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Report of the Editor of The Journal of Business Inquiry
For the Year 2012, Volume 11

The Year 2012 was another good year for *The Journal of Business Inquiry (JBI)*. Volume 11 published four articles and one book review. We received many high-quality papers with 55 percent of acceptance rate. The articles were written by authors whose primary affiliations include 10 institutions from three countries, including India, Tunisia and the U.S. Turnaround time took, with almost 55 percent of the editorial decisions, less than 30 days, 22 percent between 30 and 180 days, 23 percent, between 181 and 360 days.

On behalf of *The Journal of Business Inquiry*, I would like to thank Professor Duane Miller for copy editing the articles for this issue. Many thanks also go to Ann Mecham for her administrative assistance and for formatting the articles.

The Journal of Business Inquiry would also like to thank the following individuals, who served as referees over the past year. Some of these individuals refereed more than one paper. Without their help, *JBI* could not fulfill its mission.

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*The **Journal of Business Inquiry***

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JBI focuses on all fields of economics and finance. Papers from other related macro and micro fields impinging on business and policy towards business are also welcome. These include applied economics and finance as well as decision theory. The purpose of *JBI* is to promote a discussion of theory, research, and application from the various disciplines that are related to conducting business in industry and teaching business in academia.

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Validity Evidence for the Cube One Framework: A Cross-Lagged Panel Analysis of Objective Data

By RICHARD E. KOPELMAN*

The Cube One framework posits that organizational performance results from three sets of practices, namely practices that are enterprise-directed, customer-directed, and employee-directed. To date, most of the research and writing about the Cube One framework has examined survey data and in-depth case studies. The present research examines validity evidence using Fortune's Most Admired Company attribute ratings to measure practices and relative market capitalization data to assess organizational performance. On an across-industry basis, significant associations were found examining concurrent data (with Large and Medium effect sizes). Examining longitudinal panel data, differential cross-lagged correlations approached significance on an across-company basis.

Keywords: Enterprise-directed Practices, Customer-directed Practices, Employee-directed Practices

JEL Classifications: M19, M39, M59

I. Introduction

Over the years, the field of organizational behavior has benefitted from many theories regarding the determinants of organizational performance (e.g., Lawler, 1992; Likert, 1967; Wood and Bandura, 1989). For the most part, past theoretical explanations have focused on human behavior in organizations, with ideas drawn from the fields of psychology, sociology, economics, and anthropology, and from such relatively applied behavioral disciplines as human resource management. More recently, theoretical perspectives have broadened to encompass multiple functional areas in addition to human behavior in organizations, such as marketing, quality management, and customer satisfaction (e.g., the linkage research of Wiley and Campbell, 2006; the service profit chain research of Heskett, Sasser, and Wheeler, 2008); and operational and financial metrics have been incorporated in the balanced scorecard approach of Kaplan and Norton (1996).

In accord with the recent theorizing that incorporates multiple perspectives or functions, the Cube One framework posits that organizational performance results from three sets of practices. Customer-directed practices influence an organization's top-line results; employee-directed practices affect the satisfaction and loyalty of employees; and enterprise-directed practices affect the productive use of all inputs. The basic premise of the Cube One framework is that the management of

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an organization selects portfolios of practices pertinent to three primary sets of contributors: customers, employees, and providers of capital.

Thus the Cube One framework holds that successful organizations must perforce satisfy the needs of the aforementioned three parties. Axiomatic to the Cube One framework are three postulates: first, that enacted practices drive organizational performance. Of course, corporate strategies, vision statements, and stated policies provide an overarching framework for the practices that actually may be enacted, but it is the practices per se that are crucial. The importance of practices was succinctly noted by Tsoukas and Chia (2002, p. 577, emphasis in original): "Organizations do not simply work; they *are made* to work."

Second, it is assumed that there is equifinality with regard to enacted practices, i.e., there are multiple ways for an organization to achieve the objectives of the three key parties. Consequently, there is no single, enduring list of best practices—no "silver bullets"—that organizations should employ, or search for. Rather, akin to the paradigm employed in psychological testing, there are almost an infinite number of questions that can be developed to tap a particular content domain.

Third, it is assumed that the three sets of practices inherently are not mutually contradictory or incompatible. Although it is possible to select practices that are self-defeating (e.g., when Continental Airlines decided to reward pilots for conserving fuel, planes were flown at slow speeds causing late arrivals and customer dissatisfaction), such "doom loops" are not a necessary phenomenon. Rather, as Collins and Porras (1994) noted in *Built to Last,* visionary companies are not trapped by an either/or dilemma; instead, they are able to satisfy multiple core values.

Examining the three constituent sets of practices of the Cube One framework in further depth, it should be noted that the efficient use of resources—what is labeled enterprise-directed practices—increases the marginal revenue product of capital and employees. Having greater revenue per unit of input provides the wherewithal for an organization to pay higher wages, to lower the price charged for goods and/or services, to improve the quality of product/service offerings, to invest in new technologies (i.e., managing for the future as well as the present), and to attract and retain capital so that further increases in productivity can be achieved. Practices promotive of efficiency are not just production related, such as just-in-time manufacturing with lean inventories; they also include practices associated with improving the motivation of employees such as GMFAC (goal setting, measurement, feedback, accountability and consequences) that primarily affect human behavior in organizations. Financial techniques can also promote the productive use of capital, e.g., reducing the cost of capital, or insuring against adverse events. Thus, efficiency enhances enterprise effectiveness.

Customer satisfaction/loyalty is another key contributor to organizational performance. Customers contribute to top-line revenues, and loyal customers have been found to be very profitable. Reichheld (2006) in *The Ultimate Question* found that a 5 percent increase in the rate of customer retention increased the net present value of the average customer by about 60 percent. The success of many companies has been attributed to their adoption of customer-centric practices. For example, at Disney's theme parks, employees ("cast members") are consistently friendly even after repeatedly being asked "What time is the 3 p.m. parade?" (Ford *et al,* 2001). More broadly, Kohli *et al*, (1993) have specified practices associated with a marketing orientation and a meta-analysis by Ellis (2006) a found a consistent relationship with overall organizational performance and product quality. Along these lines, Schneider *et* al, (2005) have shown that customer-directed practices ultimately lead to greater sales. Thus, according to the

Cube One framework, customer-directed practices are viewed as a necessary pre-condition for organizational success.

Employee satisfaction/loyalty is the third essential component of organizational performance according to the Cube One framework. Employees are essential to converting inputs to outputs, i.e., goods and services. Not only is turnover costly, employee satisfaction is closely linked to customer satisfaction and profits (Heskett *et al,* 1997). Along these lines, Rosenbluth and Peters (1992) have argued in *The Customer Comes Second*, that companies cannot reasonably expect their employees to treat customers better than they (employees) feel they are being treated.

Although enterprise- customer- and employee-directed practices might seem obvious pre-conditions for organizational success, most management-related books just focus on one factor or function be it human resource management, production, marketing, or finance. As noted above, in recent years there have been some works that have focused on more than one function, such as the service profit chain and the balanced scorecard, yet despite the seeming commonalities there are also important differences. The balanced scorecard recognizes four perspectives, but they are not conceptually isomorphic with the dimensions of the Cube One framework. The internal/business perspective is comprised of process quality and process cycle time domains (i.e., practices pertinent to quality and customer satisfaction and to efficiency); and the learning and growth perspective encompasses job-related motivation (a productivity-related phenomenon) and personal growth (an employee-directed phenomenon). Further, the balanced scorecard perspectives are defined in terms of outcome metrics (e.g., the customer perspective is linked to market share, customer retention, and other intermediate outcomes), not to specific practices.

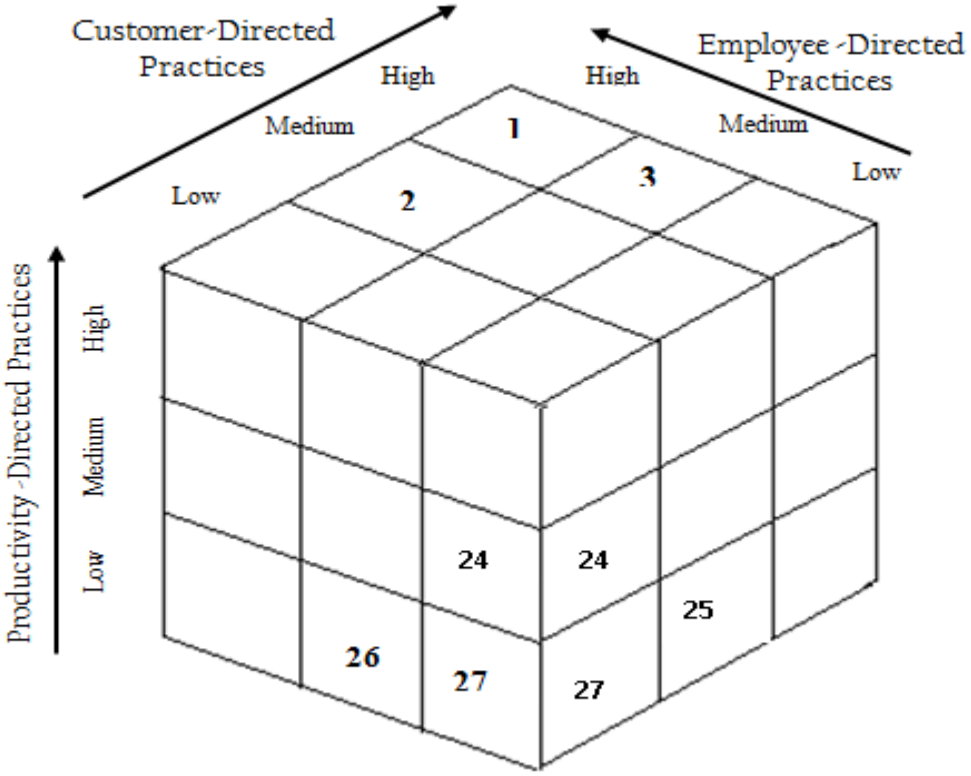
The aforementioned service profit chain books (Heskett *et al,* 1997; Heskett *et al,* 2008) conceptually define the first phase of the service profit chain as the internal system, which they see as comprised of productivity, output/service quality, and employee satisfaction and loyalty—in essence constituting the three components of the Cube One framework in the first panel of their chain. Interestingly, the final 10 pages of both Heskett *et al,* (1997) and Heskett *et al,* (2008) consist solely of questionnaire items that could be used to assess practices in organizations, but no survey data are provided.

While there has been prior writing that has referenced the importance of efficiency, customer satisfaction, and employee satisfaction in achieving organizational performance, there has been a paucity of research that has systematically examined practices, and related practice data to objective organizational performance data. Further, the Cube One framework is the only theory to date that relates specific practices—across multiple functions or disciplines—to organizational performance. Hence, there is merit in investigating research on the Cube One framework.

II. The Cube One Taxonomy

Organizations can enact High, Middle, or Low levels of each set of practices—that is customer-, employee, and enterprise-directed practices—and organizations that are High in all three regards (High, High, and High) are seen as being in Cube One; organizations that are Low in connection with all three sets of practices are classified as being in Cube 27. A schematic representation of this three-dimensional framework appears in Figure 1.

Figure 1. Schematic Representation of the Cube One Framework



The fundamental question is whether there is a relationship between the practices an organization enacts and its performance. At the extremes, are the organizations in Cube One, more successful than those in Cube 27? And, more generally, is there a lawful, systematic relationship between enacted practices and organizational performance? Briefly stated, is the Cube One framework substantively valid?

To date, research and writing on the Cube One Framework has primarily been of two kinds: survey research and in-depth case studies. Results from these two research approaches are next reviewed briefly. Subsequently, the present research is described and discussed.

III. Prior Cube One Research

A. Survey Research

In one study approximately 700 respondents provided data pertinent to the practices enacted in the organizations where they worked. Among the 10 enterprise-directed practices were five that might be characterized as GMFAC: goal setting, performance measurement, specific feedback, accountability, and consequences. Other practices included systematic methods for employee selection and training. The 10 customer-directed practices included obtaining continuing improvements in product/service quality, and responding quickly to performance lapses. The 10 employee-directed practices included the sharing of information and mitigation of work/life conflicts. Organizational performance was assessed by ratings of organizational goal

attainment, comparisons with similar organizations, and attainment of potential. As hypothesized, the three sets of practices correlated with rated performance (the median *r* being .50), and differences in performance were aligned as predicted across the various cubes. Rated organizational performance of organizations in Cube One was 14.2 standard errors higher than in Cube 27, a very large difference—Kopelman and Prottas, 2010; Kopelman and Prottas, 2012. (For comparative purposes it is notable that the acclaimed six sigma threshold—six standard errors—corresponds to a probability of 3.4 occurrences in 1 million observations.)

In a second survey research study (n = 800), three sets of practices emerged from factor analyses of 128 practices developed after first reviewing the contents of 2,100 books and articles drawn from prominent applied psychology, marketing, and management journals over a decade-long period. As hypothesized the three sets of practices were significantly related to rated organizational performance (R = .62)—Letzler and Kopelman, 2008. It is notable that the survey data in both studies were obtained from a combination of for-profit and nonprofit/government organizations. Results were essentially the same across sectors; however in the first survey study, somewhat surprisingly, results were stronger in the nonprofit/government sector compared to for-profit organizations. Thus, there is evidentiary support for the claim that the Cube One framework is generalizable across sectors.

B. In-Depth Case Studies

Detailed, case analyses provide a richness of data and explanation that cannot be obtained via questionnaire surveys completed by employees across organizations. Accordingly, the second primary source of evidentiary support for the Cube One framework has entailed in-depth examination of managerial practices via case studies. One case study compared practices at two Internet search companies: Google and AltaVista. It was concluded that Google's remarkable success is not accidental; rather it has been engineered via practices that are strongly supportive of customer satisfaction, employee satisfaction, and productivity. Indeed, some of Google's practices, such as catered quality dining, and allowing employees to spend 20 percent of their work time on projects of their own choosing have received considerable attention.

A second case study examined the turnaround at Continental Airlines. The top executives who literally took the company from "worst in the airline industry to first" explained their achievements by invoking such concepts as "flying to win" (Bethune, 1998). The top management team at Continental essentially enacted the three sets of practices necessary for successful organizational performance per the Cube One framework, but they did it relying on an intuitive understanding of what needed to be done. It might be said that what they did worked out in practice, but they did not have a coherent theory to guide them. A more generalizable and parsimonious explanation (in contrast to "flying to win") is provided by the Cube One framework: there was extensive use of productivity-, employee, and customer-directed practices.

Most recently, practices at three highly successful customer-centric organizations—Zappos, Four Seasons, and Nordstrom—were studied. Internet-based evidence (e.g., ratings at Glass door.com) enabled comparisons of the focal companies with appropriate comparison companies, e.g., Four Seasons and Ritz-Carlton. Across- and within-company comparisons demonstrated consistently higher levels of customer satisfaction, and generally higher levels of employee satisfaction. Results of the three case analyses were consistent with the findings of Basuki and Henderson (2003) who found that companies that were *almost exclusively* dedicated to customer satisfaction were below average in financial performance. Hence, based on the case

studies of customer-centric companies, it was concluded that customer satisfaction is but one-third of the job.

C. Market Capitalization Research

One prior study has examined longitudinal objective data to test hypotheses derived from the Cube One framework. In this study, data on management practices were drawn from Fortune's Most Admired Company ratings and were used to predict organizational performance as assessed by relative (within-industry) market capitalization. Data were examine for the 2005/6 and 2007/8 periods, leaving only a two-year lag between measurements. Also, data were not examined across companies, just across industries.

IV. The Present Research

There are advantages to the two primary methodologies used to date in examining the substantive validity of the Cube One framework. The in-depth (ideographic) case study provides richness of data and explanation that can rarely be attained using survey methods; in contrast, the survey (or nomothetic) approach permits a breadth of inquiry and sophistication of analysis that cannot be achieved with in-depth case studies. However, as noted above, the one market capitalization study is the only research effort to use a relatively objective (or "hard") organizational performance criterion. But, the two-year lag may not have allowed enough time to transpire between ratings of practices and performance based on relative market capitalization. Indeed, the correlation between the measure of predicted organizational performance (POP) at times 1 and 2 was r =.84—a level of stability that would be considered evidence of good test-retest reliability.

The present research uses three measures from *Fortune's* Most Admired Companies database (measures that correspond to the three pivotal sets of practices in the Cube One framework) as the basis for assessing predicted organizational performance (POP). The criterion for organizational performance is the relative market capitalization of a company (MC).

The fundamental research questions that the present research addresses are two-fold. First, is there evidence using objective data that supports the conceptual premise of the Cube One framework. The second question relates to the issue of causal priority: Do successful companies subsequently tend to adopt customer-, enterprise, and employee-directed practices, or do companies that adopt these practices tend over time to become more successful?

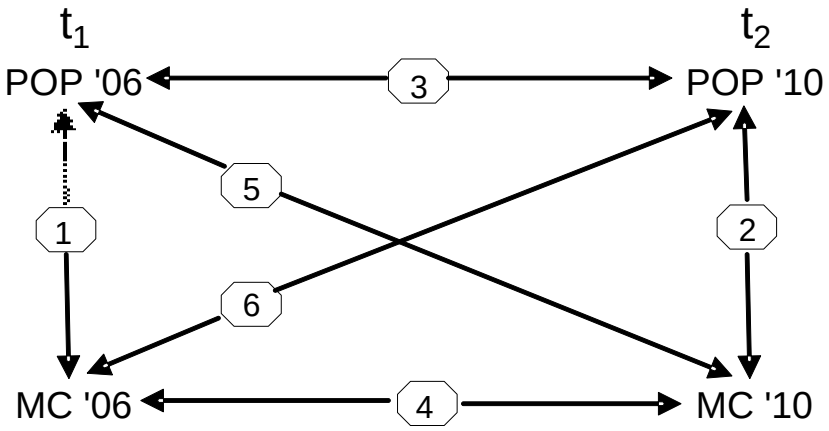
Two hypotheses are tested. First, on a concurrent basis it is posited that there will be positive correlations between assessments of predicted organizational performance (POP) and relative market capitalization (MC) both in 2006 (Hypothesis 1a), and in 2010 (Hypothesis 1b). Second, based on the fundamental premise of the Cube One framework that management practices drive organizational performance, it is hypothesized that the POP_1MC_2 correlation will exceed the MC_1POP_2 correlation (Hypothesis 2).

A. Correlations and Causality

Researchers are continually cautioned not to conflate correlational associations with established causal relationships. However, as Pelz and Andrews (1964) noted nearly fifty years ago, longitudinal panel data can provide a strong evidentiary basis for causal inferences. In their

words "If in fact A determines B rather than the reverse, then the cross-lagged correlation A_1B_2 should exceed the cross-lagged correlation B_1A_2" (Pelz and Andrews, 1964, p. 848). Building on this work Lawler (1968) labeled the six correlations that comprise a complete cross-lagged panel analysis. Figure 2 provides a schematic using the variables and time frames in the present investigation. The key correlations are the differentials, correlations 5 and 6.

Figure 2. Correlations Comprising the Cross-Lagged Correlational Analysis in the Present Research



Kenny (1975) noted that if the cross-lagged differential is not zero, this may indicate a causal effect. However, as Kenny (1975) further noted, interpretation requires examination of the relative stability of the two sets of measures, as the greater the relative stability of a measure the smaller the cross-lagged differential will be. And, of course, the use of cross-lagged correlational analysis does not rule out the potential effects of unmeasured third variables that may spuriously inflate or suppress observed correlations.

