lower national welfare: a reduced-competitors effect. The basic model we begin presenting here has abstracted from the reduced-competitors effect by assuming that the number of firms in both the domestic and foreign markets remain unchanged following the merger. Nevertheless, it could be extended to include pre-merger international competition by the acquiring and target firms in order to illustrate the negative impact of fewer home competitors on post-merger exports. While we currently refrain from such an extension so as to concentrate on the joint-economies effect, we would not want it construed that we figure joint-economies to be the sole driver behind a lenient-merger-policy / international-competitive-losses connection.

Returning to the base model, we aim to compare the post-merger with the pre-merger equilibria in terms of output, price, profit, and national welfare. Unfortunately, it is extremely difficult to directly compare the pre-merger and post-merger price and

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3 Some Canadian examples of a no-shutdown merger include: i) In the late 1980s and early 1990s, the Southam newspaper chain (which owned the two major newspapers, The Vancouver Sun and the Province, in Vancouver, British Columbia) bought a large number of community newspapers in the Greater Vancouver area yet continued operating them. ii) In late 1998 Loblaw, a fully integrated food distribution company in Canada, purchased Provigo Inc., the largest retailer/wholesaler in Quebec—the merger of two supermarket chains—but since they operated in somewhat different markets (Provigo was mostly in Quebec where Loblaw was weak) there were virtually no store closures. iii) In 2001, Best Buy Co., Inc. bought Future Shop Ltd while it was planning to enter (having already signed some leases) Canada; nevertheless, it maintained the Future Shop brand when it eventually opened Canadian Best Buy stores. iv) The convergence mergers in broadcasting and telecommunications in the late 1990s and early 2000s would also be examples (e.g., BCE owning the *Globe and Mail* and the CTV television network).
welfare levels—even in special cases. To overcome this difficulty, we introduce differential techniques. More specifically, as a useful analytical tool, we formulate the industrial structure problem as follows:

\[
\begin{align*}
\text{Max}_{q_1, q_2} \pi^A + \theta \pi^B &\equiv \pi^{AB}(q_1, q_2, q_3, q_4; \theta), \\
\text{Max}_{q_3} \pi^B + \theta \pi^A &\equiv \pi^{BA}(q_1, q_2, q_3, q_4; \theta), \\
\text{Max}_{q_4} \pi^C(q_2, q_4).
\end{align*}
\]

Clearly, \( \theta = 0 \) and 1 respectively correspond to the pre-merger and post-merger cases. Notice that both \( \pi^{AB} \) and \( \pi^{BA} \) are well defined when \( \theta = 0 \) or 1; furthermore, since \( \pi^{AB} \) and \( \pi^{BA} \) are both linear combinations of two profit functions, any value of \( \theta \) between 0 and 1 should also represent a conceivable profit function. Given these observations, switching from a pre-merger to a post-merger industrial structure can be calculated as the integral of small changes \( d\theta \). Such a small change may be referred to as an “infinitesimal merger,” and it turns out to be easy to sign the welfare effect of an infinitesimal merger. Consequently, the overall effect of the merger can also be determined because it will have the same sign as the effect of an infinitesimal merger whenever the latter sign does not change in the range of \( 0 \leq \theta \leq 1 \) — a condition that one can check.\(^4\) For much of the analysis, therefore, we shall treat \( \theta \) as a continuous variable between 0 and 1.

Given parameter \( \theta \), the Cournot equilibrium is characterized by first-order conditions of the profit-maximization problem (5)-(7), with subscripts denoting partial derivatives:

\[
\pi^{AB}_1(q_1, q_2, q_3, q_4; \theta) \equiv \frac{\partial \pi^{AB}}{\partial q_1} = \pi^A_1 + \theta \pi^B_1 = 0,
\]

\(^4\) Farrell and Shapiro (1990) and Oum et al. (1995) used a similar technique in their analysis of horizontal merger effects and airline hubbing effects, respectively.
\[
\pi_2^{AB}(q^1, q^2, q^3, q^4; \theta) = \pi_2^c = 0, \quad (9)
\]
\[
\pi_3^{BA}(q^1, q^2, q^3, q^4; \theta) = \pi_3^b + \theta \pi_3^c = 0, \quad (10)
\]
\[
\pi_4^c(q^2, q^4) = \pi_4^c = 0, \quad (11)
\]

and second-order conditions:

\[
\pi_{11}^{AB} < 0, \quad \pi_{22}^{AB} < 0, \quad \pi_{11}^{AB} \pi_{22}^{AB} - \pi_{12}^{AB} \pi_{21}^{AB} > 0, \quad \pi_{33}^{BA} < 0, \quad \pi_{44}^c < 0. \quad (12)
\]

In examining the equilibrium, we impose certain regularity conditions. Since \(q^1\) and \(q^3\) are (imperfect) substitutes in the domestic market, we have:

\[
p_1^3(\equiv \frac{\partial p^1}{\partial q^3}) < 0, \quad p_1^3 < 0. \quad (13)
\]

Furthermore, following the standard practice in models of quantity competition, we assume that \(q^1\) and \(q^3\) are “strategic substitutes” (e.g., Bulow et al., 1985; Tirole, 1988):

\[
\pi_{13}^A < 0, \quad \pi_{31}^A < 0. \quad (14)
\]