B. Procedure

In the present research, data pertinent to the three sets of management practices identified by the Cube One framework were used to construct a measure of predicted organizational performance (POP); and relative market capitalization (MC) data served as an objective indicator of organizational performance. Comparison of the two key differential correlations parallels what Platt (1964) referred to as "strong inference." If the correlation between POP at time 1 with MC at time 2 exceeds the reverse correlation (MC at time 1 with POP at time 2) this would be supportive of the basic premise of the present inquiry, i.e. the substantive validity of the Cube One framework.

Fortune's list of Most Admired Companies provides experts' judgments with regard to eight attributes (nine beginning in 2008). Three of the attributes correspond conceptually to the three sets of practices seen as essential for successful organizational performance according to the Cube One framework. One attribute, *People Management: Ability to attract, develop, and keep talented people* (called Talent Management in 2005/6) reflects practices that are employee-directed. The attribute *Quality of products and services offered*, taps practices that are customer-directed. Finally, the attribute designated as *Use of Corporate Assets* is reflective of enterprise-directed practices.

The Most Admired Company ratings have been administered by the Hay Group since 1997, relying on the inputs of corporate directors, top executives and security analyst ratings of the Fortune 1000 companies operating in the U.S. For the 2008 ratings, 3,721 individuals who were "highly knowledgeable" about 621 companies provided attribute ratings late in 2007 which were then published early in 2008 (Fortune Datastore, 2008). Ratings were obtained on an 11-point scale with endpoints of zero (poor) and ten (excellent), and these ratings were then converted to attribute rankings (Money, 2011).

C. Measures

C.1. Predicted Organizational Performance (POP)

Predicted Organizational Performance (POP) scores were computed only for companies for which attribute data were provided for 2005 and 2006 and also for 2009 and 2010. Attribute rankings for 2005 and 2006 were averaged for each of the three components separately (e.g., *People Management*) and mean scores were converted to High, Middle, and Low categories which were scored 3, 2, and 1, respectively for each industry. Because the Cube One framework posits that all three sets of practices are necessary for successful performance, the scores for each attribute were combined multiplicatively. Thus, the Predicted Organizational Performance (POP) score calculated for each company in an industry could range from 1 to 27. An identical scoring protocol was used for attribute ratings obtained for 2009 and 2010. For brevity, the 2005/2006 and 2009/2010 data are labeled 2006 and 2010.

C.2. Market Capitalization (MC)

The organizational performance criterion was the market value of each company. Although this metric is affected by numerous factors including the debt and financial leverage of a company, it is an objective measure of the success of a company. Market Capitalization (MC) scores were computed only for companies with stock market data available on January 1 of the three years 2005-2007 and also for January 1 of the three years 2009-2011. Data were accessed at the NYU financial database (NYU financial data, 2011).

D. Sample and Analyses

As noted above, the present research only included companies for which there were Most Admired attribute ratings and market capitalization data for the four years 2005, 2006, 2009, and 2010. Although the prior market capitalization study (examining results for 2005/2006 and 2007/2008) included data from 285 companies in 52 industries, two years later the pool was reduced to 186 companies in 36 industries. This reduction occurred for a variety of reasons, including companies being acquired, fortune dropping entire industries (such as automobiles), and due to the existence of (six) industries with complete data being available for only two companies.

The unit of analysis for the present inquiry was (primarily) the industry, and Spearman rank-order correlations were computed to test the hypotheses advanced. Because correlation coefficients are nonlinearly constrained between -1 and +1, mean correlations were calculated using an r to z transformation.

V. Results

It was hypothesized that Predicted Organizational Performance (POP) scores derived from attribute ratings that corresponded conceptually to the Cube One framework would be positively related to relative levels Market Capitalization (MC) on concurrent bases. Data for 2006 and for 2010 are presented in Table1. As predicted, in 2006 the mean correlation for the entire sample was positive and statistically significant (r = .49, p < .01, one-tailed). Similarly, a positive, statistically significant (and quite sizable) positive correlation was found in 2010 (r = .81, p < .001, one-tailed).

Table 1: Mean Correlations between Predicted Organizational Performance and Market Capitalizations: Concurrent and Cross-Lagged Results

		Correlations between			
Number of Companies in Industry	***Number of Industries***	***POP '06 MC '06***	***POP '10 MC '10***	***POP '06 MC '10***	***POP '10 MC '06***
3 to 4	k =14	.43	.85***	.74**	.48*
5 to 6	k =14	.57*	.81***	.64**	.51*
7 to 8	k = 8	.48	.72*	.48	.51
All Industries	k =36	.49**	.81***	.65***	.50**

POP = predicted organizational performance; MC = market capitalization; k = number of industries in category. (***) Significant at .1%, (**) Significant at 1%, (*) Significant at 5%.

It was also deduced that if management practices (as captured by the POP measure) are causally related to organizational performance (as measured by relative MC level), then the correlation between POP_1MC_2 should exceed the MC_1POP_2 correlation—viz. Hypothesis 2. With regard to those industries comprised of a small number of companies (3 or 4 companies), the data were consistent with the prediction. The corresponding mean differential correlations were as follows: POP_1MC_2, r = .74 (p < .01) versus MC_1POP_2 r = .48 (p < .05). However, given the small number of cases (n = 14), the standard error of the difference between correlations was .43, so the difference in mean correlations was not statistically significant (Z = .60; p = .23). Likewise, non-significant differences were found among industries with more companies. Examining the differential correlations for the entire sample, results were in the predicted direction (r = .65, p < .001 versus r = .50, p < .01) but the difference was not statistically significant (Z = .61, p = .23). It might be noted the key differential in the present research (.65 versus .50 = .15) exceeded the differential found in the one past study which used a two-year measurement interval (.60 versus .50 = .10).

VI. Discussion and Conclusion

As hypothesized, there were positive associations between attribute ratings and market capitalizations when examined on contemporaneous bases in 2006 and 2010, the correlations being r = .49 and r = .81, respectively. The magnitudes of effect sizes can be characterized (per Cohen, 1992) as almost Large, and clearly Large. The magnitudes of the differential cross-lagged correlations paralleled those hypothesized as well. Among companies in industries with 3-4 companies, the POP_1MC_2 and MC_1POP_2 correlations were .74 and .48, respectively—a difference in explained variance of 55 percent versus 23 percent. Yet the difference was not

statistically significant given the small number of observations. For the whole sample the corresponding differential correlations were .65 versus .50, a difference which did not approach significance (p = .23). It is somewhat encouraging, that the differential in the present research with a 4-year measurement interval (.15) exceeded the differential found previously (.10) with a 2-year interval.

There are two factors, though, that importantly impede finding support for Hypothesis 2, i.e., that practices are more associated with subsequent organizational performance than vice versa. First, past research on *Fortune's* attribute ratings has found that they are subject to a "halo effect," being significantly affected by prior financial performance (Brown and Perry, 1994; Fryxell, and Wang, 1994). As Brown and Perry (1994, p. 1348) put it: "Unfortunately, the Fortune most admired ratings have been shown to be heavily influenced by previous financial performance." And according to Fryxell and Wang (1994, p. 11) financial performance is the "dominant factor" underlying most admired ratings. Although, the halo effect is likely mitigated by the passage of time, it serves to operate in the direction opposite to the one predicted by the Cube One framework. Thus, the present research design has a built in tendency toward bi-directionality, reflecting both the effects of practices/attributes on performance and financial performance on practices/attributes.

The second factor that impedes finding clear-cut evidence of causal priority is the small sample size. Indeed, as Kenny (1975, p. 894) observed: "it is very difficult to obtain statistically significant differences between cross-lagged correlations even when the sample size is moderate (75 to 300)." In the present research, the sample size of 36 is not even close to moderate.

Accordingly, to increase the degrees of freedom and statistical power, a post hoc analysis was conducted examining results on an across-company instead of an across-industry basis. Each company's industry rankings were converted to parallel those of an 8-company industry. Thus a company ranked 3rd out of four would have a ranking of six out of eight, and so forth. On an across-company basis the two differential cross-lagged correlations were POP_1MC_2, r = .46 and MC_1POP_2, r = .34, the difference more closely approached statistical significance, Z = 1.15, p = .13.

As is the case with virtually all empirical research there are a number of shortcomings in the present endeavor. First, as noted above the experts' attribute ratings of the Most Admired Companies may not have been entirely valid; there is evidence that they reflect a "halo effect" that incorporates past financial success. Second, although the attribute ratings conceptually correspond to the three dimensions of the Cube One framework, they refer to broad categories of intermediate performance criteria, rather than specific practices enacted. Practices are not measured directly in the present inquiry, but they are clearly a component of the attribute ratings.

A couple of strengths of the present undertaking might also be noted. The attribute ratings and market capitalization data were examined not just longitudinally but on a longitudinal panel basis. The use of market capitalization data introduces a high level of objectivity into the criterion variable, and permits comparisons on an across-industry basis. Further, the use of data obtained from different sources mitigates the problem of common method variance.

A potential strength of the Cube One framework is that there are clear cut practical applications. If the framework is validated, survey data might be used for diagnostic and intervention purposes. An organization might conclude based on such data that one or more sets of practices needs to be strengthened.

While it is clear that correlational data per se cannot establish or "prove" causality they can be suggestive of causal relationships (Cliff, 1983). The present research suggests that there are

reciprocal relationships between management practices and organizational performance, with the primary causal priority likely being from practices to performance. In the present research the quest has been to examine additional evidence pertinent to a little-known management perspective, the Cube One framework. Of course, one study can never be dispositive; but the present endeavor is contributory.

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The Three Faces of the Cube One Framework

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Applying a multidisciplinary perspective, the Cube One framework posits that organizational performance is driven by three distinct sets of practices: enterprise-, customer, and employee-directed. Examining data from a sample of 860 organizations, it was found that levels of enacted practices were systematically related to organizational performance. As hypothesized, each high face of the Cube One framework was significantly related to a conceptually relevant criterion, and the high enterprise-directed face showed a large effect size. Limitations and possible practical applications are discussed. With refinements, the Cube One framework may be useful for diagnosing relative weaknesses and intervening to improve organizational performance.

Keywords: Enterprise-directed Practices, Customer-directed Practices, Employee-directed Practices

JEL Classifications: M19, M39, M59

"Organizations do not simply work; they *are made* to work."
(Tsoukas and Chia, 2002, p. 577; emphasis in original)

I. Introduction

The sage and concise observation of Tsoukas and Chia notwithstanding, a vast literature has accumulated over many decades about how to make organizations work. One way to classify this literature is by what might loosely be called genre. There are largely theoretical works, often appearing in book form, which may report the analysis of secondary data (e.g., Barnard, 1938, Collins and Porras, 1994; Lawler, 1986; Pfeffer, 1998); and there are first-hand reports of managerial success as provided by a practitioner (e.g., Berry and Seltman, 2008 [Mayo Clinic]; Novak, 2012 [Yum brands]; Welch, 2005 [GE]). There are also works in book format which focus on a specific set of techniques and often report the analysis of primary data. Examples include the productivity measurement and enhancement system (ProMES) developed and reported by Pritchard, Weaver, and Ashwood (2012) and the work by Pulakos (2009) on performance management. The management literature, broadly defined, also includes works that focus on improving customer satisfaction such as the service profit chain (Heskett, Sasser and Schlesinger, 1997) and the work of Reichheld (2006) on customer loyalty and the ultimate question.

In addition, there are immense academic literatures focusing on particular functions and/or techniques which address subfields of inquiry within management, such as organizational behavior, service management, quality management, marketing management, operations management, human

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resource management, and so forth. There are journals dedicated to reporting research within these fields. Examples of such research would include studies of staffing practices, research on goal setting, studies about responding to service lapses, and analyses of the effects of bundles of human resource management practices (often called High Performance work systems).

In light of this disciplinary focus, many academic studies do not measure the effects of practices on organizational performance; rather they tend to examine the effects of specific practices on sub-criteria pertinent to a single functional area. For example, Locke and Latham (1990) reported on more than 200 studies pertinent to goal setting and task performance; along these lines, Franke and Park, (2006) reviewed more than 150 samples which found that adaptive selling behaviors and customer orientation were positively associated with individual sales results.

However, increasingly during the past two decades, research has looked at the effects of practices on organizational performance. For instance, Boselie, Dietz and Boon (2005) identified more than 100 studies that looked at relationships between various Human Resource Management practices and organizational performance. Also, some researchers have looked at practices across more than one functional domain as related to organizational performance, e.g., the linkage research of Wiley and Campbell, 2006; the service profit chain research of Heskett, Sasser, and Wheeler, 2008); and the multiple metrics incorporated in the balanced scorecard approach of Kaplan and Norton (1996). Indeed, Jaworski and Kohli (1993) provided impressive evidence as to the effects of market orientation and management practices on overall organizational performance.

Building on the multi-functional writing and research to date, the present research is grounded in a three-dimensional theoretical model that rests on measuring levels of practices across disciplines—namely, the Cube One framework. The basic premise of this framework is that successful organizational performance requires high levels of enactment of three specific sets of practices: productivity-directed, customer-directed, and employee-directed practices. Prior research on this framework has found support using case-related evidence combined with Internet-based data (refereed journal article, 2012) and objective evidence based on Most Admired Company attribute ratings and market capitalizations (Kopelman, 2012). According to this perspective, practices can be located in three-dimensional space, and organizations can be classified as High, Middle, or Low on the levels of enactment of each set of practices. A schematic representation of the Cube One framework is provided in Figure 1.

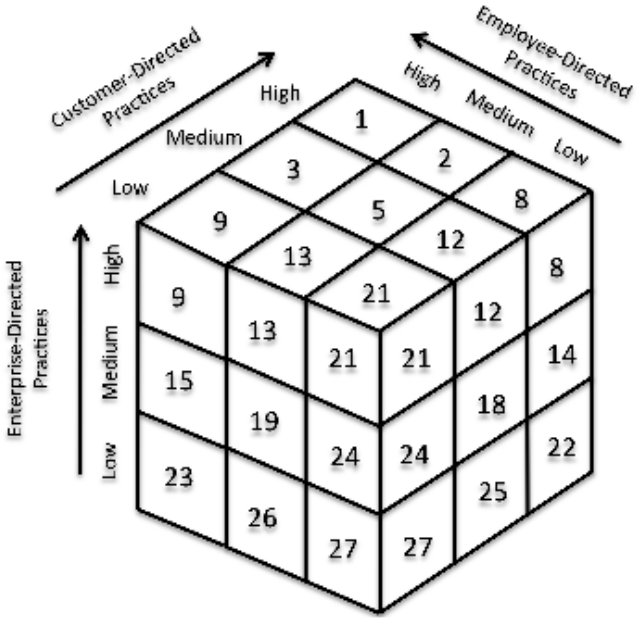
Although prior multi-functional research and writing has been conducted as noted above, Simon (1945/1997) was perhaps the first author formally to theorize that three sets of practices are necessary for successful organizational performance. In Administrative Behavior, Simon (1945/1997) described a business organization as an enterprise with three key participants—the manager (Simon used the term entrepreneur), customers, and employees. The manager focuses resources on the attainment of organizational goals; customers contribute revenue to pay for operating expenses and cost of capital; and employees contribute their time, knowledge, and talent to get the work done. However, Simon did not address how to make the organization work, nor he did he address specific management and marketing practices.

Simon's model does incorporate three key functional areas pertinent to organizational performance (i.e., management, marketing, and human resources); however, management research to date has only limitedly integrated across functional areas. Although academic research is typically delimited by academic function and sub-function, (e.g., production management, strategic management, human resource management, entrepreneurship management), each with its own journals, the present investigation adds to the limited prior research (e.g., Jaworski and

Kohli, 1993), that examines practices that span multiple functional domains. Therefore, our core research question is as follows: is there evidence to support the contention of the Cube One framework that successful organizational performance requires high levels of enactment of enterprise-, customer- and employee-directed practices?

The text is organized as follows: first, we develop the rationale and theoretical underpinnings of the Cube One framework; second, we propose five hypotheses that describe the relationships among the framework's components; third we present the results of the present data analysis, and lastly we discuss the findings, their implications, limitations, and potential applications.

Figure 1: Schematic Representation of the Cube One Framework



II. Model Development

A. The Cube One Framework

Successful organizations are need-satisfying places. According to the Cube One framework, organizational performance is driven by practices that satisfy the needs/objectives of three primary participants: the sources of capital (lenders, investors, taxpayers, dues payers, and grantors), customers, and employees. Managers, as representatives of the sources of capital, seek efficiency in operations and implement enterprise-directed practices in the quest to retain and attract capital. Employees contribute time and effort to the organization in exchange for good treatment and wages; and customers contribute money in return for products and services at an attractive price. In Simon's (1945/1997) words, "The organization objective is, indirectly, a personal objective of all the participants. It is the means whereby their organizational activity is bound together to achieve a satisfaction of their own diverse personal motives" (p. 15). Customer and employee objectives are closely and directly related to those of the organization. According to Barnard (1938) the satisfaction of employee objectives yields cooperative efforts that are

consonant with the employee's "zone of indifference" (p. 167), the degree that individuals willingly accept direction from others without questioning authority.

Differences in performance between organizations result from decisions and actions taken inside organizations (Collins 2001; Hansen and Wernerfelt 1989). By employing resources efficiently and in unique ways organizations can produce value in excess of the cost of the resources used (Pfeffer, 1998). Thus value is created through decisions made about how the organization operates—i.e., through management practices.

The three sets of practices examined in the present research were drawn from practices that have received consistent support with regard to pertinent intermediate criteria, such as efficiency, customer satisfaction, and employee satisfaction. In total, 232 academic journal articles yielded 524 practice statements. More specifically, 114 journal articles yielded 248 examples of specific enterprise-directed practices, 45 journal articles yielded 110 examples of customer direct-practices, and 73 journal articles yielded166 statements of employee-directed practices. Sample practices and sources are provided in the Appendix at the end of this article. Insofar as each specific practice has been found to improve its corresponding intermediate criterion, it was reasoned that the composite level of enactment of each set of practices would be positively related to organizational performance. In the one prior study pertinent to this assumption it was found that organizations in Cube One (i.e., High on all three sets of practices) have higher levels of performance compared to organizations classified in the other cubes (refereed journal article, 2010). The difference in ratings of organizational performance between organizations in Cube One and Cube 27 was greater than 14 standard errors—a difference far larger than the famous Six Sigma threshold (i.e., six standard errors), an outcome with a frequency of 39 occurrences in one million observations).

To date there has been no direct test of causal mechanisms that might account for finding a relationship between the cubes in the Cube One framework and organizational performance. This is because intermediate criteria have not been measured previously. Specifically, it might be posited that customer-directed practices lead to the intermediate criterion of customer satisfaction/loyalty which should be a precursor of organizational performance. Likewise, employee-directed practices should lead to the intermediate criterion of employee satisfaction/ loyalty, a precursor of organizational performance; and enterprise-directed practices should lead to high levels of the intermediate criterion organizational efficiency/effectiveness, another presumed precursor of organizational performance.

III. Hypotheses

Based on the structure of the Cube One framework, organizations scoring High with respect to the enactment of the three sets of practices (viz., enterprise-, customer- and employee-directed practices) are by definition in Cube One. Likewise, organization scoring Low with regard to the frequency of enactment of the three sets of practices are by definition in Cube 27. As noted, to date only one prior research study has examined (and found) differences in rated organizational performance between organizations classified in Cube 1 and Cube 27. In light of the basic premise of the Cube One framework and prior research it is predicted:

> Hypothesis1: Organizations in Cube One will have a higher level of rated organizational performance compared to organizations classified in Cube 27.