That is, firm A’s (B’s) marginal profit (or equivalently, revenue) declines when the output of firm B (A) rises. Since \(\pi_{13}^A = p_3^1 + q^1 p_{13}^1\), we have that \(\pi_{13}^A < 0\) if \(p_{13}^1 \leq 0\). Therefore, the fact that the outputs of A and C are substitutes is conducive to (14). Similarly, in the foreign market, \(q^2\) and \(q^4\) are strategic substitutes so that:

\[
\pi_{24}^A < 0, \quad \pi_{24}^C < 0. \quad (15)
\]
The comparative static effects of the merger variable $\theta$ on the equilibrium outputs, denoted $q^i(\theta)$, are derived by totally differentiating the first-order conditions (8)-(11):

\[
\begin{bmatrix}
\pi_{11}^{AB} & \pi_{12}^{AB} & \pi_{13}^{AB} & 0 \\
\pi_{21}^{AB} & \pi_{22}^{AB} & 0 & \pi_{24}^{AB} \\
\pi_{33}^{BA} & 0 & \pi_{33}^{BA} & 0 \\
0 & \pi_{42}^C & 0 & \pi_{44}^C
\end{bmatrix}
\begin{bmatrix}
q_1^0 \\
q_2^0 \\
q_3^0 \\
q_4^0
\end{bmatrix}
= \begin{bmatrix}
-\pi_1^B \\
0 \\
-\pi_3^A \\
0
\end{bmatrix},
\]  

(16)

where $q_i^0 \equiv dq_i^i(\theta)/d\theta$. Notice that the equations in (16) have already been simplified, with $\pi_{14}^{AB} = 0$, $\pi_{23}^{AB} = 0$, $\pi_{32}^{BA} = 0$, $\pi_{34}^{BA} = 0$, $\pi_{41}^C = 0$, and $\pi_{43}^C = 0$. For example, since $\pi_3^{BA} = \pi_3^B + \theta \pi_3^A = [p_3^1(q_1^1, q_3^1) + p_3^3 q^3 - c_B(q^3)] + \theta [p_3^1(q_1^1, q_3^1)q_1^1]$ , it follows that $\pi_{32}^{BA} = 0$ and $\pi_{34}^{BA} = 0$. For the comparative static analysis of (16) to be useful, we assume that the equilibrium is locally strictly stable — which implies the following: i) the determinant $|\pi_{ij}|$ of the $4 \times 4$ matrix, $\pi_{ij}$, in (16) is positive; ii) in the absence of the foreign market, the domestic market would still be strictly stable, hence $\pi_{11}^{AB} \pi_{33}^{BA} - \pi_{13}^{AB} \pi_{31}^{BA} > 0$; and iii) in the absence of the domestic market, the foreign market would similarly still be strictly stable, hence $\pi_{22}^{AB} \pi_{44}^C - \pi_{24}^{AB} \pi_{42}^C > 0$ (e.g., Bulow et al., 1985; Zhang and Zhang, 1996).

3. Effects on Output, Price, Profit and Welfare

To investigate the effect of merger on national welfare, we rewrite the system (16) as:

\[
\pi_{11}^{AB} q_1^1 + \pi_{12}^{AB} q_2^1 + \pi_{13}^{AB} q_3^1 = -\pi_1^B ,
\]  

(17)

\[
\pi_{21}^{AB} q_1^1 + \pi_{22}^{AB} q_2^2 + \pi_{24}^{AB} q_4^2 = 0 ,
\]  

(18)

\[
\pi_{31}^{BA} q_1^1 + \pi_{33}^{BA} q_3^3 = -\pi_3^A ,
\]  

(19)
\[ \pi_{42}^C q_\theta^2 + \pi_{44}^C q_\theta^4 = 0. \]  

(20)

We first report the following result:

**Lemma 1.** i) \( q_\theta^1 \) and \( q_\theta^3 \) cannot both be positive; ii) \( q_\theta^2 \) and \( q_\theta^4 \) have the opposite sign; and iii) \( q_\theta^1 \) and \( q_\theta^2 \) have the same sign.

**Proof:** i) In equation (19), \( \pi_{33}^{BA} < 0 \) by the second-order condition (12) and \( \pi_{31}^{BA} = \pi_{31}^B + \theta \pi_{31}^A < 0 \) by (14). Thus, if both \( q_\theta^1 \) and \( q_\theta^3 \) are positive, then the left-hand side of (19) will be negative; which contradicts with the fact that the right-hand side of (19) is positive since \( \pi_{31}^A = p_1^C q^1 < 0 \).

ii) From equation (20), it follows that \( q_\theta^4 = -\pi_{42}^C q_\theta^2 / \pi_{44}^C \). Since \( \pi_{44}^C < 0 \) by (12) and \( \pi_{42}^C < 0 \) by (15), \( q_\theta^2 \) and \( q_\theta^4 \) have the opposite sign.

iii) Substituting \( q_\theta^4 = -\pi_{42}^C q_\theta^2 / \pi_{44}^C \) into (18) and rearranging yields:

\[ \pi_{21}^{AB} q_\theta^1 + \left( \pi_{22}^{AB} - \frac{\pi_{24}^{AB} \pi_{44}^C}{\pi_{42}^C} \right) q_\theta^2 = 0. \]

Since \( \pi_{21}^{AB} = -c_A^* > 0 \) by (4) and \( \pi_{22}^{AB} \pi_{44}^C - \pi_{24}^{AB} \pi_{42}^C > 0 \) by the stability condition, \( q_\theta^2 \) must have the same sign as \( q_\theta^1 \). \( Q.E.D. \)

Lemma 1 thus narrows down the sign combination of \((q_\theta^1, q_\theta^2, q_\theta^3)\) to only three possibilities: (i) \( q_\theta^1 < 0, q_\theta^2 < 0, q_\theta^3 > 0 \); (ii) \( q_\theta^1 > 0, q_\theta^2 > 0, q_\theta^3 < 0 \); and (iii) \( q_\theta^1 < 0, q_\theta^2 < 0, q_\theta^3 < 0 \). The first two possibilities can be ruled out provided that the merger benefits both partners. For example, consider the first case: from (2), firm B’s equilibrium profit can be written as:

\[ \pi^B(\theta) = \pi^B(q^1(\theta), q^3(\theta)). \]
From the first-order condition (10), it follows that $\pi_3^B = -\theta \pi_3^A$ and

$$\pi_\theta^B = \pi_1^B q_\theta^1 - \theta \pi_3^A q_\theta^3.$$  \hspace{1cm} (21)

Under case (i) we obtain $\pi_\theta^B > 0$, since $\pi_1^B = q^3 p_1^3 < 0$ and $\pi_3^A = q^1 p_3^1 < 0$. In this case, therefore, firm B prefers a merger to no merger.