Consistent with Hypothesis 1, it follows that there should be a systematic relationship between levels of practices and rated organizational performance. Compared to organizations in

Cube One (which are High, High, High on the three sets of practices), the next highest level of performance should be found among organizations with two High scores and one Middle score in terms of the three sets of practices—Cubes 2, 3, and 4—which we label Metacube A. If we assign scores of 3, 2, and 1, respectively, to High, Middle, and Low levels of practices, organizations in Cube 1 would have a predicted organizational performance score of 9 (using an additive formulation) and organizations in Metacube A would have a predicted performance score of 8. Extending this approach for predicted organizational performance from scores of 7 through 4 defines Metacubes B through E and organizations with Low levels of all three sets of practices (Cube 27) would have a predicted organizational performance score of 3. According to the Cube One framework it would be posited that level of enactment of practices would be systematically related to organizational performance. Therefore, we advance the following proposition:

> Hypothesis 2: There will be a consistent, systematic relationship between levels of practices (per the seven Cubes/Metacubes) and rated organizational performance with performance highest in Cube One and lowest in Cube 27.

Schematically, the Cube One framework has six sides or faces. Of particular interest are the three faces that correspond with High scores on enterprise-directed, customer-directed, and employee-directed practices. It follows that organizations in the nine cubes that comprise the High enterprise-directed practices face should have higher scores on the intermediate criterion of efficiency/effectiveness compared to organizations in the remaining 18 cubes. Likewise, organizations in the nine cubes that comprise the High customer-directed practices face should have higher levels of customer satisfaction/loyalty than organizations in the remaining 18 cubes. Finally, organizations with High scores on the employee-directed practices face should have higher levels of employee satisfaction/loyalty compared to organizations in the remaining 18 cubes. Figures 2 through 4 present schematics of the cubes that constitute each of the three faces.

For each High face there is, of course, a Low face and an in-between or middle "slice" of organizations. Organizations in cubes constituting the High face should be positively associated with the corresponding, conceptually appropriate intermediate criterion. More formally stated, we advance the following three propositions:

> Hypothesis 3: Organizations in cubes that constitute the High enterprise-directed practices face will have higher levels of organizational efficiency/ effectiveness compared to organizations in the other 18 cubes.
>
> Hypothesis 4: Organizations in cubes that constitute the High customer-directed practices face will have higher levels of customer satisfaction/loyalty compared to organizations in the other 18 cubes.
>
> Hypothesis 5: Organizations in cubes that constitute the High employee-directed practices face will have higher levels of employee loyalty/satisfaction compare to organizations in the other 18 cubes.

Figure 2: High Enterprise-Directed Practices Face

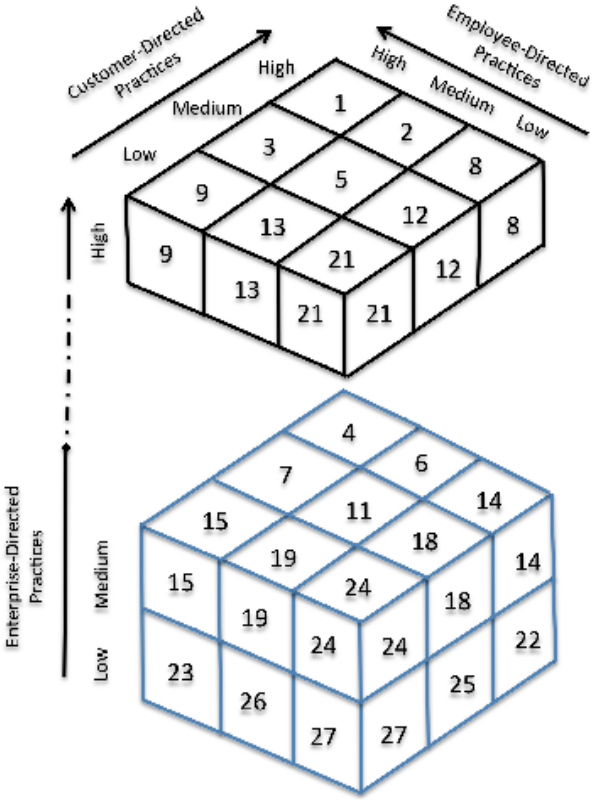


Figure 3: High Customer-Directed Practices Face

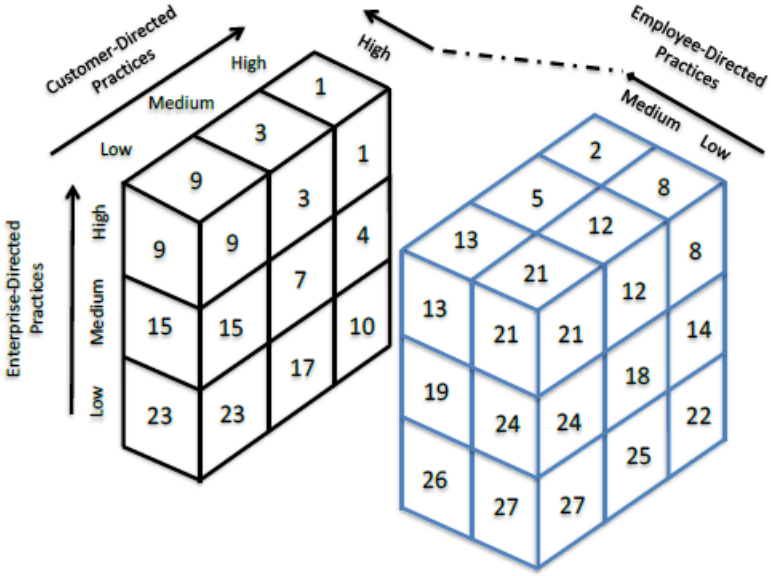
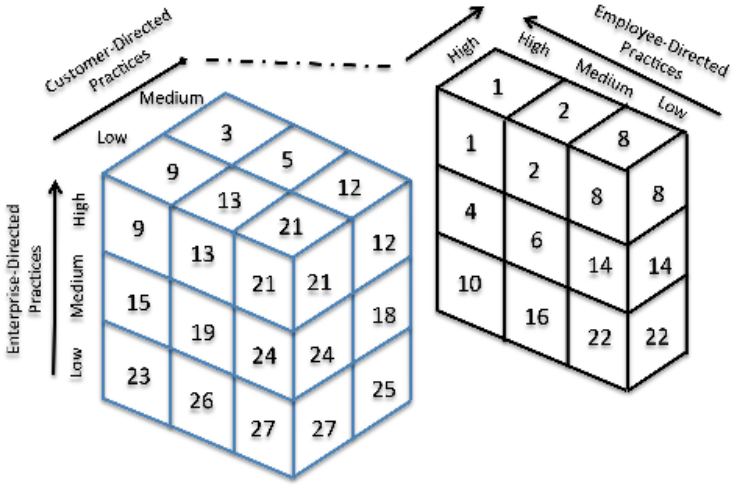


Figure 4: High Employee-Directed Practices Face



IV. Methodology

A. Participants and Procedure

Participants were attendees at management education and training seminars held in New York City by an independent management training organization. We received 1,156 questionnaires representing a 42 percent response rate. Participants included employees from organizations of all types and sizes including: publicly- and privately- held for-profit companies, as well as nonprofit, and governmental organizations. Among the industries included were finance, accounting, law, pharmaceuticals, aviation, education, and general manufacturing. The typical organization was large (median sales of $960 million) and for-profit (80 percent of sample) with a median domestic work force of 3,564 employees and 937 people at the focal worksite. Participant median age was 37 years, compensation was $83,000, tenure with the employer was four years, and tenure on the current job was two years. Fifty one percent were female; 77 percent possessed a bachelor's degree or higher; and 61 percent worked between three and five levels below the organization's Chief Executive Officer. Participation was voluntary and anonymous, with a token reward of a management-related book given to responders.

The questionnaire was quite lengthy, consisting of 164 items on 10 pages. Consequently, a large number of questionnaires were missing data on at least one item; further, the scope of the questionnaire was broad as it asked about the frequency of enactment of 137 different practices pertinent to multiple functions. Also contributing to missing data was our decision to treat both Don't Know and blank responses as missing data. To minimize the loss of cases due to missing data, we substituted the practice portfolio case mean for missing data for respondents missing three or fewer practice statements in a portfolio, out of 26 practices per portfolio. The maximum number of substituted items per case was nine, or 10 percent, and this was a rare occurrence. According to Cohen and Cohen (1983), up to 10 percent missing data is acceptable. For analyses involving the three practice portfolios, sample size decreased to 861.

B. Measures

B1. Three Sets of Practices

We operationalized the three practice portfolios from a pool of 137 practice statements: 37 customer-directed practices, 42 employee-directed practices, and 58 enterprise-directed practices. Response scale endpoints ranged from 1 (*Never or Almost Never*) to 5 *(Always or Almost Always*), (plus *Not Applicable* and *Don't Know*). We developed the practice statements from 1748 articles published between 1990 and 1999 in the *Academy of Management Journal*, *Journal of Applied Psychology*, *Journal of Marketing*, *Journal of Management*, *Personnel Psychology*, *Journal of Marketing Research*, and *Strategic Management Journal*. We examined the entire contents of the even-numbered year volumes for the first three journals; and the entire contents of the odd-numbered year volumes for the latter four journals. Two authors sorted the 1637 statements into three distinct sets of practices (enterprise-, customer- and employee-directed practices) with inter-rater agreement of 81.3 percent on a test of 150 randomly selected statements). Sample items are: "Employee concerns are responded to with action, not just words," "Promises made to customers are met and/or exceeded," "Work processes are regularly analyzed to identify opportunities to improved operating performance." For this analysis we retained 26 items for each set of practices (not using items with higher percentages of missing data or which lowered internal consistency reliability). The maximum score on each set of practices was 130. Mean and median scores and internal consistency reliabilities (Cronbach alpha) for the three sets of practices were: employee-directed practices, m = 89.98, sd = 16.96, md = 90.48, α = .94; customer-directed practices, m = 97.53, sd = 14.97, md = 98.00, α = .92; enterprise-directed practices, m = 84.21, sd = 16.79, md = 84.00, α = .94.

B.2. Outcome Measures

The three intermediate criteria of enterprise efficiency/effectiveness, customer satisfaction/ loyalty, and employee satisfaction/loyalty were each measured by 3-item scales (with varying anchors shown below in parentheses). Given that the three items were assessed on 5-point scales, the maximum score for each intermediate criterion measure was 15.

The efficiency/effectiveness items (and response anchors) were: "Compared to other organizations, how efficient is the organization in utilizing its resources to produce products/services at low cost?" (*One of the Worst* to *One of the Best*); "Compared to other organizations, how effective is the organization in producing high quality, reliable products/ services in a timely manner?" (*One of the Worst* to *One of the Best*); "Compared to other organizations, how adaptive is the organization to changes in its environment?" (*One of the Worst* to *One of the Best*) Basic statistics for the 3-item efficiency/effectiveness scale were: m = 10.43, md = 11.00, sd = 2.33, α = .76.

Customer satisfaction/loyalty was assessed by the following three statements: "How satisfied do you believe customers are with the organization?" (*Very Dissatisfied* to *Very Satisfied*) "In your judgment how likely are customers who have purchased once to purchase again?" (*Very Unlikely* to *Very Likely)* "How likely are customers to recommend the organization (or its products/services) to others?" (*Very Unlikely* to *Very Likely)* Basic statistics for the 3-item customer satisfaction/loyalty scale were: m = 12.41, md = 13.00, sd = 2.20, α = .71.

The employee satisfaction/loyalty statements (and response anchors) were: "Considering everything how satisfied are you with your job?" (*Very Dissatisfied* to *Very Satisfied*) ("How would you rate the organization as a place to work compared to other organizations?" (*One of the Worst* to *One of the Best)* "If you have your way, how likely is it that will be working for this organization five years from now?" (*Very Unlikely* to *Very Likely)* Basic statistics for the 3-item employee satisfaction/loyalty scale were: m = 11.24, md = 12.00, sd = 2.92, α = .79.

The final criterion, as distinct from the three intermediate criteria, was organizational performance. The three organizational performance items (with varying 10-point response anchors in parentheses) were: "Overall, how successful is the organization in accomplishing its mission and goals?" (*Completely Unsuccessful* to *Completely Successful*) "Overall, how does the organization's performance compare to the performance of similar, or competitive, organizations?" (*One of the Worst* to *One of the Best*) "Overall, what percent of maximum potential performance is the organization now achieving? (*0 percent to 10 percent of Potential* to *About 100 percent of Potential*) One *of the Best*) In light of the 10-point scales, the maximum organizational performance score was 30. Basic statistics were: m = 21.43, sd = 4.60, md = 22.00, α = .85.

We chose subjective rather than objective measures for multiple reasons. First, participants were unlikely to have had access to or knowledge about the information required to respond properly to objective measures. Even if participants had been able to respond accurately, selecting one or more objective indicators to yield a comprehensive, content-valid measure of organization performance would have been difficult. Metrics that are relevant for for-profit organizations vary across industries, and are likely not relevant to assessing the performance of nonprofit and governmental organizations. (It should be noted that the Cube one framework is theorized to be applicable to organizations in all sectors, and the present research examines predictions across sectors).

C. Cube One Taxonomy

To test the hypotheses advanced, data were obtained for each set of practices from the respondent reporting on his/her organization. (Limitations associated with having one respondent per organizations are addressed in the discussion section). Given that the maximum score for each set of practices was 130 (26 practices with a 5-point scale), we defined High scores as $\geq$ 100; Medium as $\geq$ 80 and < 100; and Low < 80). Using each participant's report of the frequency of practices, it is possible to classify their organization as High, Middle, or Low in the enactment of each set of practices. Using the aforementioned additive formulation, three High scores were equated to a predicted performance level of 9 (3 + 3 + 3), and two High scores and a Middle were equated to 8, and so forth down to Cube 27 which would have a predicted performance level of 3. All told, in addition to Cube One and Cube 27, there were seven cube/megacube categories.

V. Results

Descriptive statistics, Pearson intercorrelations, and internal consistency reliabilities for the seven variables in the present research, plus three demographic variables are shown in Table 1. Alphas indicate strong internal consistency reliability, particularly for the three sets of practices (all > .90) and Organizational Performance (.85). Alphas for the intermediate criteria were lower

but still adequate, ranging from .71 to .79. With regard to the discriminant validity of the seven variables examined in this research it should it be noted that the two demographic variables (age and sex of respondent) were unrelated with r = .00 and .05, respectively. Likewise, neither sector nor organization size was related to the criterion measures (with r = .00 and .06, respectively)—see Table 1.

Table 1: Basic Statistics and Correlation

	Variable	Mean	SD	N	1	2	3	4	5	6	7	8	9	10	11
1.	Sex	1.48	.50	851	-										
2.	Age	38.61	9.57	857	-.03	-									
3.	Sector	.84	.37	852	-.12	-.13	-								
4.	Organization Size	.69	.46	773	.01	.02	.01	-							
5.	Customer Practices	97.53	14.97	860	.11	.01	.09	.11	(.92)						
6.	Employee Practices	89.97	16.95	860	.02	.01	-.02	.02	.61	(.94)					
7.	Enterprise Practices	84.21	16.79	860	.04	-.03	.04	.07	.65	.84	(.94)				
8.	Customer Satisfaction/ Loyalty	12.41	2.20	860	-.00	.00	-.01	-.02	.29	.27	.25	(.71)			
9.	Employee Satisfaction/ Loyalty	11.24	2.92	860	.06	.06	-.11	.08	.40	.62	.57	.35	(.79)		
10.	Efficiency/ Effectiveness	10.43	2.33	860	.05	-.02	.06	.06	.52	.51	.62	.31	.52	(.76)	
11.	Organization Performance	21.43	4.60	860	.08	-.05	-.02	.07	.52	.48	.54	.31	.48	.63	(.85)

Note: Categorical variables: Sex, 1 = male, 2 = female; Sector, 1 =for-profit, 0 = not-for-profit (including government); Organization Size, 1 = $\geq$ 500 employees, 0 = < 500 employees.
Correlations $\geq$ .25 significant at $p < .001$, two-tailed; .11 to.13 $p < .01$, two-tailed; .07 to.09 $p < .05$, two-tailed.

Hypothesis 1 posited that ratings of organization performance would be higher in Cube One compared to Cube 27. As predicted, means were 25.16 and 14.61, respectively, t = 7.38, $p < .001$. d = 3.14. Cohen (1992) provides guidance as to the interpretation of the standardized mean effect size (d), with the following thresholds: .20 for small, .50 for medium, and .80 for large. Thus, the d statistic of 3.14 in the present research (comparing organizational performance in Cube One versus Cube 27) was substantially greater than large. In addition to examining organizational performance, differences in the three intermediate criteria (customer satisfaction/ loyalty, employee satisfaction/loyalty, and efficiency/effectiveness) were examined. Results were as follows: customer satisfaction/loyalty (t = 5.34, d = 1.36), employee satisfaction/loyalty (t = 7.60, d = 2.83), efficiency/ effectiveness (t = 7.09, d = 2.68)—see Table 2.

Hypothesis 2 posited that there would be a consistent, systematic relationship between predicted performance levels based on the seven cubes/megacubes and organizational performance. Table 2 provides means and standard deviations for the three intermediate criteria (customer satisfaction/loyalty, employee satisfaction/loyalty, efficiency/ effectiveness) and for organizational performance for the seven cubes/megacubes. We also calculated t-statistics for differences between means in adjacent cubes/megacubes and the d statistic for each adjacent comparison. Those statistics are shown in Table 2 as well.

Table 2: Means of Measures by Cube/Megacube and between Adjacent Cube/Megacube

			Customer Sat/Loyalty		Employee Sat/Loyalty		Efficiency/ Effectiveness		Organization Performance	
	Points	**N**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Cube 1	9	119	13.27	2.28	13.56	1.75	12.52	1.67	25.16	2.80
d / t			.09	.52	.39	2.75***	.51	3.68***	.52	3.75***
Megacube A	8	95	13.08	1.84	12.84	2.02	11.64	1.82	23.69	2.92
d / t			.19	1.60	.32	2.44*	.32	2.42*	.40	3.23***
Megacube B	7	148	12.62	2.68	12.19	2.03	11.08	1.72	22.29	3.81
d / t			.05	.47	.37	3.31**	.36	3.26**	.18	1.60
Megacube C	6	177	12.50	1.93	11.38	2.32	10.42	1.94	21.59	4.04
d / t			.20	1.65	.41	3.82***	.43	3.95***	.33	3.05**
Megacube D	5	165	12.14	1.74	10.36	2.64	9.57	2.03	20.23	4.19
d / t			.34	2.90**	.68	5.80***	.50	4.28***	.54	4.71***
Megacube E	4	138	11.50	2.05	8.43	3.07	8.54	2.14	17.86	4.57
d / t			.63	2.55***	.14	.56	.46	1.87	.69	2.74***
Cube 27	3	18	10.17	2.38	8.00	3.03	7.50	2.94	14.61	5.97

Note: Points: organizations were classified as being High (3 points), Middle (2 points), or Low (1 point) in levels of customer-, employee-, and enterprise-directed practices and placed in cubes or megacubes based on the summation. Cube One organizations were high on all three sets of practices and Cube27 were low on all three. Megacube A was composed of organizations rated High on two sets of practices and Middle on the third set. The standardized mean difference (*d*) and the independent sample *t* statistic are shown in rows for adjacent cubes/megacubes. We conducted multivariate analysis using SPSS's general linear model, The *F* statistic based on Wilks lambda for the fixed factor with the seven value categories was 23.87 (df 24, 969), p < .001, two-tailed, $\eta_p^2 = .14$.