What will happen to B’s merger partner, firm A? Its profit is:

$$\pi^A(\theta) = \pi^A(q^1(\theta), q^2(\theta), q^3(\theta)).$$

Using first-order conditions (8)-(9) and rearranging, we obtain:

$$\pi_\theta^A = -\theta \pi_1^B q_\theta^1 + \pi_3^A q_\theta^3.$$  \hspace{1cm} (22)

It can be easily seen that $\pi_\theta^A < 0$ under case (i).

Similarly, we can show that $\pi_\theta^A > 0$ but $\pi_\theta^B < 0$ under case (ii). The discussion thus leads to:

**Lemma 2.** If a merger must benefit both partners, then $q_\theta^1 < 0$, $q_\theta^2 < 0$, $q_\theta^3 < 0$, and $q_\theta^4 > 0$.

The constraint that both partners must gain from a merger is reasonable in some situations, especially when the two firms produce differentiated products and continue to produce their outputs post-merger. In other situations, it might be too stringent. If this constraint is removed, what will happen to the signs of $q_\theta^1$, $q_\theta^2$ and $q_\theta^3$? Solving the equations (16) for $q_\theta^1$ and $q_\theta^3$ yields:
\[ q^1_\theta = -\frac{\pi^{AB}_{22} \pi^{C}_{44} - \pi^{AB}_{24} \pi^{C}_{42}}{\pi^{AB}_{21} \pi^{C}_{44}} q^2_\theta, \quad q^2_\theta = \frac{(-\pi^{B}_{44} \pi^{BA}_{13} + \pi^{A}_{13} \pi^{AB}_{21}) \pi^{AB}_{21} \pi^{C}_{44}}{|\pi^{AB}_{21}|}. \]  

Since \( \pi^{AB}_{21} = -c^A > 0 \) by (4), \( \pi^{C}_{44} < 0 \) by (12), and \( \pi^{AB}_{22} \pi^{C}_{44} - \pi^{AB}_{24} \pi^{C}_{42} > 0 \) and determinant \( |\pi^{AB}_{21}| > 0 \) by the stability condition, both \( q^1_\theta \) and \( q^2_\theta \) must have the opposite sign of term \( \pi^{A}_{13} \pi^{AB}_{21} - \pi^{B}_{13} \pi^{BA}_{21} \). Furthermore, notice that the following condition has been used in the models of quantity competition:

\[ \pi^{BA}_{33} < \pi^{AB}_{13}, \]  

(24)

which is among the weaker known stability conditions for Cournot equilibrium (Dixit, 1986). Since \( \pi^{A}_{13} = p^1_1 q^1 \) and \( \pi^{B}_{13} = p^1_3 q^3 \), reasonable symmetry between firms A and B in the domestic market would ensure the two terms are about equal. Thus, (24) and symmetry would give rise to:

\[ \pi^{A}_{13} \pi^{AB}_{21} - \pi^{B}_{13} \pi^{BA}_{21} > 0. \]  

(25)

Condition (25) holds, for example, when both the demand functions, \( p^1(q^1, q^3) \) and \( p^3(q^1, q^3) \), and the marginal cost of \( c_B(\cdot) \) are linear.\(^5\) Using Lemma 1 we then obtain the following result:

**Lemma 3.** Assuming condition (25), an infinitesimal merger between A and B gives rise to \( q^1_\theta < 0, \ q^2_\theta < 0, \ q^3_\theta < 0, \) and \( q^4_\theta > 0. \)

\(^5\) Note that \( \pi^{AB}_{13} = \pi^{A}_{13} + \theta \pi^{B}_{13} = p^1_1 + p^1_3 q^1 + \theta (p^3_1 + p^3_3 q^3) \) and \( \pi^{BA}_{33} = \pi^{B}_{33} + \theta \pi^{A}_{33} = 2 p^3_3 + p^3_3 q^3 - c^A_B(q^3) + \theta p^3_3 q^3 \). With linear demand functions and \( c^A_B = 0 \), we have \( \pi^{BA}_{33} = 2 p^3_3 < p^1_1 = p^1_3 \leq p^3_1 + \theta p^3_3 = \pi^{AB}_{13} \), where \( p^3_3 < p^1_1 \) and \( p^3_3 < p^3_1 \) by the stability condition and symmetry. Combining this with symmetry will give rise to (25).
Lemmas 2 and 3 show that an infinitesimal domestic merger will likely reduce outputs in the domestic market, but that in the foreign market, the domestic firm will likely reduce output and the foreign firm increase output following the merger. In what follows, we shall assume condition (25) so that we have $q^1_\theta < 0, q^2_\theta < 0, q^3_\theta < 0$, and $q^4_\theta > 0$ as a result.