*$p < .05$, two-tailed; **$p < .01$, two-tailed; ***$p < .001$, two-tailed

Hypothesis 3 posited that the nine cubes comprising the High enterprise-directed practices face (specifically Cubes One, 2, 3, 5, 8, 9, 12, 13, and 21—see Figure 2) would have higher levels of performance on the intermediate criterion of enterprise efficiency/effectiveness than the 18 cubes that constitute the middle and low slices below the High face. We conducted a multivariate analysis with organizational performance as well as the three intermediate criteria as dependent variables. As shown in Table 3, the *F* statistics based on Wilks lambda were statistically significant in all cases (i.e., for the entire sample and for subsamples of large and small, organizations and for-profit nonprofit organizations. The multivariate effect sizes (η_p^2) for the full sample were similar and well above the .14 threshold (Stevens, 2002) for large in all three analyses (high enterprise-directed face, .21; high customer-directed face, .22; and high employee-directed face, .19). We also averaged the three univariate partial eta-squared statistics (η_p^2) for each of the three face analyses and found them similar in (.10, .12, .10). It might be noted the results pertinent to Hypothesis 3 generalized to large and small organizations as well as to for-profit and nonprofit organizations. These data are provided in Table 3.

Table 3: Multivariate Analysis: High Practice Faces vs. Others (All Participants and Subgroups)

	Multivariate		Customer Sat/Loyalty		Employee Sat/Loyalty		Efficiency/ Effectiveness		Organization Performance	
	F	η_p^2	*B*	η_p^2	*B*	η_p^2	*B*	η_p^2	*B*	η_p^2
					Enterprise-Directed Practices					
All	57.02***	.21	.92***	.04	1.89***	.10	1.87***	.16	3.78***	.17
Large	16.34***	.22	.88***	.04	1.81***	.10	1.90***	.17	3.58***	.16
Small	35.36***	.21	1.17***	.07	2.05***	.14	1.75***	.19	4.14***	.17
For-Profit	50.97***	.22	.90***	.10	2.03***	.12	1.88***	.17	3.91***	.18
Non-Profit	5.25**	.14	1.12**	.06	1.24**	.06	1.54***	.09	3.03***	.10
					Customer-Directed Practices					
All	58.76***	.22	1.10***	.05	2.71***	.18	1.91***	.14	3.37***	.11
Large	39.11***	.23	1.02***	.04	2.74***	.19	1.96***	.14	3.39***	.11
Small	17.56***	.23	1.31***	.08	*2.86***	.17	2.05***	.16	3.11***	.09
For-Profit	48.19***	.21	1.06***	.05	*2.85***	.18	1.87***	.14	3.22***	.10
Non-Profit	9.38***	.22	1.37***	.09	1.86***	.12	2.05***	.15	3.94***	.15
					Employee-Directed Practices					
All	50.30***	.19	.88***	.02	2.51***	.11	2.51***	.17	4.23***	.12
Large	31.28***	.19	.80***	.02	2.62***	.12	2.44***	.16	3.94***	.11
Small	12.50***	.17	1.26***	.04	2.23***	.07	2.55***	.16	4.41***	.12
For-Profit	42.42***	.19	.95***	.03	2.65***	.11	2.49***	.17	4.28***	.12
Non-Profit	5.85***	.15	.54	.01	1.73**	.06	2.12***	.10	4.24***	.11

Notes: *B* = general linear model beta coefficient. η_p^2 = partial eta squared. Large organizations: $\geq$ 500 employees. Small organizations: < 500 employees. The *F* statistic is based on Wilks lambda with fixed factors: 1 = High Practice Face, 0 = Others. All N Productivity Practices: High = 392, Others = 468. All N Customer Practices: High = 248, Others = 612. All N Customer Practices: High = 147, Others = 713.

** $p < .01$, two-tailed;*** $p < .001$, two-tailed.

Hypothesis 4 posited that the nine cubes constituting the High customer-directed practices face (specifically Cubes One, 3, 4, 7, 9, 10, 15, 17, and 23—see Figure 3) would have higher levels of performance on the intermediate criterion of customer satisfaction/loyalty than the 18 cubes that constitute the middle and low slices below the High face. For the sample as a whole, there was a significant association ($\eta_p^2 = .05$, $p < .001$); however, counter to expectation, the association was stronger with regard to the other two intermediate criteria. Results are presented in Table 4. Similar patterns were found for large and small organizations as well as for-profit and nonprofit organizations.

Hypothesis 5 posited that the nice cubes constituting the High employee-directed practices face (specifically Cubes One, 2, 4, 6, 8, 10, 14, 16, 22—see Figure 4) would have higher levels of performance on the intermediate criterion employee satisfaction/loyalty than the 18 cubes that constitute the middle and low slices below the High face. As predicted there was a significant difference ($\eta_p^2 = .11$, $p < .001$); however, the pattern was only partly as would be predicted. The High employee-directed practices face had weaker association with the intermediate criterion of customer satisfaction/loyalty ($\eta_p^2 = .02$), but higher association with the intermediate criterion of efficiency/effectiveness ($\eta_p^2 = .17$). Results, presented in Table 3 indicate similar patterns across sector and organization size.

VI Discussion

To date many different theories have been advanced that seek to explain important determinants of organizational performance. Many prominent theories, though, have not been directly tested due to the absence of instrumentation, for example the congruence model (Nadler and Tushman, 1992), and Lawler's four-factor model (1986; 1992). The Cube One framework is directly testable and provides a taxonomy that permits classifying organizations; it also is potentially relevant to diagnosing and improving organizations.

Although the Cube One framework does not purport to explain the performance of every organization, it does pertain to organizations that seek to create value and survive through the production of goods and provision of services. It is, therefore, relevant to both for-profit and nonprofit organizations. Although our literature review is not exhaustive, we have not found a model that systematically measures the frequency of enactment of practices pertinent to the academic disciplines of human resource management, marketing, quality management, industrial and organizational psychology, and operations management.

As hypothesized, higher levels of organizational performance were found for organizations in Cube One compared to Cube 27, and the difference was sizable (> 7 standard errors). Also, as predicted, there was a consistent relationship across all seven cubes/metacubes. We conducted a multivariate analysis using the SPSS general linear model. The *F* statistic based on Wilks lambda for the fixed factor with seven values (Cube 1, five megacubes, and Cube 27) was 23.87 (df 24, 969), $p < .001$, two-tailed with $\eta_p^2 = .14$.

There was partial support for the hypotheses pertaining to the three faces of the Cube One framework. Consistent with Hypothesis 3 the High Enterprise-direct practices face scored significantly higher on enterprise efficiency/effectiveness than the middle and low slices, and the patterns of association with other intermediate criteria were fully in conformance with a priori expectations. With regard to Hypothesis 4, the High customer-directed practices face had higher levels of customer satisfaction/loyalty than the middle and low slices, but did not "line up" with regard to the other criterion measures. Hypothesis 5 was supported, but results for the High employee-directed practices face did not conform fully to a priori expectations.

An examination of bi-variate relationships (see Table 2) provides a partial explanation for the present results. The single best predictor of Organizational Performance was the intermediate criterion enterprise efficiency/effectiveness ($r = .63$), and the single best predictor of enterprise efficiency/effectiveness was the summated score on enterprise-directed practices ($r = .62$). Also consistent with the theorized network, the best predictor of employee satisfaction/loyalty was the summated score on employee-directed practices ($r = .62$). However, customer satisfaction/ loyalty was only moderately associated with organizational performance ($r = .31$), and not more strongly associated with customer satisfaction/loyalty than were enterprise- and employee-directed practices ($r = .29$, $r = .25$, and $r = .27$, respectively).

While it is possible that the theorized framework is incorrect, a more plausible explanation for the weak results with regard to customer-directed practices and customer satisfaction/loyalty is that respondents were employees of the organization, not customers. Consequently, participants may have lacked the information required to answer these questionnaires item correctly, or knowledgably. Future research should obtain customer practices and criterion data from actual customers.

There are other limitations that might be noted. First, because all data were collected from the same source at the same point in time, there is the threat of common method variance. A few

facets of the present research mitigate this threat. As noted by Podsakoff, MacKenzie, Lee, and Podsakoff (2003), not all types of measures and item formats are equally susceptible to this threat. In this regard it is notable that we asked respondents to describe the frequency of observable practices, rather than the strength of their attitudes toward "vague concepts" (p. 888). Second, the intermediate criterion variables sued multiple anchors/endpoints, and the measure of organizational performance employed three different descriptors and a 10-point scale. The use of differing scale formats and anchors is recommended by Podsakoff et al. Third, we insisted on anonymity, specifically instructing potential respondents as follows: "Please do not put your name on this survey." This served to reduce evaluation apprehension.

Although it is not uncommon for research on human resource management practices to rely on a single source report (e.g., Delany and Huselid, 1996), Gerhart, Wright and McMahan (2000) reported finding relatively low interrater reliability when they asked different employees about organizational practices. Importantly, it should be noted that in the Gerhart *et al.* study, respondents were asked to provide detailed information about the proportion of the workforce "that is covered by or experience" specific benefits. This is rather detailed information. In the present research, respondents were asked to describe the frequency of relatively broad-gauged practice statements: e.g., "Employee layoffs are avoided where possible, by first attempting to place employees in other jobs within the organization."

The sample in the present research is large and includes a broad and diverse population, yet it is not representative of all organizations and may include sampling bias (cf. Denrell, 2003) which, if it exists, is unmeasured and unknown. The interests of three key participants were examined, but other stakeholders exist. Multicollinearity exists among the sets of practices and the intermediate criteria. Evidently, well run organizations tend to enact high levels of all three sets of practices.

As noted above, respondents in the present research were drawn from a pool of individuals taking training courses; hence the existence of non-response bias is difficult to calibrate insofar as there are no norms from a universe population. Perhaps the closest approach to gauging the representativeness of organizational respondents is by comparing results in the present research to the aforementioned prior survey study, both using the same 3-item organizational performance scale. Mean organizational performance scores were 21.43 and 20.11, respectively, a difference which indicated significantly higher performance in the present sample. However, in the present research 69 percent of respondents worked for large organizations, whereas in the prior sample 61 percent of respondents worked for large organizations. Controlling for organization size, the mean performance score in the prior study would have been 21.49—almost identical with the organizational performance score in the present research (of 21.43). The present endeavor began with extensive literature reviews across multiple disciplines to identify practices that contribute meaningfully and predictably to organization performance. It is not claimed, though, that final set of 78 practices provides "the" prescription for generating good performance, nor is it claimed that these practices are the best ones organizations can, or should, employ. Rather, the practices identified are but a sampling of the (large) universe of practices that might be employed. In any event, achieving and maintaining sustained competitive advantage appears to be an elusive goal (Wiggins and Ruefli, 2002).

In brief, the present research found large effects for the Cube One framework with regard to each set of practices and organizational performance. There was partial support for the three faces of the model, and results generalized to subsamples based on organization size and sector, findings supportive of external validity.

The Cube One framework may have substantial practical utility, providing managers with a tool to diagnose and intervene effectively in improving organization performance. It may be possible to discern if a particular organization is deficient in one or more of the three sets of practices, in which case there may be a need for more attention to enterprise-, customer- or employee-directed practices.

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Wiggins, R., and T. W. Ruefli. 2002. "Sustained Competitive Advantage: Temporal Dynamics and the Incidence and Persistence of Superior Economic Performance." *Organization Science*, 13: 82-105.

Appendix: Illustrative Journal Sources for Nine Practice Statements

Customer-Oriented Practice Statements

Statement: Multiple customer segments are targeted with differentiated products and/or marketing strategies.

Cronin Jr., J., and S. A. Taylor. 1992. "Measuring Service Quality: A Reexamination and Extension." *Journal of Marketing*, 56(3), 55-68.

Schneider, B., J. K. Wheeler, and J. F. Cox. 1992. "A Passion for Service: Using Content Analysis to Explicate Service Climate Themes." *Journal of Applied Psychology*, 77(5), 705-716.

Schreuder, H., P. van Cayseele, P. Jaspers, and B. de Graaff. 1991. "Successful Bear Fighting Strategies." *Strategic Management Journal*, 12(7), 523-533.

Statement: Complaints/problems are resolved quickly

Connor, T. 1999. "Customer-led and Market-oriented: A Matter of Balance." *Strategic Management Journal*, 20(12), 1157-1163.

Keller, K. 1991. "Cue Compatibility and Framing in Advertising." *Journal of Marketing Research*, 28(1), 42-57.

Matsuno, K., and J. T. Mentzer. 2000. "The Effects of Strategy Type on the Market Orientation—Performance Relationship." *Journal of Marketing*, 64(4), 1-16.

Smith, A. K., R. N. Bolton, and J. Wagner. 1999. "A Model of Customer Satisfaction with Service Encounters Involving Failure and Recovery." *Journal of Marketing Research*, 36(3), 356-372.

Statement: All employees, including senior management, are regularly exposed to customers.

Agrawal, D., and R. Lal. 1995. "Contractual Arrangements in Franchising: An Empirical Investigation." *Journal of Marketing Research*, 32(2), 213-221.

Ganesan, S. 1993. "Negotiation Strategies and the Nature of Channel Relationships." *Journal of Marketing Research*, 30(2), 183-203.

Hennart, J., T. Roehl, and D. S. Zietlow. 1999. "`Trojan Horse' or `Workhorse'? The Evolution of U.S.–Japanese Joint Ventures in the United States." *Strategic Management Journal*, 20(1), 15-29.

Jap, S. D. 1999. "Pie-expansion Efforts: Collaboration Processes in Buyer-supplier Relationships." *Journal of Marketing Research*, 36(4), 461-475.

Kumar, N., L. K. Scheer, and J. M. Steenkamp. 1995. "The Effects of Perceived Interdependence on Dealer Attitudes." *Journal of Marketing Research*, 32(3), 348-356.

Kumar, N., L. K. Scheer, and J. M. Steenkamp. 1995. "The Effects of Supplier Fairness on Vulnerable Resellers." *Journal of Marketing Research*, 32(1), 54-65.

Matsuno, K., and J. T. Mentzer. 2000. "The Effects of Strategy Type on the Market Orientation-performance Relationship." *Journal of Marketing*, 64(4), 1-16.

Powell, T. C., and A. Dent-Micallef. 1997. "Information Technology as Competitive Advantage: The Role of Human, Business, and Technology." *Strategic Management Journal*, 18(5), 375-405.

Richardson, J. 1993. "Parallel Sourcing and Supplier Performance in the Japanese Automotive Industry." *Strategic Management Journal*, 14(5), 339-350.

Employee-Oriented Practice Statements

Statement: Managers serve as mentors to junior staff.

Arthur, J. B., and J. B. Dworkin. 1991. "Current Topics in Industrial and Labor Relations Research and Practice." *Journal of Management*, 17(3), 515-572.

Delaney, J. T., and M. A. Huselid. 1996. "The Impact of Human Resource Management Practices of Perceptions of Organizational Performance." *Academy of Management Journal*, 39(4), 949-969.

Feuille, P., and D. R. Chachere. 1995. "Looking Fair or Being Fair: Remedial Voice Procedures in Nonunion Workplaces." *Journal of Management*, 21(1), 27-42.

Karambayya, R., J. M. Brett, and A. Lytle. 1992. "Effects of Formal Authority and Experience on Third-party Roles, Outcomes, and Perceptions of Fairness." *Academy of Management Journal*, 35(2), 426-438.

Olson-Buchanan, J. B. 1996. "Voicing Discontent: What Happens to the Grievance Filer after the Grievance?" *Journal of Applied Psychology*, 81(1), 52-63.

Shaw, J. D., J. E. Delery, J. Jenkins, and N. Gupta. 1998. "An Organization-level Analysis of Voluntary and Involuntary Turnover." *Academy of Management Journal*, 41(5), 511-525.

Terpstra, D. E., and D. D. Baker. 1992. "Research Notes: Outcomes of Federal Court Decisions on Sexual Harassment." *Academy of Management Journal*, 35(1), 181-190.

Statement: Employees are assisted in balancing work and family responsibilities (e.g., through dependent care, flexible scheduling).

Aryee, S., D. Fields, and V. Luk. 1999. "A Cross-cultural Test of a Model of the Work-family Interface." *Journal of Management*, 25(4), 491-511.

Carlson, D. S., and P. L. Perrewé. 1999. "The Role of Social Support in the Stressor-strain Relationship: An Examination of Work-family Conflict." *Journal of Management*, 25(4), 513-540.

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Lambert, S. J. 2000. "Added Benefits: The Link between Work-life Benefits and Organizational Citizenship Behaviors." *Academy of Management Journal*, 43(5), 801-815.

Perry-Smith, J. E., and T. C. Blum. 2000. "Work-family Human Resources Bundles and Perceived Organizational Performance." *Academy of Management Journal*, 43(6), 1107-1117

Pierce, J. L., and R. B. Dunham. 1992. "The 12-hour Work Day: A 48 Hour, Eight-day Week." *Academy of Management Journal*, 35(5), 1086-1098.

Tompson, H. B., and J. M. Werner. 1997. "The Impact of Role Conflict/facilitation on Core and Discretionary Behaviors: Testing a Mediated Model." *Journal of Management*, 23(4), 583-601.

Statement: Employees are trusted, respected, and treated fairly.

Hartline, M. D., J. G. Maxham III, and D. O. McKee. 2000. "Corridors of Influence in the Dissemination of Customer-oriented Strategy to Customer Contact Service Employees." *Journal of Marketing*, 64(2), 35-50.

Hyatt, D. E., and T. M. Ruddy. 1997. "An Examination of the Relationship between Work Group Characteristics and Performance: Once More into the Breach." *Personnel Psychology*, 50(3), 553-585.

Konovsky, M. A., and S. Pugh. 1994. "Citizenship Behavior and Social Exchange." *Academy of Management Journal*, 37(3), 656-669.

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Naumann, S. E., and N. Bennett. 2000. "A Case for Procedural Justice Climate: Development and Test of a Multilevel Model." *Academy of Management Journal*, 43(5), 881-889.

Powell, T. C., and A. Dent-Micallef. 1997. "Information Technology as Competitive Advantage: The Role of Human, Business, and Technology." *Strategic Management Journal*, 18(5), 375-405.

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Robinson, S. L., M. S. Kraatz, and D. M. Rousseau. 1994. "Changing Obligations and the Psychological Contract: A Longitudinal Study." *Academy of Management Journal*, 37(1), 137-152.

Schneider, B., J. K. Wheeler, and J. F. Cox. 1992. "A Passion for Service: Using Content Analysis to Explicate Service Climate Themes." *Journal of Applied Psychology*, 77(5), 705-716.

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Wanous, J. P., T. D. Poland, S. L. Premack, and K. Davis. 1992. "The Effects of Met Expectations on Newcomer Attitudes and Behaviors: A Review and Meta-analysis." *Journal of Applied Psychology*, 77(3), 288-297.

Productivity-Oriented Practice Statements

Statement: The mission statement and core values are well communicated.

Audia, P. G., E. A. Locke, and K. G. Smith. 2000. "The Paradox of Success: An Archival and a Laboratory Study of Strategic Persistence following Radical Environmental Change." *Academy of Management Journal*, 43(5), 837-853.

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Iaquinto, A. L., and J. W. Fredrickson. 1997. "Top Management Team Agreement about the Strategic Decision Process: A Test of its Determinants and Consequences." *Strategic Management Journal*, 18(1), 63-75.