Given these results, we now discuss whether there is an incentive for firms A and B to merge. Suppose that the merger decision is made so as to maximize joint profit. Adding (21) and (22) we obtain:

$$d(\pi^A + \pi^B) \over d\theta = (1-\theta)\pi^C_1 q^1_\theta + (1-\theta)\pi^C_3 q^3_\theta.$$  \hspace{1cm} (26)

An examination of (26) gives the following result:

**Proposition 1.** Under the conditions specified above, both firms A and B prefer a merger to no merger.

If an infinitesimal merger results in output contraction by the merger partners (i.e., $q^1_\theta < 0, q^3_\theta < 0$), then domestic prices will rise: $p^1_\theta = p^1_1 q^1_\theta + p^1_3 q^3_\theta > 0$ and $p^3_\theta = p^3_1 q^1_\theta + p^3_3 q^3_\theta > 0$. As a consequence, domestic consumers would be worse off post-merger. As for the foreign market, whilst firm A will produce less, the foreign firm, C, produces more output post-merger. In terms of the impact on total output, we have $dq^4 = -(\pi^C_{42}/\pi^C_{44}) dq^2$ from (20). Thus,

$$d(q^2 + q^4) = dq^2 + dq^4 = (1-\pi^C_{42}/\pi^C_{44}) dq^2.$$  

To sign this term, we introduce the following condition,
\[ c_C'(q^4) > p_2'(q^2 + q^4). \] (27)

That is, the foreign firm’s residual demand curve, \( p_2'(q^2 + \cdot) \), intersects its marginal cost curve from above. This condition is met if marginal cost \( c_C'(\cdot) \) is constant or increasing, and is used in Farrell and Shapiro (1990). It is among the weaker known stability conditions for Cournot equilibrium (Dixit, 1986).

Condition (27) implies \( \pi_{44}^C < \pi_{42}^C \); consequently, \( d(q^2 + q^4) \) will have the same sign as \( dq^2 \), the change in domestic export. Given that \( q^2_\theta < 0 \), total output in the foreign market falls, and foreign prices correspondingly rise.

**Proposition 2.** Under the conditions specified above, the post-merger equilibrium consists of:

i) firms A and B selling less in the domestic market,

ii) firm A selling less, but firm C selling more, in the foreign market,

iii) prices being higher in both markets, and

iv) all firms earning greater profits,

relative to the pre-merger equilibrium (i.e., the no merger scenario).

**Proof:** Parts i)-iii) have been shown in the text. As for part iv), partners A and B earn greater profits, according to Proposition 1, following the merger. As for the foreign firm, we have:

\[ \pi_\theta^C = \pi_2^C q^2_\theta + \pi_4^C q^4_\theta > 0, \]

because \( \pi_2^C = p_2'q^4 < 0, q^2_\theta < 0 \), and \( \pi_4^C = 0 \) by (11). Q.E.D.

The basic intuition behind Proposition 2 is that when two firms produce differentiated products, both may continue to operate out of their respective plants post-merger; hence, the merger allows or facilitates the coordination of pricing or output. Moreover, if one of the merging firms both produces for an international market and has
joint economies in the production of domestic and international outputs, then a post-merger domestic-output reduction (or lenient competition policy towards domestic pricing/output coordination) would correspondingly lead to international output contraction. Given the merging firm's international output contraction, the foreign firm would increase output and profit, as their output is a substitute for that of the merging firm. The two domestic firms may, nevertheless, still experience a joint profit increase; yet, the profit gain is due mainly to increased market power, as the domestic prices for both (differentiated) products rise. Total output in the foreign market is also likely to fall (i.e., the contraction by the domestic firm dominates the output expansion by foreign firms); hence, foreign prices rise.

Proposition 2 also illustrates the traditional tension between firms and consumers with regard to mergers. Following the merger, the net-profit of firms in both domestic and foreign markets rises, but consumer surplus falls in both markets. Given this profit/consumer-surplus tension, it is interesting to examine whether total surplus in the home country increases or decreases post-merger. Consequently, we consider a national welfare standard for merger policy; see Bian and McFetridge (2000) for an analysis of the range of potential merger-policy standards. To examine this national-welfare effect, we follow the standard practice in open economy IO by considering a partial equilibrium framework in which domestic consumer demand is derived from a utility function that can be approximated by the form:

\[ u(q^1, q^3) + z, \]

where \( z \) is expenditure on a competitively supplied \textit{numeraire} good, and \( \frac{\partial u}{\partial q^i} = p^i \).

The consumer surplus in this framework can be written as:

\[ CS^d = u(q^1, q^3) - p^1 q^1 - p^3 q^3, \]
where subscript \( d \) stands for “domestic” market. Total domestic welfare, denoted \( W^d \), can then be written as:

\[
W^d = CS^d + \pi^A + \pi^B. \tag{28}
\]

Substitution of (1) and (2) into (28) yields:

\[
W^d = u(q^1, q^3) + p_2q^2 - c_A(q^1 + q^2) - c_B(q^3). \tag{29}
\]

Differentiating (29) with respect to \( \theta \) and using \( \partial u / \partial q^i = p^i \), we obtain:

\[
W^d_{\theta} = (p^1 - c_A^')q^1_{\theta} + (p^3 - c_B^')q^3_{\theta} + (p_2 + p_2q^2 - c_A^')q^2_{\theta} + p_2q^2q^4_{\theta}.
\]

Since \( p_2 + p_2q^2 - c_A^' = 0 \) by the first-order condition (9), it follows that:

\[
W^d_{\theta} = (p^1 - c_A^')q^1_{\theta} + (p^3 - c_B^')q^3_{\theta} + p_2q^2q^4_{\theta}. \tag{30}
\]

The signs of the mark-up terms in the brackets of (30) are positive by the first-order conditions, and the signs of the \( q^i_{\theta} \) terms are \( q^1_{\theta} < 0 \), \( q^3_{\theta} < 0 \), and \( q^4_{\theta} > 0 \). Accordingly, the first two terms on the right-hand side of (30) are negative—reflecting the familiar efficiency loss due to post-merger output contraction in the domestic market. More interestingly, the last term on the right-hand side is also negative—reflecting firm A’s revenue decline in the international market owing to the foreign firm’s output increase. The sign of \( W^d_{\theta} \) is consequently negative, as the decrease in domestic consumer surplus will outweigh the merging firms’ profit increase; i.e., home-nation welfare falls following an infinitesimal merger.

It is important to dwell on the last term on the right-hand side in equation (30), as it is unique in an open economy setting—the term equals zero in a closed-economy
setting. The negative sign of this term broadly captures the international-competitive-losses driven by the joint-economies effect: non-synergistic mergers (motivated by market-power and resulting in no post-merger ‘production rationalization’) reduce home firms’ exports. Further, lower exports reduce the national welfare merits of the merger, which in turn drives more stringent merger-reviews. Consequently, the last term of equation (30) yields a key insight that helps generate and formalize empirical tests. Note further that the economic weight of the third term will likely be greater when industry sectors are more export-oriented (characterized by larger relative values for \( q^2 \)). In effect, when both the demand functions and the marginal costs are linear, equation (30) can be written as:

\[
W_{\theta}^d = \alpha(\theta) + \beta(\theta)q^2,
\]

with \( \alpha \) and \( \beta \) being constant; in this case, \( W_{\theta}^d \) is linear in \( q^2 \). Hence, the more export-oriented the industrial sector the more economic weight the negative third-term carries; thus, the lower the national-welfare merits of the merger and the more skeptical the antitrust authority.

The main insight from above can be characterized even more intuitively. Imagine a domestic merger involving a marginally negative national-welfare effect in a closed-economy setting; that same merger in an open-economy setting will be more likely to reduce national-welfare because the negative impact on exports is now part of a national welfare analysis. Accordingly, non-synergistic domestic mergers involving international-competitive-losses compound the welfare concerns of a borderline (where the welfare effect is marginally negative) merger review. As an aside, the above discussion is in direct contrast to Zhang and Chen’s (2002) finding that synergistic mergers (motivated by efficiency-gains and resulting in post-merger ‘production rationalization’) enhance home firms’ exports, and thereby enhance the national welfare merits of lenient merger policy; or put differently, mergers involving a marginally negative national-welfare effect in a
closed-economy setting are more likely to improve national-welfare in an open-economy setting.\footnote{Also note that Zhang and Chen (2002) consider cases involving homogenous products for merging firms: where mergers naturally lead to production rationalization (which can include the reduction in the number of firms or plants). In contrast, here the merging firms produce differentiated products; thus, each firm may continue to operate out of its respective plant post-merger. As a result, each partner would produce less than in the absence of merger, owing to the merger’s collusive effect on output.}

4. Empirical Analysis

The data are panel in nature: covering U.S. merger policy by industrial sector (sixty-five industrial sectors) on an annual basis (the 1997-2001 period). Each panel consists of a two-digit industrial sector; for instance, 'Petroleum Refining' is one distinct panel consisting of five annual observations (1997-2001). While more specific industrial sector data would be desired (such as three or four digit data), U.S. antitrust authorities only report data on merger policy at the two-digit level in the FTC and DOJ’s combined 'Annual Report to Congress on Hart-Scott-Rodino Antitrust Enforcement'.\footnote{See \url{www.ftc.gov/bc/hsr/hsrinfopub.htm} for the 1997-2001 ‘Annual Reports to Congress’.

Essentially, beyond constructing a data set on a merger-by-merger basis from the ground up, the above represents the best available data on U.S. merger enforcement. Unfortunately, the state of data on competition policy—both within and across nations—is rather primitive (Horn & Levinsohn, 2001). For instance, we are not aware of any efforts that have quantified actual merger enforcement; instead, price-cost margins (e.g., Warzynski, 2001; Hoekman & Kee, 2003) and concentration ratios (e.g., Clougherty, 2001) have been employed to proxy competition policy. Accordingly, this empirical effort represents a contribution in itself, as it considers the actual decisions—albeit at a sectoral level—made by competition-policy authorities.

Testing our main contention requires two principal variables: a measure of domestic merger policy (the dependent variable), and a measure of export-orientation (the main explanatory variable). Beyond the two principal variables, additional variables—import-orientation, the number of intra-industry mergers, the market share for the 50
largest firms, and the Herfindahl-Hirschmann-Index (HHI) for the 50 largest firms—are introduced in order to capture some of the other drivers of industrial sector merger policy, and in order to make better causal inferences on the main explanatory variable. The following paragraphs explain the variable measures.

The dependent variable must capture the state of domestic antitrust scrutiny for a particular industry sector. We use the number of annual mergers eliciting a 'second-request-investigation' within a two-digit industrial sector as indicating the level of antitrust scrutiny for that sector (subsequently referred to as the Merger-Scrutiny variable). Second request investigations denote serious concerns on the part of U.S. antitrust officials, who will consequently require more information from the merging firms, and more time to clear or contest the merger. This level of antitrust scrutiny is a pre-requisite for serious remedial measures: such as divestments and outright prevention. While a proportion of mergers will be cleared by the 'second-request' procedure, such investigations still represent serious antitrust scrutiny: as merging firms will be uncertain of the eventual outcome, required to divulge more information, and need to wait longer for clearance and completion of their intended strategy. Unsurprisingly, many merging parties call off intended mergers when notified of a 'second-request' investigation. Further, the combined FTC/DOJ 'Annual Report to Congress on Hart-Scott-Rodino Antitrust Enforcement' reveals this measure of U.S. merger policy.\(^8\)

Testing the main contention requires a measure of export-orientation in order to examine whether greater export-weights lead to enhanced or reduced scrutiny for mergers in an industrial sector. The U.S. International Trade Commission reports annual data on export levels by two-digit industrial sector; and the U.S. Census Bureau reports data on total revenue for U.S.-based establishments by two-digit industrial sector. Such measures allow the creation (by simply dividing industrial-sector exports by revenue) of an export-orientation measure (subsequently referred to as the Export-Orientation variable). If the prevailing open-economy IO literature is correct, then export-orientation will negatively

\[^8\] Unfortunately, no other potential measures of merger policy—such as number of prohibitions or remedial actions—are reported by industrial sector in the Annual Reports.
affect merger-reviews: i.e., the more a particular industry is characterized as an exporter, the more lenient are U.S. antitrust authorities with regard to merger activity. Yet if our contention is correct, then export-orientation will positively affect merger-scrutiny: i.e., the more a particular industry is characterized as an exporter, the stricter will U.S. antitrust authorities be with regard to merger activity.