St. John, C. H., and L. W. Rue. 1991. "Research Notes and Communications Co-ordinating Mechanisms, Consensus between Marketing and Manufacturing Groups, and Marketplace Performance." *Strategic Management Journal*, 12(7), 549-555.

Sawyer, J. E. 1992. "Goal and Process Clarity: Specification of Multiple Constructs of Role Ambiguity and a Structural Equation Model of their Antecedents and Consequences." *Journal of Applied Psychology*, 77(2), 130-142.

Spreitzer, G. M. 1996. "Social Structural Characteristics of Psychological Empowerment." *Academy of Management Journal*, 39(2), 483-504.

Vancouver, J. B., R. E. Millsap, and P. A. Peters. 1994. "Multilevel Analysis of Organizational Goal Congruence." *Journal of Applied Psychology*, 79(5), 666-679.

Vancouver, J. B., and N. W. Schmitt. 1991. "An Exploratory Examination of Person-organization Fit and Organizational Goal Congruence." *Personnel Psychology*, 44(2), 333-352.

Witt, L. A. 1998. "Enhancing Organizational Goal Congruence: A Solution to Organizational Politics." *Journal of Applied Psychology*, 83(4), 666-674.

Statement: Employees are encouraged to develop both new and existing customers.

Bitner, M., B. H. Booms, and L. A. Mohr. 1994. "Critical Service Encounters: The Employee's Viewpoint." *Journal of Marketing*, 58(4), 95-106.

Hyatt, D. E., and T. M. Ruddy. 1997. "An Examination of the Relationship between Work Group Characteristics and Performance: Once More into the Breach." *Personnel Psychology*, 50(3), 553-585.

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Patterns and Determinants of Intra Industry Trade for the Mexican Non-Maquiladora Manufacturing Industry

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This study proposes that a quantification of bilateral IIT executed without differentiation of the maquiladora component overestimates the IIT index for Mexico with its North American Free Trade Agreement (NAFTA) partners. The adjusted index performed in this paper shows that Mexican trade benefits from NAFTA are overvalued. After the non-maquiladora IIT index is differentiated according to its horizontal or vertical nature, this study finds that the Mexican non-maquiladora IIT is mainly of a vertical nature. In addition, an econometric estimation of the determinants encompasses several variables which differentiate between horizontal and vertical IIT. This work finds that differences in market size, Foreign Direct Investment (FDI), product differentiation and trade restrictions were significant determinants of this trade.

Keywords: Intra-Industry Trade, Maquiladora, Mexico, NAFTA

JEL Classifications: F13, F14

I. Introduction

During the second half of the nineteen-eighties until the end of the nineties (between 1988-91, 1992-95, and 1996-2000 specifically), Mexico stood amongst the countries with the highest growing intra-industry trade (IIT) indices (OECD, 2002). This enhanced performance emerged as a result of the economic liberalization process initiated during the mid-80s (Lustig, 1994). Some quantitative estimations called for an index of around 60 to 70 percent during these years, particularly for quantifications between Mexico and the Unites States (Globerman, 1992; González and Vélez, 1995; Clark et al., 2001; Ekanayabe et al., 2009). Ramírez (1999) concluded that the conditions of the North American Free Trade Agreement (NAFTA) favored further increase of IIT given the assembly characteristics of the maquiladora (in-bond) industry, which supported this type of trade. This article demonstrates, however, that previous calculations of the trade benefit Mexico gained from NAFTA have been overestimated due to the addition of the maquiladora trade data flows.

The maquiladora industry initially developed in the mid-1960s as an export oriented assembly industry based in the northern Mexican border as a part of a broad industrialization program for this region (González-Aréchiga and Barajas, 1989). Moreover, the maquiladora program was the result of an international globalization process that led corporations to relocate

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some stages of the production process to another country to reduce production costs and gain competitiveness in their domestic markets (Clark et al., 1993).

Maquiladora's trade was based on imports of parts and components which were dispatched primarily from the U.S. for assembly in Mexico and subsequently shipped back to the U.S. (*idem*) with little value added and without significant integration in the domestic market. For this reason, the maquiladora industry is largely described as a vertical specialization trade where the exchange of goods takes place at different stages of the production process (Hummels et al., 1998). Conversely, the IIT is characterized as the exchange of product varieties belonging to the same production process (Greenaway and Milner, 1986). An increase of IIT between trade partners is seen as a positive effect of trade integration which implies reduced adjustment costs (Balassa, 1979). Consequently, an accurate measurement of IIT would ultimately result in adjusted indices for Mexico's IIT and its NAFTA partners, implying that the benefits from this trade accord were not as significant as previously thought. Therefore, this paper maintains that a differentiation of trade flows derived from the maquiladora industry is necessary when analyzing IIT flows of the Mexican manufacturing industry.

Previous quantitative estimations present limitations when the maquiladora industry data is included within IIT index quantification.[1] Their main problem involved an overestimation of the index, resulting in inaccurate conclusions about the Mexican manufacturing industry trade performance as a result of the trade liberalization process and the NAFTA accord. Moreover, owing to the significance of the maquiladora industry in international trade as well as the added relevance of IIT due to a greater trade integration of Mexico into the world economy, Mexican international trade merits deeper analysis that takes into account the difference between this country and the NAFTA partners. Following this logic, the purpose of this article is as follows.

First and foremost, this article aims to provide an accurate measurement of IIT indices for Mexico and its NAFTA partners in demarcation of the maquiladora component. Relatedly, differences between horizontal and vertical IIT will also be critically explored with special consideration given to the determinants of these types of trade for the Mexican non-maquiladora industry and its NAFTA partners from 1994 to 2006. This investigation does not take into account data subsequent to the year 2006 because the National Institute of Statistics, Geography and Informatics (INEGI in Spanish) has not published any maquiladora trade data since 2006. This article also hypothesizes the need to distinguish between non-maquiladora and maquiladora trade for a quantification of IIT indices because of the vertical specialization and international fragmentation characteristic of the maquiladora industry[2] (Campa and Goldberg, 1997; Hummels et al., 1998). This point is of key relevance since if the most widely used definition of IIT (Grubel and Lloyd, 1975) is applied to Mexico.

Furthermore, although recent advances in the quantification of IIT indices seemed to differentiate trade flows according to their nature, either horizontal (same quality varieties) (Greenaway et al., 1994/1995) or vertical (varieties of different quality) (*idem*), few studies examined the Mexican case conducting such differentiation, including the maquiladora industry trade flows (Vogiatzoglou, 2005; Valderrama and Neme, 2011). This failure is particularly

[1]Such has been the case in the case of Esquivel (1992), Globerman (1992), and Ekanayabe (2001) or more recently with Vogiazoglou (2005) and Valderrama and Neme (2011) where the IIT estimation has been done for the total manufacturing industry, including the maquiladora.

[2]It is also known as the dual production of international framework. It is worth noting that the new advances in the theoretical literature regarding firm heterogeneity and international trade appear to include characteristics of the trade of differentiated goods and the analysis of goods in different production stages. In this respect a greater understanding in terms of quantification is still needed.

surprising since distinguishing IIT indices according to their nature is chiefly important in the Mexican context where the trade between Mexico and its NAFTA partners is one between unequal partners (Salvatore, 2007). Moreover, it is largely accepted that North-South IIT flows are predominantly of a vertical nature (Tharakan, 1989). Consequently, a model examining the determinants of this type of trade should be essentially different from a model inspecting the determinants of horizontal IIT, a contribution this paper makes by precisely formulating an empirical model for the determinants of IIT differentiated by its horizontal and vertical natures.

Therefore, a patent research gap exists in relation to the maquiladora industry, a crucial component of Mexican foreign trade. Moreover, when an examination of the IIT have been performed without exercising a distinction between maquiladora and non-maquiladora flows as well as between horizontal and vertical IIT, an added problem in the quantification of indices has been carried forward , providing further validation for the objectives of the present investigation.

Hence, the differentiation of maquiladora components in the estimation of the Mexican manufacturing industry (from 1994-2006) will comprise one of the key focal points of this study. Relatedly, this article will distinguish the types of IIT—horizontal or vertical—according to the author, a likely prevalence in the bilateral exchange of non-maquiladora. Lastly, discussions linked to the estimation of non-maquiladora determinants of the IIT will also be explored.

Estimates of the indices will be performed using a six-digit breakdown, following the 1996 version of the international classification of harmonized system. In this way, the present investigation differs from previous studies which have typically made use of estimated indices with an aggregation of three digits or less, which created problems of statistical aggregation (Esquivel, 1992; González and Vélez, 1995; Brulhart and Thorpe, 2001). Furthermore, the IIT indices are quantified as bilateral to avoid geographical aggregation. This study follows the widely used Grubel and Lloyd (1975) index as well as the adjusted index developed by Greenaway and Milner (1984) to differentiate the IIT according to horizontal and vertical nature.

Based on the above argumentation, this article will discuss how the inclusion of the maquiladora component in the indices measurement results in the overestimation of bilateral IIT indices in relation to the United States and Canada. Subsequently, the focus of the article will shift to the analysis of non-maquiladora IIT indices, their differing horizontal and vertical components and how this results in a high percentage for the latter. The final sections of this article will deal with an econometric model specification to analyze the determinants of the horizontal and vertical IIT for the non-maquiladora industry and a series of concluding remarks.

II. Measurement of the Bilateral IIT Indices for the Mexican Manufacturing Industry

In order to highlight the significance of the maquiladora industry for Mexico's international trade, trade data was organized following a table format, ordering figures under origin and destination categories while concomitantly differentiating maquiladora and non-maquiladora data. This table highlights the significance of the U.S. market for Mexican products. On average, more than 80 percent of Mexican exports had the U.S. as their main destination. The increasing participation of the maquiladora products was also significant, for the rest of the countries listed in Table 1. These percentages support the argument of differentiating the maquiladora's flows from the total trade when estimating IIT flows.

The elevated percentages in the first three rows of the table corroborate the importance of the U.S. market for the Mexican export sector performance and the vulnerability in its demand due to high elasticity. It is also evident that while NAFTA was able to secure a market for

products originating in Mexico, a fall in domestic demand in the U.S. (such as the ones that occurred in 1989 and in 2000) resulted in a disproportionate decrease of exports.

Table 1: Mexican Trade by Origin and Destination Main Trade Partners (%)

Countries	Exports			Imports		
	1993	*1998*	*2006*	*1993*	*1998*	*2006*
United States	**82.70**	**87.77**	**84.75**	**69.29**	**74.38**	**50.91**
Maquiladora	*50.56*	*52.20*	*49.22*	*33.71*	*43.39*	*31.93*
Non-maquiladora	*49.44*	*47.80*	*50.78*	*66.29*	*56.61*	*68.07*
Canada	**3.01**	**1.29**	**2.07**	**1.80**	**1.83**	**2.88**
Maquiladora	*1.37*	*4.74*	*36.33*	*1.02*	*6.20*	*17.17*
Non-maquiladora	*98.63*	*95.26*	*63.67*	*98.98*	*93.80*	*82.83*
European Union	**5.20**	**3.31**	**4.31**	**11.93**	**9.40**	**10.84**
Maquiladora	*1.44*	*7.41*	*14.51*	*1.20*	*2.47*	*9.74*
Non-maquiladora	*98.56*	*92.59*	*85.49*	*98.80*	*97.53*	*90.26*
Japan	**1.36**	**0.72**	**0.64**	**6.01**	**3.62**	**5.97**
Maquiladora	*0.87*	*6.40*	*12.13*	*14.25*	*25.67*	*51.59*
Non-maquiladora	*99.13*	*93.60*	*87.87*	*85.75*	*74.33*	*48.41*
Other Countries	**7.73**	**6.91**	**8.23**	**10.97**	**10.77**	**29.40**
Maquiladora	*2.24*	*4.39*	*18.93*	*7.07*	*15.66*	*45.16*
Non-maquiladora	*97.76*	*95.61*	*81.07*	*92.93*	*84.34*	*54.84*

Source: own calculation based on INEGI-BANXICO databases, several years

Although the Canadian contribution to Mexico's total foreign trade was small, when this trade is differentiated between maquiladora and non-maquiladora, the latter increased both exports and imports. A similar scenario occurs in the case of European Union countries. Thus, the maquiladora industry represented a positive addition to Mexican foreign trade and in particular was of critical importance for its main trading partner, the U.S. Furthermore, the maquiladora industry also heavily impacted the quantification of IIT bilateral indices.

The following section will identify the data gathering sources used in this article and how the quantification of IIT bilateral indices was performed.

A. Data Gathering Sources

The construction of indices was made using the databases generated by the National Institute of Statistics and Geography (INEGI in Spanish) and the Bank of Mexico (BANXICO in Spanish)[3]. These institutions include in their trade flows register data differentiated between maquiladora and non-maquiladora for the years up to and including 2006, following the

[3]Since international trade statistics do not consider the unbundling of Mexican accounts between maquiladora and non-maquiladora, this study considered of greater relevance the Mexican sources of information.

classification of the 1996 version of Harmonized System (HS). This classification encompasses a level of disaggregation of the information of up to eight digits for exports and up to ten digits for imports.

In relation to bilateral manufacturing trade between Mexico and United States, the study made use of a total of 4,500 tariff subsections to six digits for exports. Imports were differentiated between maquiladora and non-maquiladora with approximately 3000 fractions for bilateral trade with Canada.

In addition, trade data was matched with the Mexican Classification of Activities and Products (CMAP in Spanish) following the 1994 Mexican version published by the INEGI. This version is in turn based on revision 2 of the International Standard Industrial Classification (ISIC). This correspondence was performed in order to facilitate the classification of trade in terms of its industrial counterparts. Therefore, the IIT indices were aggregated to six digits which resulted in 310 industrial activities which were subsequently added to a level of 27 branches (three digits) and 9 (two digits) industries.

B. IIT Indices Quantification

The construction of indices was performed according to the method proposed by Greenway and Milner (1984), who based their construction on the Grubel-Loyd index (1975):

$$IIT_i^k = 1 - \frac{\sum_j^n \left| X_{ji}^k - M_{ji}^k \right|}{\sum_j^n \left(X_{ji}^k + M_{ji}^k \right)} \qquad (1)$$

The index of IIT_i^k is represented as the residue from total trade to the inter-industrial component. The index value goes from 0 (non-existence of intra-industrial trade) to 1 (totally intra-industrial trade). More specifically, IIT_i^k is conceived as the index of *i* industries for the *k* industry, *k* representing either maquiladora, total (maquiladora and non-maquiladora) or non-maquiladora industry. Bilateral trade is aggregated from *j* products of HS classification to *i* CMAP industries.

As seen in the above table, the IIT for Mexico with the U.S. in its totality is higher than IIT non-maquiladora for the entire 1993-2006 period. However, a convergence between the two indices (total and non-maquiladora) is largely explained by changes in the type of commercial flow attributed to the maquiladora and the growth of the non-maquiladora IIT. For instance, in 1993 the total IIT was approximately 40 percent (including maquiladora), while non-maquiladora IIT was 25 percent, demarking a difference of 15 percentage points. However, 2006 demarcates a differing trend to the one from 1995. In this respect, the overall IIT and non-maquiladora IIT appear to be fairly similar. Indeed, the maquiladora component does not affect the total index to the degree it did previously, which can be explained by the fact that the maquiladora has shifted to become further inter-industrial in its nature. In addition, due to the slowdown in the U.S. economy and its immediate impact on the maquiladora industry, its trade suffered a reduction in volume after 2001 (Cañas and Gilmer, 2007). Thus, as Table 2 demonstrates, the total IIT remained around 40 percent for the entire period due to changes in the maquiladora industry (which became more inter-industrial) and the increase in the non-maquiladora IIT. This adjusted percentage is lower than indices calculated in previous estimations for the Mexican IIT (Brulhart

and Thorpe, 2001; Leon and Dussel-Peters, 2001; Clark et al., 2001; Vogiatzoglou, 2005; Valderrama and Neme, 2011) due to its calculation included the maquiladora trade flows.

Table 2: Bilateral IIT indices for Mexico with United States and Canada 1993-2006 (%)

	United States		Canada	
	IIT Non-Maquiladora	IIT Total	IIT Non-Maquiladora	IIT Total
1993	25.02	39.52	4.35	4.84
1994	26.26	39.77	11.81	12.52
1995	28.03	38.96	8.68	9.48
1996	29.68	39.80	10.77	12.21
1997	32.34	41.73	14.06	15.46
1998	33.68	42.02	16.82	18.48
1999	34.28	41.42	14.21	16.14
2000	35.89	42.49	18.08	20.18
2001	37.19	42.48	16.95	19.03
2002	39.38	41.93	25.46	26.24
2003	39.65	41.11	27.80	29.29
2004	40.58	41.26	23.52	24.71
2005	39.26	40.39	28.32	27.10
2006	38.82	39.80	26.71	26.37

The maquiladora trade represented 50 percent of Mexico's total trade activities for the entire period, showing that the maquiladora industry played a significant role within the manufacturing trade. Additionally, the maquiladora's trade balance was largely positive whereas the non-maquiladora trade balance was predominantly in deficit for the examined period. It is worth highlighting this fact since the expression´s numerator (see expression 1) measures the absolute value of trade balance.

The index of IIT between Mexico and Canada is a good example of how both total and non-maquiladora IIT indices are quite similar (see Table 2), due to a reduced participation in the maquiladora trade by these two countries (see Table 1). Up until the year 2000, the maquiladora trade followed similar trends to those observed in non-maquiladora industries for which differences were detected in the trade between Mexico and the U.S. Nevertheless, the total IIT was not affected by the maquiladora industry since the average growth for the previously mentioned period was of 12 percent. Although the total IIT index overestimated the non-maquiladora IIT, the difference was not significant. Notwithstanding these results, it is evident a clear growth rates were witnessed in both economies for the non-maquiladora IIT indices. Finally, it is worth noting that the U.S. economic recession, which started in the year 2000, affected trade between Canada and Mexico and thus created a shift within the maquiladora trade, turning it increasingly inter-industrial for a period that lasted until 2004.

II. Measurement of Bilateral Horizontal and Vertical IIT for the Non-maquiladora Manufacturing Industry

As previously delineated, this article also aims to analyze the results for the bilateral non-maquiladora IIT indices by differentiating them according to their nature (horizontal and vertical). In order to perform this task, the author employed the expression outlined in expression (2). This expression redefines the adjusted index G-L (TIIT) to include the distinction between horizontal (HIIT) and vertical trade (VIIT):

$$\mathrm{TIIT}_{ji}^{p}=\frac{\sum_{j}^{n}\mathrm{IIT}_{ji}^{p}}{\sum_{j}^{n}\left(\mathrm{X}_{ji}+\mathrm{M}_{ji}\right)}*100=\frac{\sum_{j}^{n}\left(X_{ji}^{p}+M_{ji}^{p}\right)-\sum_{j}^{n}\left|X_{ji}^{p}-M_{ji}^{p}\right|}{\sum_{j}^{n}\left(X_{ji}+M_{ji}\right)}*100 \qquad (2)$$

Expression (2) was applied to *j* products of the HS classification. Trade products were aggregated into *i* industries according to the CMAP classification, whereby *p* may refer to the horizontal trade (H) or vertical trade (V). Therefore, from expression (2) TIIT = HIIT + VIIT. According to the methodology suggested by Abd-el Rahman (1991), the unit values of exports and imports were used to distinguish each type of intra-industrial trade under the assumption that prices were the best approximation of the quality of a product. This allowed for a variety of goods of similar quality to be traded and classified as horizontal, provided they were within the following interval:

$$1-\alpha\leq\frac{UV_i^x}{UV_i^m}\leq 1+\alpha \qquad (3)$$

UV_i^x and UV_i^m were the ratios used for the unit values of exports and imports for the product *i* and α is the threshold value. Conversely, the trade of goods of different qualities (i.e. the vertical IIT) occurs when the unit value ratio falls outside the following ranges:

$$\frac{UV_i^x}{UV_i^m}<1-\alpha \quad \text{or} \quad \frac{UV_i^x}{UV_i^m}>1+\alpha \qquad (4)$$

The proposed threshold values (α) were 15 and 25 percent[4]. Expression (4) includes an additional disaggregation to analyze whether the vertical IIT is of low or high quality using the unit values of exports and imports to classify goods of high quality as well as those of low quality (Greenaway et al., 1994). Following this reasoning, one would expect that those countries with a high capital/labor ratio would specialize in the export of goods of high quality. Nevertheless, this was not entirely the case for a number of reasons. In order to demonstrate why this process was not realized in its entirety, the following table illustrates the disentanglement of the horizontal and vertical bilateral IIT (percentages) between Mexico and NAFTA partners.