As already noted, trade-orientation is composed of not only export-orientation, but also import-orientation; hence, it is exceedingly important to control for the salubrious role imports play regarding domestic merger policy in order to make sound causal inferences on export-orientation. As with exports, the U.S. International Trade Commission reports annual data on import levels by two-digit industrial sector. Taking this measure of imports by industrial sector and dividing by U.S. establishments’ total revenue yields a measure of import-orientation (subsequently referred to as the Import-Orientation variable). In line with the standard economic intuition that trade and competition policies are substitutes, we expect import-orientation to negatively impact the level of merger scrutiny.

Mergers that involve acquirers and targets from the same industry sector will clearly merit more attention than mergers composed of pairs from separate industry sectors. Simply put, received wisdom suggests that conglomerate mergers merit the least amount of antitrust concern (though largest amount of stockholder concern). The combined FTC/DOJ Annual Report to Congress reveals the number of merger transactions characterized by merging parties as intra-industry transactions—transactions that are intra-industry in the sense that both the acquirer and target compete in the same three-digit industrial sector. The list of explanatory variables consequently includes the number of three-digit intra-industry mergers occurring within the two-digit industrial sector (subsequently referred to as the Intra-Industry-Mergers variable). We expect the Intra-Industry-Mergers variable to positively affect Merger-Scrutiny; thus, the more intra-industry-mergers in an industrial sector, the more regulators should scrutinize the mergers and acquisitions taking place.
Finally, the U.S. Census Bureau (1997) provides more specific data—the market-share held by the largest 50 firms, and the HHI for the largest 50 firms—on the structural conditions for a subset of the 65 industrial sectors (the 18 sectors characterized as manufacturing). These two variables (subsequently referred to as TOP50-Market-Share and Top50-HHI) help better control for the structural conditions in which merger activity is embedded; thus, a sub-set of the regression models include them as control variables. Nevertheless, two opportunity costs present themselves with the inclusion of the two structural variables. First, the number of observations drops from 324 to 90, as we were not able to obtain similar measures for non-manufacturing sectors. Second, the data derivates from the census of business activity and is thus reported only for 1997 and not on annual basis; accordingly, the range of regression model specifications (i.e., no fixed effects) is limited by the non-varying nature of these two variables over the 1997-2001 period.

Table 1 presents the means and number of observations (plus correlation coefficients) for the variables noted above.

4.1 Econometric Issues

Panel data require consideration of a number of econometric issues. This section considers four particular issues: 1) model specification; 2) inclusion of period effects; 3) potential for multicollinearity; 4) reciprocal-causation concerns.

First, panel data often require a choice between fixed-effects and random-effects. Fixed-effect models are called for when the panel-specific effects are unique and unrelated to other panels, while random-effect models are often employed when panel specific effects might be related amongst panels (Hsiao, 1986; Greene, 1990). A series of
Lagrange Multiplier and Hausman tests favor the choice of random-effects over fixed-effects, as a large LM statistic (6.91) was generated in the presence of a small Hausman statistic (1.67) (Greene, 1995). Further, and as alluded to above, the employment of random effects helps handle the non-varying nature of the Top50-Market-Share and Top50-HHI variables. As an aside, the random effects regressions that include the market-share and HHI variables can essentially be understood as being fixed with respect to structural conditions due to the non-varying nature of the two variables. Table 2 accordingly presents random-effects specifications alongside the standard OLS regressions. Further, Appendix A presents additional panel-specific specifications (fixed-and-period effects, the Parks method, and the DaSilva Method) that generally conform with the results reported in Table 2; thus, underscoring the robustness of the results.

Second, gradual changes have potentially occurred in the environment for mergers & acquisitions and merger reviews over the 1997-2001 period. Changes—beyond those captured by the noted explanatory variables—include an ebb-and-flow of overall merger activity (with the year 2000 representing the high point of 4926 transactions reported to U.S. merger authorities), the increasingly international nature of competition policy, relative changes in agency budgets, and other developments that might impact the state of U.S. merger policy. These changes can create time-specific data trends that affect causal inferences; thus, calling for the addition of period effects.

Third, the relatively small number of observations (324—and 90 in the data subset) raises multi-collinearity concerns. Table 1 presents the correlation coefficients for all variables, and it seems that two pairs of explanatory variables—Export-Orientation and Import-Orientation; Top50-Market-Share and Top50HHI—exhibit collinear tendencies (correlation coefficients above the 0.5 benchmark for notice). The Export-Orientation/Import-Orientation relationship does not surprise, as both measures will be broadly driven by the overall trade-orientation of an industrial sector. Nor does the Top50-Market-Share/Top50-HHI relationship surprise, as both measures capture industry concentration. Hence, it is important to recall that collinearity does not lead to unbiased estimates, but instead makes it more difficult to obtain significant coefficient estimates.
Consequently, no explanatory variables were dropped for collinearity concerns, as there is no particular cause to invite specification-bias.