The IIT figures shown in Table 3 highlight how significant vertical IIT was present throughout the 1994-2004 periods for non-maquiladora Mexican products, both at threshold values of 0.25 and 0.15. The well-differentiated indices underlined the North-South trade relationship character of Mexico with these countries and confirmed that the aforementioned

[4]Abd-el Rahman selected 15 percent as a threshold limit; however, this value was subsequently extended to 25 percent (Greenaway et al., 1994: Blanes and Martín, 2000; Sohn and Zhang, 2006).

trade was based on comparative advantages as contended by Neo-Heckscher-Ohlin's theory (or Neo-H-O) (Falvey, 1981; Falvey and Kierzkowski, 1987).

Conversely, the bilateral rates in relation to the U.S. seemed to suggest a slight increase in the horizontal trade for the last years of the examined period ($\alpha = 0.25$), despite the fact that vertical trade was dominant throughout most of this time. In turn, vertical IIT was characterized as being of high or low quality, the latter being predominant for Mexico and its trading partners.

Table 3: Horizontal (HIIT) and Vertical (VIIT) Bilateral IIT (%)

		α=*0.25*		α=*0.15*		*VIIT*	
	TOTAL	***HIIT***	***VIIT***	***HIIT***	***VIIT***	***High α>1.15***	***Low α<0.85***
United States							
1994	25.89	5.21	20.67	3.57	22.31	14.03	8.28
1995	27.80	4.73	23.07	2.95	24.85	14.59	10.25
1996	29.63	5.48	24.15	3.23	26.40	19.16	7.24
1997	32.32	6.36	25.96	4.20	28.12	18.49	9.63
1998	33.58	5.33	28.25	3.40	30.18	11.71	18.47
1999	34.13	8.00	26.13	5.55	28.58	16.23	12.35
2000	35.81	7.81	27.99	3.12	32.69	25.94	6.74
2001	37.28	7.11	30.18	2.76	34.52	28.53	5.99
2002	38.03	8.04	29.99	2.65	35.38	19.72	15.66
2003	38.98	17.05	21.94	14.10	24.88	10.27	14.62
2004	39.56	17.05	22.51	11.20	28.36	10.17	18.19
2005	39.26	25.50	13.76	17.00	22.27	10.26	12.00
2006	38.82	22.23	16.58	13.12	25.69	12.24	13.45
Canada							
1994	11.83	0.79	11.04	0.50	11.34	8.45	2.88
1995	8.71	0.62	8.09	0.42	8.29	4.26	4.03
1996	10.80	1.09	9.71	0.77	10.03	5.63	4.40
1997	14.03	2.15	11.88	0.80	13.23	5.60	7.63
1998	17.26	3.00	14.26	1.55	15.71	7.51	8.20
1999	14.27	1.90	12.37	1.31	12.96	6.91	6.06
2000	18.12	0.77	17.34	0.61	17.50	15.82	1.68
2001	17.09	2.48	14.61	0.49	16.60	13.18	3.42
2002	25.54	6.19	19.34	5.46	20.08	9.74	10.34
2003	27.88	15.77	12.11	14.66	13.22	4.87	8.34
2004	23.71	11.28	12.42	10.02	13.68	7.60	6.08
2005	28.32	20.48	7.85	14.65	13.67	7.93	5.75
2006	26.71	19.13	7.58	14.80	11.91	7.38	4.53

Source: own calculation based on INEGI-BANXICO databases, several years.

Similarly, Table 3 illustrates how percentages for the horizontal IIT as related to Mexican trade with the U.S. seemed to be higher than those for trade with Canada. In this regard, even though horizontal IIT with Canada increased during the years of the treaty (as percentages of the rate of total IIT), there was a visible predominance of trade of a vertical nature. A further

perceptible change also took place in relation to the vertical IIT for both the U.S. and Canada in equal manners. In correlation, the low quality vertical IIT dominated the entire period with the exception of the final two years when changes in the automotive industry (which represents nearly 50 percent of the total traded with Mexico) affected the final balance.

On the whole, the data confirmed the vertical nature of the IIT of Mexico with these two countries. Likewise, the percentages obtained were consistent with the findings obtained in studies for the IIT of North-South countries which showed a predominance of the vertical IIT (Fukao et al., 2003; Byun and Lee, 2005; Ando, 2006).

On this note, it is surprising that although one might expect the trade of goods to be vertically differentiated, the trend actually reflected an increase of horizontally differentiated products (Table 3). An analysis by industrial sectors showed that the main explanation for this trend was the changes in the NAFTA tariff schedule for the automotive industry.[5]

Establishing the IIT indices shows the need to differentiate the indices from the maquiladora component and more particularly, to examine the bilateral IIT between Mexico and its NAFTA partners. Accordingly, the following section will examine the empirical hypothesis, the proposed variables and its predicted signs.

III. Determinants of the Non-maquiladora IIT of Mexico with NAFTA Partners

This section analyzes the IIT determinants following the distinction proposed by Loertscher and Wolter (1980) and Balassa and Bauwens (1987), in which the authors suggest the need to differentiate between country-specific and industry-specific variables. This distinction is of key importance since the state of the economy in aggregate terms has an impact on the trade flow, whereas economies of scale, product differentiation and capital intensity are industry specific factors (*idem*).

A. Country-specific Variables

A.1. Differences in the Market Size (dgdp)

Linder (1961), citing Chamberlain-Heckscher-Ohlin's (C-H-O) theory, postulated that countries with similar market structures tend to share similar demand patterns. This similarity favored a trade of varieties of same quality or horizontal IIT (Greenaway and Milner, 2002). Therefore, the expectation would be that the narrower the disparity in the size of the markets, the greater the flow of goods horizontally differentiated. Likewise, Melitz (2003), while discussing the models of firm heterogeneity, argued that countries with similar demand structure tend to establish a trade of differentiated goods.

Conversely, given that the trade between Mexico and its NAFTA trading partners is characterized as a North-South trade (Clark and Stanley, 1999), the Neo-H-O framework postulates that an IIT of different quality between countries of different sizes should be used to examine behavior of trade flows between such countries.[6] In such a case, the assumption would

[5]The automotive industry represents close to 14 percent of total trade with the U.S. The tariff for automobiles went down from 20 percent in 1993 to 0 percent in 2003.

[6]Falvey (1981), Falvey and Kierzkowski (1987) and Flam and Helpman (1987) are considered as proponents of the monopolistic competition Neo-H-O framework, while Shaked and Sutton (1984) favored the oligopolistic market framework.

be that differences in market size would be positively related with trade of different qualities (horizontal or vertical trade). In this respect, a proxy variable, *dgdp*, which represents the differences in market size, is built with the GDP of each country, following Balassa and Bauwens (1987) who postulated the following:

$$dgdp_{fht} = 1 + \frac{[w * \ln w + (1-w) * \ln(1-w)}{\ln 2} \quad (5)$$

$$w = \frac{gdp_{ht}}{gdp_{ht} + gdp_{ft}}$$

The expression *w* in equation (5) illustrates a ratio of incomes (GDP) between trade partners. The subscript *f* refers to the Mexico's partner, *h* refers to Mexico and *t* represents the time period (1994-2006). This study assumes that the difference in income might be positively related to vertical IIT and total IIT (since the vertical IIT represents a high proportion of the total IIT), while conversely being negatively linked to horizontal IIT.

A.2. Differences in Per Capita Income (dpcgdp)

The variable *dpcgdp* represents the difference in per capita incomes between the two countries; it is constructed in the same way as in (5) with the difference that *w* refers to per capita GDP for Mexico and its trading partners.

As attested by numerous empirical estimates (Blanes and Martín, 2000; Durkin and Krygier 2000; Gullstrand, 2002; Sohn and Zhang, 2006; Turkcan and Ates, 2010), the *dpcgdp* can be largely viewed as a determinant of the IIT. Indeed, Linder (1961) postulated that the C-H-O theories could be used to explain how small differences in per capita income between countries might positively affect the IIT (horizontal IIT). Similarly, Flam and Helpman (1987) concluded that the IIT of vertically differentiated goods is determined by country size and income distribution variables. In effect, differences in income distribution produce a demand for trade of both low and high quality products.

Taking into consideration demand factors, this study predicts that differences in per capita income are negatively associated with the horizontal IIT and positively correlated with per capita income of vertical IIT and total IIT. In the latter case, this positive correlation will be due to the high percentage share of the vertical IIT in the total IIT.

A.3. Differences in Factor Endowments (dkl) and *(dedu)*

This study proposes the capital-labor ratio as an alternative variable for factor endowment differences between countries. The purpose is to verify whether these differences, seen from the supply side, have any effect on the performance of the IIT. The variable is based on the same theoretical framework as the *dgdp* and *dpcgdp* variables.

The study assumes that countries with similar factor endowments (similar capital-labor ratios) are likely to focus on the trade of varieties with similar qualities (horizontal IIT), whereas countries with different factor endowments tend to specialize on the trade of varieties of different quality (vertical IIT) (Falvey, 1981). Furthermore, this study proposes that differences in factor endowments, when referring to North-South countries (a relationship analyzed in this article), might explain the behavior of IIT flows (particularly those of a vertical nature).

More specifically, this study postulates that the variable *dkl* quantifies the differences in the capital-labor relationship between trading partners, known similarly as the differences in the capital intensity. However, it is worth highlighting that due to data availability restrictions, *dkl* was constructed out of data pertaining to the gross fixed capital formation (corrected by inventories depreciation).

A further measure which in conjunction with *dkl* intends to quantify differences in factor endowments is the difference in human capital endowments (*dedu*). Factor endowments have been commonly linked to differences in physical capital endowments (Falvey, 1981; Falvey and Kierzkowski, 1987). Although Torstensson (1991, 1996) has criticized the empirical estimates of the IIT determinants that only consider the physical capital as the main variable that explains a trade in goods of different qualities, the empirical analysis conducted by Torstensson (1996) concluded that human capital, rather than physical capital, was the main determinant of the vertical IIT (*idem*, 1991). This study therefore employs *dedu* as a proxy of the difference in the human capital endowments between trade partners. This variable is built as the difference in absolute values, of the percentage of the population between 25 and 64 years who have reached at least university, college or technical education. In terms of signs, the study expects the difference in factor endowments to have a negative effect on the horizontal IIT, and for this same difference to account for a boost in vertical IIT, based on the understanding that a skilled workforce is related to the production of high-quality goods.

A.4. Trade Orientation (to)

This variable *to* reveals that with a greater participation of a particular country in the world market, an increase in the flow of horizontally or vertically differentiated goods is likely to take place. The variable *to* is constructed following the methodology of Balassa and Bauwens (1987) out of the residuals of a regression in exports per capita with respect to income per capita and population:

$$\log\left(\frac{X_{hf}}{P_h}\right) = \alpha + \beta \log\left(\frac{Y_h}{P_h}\right) + \delta \log P_h + \varepsilon_h \qquad (6)$$

Where $to = \varepsilon X$ represents bilateral exports between *h* home country and *f* foreign country. *P* represents per capita income and *Y* is a variable for the GDP.

According to Balassa and Bauwens (1987) *to* is an indicator of trade openness. Thus the contention would be that greater openness of trade might yield positive effects for the horizontal and vertical IIT. Additionally, since the variable is constructed from exports, it makes it possible to differentiate total trade from its maquiladora component.

Empirical evidence supporting the argument of trade orientation as one of the IIT determinants can be found in the works of Thorpe and Zhang (2005) for the East Asian economies, Ekanayabe (2001) for the Mexican economy and Clark and Stanley (1999, 2003) for the U.S. economy.

B. Industry-specific Variables

IIT flows cannot be solely explained according to differences or similarities between trade countries since factors at industry level also influence IIT performance (Balassa and Bauwens, 1987). The theory of IIT flows is based on the monopolistic competition theory in

which product differentiation facilitates the explanation of trade of similar varieties of goods (Krugman, 1979; Lancaster, 1980). Accordingly, product differentiations, economies of scale and capital intensity, among other factors, are analyzed as determinants of trade of differentiated goods (Greenaway, 1984). Hence, this study proposes a set of explanatory variables of industrial attributes as determinants of the IIT indices for Mexico and its NAFTA partners.

B.1. Horizontal Differentiation of the Product (pdi)

The new theory of international trade indicates that industries specialize in a line of varieties of goods to such a degree that trade between countries takes places according to the demand for varieties that are not locally produced (Krugman, 1979, Lancaster, 1980). However, problems arise in the selection of an adequate measurement of a product differentiation variable (Greenaway and Milner, 1986). Taking this measurement problem into account, this study formulates a variable proxy as the difference in the ratio of unit values of exports. This variable is also built at the level of industry and on a bilateral basis as an index of similarity of unit values. This proxy is based on the work of Hufbauer (1970), who argues that if the products become increasingly homogeneous, the variation in unit values should be small. An approximation method can be obtained through the use of a modification proposed by Blanes and Martín (2000), which has the added advantage of being more manageable.

$$pdi_{ifht} = \sum_{j \in i} \left[\frac{V_j}{\sum V_{jt}} \times \frac{min\left(VU_{jht}, VU_{jf`t}\right)}{max\left(VU_{jht}, VU_{jf`t}\right)} \right] \tag{7}$$

In expression (7), *pdi* represents the index of homogeneity, *V* stands as the export value of the *j* product at *i* industry level and *VU* represents the unit value of exports. Lastly, *h* and *f* refer to the local and foreign country respectively.

As attested by expression (7), this study hypothesizes a greater product differentiation as linked to an increased trade of a horizontal nature. Likewise, the expectation would be for an enhanced differentiation of the product that would to negatively affect vertical IIT. Indeed, these two signs are both expected for total trade.

B.2. Economies of Scale (ee)

The heterogeneous industrial structure of Mexico as well as the presence of a large national and foreign capital in trade activities implies that the inclusion of various economies of scale in the model is of vital importance. In this regard, this article follows the methodology developed by Caves (1981) which has been recurrently used in studies dealing with the Mexican industrial structure (Casar et al., 1990; Dominguez and Brown, 2003). Thus, following Caves's (1981) methodology, the variable *ee* stands as the ratio between the minimum size efficient plant, *tme*, in relation to the relative disadvantage of costs, *drc*.

$$ee_{it} = \frac{tme_{it}}{drc_{it}} \tag{8}$$

As illustrated by expression (8), a positive relation is expected to occur between economies scales and horizontal IIT. Nonetheless, when referring to vertical IIT, signals are not as straightforward given that this variable is constructed to prove horizontal IIT. Cave's methodology (1981) has been applied in several empirical studies on IIT determinants, including

research conducted by Balassa (1986a), Balassa and Bauwens (1987), Bano (1991) and Blanes and Martín (2000).

B.3. Technology Intensity (ryd)

This variable is defined as the average percentage of sales set aside for research and technological development by manufacturing firms (Martín-Montaner and Orts, 2002). The *ryd* variable denotes that spending on research and development could be a reflection of efforts by firms to offer a greater number of varieties for the local market and exports industry (horizontal IIT). In the same way, the *ryd* variable could also denote efforts realized by companies to provide a wider number of varieties in the improvement of the quality of the products traded by a country (vertical IIT) (Faruq, 2006). Thus, this study posits that the relationship concerning the horizontal and vertical IIT is a positive one.

Since the trade opening of the Mexican manufacturing industry at the end of the eighties, export firms increased their expenditure on plant modernization resources in order to achieve enhanced global competitive advantage (Dominguez and Brown, 2004). Owing to this fact, the present study considered the inclusion of the ryd variable essential to its integrity. Furthermore, this variable can be seen as one of the variables which represent firm heterogeneity and can provide an explanation of firm participation in international trade (Melitz, 2003).

B.4. Presence of Foreign Capital (fdi)

Participation in foreign investment has been part of the Mexican industrial development strategy since the onset of the industrialization process in the forties and fifties (Villarreal, 1997). During this period, foreign capital turned to the production of goods for the domestic market (Villarreal, 1997; Máttar et al., 2002). Concomitantly, trade liberalization and the promotion of exports by the government boosted the development of the sector with a significant presence of foreign investment (Lustig, 1994). This took place even in areas such as the automotive or chemical industries, where foreign capital was traditionally restricted.[7]

The *fdi* variable has been empirically used as one of the main determinants of trade flows between developed and developing countries as well as in IIT studies (Blanes and Martín, 2000; Fukao, et al 2003; Melitz, 2003; Sohn and Zhang, 2006; Turkcan and Ates, 2010). This variable was obtained through the average percentage of the participation of foreign capital in the manufacturing industry. This variable was calculated to three digits resulting from the National Survey of Employment, Wages and Technology and data from INEGI. The study predicted the relationship between the presence of foreign capital and the different types of IIT to be a positive one.

[7]Dussel-Peters (2000) showed that since 1988 FDI had a high association with the most dynamic exports. The NAFTA helped to increase exports years after the accord was signed. However, this author pointed out that FDI was concentrated in a small number of industrial sectors without any significant generation of new jobs. Máttar et al. (2002) also found a strong relationship between exports and FDI, however, exports had a high import content, which affected the trade balance.

B.5. Intensity of Human Capital (khum)

The *khum* variable is proposed in order to explain the vertical IIT, especially in reference to a North-South trade. Differences in factors endowments would increase trade in products of different qualities, in this case, the vertical IIT. More explicitly, the interest lies in denoting evident changes for a significant part of the IIT which is of a vertical nature. In so doing, this study follows the methodology of Martín-Montaner and Orts (2002) for the construction of the variable *khum*. This variable is defined as the difference between the salaries paid to skilled workers and wages paid to unskilled workers. This difference is in turn multiplied by the total number of workers qualified at the industrial branch level which is expressed in equation (9):

$$khum_{it} = (w - s)L_{it} \quad (9)$$

w refers to the salaries of skilled workers; *s* represents the wages of unskilled workers and *L* corresponds to the number of skilled workers. The amounts are expressed in constant 2000 dollars and at the industrial branch level. In this case, the study expects *khum* to be positively related with different types of IIT, including the vertical IIT.

B.6. Tariff (tar)

The tariff *(tar)* is a dummy variable which takes the value of 0 for the 1994-1999 period and 1 for the 2000-2006 period. Previous sections underlined how the NAFTA tariff schedule was one of the reasons behind the 2000-2001 IIT indices changes. More specifically, the reduction in transportation and machinery tariffs, which was initiated in 2000, impacted trade flows. Furthermore, an increase in competition within the textile industry due to Chinese products flooding the U.S. market also had an influence on Mexican bilateral trade with the U.S.A. Consequently, this study proposes the inclusion of a dummy variable to differentiate these two periods, denoting the changes which took place prior and following the NAFTA tariff schedule.