Fourth, an additional econometric concern involves reciprocal-causation. The principal danger being that the dependent variable (merger-scrutiny) potentially affects the main explanatory variable (export-orientation); hence, the coefficient estimates would lead to spurious causal inferences (Maddala, 1992). Such reciprocal causation would not be so surprising since our theoretical justifications suggest that lax merger policy reduces exports, and strict merger policy enhances exports. Yet, unreported Granger (1969) tests do not support reciprocal causation concerns. The lack of feedback causality may owe to the fact that a number of other drivers exist behind the export-orientation of a particular industry: most of which are not likely to vary greatly on an annual basis.

The regression models reported in the panel data regression results (Table 2) take the above econometric issues into account. While Regression #1 reports the standard OLS regression, Regression #2 incorporates a two-way random effects specification which controls for both panel-specific and time-specific effects. Additionally, regressions’ #1 and #2 are run on the complete data set of 324 observations. Regressions’ #3 and #4 are respectively identical to regressions’ #1 and #2; except, they are run on the smaller data subset of U.S. manufacturing industries (90 observations), and include the market structure variables (Top50-Market-Share and Top50-HHI). Regression #4 presents the most comprehensive econometric testing; accordingly, Regression #4 (a random-and-period effects model with a linear functional form) is represented here as follows:

\[
\text{Merger-Scrutiny}_{it} = b_0 + b_1 \times \text{(Export-Orientation)}_{it} + b_2 \times \text{(Import-Orientation)}_{it} + b_3 \times \text{(Intra-Industry-Mergers)}_{it} + b_4 \times \text{(Top50-Market-Share)}_{i} + b_5 \times \text{(Top50-HHI)}_{i} + \varepsilon_{it} + u_i + w_t
\]

where i indexes the 18 industrial (manufacturing) sectors, t indexes time, ui represents the panel-specific effect, and wt captures the period-specific effect.
4.2 Results and Interpretation

Table 2 presents the empirical results of the four regression models. All four regression equations indicate decent model-specification: with R-squares ranging from .156 in Regression #4 to .403 in Regression #3. More importantly, the four models generate reasonably consistent and significant results for the coefficient estimates: all the common variables exhibit the same sign and statistical significance—with the exception of the insignificant coefficient estimate for Import-Orientation in Regression #2. Due to the general consistency of results across regression models, the following analysis and interpretation discusses the empirical results using a variable-by-variable approach.

The Export-Orientation variable is instrumental in testing the main contention: the more export-oriented an industry, the more vigilant will a national antitrust authority be with regard to domestic merger activity. The coefficient estimate for Export-Orientation is positive, as contended, and significant in each regression equation (at the 1%-significance level in Regressions’ #1, #2 & #3). Regression #1 yields the most conservative coefficient estimate of 8.07; thus, suggesting that industry's experiencing an increase in their export-orientation by 12.4 percentage points (recall that export-orientation measures exports as a percent of U.S. establishment revenue) would encounter an additional merger investigation per annum. Accordingly, the empirical evidence supports our contention that more export-oriented industries will experience higher levels of merger-scrutiny.

The Import-Orientation variable is less robust than Export-Orientation: the coefficient estimate is negative as predicted in all four regression equations, but is insignificant in Regression #2. Adopting the more conservative coefficient estimate of –
1.09 from Regression #1 suggests that industry’s experiencing an increase in their import orientation by 92 percentage points (where import-orientation measures imports as a percentage of U.S. establishment revenue) would encounter one less merger investigation per annum. Accordingly, the empirical evidence generally supports the mainstream received-wisdom that imports act as a substitute for stringent domestic merger policy; yet, the economic weight of imports on U.S. merger policy is relatively limited—unsurprising in light of the strong weight given to domestic factors (versus international factors) by U.S. public policy.

The Intra-Industry-Mergers variable is included to make better causal inference on the Export-Orientation variable. Recall that we expected a positive sign for the Intra-Industry-Mergers coefficient estimate, as industries experiencing greater amounts of intra-industry merger activity should merit enhanced merger scrutiny by regulators. As expected, the coefficient estimate for Intra-Industry-Mergers is positive—and significant—in all four regression-equations. The coefficient estimate in Regression #4 of 0.011 is the most conservative estimate and suggests that an industry experiencing an additional ninety-one intra-industry-mergers will encounter an additional merger investigation per annum. Accordingly, the empirical evidence generally supports the conventional intuition that intra-industry mergers (as opposed to conglomerate mergers) will elicit greater merger scrutiny.

Lastly, the two additional explanatory variables—Top50-Market-Share and Top50-HHI—included only in Regressions’ #3 & #4 to control for structural conditions in the industry sector yield mixed results. First, the coefficient estimate for Top50-Market-Share exhibits the expected positive sign and is significant in both regression equations. However, the coefficient estimate for Top50-HHI exhibits an unexpected negative sign in both regression equations. Note that the negative sign for Top50-HHI may owe to the fact that Top50-Market-Share and Top50-HHI are highly correlated (0.82 from Table 1); hence, Top50-HHI may be picking up the diminishing effect that structural conditions will have on merger enforcement: i.e., higher concentration leads to greater merger scrutiny but involves a diminishing effect.
In sum, the empirical results support our contention that the more export-oriented an industrial sector the more antitrust authorities practice strict merger policy. Consequently, there appears to be scant evidence in support of U.S. authorities practicing lenient merger policy in export-oriented industrial sectors. Instead, U.S. antitrust authorities appear to practice strict merger policy when industrial sectors are characterized as exporters.

5. Concluding Remarks

This work was motivated by the conformity in the ‘open-economy industrial organization’ literature with regard to export-orientation enhancing the optimality of lenient merger policy—a conformity that is confounded by a few observations. First, none of the recent open-economy IO studies proffer empirical evidence. Second, merger synergies support the international-competitive-gains dynamic resting behind export-orientation favoring lenient merger policy; yet, mergers seldom generate significant synergies. Third, a number of effects (joint-economies, reduced-competitors, and reduced-rivalry) may reverse the prevailing relationship between merger policy and international competitiveness.