The next section presents a proposed model to test the IIT determinants for the Mexican non-maquiladora industry, differentiating IIT according to horizontal and vertical nature. The explanatory variables are proposed following the theoretical foundations of IIT and previous empirical evidence for trade between North-South countries.

C. Econometric Specification

The econometric specification model boasts total bilateral IIT percentages which are differentiated by their horizontal and vertical natures. The source of information used for the construction of the dependent variable was INEGI, since it differentiates between maquiladora and non-maquiladora in its provision of import and export data. The explanatory variables were obtained through the use of multifarious data sources (aggregated by countries) such as the World Bank, Penn World Tables, United Nations and the Organization for Economic Cooperation and Development (OECD). The industrial level data was gathered from statistics published by the INEGI and the United Nations Conference on Trade and Development (UNCTAD). The collected data covers the period relating to 1994-2006 and refers to 27 different manufacturing industries while also covering Mexican bilateral trade with the United States and Canada. As was mentioned earlier, INEGI ended the publication of trade data disaggregated between maquiladora and non-maquiladora in 2006.

The data for the dependent variable *iit* presents a set of challenges, amongst which the presence of zeros in the dependent variable stands out. Given that this variable is a percentage, which ranges from 0 to 1 (in this case the maximum value goes to only 75 percent), a predominance of zeros could lead to performance transformations on the variable, which would consequently result in problems of interpretation.

In regards to explanatory variables, this study proposes a set of explanatory variables which represent the country-specific variables making use of two-dimensional data (period and country). Additionally, a set of explanatory industry-specific variables consisting of three dimensions (period, country and industry) are put forth. With regards to econometric estimations, these include time series and cross-section data (13 years, 27 industries, 2 countries).

Furthermore, this article has opted to employ Non-Lineal Squares (NLS) estimation with a logistic probability function, since the dependent variable is a percentage, with values ranging from zero to one. A standard Ordinary Least Square (OLS) has the problem that it predicts values outside this range which would result in inconsistent parameters. Balassa (1986b) proposed a cumulative logistic distribution function with NLS, which allows for extreme values such as zero or one. It is possible to preserve some valuable information that otherwise would have been lost when a simple logarithm is applied on the dependent variable. Gullstrand (2002) pointed out that another advantage of using NLS estimation is that there is no need for a specific distribution of the error term.

The NLS estimation has been employed in several empirical applications on the subject, such as in case studies published by Balassa and Bauwens (1987), Greenaway et al. (1999), Blanes and Martín (2000), and Gullstrand (2002). All these studies also included determinants which correspond to the characteristics of the country as well as industrial characteristics, in order to differentiate both the horizontal and vertical IIT. Following this logic, the function of logistics distribution by NLS stands as:

$$IIT_{fhit} = \frac{1}{1+\exp\left(-\beta' X_{fhit}\right)} + \nu_{fhit} \tag{10}$$

$$\beta' X_{fhit} = \beta_0 + \beta'_1 X_{fht} + \beta'_2 X_{it} \tag{11}$$

X_{fhit} represents the matrix containing the variables which correspond to the country—and industry—specific characteristics. In turn, industrial β stands as the vector of coefficients while v_{fhit} encompasses the terms of errors. Furthermore, as can be seen in expression (11), the matrix of explanatory variables can be decomposed in order to differentiate variables according to country-specific characteristics ($\beta'_1 X_{fht}$,), as well as industry-specific characteristics ($\beta'_2 X_{it}$). The estimation of parameters was performed through NLS while estimators were of a consistent and efficient maximum likelihood (provided that the residual was normally distributed). Finally, the explanatory variables were estimated in their logarithmic form (except for the variables *to* and *tar*).

In addition, the study illustrated the results of an alternative estimation in combination with an estimation by NSL using a Generalized Linear Model (GLM). This model allowed the estimation of the dependent variable in the form of a proportion. In this respect, although there are no other studies on the IIT determinants using this approach to compare with this paper's results, it is useful to propose a GLM model as an additional option for the treatment of functions with fractioned dependent variables.

$$\mathbf{Y} = \mathbf{X\beta} + \boldsymbol{\mu} \tag{12}$$

According to the matrix model (12), a GLM *Y* contains an observable random vector whereby its elements are independent in regards to the function of the exponential family distribution. In addition, *Y* represents a systematic component given by the linear predictor $\eta = X\beta$. Finally, the GLM *Y* also has a link function $g(\mu)$ that relates the linear predictor η with the expected value of *Y* and $E(Y/X) = \mu$, as expressed in (13)

$$\mathbf{g}(\boldsymbol{\mu}) = \boldsymbol{\eta}. \quad (13)$$

The expressions (12) and (13) allow specific restrictions to be executed on *Y* (via g (μ)). In this case, the dependent variable stands as a percentage which ranges from 0 to 1, with a binomial distribution, making it suitable to a family of logit link as can be seen in expression (14):

$$\boldsymbol{\eta} = \ln(\boldsymbol{\mu}/(\mathbf{1}-\boldsymbol{\mu})) \quad (14)$$

The optimization of the parameters is most plausible and the predicted values of these functions are maintained in the range of 0 and 1. Therefore, it is not necessary to perform any additional processing to the dependent variable. Overall, the main objective for the use of a GLM is to solve a sample reduction problem that occurs with NLS estimations as well as to obtain more reliable results, particularly with the horizontal IIT data. The following section covers the results obtained using both econometric specifications.

Table 4: Econometric Results

	First Specification						Second Specification					
	NL			GLM			NL			GLM		
Variables	*iit*	*hiit*	*viit*	*iit*	*hiit*	*viit*	*iit*	*hiit*	*viit*	*iit*	*hiit*	*viit*
dgdp	.10** (2.91)	-.20 (-.54)	.08* (2.22)	.07* (2.10)	.20*** (3.80)	.06 (1.68)	.14*** (5.32)	-.11 (-.34)	.11** (3.06)	.10*** (4.52)	.32*** (7.24)	.09** (2.87)
dpcgdp	4.24*** (4.87)	5.69* (2.18)	3.36** (3.30)	3.98*** (4.90)	8.33*** (6.74)	3.49*** (3.66)						
dkl	-.10 (-1.09)	.50** (2.67)	-.21 (-1.82)	-.10 (-1.07)	.10 (.73)	-.18 (-1.68)	-.40*** (-8.36)	.17 (.81)	-.45*** (-6.94)	-.37*** (-8.28)	-.54*** (-6.70)	-.45*** (-7.30)
dedu	1.77*** (3.32)	4.45* (2.06)	.73 (1.16)	1.36* (2.56)	5.41*** (6.21)	.44 (.71)	-.05 (-.07)	3.42 (1.39)	-.95 (-.91)	-.22 (-.33)	1.25 (1.01)	-1.18 (-1.20)
tonm	.25 (.31)	2.44 (1.75)	-.20 (-.20)	.29 (.42)	2.63* (2.15)	-.09 (-.10)	.63 (.75)	3.01* (2.00)	.09 (.08)	.64 (.86)	3.44** (2.65)	.22 (.20)
pdi	-.53*** (-3.85)	.003 (.01)	-.67*** (-4.18)	-.48*** (-3.67)	.22** (3.07)	-.63*** (-4.07)	-.37** (-2.75)	.36 (.66)	-.60*** (-4.03)	-.30* (-2.53)	.30** (3.19)	-.54*** (-3.72)
ee	.13*** (4.50)	-.18** (-3.18)	.24*** (6.80)	.12*** (4.63)	-.18*** (-3.42)	.19*** (6.12)	.14*** (4.62)	-.17** (-3.00)	.24*** (6.77)	.11*** (4.24)	-.19*** (-3.46)	.19*** (5.80)
fdi	.19*** (5.35)	-.06 (-.89)	.27*** (6.52)	.17*** (5.37)	.11 (1.71)	.23*** (6.36)	.16*** (4.61)	-.002 (-.02)	.24*** (5.59)	.11*** (3.71)	.12 (1.92)	.19*** (4.81)
ryd	.34*** (6.48)	.21* (2.27)	.34*** (4.72)	.31*** (6.57)	.14 (1.73)	.29*** (4.61)	.27*** (5.38)	.20* (2.09)	.28*** (3.80)	.22*** (5.10)	.17* (2.26)	.23*** (3.46)
khum	-.0007 (-.04)	.06 (1.87)	.01 (.52)	-.01 (-.95)	.07* (2.32)	-.01 (-.48)						
tar							.35*** (3.79)	.32 (1.53)	.31* (2.23)	.33*** (3.88)	.75*** (5.23)	.31* (2.40)
c	7.64*** (5.34)	11.8** (2.66)	4.22* (2.39)	5.93*** (4.66)	15.4*** (7.50)	3.4* (2.12)	-1.83 (-1.69)	2.61 (.72)	-3.6* (-2.23)	-3.00** (-2.95)	-2.99 (-1.56)	-4.81** (-3.18)
N	636	324	636	636	576	636	636	324	636	636	576	636
R2_a	.58	.11	.51	.08	.16	.10	.48	.09	.43	.04	.15	.07
F	87	5	67				65	5	55			
Chi2				477	638	528				401	532	398
AIC	-1260	-1160	-1490	494	97	398	-1223	-1149	-1369	527	102	416

D. Results from Econometric Estimations

Table 4 illustrates the results of two econometric specifications using NSL and GLM models, differentiating the IIT according to their horizontal and vertical natures, excluding maquiladora considerations. Therefore, the dependent variables are intra-industry trade *(iit)*, horizontal intra-industry trade *(hiit)* and vertical intra-industry trade *(viit)*, for the non-maquiladora industry. The first specification differs from the second specification through its inclusion of the variable *dpcgdp*, differences in per capita GDP, the *khum* variable, and intensity of human capital. However, the first specification does not include the tariff variable, *tar*, which is included in the second specification.

A first look at Table 4 denotes similar results for vertical IIT and total IIT, because vertical IIT accounts for most of the total IIT. Horizontal IIT coefficients seem to lack significance, in particular when these are estimated through NLS due to a problem with the sample data. This study overcomes this deficiency by applying a GLM estimation. In this respect, the above table seems to indicate that horizontal IIT coefficients seem to be more significant when linked to GLM estimation.

In relation to country-specific variables, the data contained in the table confirms that results are consistent with the hypothesis raised. Nevertheless, the differences between the first and second specification, regarding the variables denoting the dissimilarities in the size of the market (*dgdp*) and differences in economic development (*dpcgdp*, *dkl* and *dedu*), must still be accounted for. The first specification includes *dpcgdp* (differences in per capita income) in conjunction with variables of differences in factor endowments *dkl* (differences in capital-labor ratio) and *dedu* (differences in level of education). The second specification solely includes the differences in factor endowments. The variable for differences in market size (*dgdp*) indicates a better response (the coefficients are significant) when it is included in the second specification rather than the first one.

Furthermore, the *dgdp* variable is in most cases significant due to the two specifications related to the total and vertical IIT expected signs, while the expected sign for the horizontal IIT is not correct (although the NLS specification is correct, this is still not significant). This result can be explained to some extent by a risk of partial multicollinearity, although the pre-testing estimates indicated that these were within the allowed limit.[8]The results' implications for the Mexican non-maquiladora IIT reveal that the difference in market size to a large extent serves to explain the trade in varieties of different quality (vertical IIT). Thus, the results appear to substantiate evidence found in empirical evidence for countries whose trade is characterized by North-South flows (Blanes and Martín, 2000; Gullstrand, 2002; Fukao et al., 2003; Thorpe and Zhang, 2005).

The significance of variables in country size is related to economic distance. As previously mentioned, economic distance (*dpcgdp*) was devised by taking into account the characteristics of vertical IIT, predominating in North-South trade. Therefore, the coefficients for a vertical IIT and total IIT were expected to be positive. Conversely, the coefficients for the horizontal IIT were expected to be negative. The results for the first specification proved a positive relation for vertical and total IIT with highly significant coefficients. However, following a similar trend to the *dgdp* variable, difference of per capita income (*dpcgdp*) did not produce the expected signs

[8]Attempts were made to include an alternative variable to reflect the size of the markets, using example from empirical literature such as the average real GDP between partner countries. (Balassa, 1986a). Yet its inclusion caused problems of collinearity with other regressors.

for the horizontal IIT, even when this variable is estimated under the GLM model. Accordingly, these results support previous empirical findings on North-South trade and explain the performance of Mexico's commercial relationship with its NAFTA partners. Furthermore, these results confirm Greenaway and Milner (2002)'s findings, which recognized that the difference in per capita income promotes vertical IIT flows.[9]

In connection with the economic distance variable, this study acknowledged the potential risk that the difference in per capita income variable (*dpcgdp*) would encompass both demand and supply-side factors. Consequently, the study proposed separate variables to represent the differences in factor endowments as supply side variables. One of the variables was built as the difference in the physical capital endowments (*dkl*) and the other variable was constructed as the difference in human capital endowments (*dedu*). These two variables were added in order to compare whether either of these variables could provide an explanation for the proposed model. The second specification considers these two variables (*dkl*, *dedu*) without inclusion of the differences in per capita income (*dpcgdp*). This specification avoids a potential problem of instability of the coefficients.

The *dkl* variable appears significant, indicating the expected negative signs for total and horizontal IIT (in particular when it is estimated by GLM).The coefficients for the vertical IIT report the expected negative sign, which appear significant as well. Thus, these results seem more in accordance with the postulations made by Linder (1961) and Blanes and Martín (2000), who also proposed this same variable. Nevertheless, the difference in the allocation of human resources (*dedu*) does not seem to explain the IIT; it was only significant with the correct sign for the first specification. In the second specification, the expected signs only surfaced in a few cases, and most of these were not of great significance. It is worth mentioning, though, that the works cited for Mexico did not include physical and human capital endowment variables, which arguably made it difficult to compare these variables with other results.

Table 4 indicates the contribution of the *to* variable to the proposed model specification. The variable trade orientation (*to)* was included in the two specifications. However, the results indicate there was no contribution from this variable as a determinant of horizontal IIT. Nevertheless, the variable *to* does denote a positive relationship for all other cases (with the exception of the first specification, where it presents a negative sign) without this being significant. Even though the study expected the orientation of trade, as one of the determinants, to produce a positive influence, the sample used in this study only considered data from the year 1994 onwards, while trade liberalization occurred in 1987. Nonetheless, it is possible that the role of openness in a framework of trade integration could lead to the growth of trade flows regardless of the trade pattern among members.

In fact, another variable that indirectly showed how trade liberalization affected the IIT flows was the variable *tar* in the second specification. In this regard, Table 4 indicates that *tar* was highly significant for all types of trade and also demonstrates the expected positive signs for NLS and GLM models. The positive relationship of the variable with different types of trade would be consistent with that postulated by Markusen and Wiggle (1990) who argue that the elimination of tariff restrictions would foster the commercial relationship between North-South

[9]These results are not consistent with those obtained by Ekanayake (2001) since the author posited the income gap from the demand structure perspective. In addition, the author did not carry out the differentiation of IIT by its horizontal and vertical nature or the differentiation between maquiladora and non-maquiladora. Montout et al. (2002) postulated a positive relationship between the economic distance and vertical IIT; however, the coefficients had a negative sign for the horizontal and vertical IIT trade of automotive final goods.

countries. In this case, the variable *tar* showed the significance of the changes within the NAFTA tariff schedule to explain the different types of IIT.

Regarding the industry characteristics variables, Table 4 denotes a group of variables that express mostly the expected signs and whose coefficients are significant. These variables include the horizontal differentiation of the product, economies of scale, the presence of foreign capital and research and development. These results for the industrial level variables are noteworthy since previous empirical evidence for the Mexican manufacturing industry mainly focused on country-specific characteristics.

In particular, the economies of scale variable *(ee)* is significant and stands within the expected signs for the total and vertical IIT. Nonetheless, there is a negative sign associated to the horizontal IIT. This negative sign is related to the hypothesis of Ethier (1982), which examines high domestic plant scale economies resulting in a reduced number of companies and therefore a smaller number of varieties to trade. On the other hand, in reference to vertical IIT, the existence of economies of scale in the non-maquiladora industry reflects the presence of large companies in the external sector. These companies are linked with subsidiary companies in the United States and Canada, such as in the case of the automotive and pharmaceutical industries. However, it has only been possible to compare these results with the work of Montout et al. (2002). This study includes an economies of scale variable for the automotive industry (including maquiladora) while describing the coefficient as the negative sign.[10] Previous research by Arjona and Unger (1996) and Brown and Domínguez (1997) include economies of scale variables to explain the behavior of the industrial structure in a context of trade openness. Both works recognize the presence of large enterprises with national and foreign capital, and how these companies take advantage of production on a large scale which enables them to compete in an environment of open economy.

It is precisely the presence of foreign capital (*fdi*) which actually acted as a critical factor in explaining the total and vertical IIT but not the horizontal IIT. As can be seen in Table 4, the *fdi* variable is significant in all cases and denotes the expected signs. Moreover, when these results are compared with those found in other similar studies which include this variable to explain trade between unequal countries, the *fdi* is also a significant determinant for the vertical IIT. For the most part, works highlighting the determinants of the North-South IIT include foreign capital as one of the main determinants of this trade pattern (Blanes and Martín, 2000; Fukao et al, 2003; Sohn and Zhang, 2006). In the case of the Mexican manufacturing industry and the presence of FDI, Valderrama and Neme (2011) found a positive relationship between IIT and *fdi*; however, their trade data included the maquiladora industry. Lastly, according to models of firm heterogeneity, exporting companies can complement their activities with foreign investment. Owing to this perspective, the work of Helpman et al. (2004) elucidates, to some extent, the factors influencing the decisions of companies exporting or embarking on foreign direct investment abroad. In this sense, products that these companies export have an impact on patterns of trade and the opportunities to find new sources of comparative advantages.

Another variable that is highlighted in Table 4 is *ryd* (spending on research and development). This variable is highly significant and denotes the expected signs for the total IIT, the horizontal IIT (with the exception of the GLM first specification) and the vertical IIT. Following this logic, the promotion of research and development by the Mexican government has been proven effective to increase intra-industry trade. These activities were meant to increase competitiveness through

[10]It is worth noting that Montout et al. (2002) proposed a different proxy variable for economies of scale than this present study.

an increase in the quality of products targeting the foreign market.[11] In this regard, heterogeneity models highlight how companies producing goods for the local and foreign market convey discrepancies in the quality of goods depending on which market these goods are destined for. Interestingly, export goods seem to denote a higher quality than those produced for the local market.[12] Furthermore, the results in Table 4 seem to confirm a positive relationship between the *ryd* variable and the total and vertical IIT.

In addition, the variable intensity of labor, *khum*, submitted in the first specification, has only proven significant when modeled through a GLM for horizontal IIT, with a relatively small coefficient. This study expected this variable to prove that an increase in human capital would explain the trade flows of different quality products as Martín-Montaner and Orts (2002) proposed for the Spanish economy, but this was not the case in this study.

In sum, the estimates proposed for the non-maquiladora industry IIT highlight the significant disparities in terms of economic development between Mexico and its trading partners. The results also convey how IIT flows behave according to the concept of comparative advantage and the guidelines discussed in Neo-Herkscher-Ohlin's theory. The significance of the variables for the vertical IIT lies in the predictions they provide in terms of the behavior of North-South trade flows, as discussed by Flam and Helpman (1987) or Highfill and Scott (2006), among others. Furthermore, the proposed variables for varying quality IIT have been explanatory and have yielded the expected signs. These results foreshadow the kind of commercial relationship that Mexico has had with its NAFTA partners, in addition to anticipating the predictions made about the reduced costs of adjustment brought by the integration trade.