Accordingly, we contend that export-orientation favors strict (not lenient) domestic merger policy. In making this claim, we focus on how a joint-economies effect might favor export-orientation leading to strict merger policy. In this context, merging firms benefit from the increased collusion made possible by a domestic merger; yet, the reduction in domestic production leads to reduced exports—via joint-economies of production between domestic and foreign output—which in turn leads to reduced national welfare. In order to support this claim, we develop a model illustrative of how non-synergistic domestic mergers in the presence of international sales might reduce national welfare and incur stringent merger-reviews. Further, using a panel data set composed of
U.S. merger reviews by industrial sector over the 1997-2001 period, we empirically support export-orientation leading to stricter (not more lenient) merger policy.

One obvious limitation of this work involves our not explicitly testing the joint-economies effect. This omission owes to our inability to elicit the types of mergers notified to US antitrust authorities, and to the potential for other effects to produce the same prediction: lenient merger policy leading to international competitive losses. For instance, one additional effect (a reduced-competitors effect) was broached within the analysis, and entailed lenient merger policy reducing exports (and thereby national welfare) by reducing the number of home-nation international competitors—where competitors act as a strategic commitment in international markets. Even further, one could posit a reduced-rivalry effect that would entail lenient merger policy reducing exports and national-welfare via the reduced international efficiency of home-nation competitors—an efficiency reduction permitted by a slack domestic competitive environment with less rivalry. Accordingly, important extensions to this work are two-fold: first, analyzing and testing the joint-economies effect with more precision; second, analyzing additional drivers, beyond the joint-economies effect, behind how domestic mergers (lenient merger policy) might generate international competitive losses (reduced national welfare).

In terms of policy implications, one interesting walk-away from this study regards small open-economies: where trade-orientation—and the composite import and export orientation measures—is high. A number of small open-economies continue to resist the adoption of competition policies (e.g., Singapore, and Hong Kong) with the stated rationalization that trade policy acts as a substitute for domestic competition policy. This analysis certainly supports the mainstream intuition that imports act as a substitute for stringent merger policy; however, our findings with regard to export-orientation suggest an additional welfare rationale behind adopting competition policies. In short, the more import-oriented an economy the less incentive is there to invest in sound merger policy; yet, the more export-oriented an economy (and small open-economies are big exporters) the more incentive there is to invest in sound merger policy.
Implications on a broader scale involve the ongoing WTO talks that have sparked interest in the merits of harmonizing cross-national competition policies. One of the proffered benefits of harmonization is that it will curb export-oriented nations from engaging in beggar-thy-neighbor lenient merger policies. Yet the results here suggest that such concerns may be unwarranted—at least with respect to the U.S. Instead of engaging in lenient merger policy, nations with export-oriented sectors may conduct strict merger policy. The key of course is that the beggar-thy-neighbor dynamic is non-existent in this analysis (i.e., international competitive gains are hard to come by or dubious). Clearly, cross-national empirical work is called for before debate closure and the resultant definitive policy implications. Nevertheless, the U.S. environment is important—and involves rather good data—but it remains an open question as to whether export-oriented sectors in other nations are also characterized by relatively strict merger policy. Accordingly, the burden of proof with regards to the merits of cross-national harmonization of competition policies remains with those who desire to change the status quo.
<table>
<thead>
<tr>
<th></th>
<th>Merger-Reviews</th>
<th>Export-Orientation</th>
<th>Import-Orientation</th>
<th>Intra-Industry-Mergers</th>
<th>Top50-Market-Share</th>
<th>Top50-HHI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>1.59</td>
<td>0.048</td>
<td>0.107</td>
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Table 2: Panel Data Regression Results

Dependent Variable: Merger-Scrutiny

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Regression Models Based on N=324</th>
<th>Regression Models Based on N=90</th>
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<tr>
<td></td>
<td>Regression #1:</td>
<td>Regression #2:</td>
</tr>
<tr>
<td></td>
<td>OLS Estimation</td>
<td>Two-Way Random-Effects Estimation</td>
</tr>
<tr>
<td>Export-Orientation</td>
<td>8.07 *** (1.91)</td>
<td>9.54 *** (3.46)</td>
</tr>
<tr>
<td>Import-Orientation</td>
<td>-1.09 * (0.61)</td>
<td>-1.35 (1.09)</td>
</tr>
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<td>Intra-Industry-Mergers</td>
<td>0.032 *** (0.002)</td>
<td>0.016 *** (0.002)</td>
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<td>0.030 *** (0.007)</td>
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<td>Top50-HHI</td>
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<td>0.011 * (0.006)</td>
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<tr>
<td>Constant</td>
<td>0.355 ** (0.161)</td>
<td>0.792 *** (0.289)</td>
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<tr>
<td>R-squared</td>
<td>.396</td>
<td>.160</td>
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</table>

( ) = Standard Error

*** = 1% Signif.
** = 5% Signif.
* = 10% Signif.
## Appendix A: Additional Panel Data Regression Results

**Dependent Variable:** Merger-Scrutiny

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Export-Orientation</td>
<td>6.90 (10.27)</td>
<td>8.91 (16.17)</td>
<td>10.54 (9.61)</td>
<td>13.36 ** (5.55)</td>
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<td>Constant</td>
<td>0.164 (0.699)</td>
<td>2.278 (5.98)</td>
<td>0.084 (4.58)</td>
<td>-1.32 (2.02)</td>
</tr>
<tr>
<td>R-squared</td>
<td>.789</td>
<td>.776</td>
<td>.294</td>
<td>.153</td>
</tr>
<tr>
<td># of Observations</td>
<td>324</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

( ) = Standard Error  
*** = 1% Signif  
** = 5% Signif  
* = 10% Signif
References