Thus, the set of variables that constitutes the industrial characteristics has been significant and has produced the expected signs. This article has also made special mention of horizontal product differentiation, as well as economies of scale. The presence of foreign capital in the industry was also found to be positive in relation to different types of trade, which was considered to be particularly relevant for vertical IIT. Moreover, spending on research and development was proposed along with alternative variable intensity in skilled labor. However, the latter was unable to explain the behavior of IIT. Concurrently, the *ryd* variable conveyed a highly significant coefficient. Therefore, the totality of these results supports the prediction of the firm heterogeneity model, which called for the introduction of elements from companies' strategies to explain the behavior of firms producing IIT within foreign trade.

Finally, this study has made use of econometric estimates to reflect on the position of a relatively small country such as Mexico in relation to its NAFTA partners. The article has particularly underlined how differences in the size of economies, factors endowments, and industrial heterogeneity along with the presence of foreign capital are significant factors in explaining the bilateral trade of different quality products.

IV. Concluding Remarks

In conclusion, the results of non-maquiladora IIT indices quantification for Mexico and United States reflected that in 1994 the index only stood at 25 percent. The investigation further

[11]The spending on Research and Development by sources of funding showed that Mexican Government participation was 66.2 percent while private investment was 17.6 percent in 1995. These percentages changed; in 2011 government spending was 52 percent and private investment increased to 43 percent (CONACYT 1996, 2012).
[12]Verhoongen (2008) pointed out the relation between high quality products with export for the Mexican manufacturing industry.

recorded a value of 40 percent for the year 2006, revealing that the performance of the indices was smaller than those found in other works on this issue. Furthermore, it denoted that starting from the year 2000, maquiladora trade flows tended to follow a one-way pattern, even in instances when maquiladora percentages were average for the 40 percent held. Conversely, non-maquiladora trade flows increased their intra-industrial participation as a proportion of total trade.

Although the IIT was predominantly of a vertical nature for most of the 1994-2006 period, a number of industrial branches began to reveal an increase in the trade of different varieties of goods (horizontal IIT). This was the case for the automotive industry due to the relaxation of the tariff schedule of the NAFTA treaty for automotive products, which took effect in 2001 and caused a shift in the nature of trade.

In this regard, this study draws attention to the disadvantages that may occur with the application of unit values to differentiate IIT according to its nature. In this case, the Mexican manufacturing industry trade went from being one characterized by different qualities in the year 2000 to one with different varieties in 2001. This occurred as a result of a relaxation in the automotive industry tariff schedule. The change from vertical to horizontal IIT would have been expected to take place as a result of productive reasons and not due to a change in the tariff regulations.

The second section of this article dealt with the study of the bilateral IIT determinants differentiated by their horizontal and vertical natures in regards to the non-maquiladora industry. Consequently, this study proposed a set of explanatory variables grouped into country and industrial characteristics.

Since the vertical IIT constituted a large proportion of the total trade, both total and vertical IIT portrayed similar results. The econometric results, both in relation to NSL and GLM estimates, denoted the significance of the differences in economic development and factor endowments as determinants of the vertical IIT. In this regard, these differences were shown to have played a key role in explaining how the vertical nature of IIT had been dominant as a main trade route between Mexico and its NAFTA partners. Furthermore, in the case of Mexico, this study indicated that Neo-Heckscher-Ohlin's theory represented a suitable framework to explain Mexico's bilateral trade with these NAFTA countries.

Moreover, the proposed specifications also stressed the significance of foreign capital presence and horizontal product differentiation. The model presented further emphasized the relevance of technology intensity and the importance of including dummy variables as the set of determinants of trade in regards to goods differentiated between Mexico and its NAFTA partner. This inclusion reflected key changes in the treaty tariff regulations.

Econometric estimates also constituted a substantial contribution to the provision of new empirical evidence for the study of impact of NAFTA on developing countries. Indeed, no other studies have been published on the determinants of IIT for the Mexican non-maquiladora manufacturing industry. Previous literature has only dealt with estimates of the manufacturing industry (including maquiladora) or for the automotive industry IIT determinants.

The potential research lines that flow from this article can be summarized as follows. Firstly, further discussion relating to the relationship between the theories explaining the IIT of final goods and international fragmentation of production is needed. Furthermore, given the increasing trade in intermediate goods, there is an evident need for the conception of models incorporating these goods, particularly since the maquiladora disappeared as tariff scheme and its trade can be considered intermediate products. This article has also argued that heterogeneity of firm models in international trade is an approach that encompasses numerous aspects of

differentiated products in different productive stages. Nonetheless, this hypothesis requires further empirical research which specifically incorporates IIT differentiated by its horizontal and vertical nature, as well as trade in intermediate goods.

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Fiscal and Monetary Policies Interrelation and Inflation over the Long Run: Testing Sargent and Wallace's View for the United States

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This paper focuses on long-run estimation of the price equation in the United States for the period of 1973Q1-2011Q3. It was found the Sargent and Wallace view that an easy monetary policy today will result in a lower price level over the long run when debt and deficit exist is true for the United Sates. Furthermore, it was found that, over the long run, a higher real exchange rate, government expenditures, deficit per GDP as well as debt per GDP lead to a higher price level. Finally, it was found neither monetary policy dominates the fiscal policy nor the opposite is true.

Keywords: Sargent and Wallace, Interest Rate, Debt and Deficits

JEL Classifications: E31, E41 E52, E62

I. Introduction

Fiscal and monetary policies are interrelated and must be coordinated. The coordination can be imagined when the monetary authority is powerful enough to determine current and indefinite future rates of seigniorage from money creation. In this setting the monetary authority disciplines the fiscal authority by assigning how much seigniorage can be expected now and in the future. Then monetary policy can permanently affect inflation rate. Alternatively, if the monetary authority is not in a position to influence the government's deficits path but is limited simply to managing the debt that is generated by the deficit path then the fiscal authorities constrain monetary authority. Under this coordination scheme a tight current monetary policy to fight inflation leads to higher future inflation, Sargent and Wallace (1986).

If the real rate of interest on government securities exceeds the economy's growth rate then rolling over a fixed amount interest-bearing debt requires raising revenue from other sources to pay the interest on the debt. "In particular, the government must either levy taxes or reduce purchases or print currency to pay the interest." Sargent and Wallace (1986, P. 159).

The question Sargent and Wallace (1986, P. 158) raises is that "Is it possible for monetary policy permanently to influence an economy's inflation rate? The answer to this question hinges on how monetary and fiscal policies are imagined to be coordinated." A monetary authority can dominate the fiscal authority if it can impose slower rates of growth on high-powered money, both now and into the indefinite future, so that the fiscal authority knows that how much seigniorage it can expect now and in the future. Under this coordination scheme the monetary authority can permanently influence the inflation rate. Alternatively, under a fiscal dominate

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environment when the monetary authority cannot influence the government's deficit path, but is limited to managing the debt created by the deficit path chosen by the fiscal authorities, the monetary authority is not able to influence the inflation rate permanently. Under this scheme the monetary authority may not even influence inflation rate in the short run.

The objective of this paper is two fold: (i) to investigate how the fiscal and monetary policies have been coordinated in the United States. Specifically, the question is which authority imposes discipline on whom and (ii) to test a price equation level, which takes into account, for a given monetary base, whether a lower/higher interest rate leads to a lower/higher price level over the long run when debt and deficits exist. Specifically, in this paper we investigate that if the current quantitative ease which the Fed is adopting will lead to future inflation when the U.S. debt is at a record high. To the best knowledge of the authors, no such study for developing or developed countries exists.

For example, King and Plosser (1985) and Grier and Neiman (1987), found mixed evidence for fiscal dominance in the United States; however, Ashra *et al.* (2004) find no systematic relationship between money and fiscal deficits in India. It is also believed that the uncertainty as to the time the deficits are financed can influence the rate of inflation. For example, Dornbush *et al.* (1990) and Drazen and Helpman (1990) find such an uncertainty creates fluctuation in the inflation rate.

II. Survey of Literature

Darby (1985) contradicted Sargent and Wallace (hereafter SW) (1981) view that monetary policy cannot be manipulated independently when tax rates and government expenditure are fixed. Darby maintained that government can, at least in the United States, independently manipulate "all three instruments, with government debt adjusting in a passive but stable way".

Beetsma and Jenson (2005) explored the interactions between monetary and fiscal policy across the European Union in a micro-founded model with sticky prices and the contribution of public purchases in a stabilization role under demand and supply shock. They found non-trivial gains from fiscal stabilization and commitment. They also found that the interaction between the two polices strengthens and that the time consistency problems deepen when the time profile of taxes and/or transfers is irrelevant and government debt is nominal.

Sargent (1999) argued that Fed's administrative independency does imply that monetary policy is independent of the fiscal authority of government. He also argued that monetary policy can be subjected to fiscal policy when the fiscal deficits become large enough to require monetization of government debt. He proposed some economic limitations with regard to what monetary policy can and cannot achieve.

Bhattacharya, Guzman, and Smith (1998) examined the issue: "does monetizing a deficit always result in a higher rate of inflation than the bond financing the same deficit" with a modified model of Sargent and Wallace (1981). While Sargent and Wallace's answer was negative (called unpleasant monetarist arithmetic), Bhattacharya, Guzman, and Smith found that under the condition of the Fed's reserve requirement, unpleasant monetarist arithmetic becomes even higher when the real growth rate of the economy is higher than the real interest rate on bonds.

Further, Bhattacharya and Haslag (1999) examined 'unpleasant monetarist arithmetic' and found that increased interest payments on bond financing forces government to print money at a much faster rate than would have been necessary if the deficit were initially financed by printing money. This increase in monetary growth, to finance the deficit, leads to a more inflationary

situation. According to them, conditions under which unpleasant monetarist arithmetic works are: (i) when the Fed is subservient to fiscal authority (ii) the real interest rate on bond financing is higher than the real growth rate of economy, and (iii) seigniorage is possible, i.e. when the Fed is in position to raise money by printing money. Bhattacharya and Haslag did not agree with the assumption of SW (1981) that the real interest rate exceeds the growth rate of economy. In their study, they found that real interest rate during postwar period had been below the growth rate of U.S. and Canada.

Buffie (2003) argued that pleasant monetarist arithmetic is feasible when the interest elasticity of money demand is unity. Pleasant monetarist arithmetic which suggests that tight money under a fixed money growth rule may reduce internal debt to a level compatible with lower money growth and hence permanently lower inflation is not possible if either (i) interest elasticity of money demand is less one or (ii) the growth of money is determined by the rule that "seigniorage should finance a small fraction of the fiscal deficit". He also argued that monetarist pleasant arithmetic depends on public perception about how policy-makers will react to high inflation. If the public realizes that a very short period of high inflation may change a policy reversal, then "both pleasant monetarist arithmetic and the tight money paradox are self-fulfilling equilibria." Public sector credibility on policy is important whether tight monetary policy succeeds or fails. Pekarski (2007) examined "unpleasant monetarist arithmetic" of SW (1991), applying a simple forward looking monetary model (that does not substantially depart from the SW model) and found support in favor of SW. He found that unpleasant monetarist arithmetic follows unambiguously when there is a steady state analysis, i.e., there is an unexpected and permanent decrease in the growth rate of the monetary base. However, when a tight money policy is conducted, either gradually or with preannouncement, it "generates transitional dynamics" and fails to provide unpleasant monetarist arithmetic. That is, in that case pleasant monetarist arithmetic is possible. Dotsey (1996) used a dynamic model of Dotsey (1994) for examining monetarist arithmetic. In his model both money growth and taxes were stochastic variables and assumed that monetary policy is independent when the monetary authority does not respond to debt. On the other hand, when it responds to debt, monetary policy is dependent. Under these assumptions, he found that monetarist arithmetic is not so unpleasant when the tax authority responds to the debt level. When the tax authority responds to the debt level the nominal variable (interest rate and inflation) does not significantly depend on whether the monetary authority reacts to a government financing deficit.

Woodford (1995) and Aigyagari and Gertler (1985) found that when the monetary policy responds to government's inter-temporal budget constraint, nominal variables are sensitive to debt.

In this paper we found, that neither fiscal policy dominates monetary policy and also that reverse is true in the United States. Moreover, it was found that Sargent and Wallace's view that a tight/easy monetary policy leads to a higher/lower inflation over the long run is accepted for the United States. The following section deals with testing how coordination between monetary and fiscal policies occurs in the U.S. Section IV tests Sargent Wallace's view. Section V provides some concluding remarks.

III. Fiscal and Monetary Policies Coordination in the United States

In this section we investigate how the fiscal and monetary policies have been coordinated in the United States. Specifically, the question is which authority imposes discipline on whom. To check the situation, following Sargent and Wallace (1986) we assume the entire government

debt consists of one-period debt so that the consolidated (the treasury and Federal Reserve) government budget constraint can be written as:

$Debt_t = Debt_{t-1}[1 + R_{t-1}$(=interest rate on debt)$] + gc_t$ (=government spending on goods and services and transfer payments) - T_t(=government tax revenues) - ΔMB_t (=change in monetary base) = $Debt_{t-1}$ + $deficits_t$ (=R_{t-1} $Debt_{t-1}$ + gc_t - T_t) - ΔMB_t. From here we will have ΔMB_t = $deficits_t$ – $\Delta Debt_t$ = fis_t. We will investigate if during our sample period the change in the monetary base in the United States was caused by the federal deficits net of the change in federal outstanding debt (fis_t), a fiscal-dominate environment. The alternative would be the federal deficits net of the change in outstanding debt is caused by the change in monetary base, a monetary authority-dominate environment. It is also, of course, possible that these two variables be independent. Furthermore, it is possible that the changes in the monetary base have been mostly for the accommodation purpose rather than for the monetization of debt. In this case there is no coordination between monetary and fiscal policies.

The sample period is 1973Q1-2011Q3. The choice of the sample period is based on the availability of all variables. The sources of data, unless specified, are the *International Financial Statistics* (IFS) online as well as the Federal Reserve Bank of St. Louis data base (FRED®). Some of the variables were available on monthly basis and, therefore, using the monthly average, quarterly observations were calculated.

Table 1 reports the stationarity test results on these variables. We used three stationarity tests on which Zivot and Andrews' (1992) unit-root test allows for unknown breaks in intercept and Phillips-Perron's (1988) test allows for the unknown break in both the slope and the intercept. As we can see according to all tests results, both variables fis and ΔMB are homogeneous of degree zero (stationary).

The next question is to investigate the Granger-Causality between fis and ΔMB. We can investigate the causality between these two stationary variables by estimating each variable on its 6 lagged values (a year and half) as well as the lagged values of the other variable.[13] By doing so, we found the Wald test on the coefficients of six lagged values of ΔMB in a regression of ΔMB on its six lagged values as well as six lagged values of fis is 8.86 (*p*-value=0.18), while the Wald test on six lagged values of fis is 17.03 (*p*-value=0.01). At the same time, the Wald test on the coefficients of six lagged values of fis in a regression of fis on its six lagged values as well as six lagged values of ΔMB is 22.37 (*p*-value=0.00), while the Wald test on six lagged values of ΔMB is 49.76 (*p*-value=0.00). This result implies that fis and ΔMB Granger causing each other. Specifically, we conclude during our sample period that we don't have any fiscal or monetary dominate environment in the United States.

[13] Note that using both Akaike and Schwarz final prediction error the lag length was determined.

Table 1: Stationarity Test Results*

Variable	ADF[1] (k)	PP[2](k)	ZA[3](k)-Break
fis	-5.06[a] (4)	--9.18[a] (4)	-6.57[a] (3) - 2005Q4
ΔMB	-4.00[a] (4)	-10.72[a] (4)	-5.72[a] (3) – 2006Q1
lMs	-1.95 (4)	-1.15 (4)	-3.38 (3) – 1995Q4
ΔlMs	-5.15[a] (0)	-5.11[a] I(4)	-3.71 (3) – 1994 – Q1
lq	-2.23 (4)	-1.88 (4)	-2.37 (3) – 1980Q4
Δq	-4.94[a] (4)	-12.87[a] (4)	-5.74[a] (3) – 1985Q2
i	-0.92 (4)	1.65 (4)	-1.08 (3) – 2006Q1
Δi	-5.01[a] (4)	-9.17[a] (4)	-3.79 (3) – 2006Q1
ly	-1.77 (4)	-09.4 (4)	-3.07 (3) - 2006Q1
Δly	-4.93[a] (4)	-8.45[a] (4)	-5.67[a] (3) – 1983Q1
i*	-4.26 (4)	-0.18 (4)	-3.03 (3) - 1980Q4
Δi*	-4.16[a] (4)	-8.02[a] (4)	-4.34 (3) – 2006Q1
lg	-2.09 (4)	0.61 (4)	-2.92 (3) - 2001Q1
Δlg	-3.31[b] (4)	-11.84 (4)	-4.34 (3) - 1998Q2
defgdp	-2.60 (4)	-1.74 (4)	-3.063 (3) -2006Q1
Δdefgdp	-4.35[a] (4)	-11.60 (4)	-5.31[b] (3) - 2000Q2
debtgdp	-1.96 (4)	1.66 (4)	-2.15 (3) - 1996Q2
Δdefgdp	-4.36[a] (4)	-11.60 (4)	-5.31[a] (3) - 2000Q2
fdgdp	-1.52 (4)	3.03 (4)	-1.92 (3) - 2005Q3
Δfdgdp	-3.58[a] (4)	-8.63[a] (4)	-3.96 (3) - 2001Q3
lcp	-2.43 (4)	-7.18[a] (4)	-4.42 (3) – 1979Q2
Δlcp	-3.10[b] (4)	-4.55[a] (4)	5.39[a] (3) – 1981Q4

The sample period is 1973Q1-2011Q3. Δ means the first difference and l before a variable means the log of the variable. fis is the deficits net of the change in the outstanding debt. MB is the monetary base, Ms is the nominal money supply, q is the real effective exchange rate, i is the gross interest rate, y is the real GDP, i is the gross foreign interest rate, g is the government expenditure on goods and services, defgdp is the federal government deficits per GDP, debtgdp is the Federal debt per GDP and fdgdp is the foreign-financed debt per GDP.

1. ADF is the conventional augmented Dickey-Fuller test statistics and k is the optimal lag length, which was determined by the minimum of AIC, as well as SC. The critical value for ADF τ test is -2.88 at 5% and -3.46 at 1%.
2. PP is Phillips-Perron non-parametric Unit Root Test. The critical value is -2.88 at 5% and -3.474at 1%.
3. ZA is Zivot-Andrews Unit Root Test. The test allows a break in only intercept. The critical value is -4.80 at 5% and -5.34 at 1%.
a=Significant at 1%.
b=Significant at 5%.

IV. Does Current Easy Monetary Policy Lead to Future Inflation? Testing Sargent-Wallace Hypothesis

In the previous section we found that the monetary authority is not in a position to influence the government's deficits path in the United States but its authority is limited simply to managing the debt that is generated by deficit path, implying that the fiscal authorities constrain monetary authority. Under this coordination scheme the current quantitate easing to fight recession/slow-growing economy/financial crisis should lead to lower future inflation according to Sargent and Wallace (1986). Specifically, adjusting for the money supply, there should be a positive long-run relationship between the interest rate and the price level. In other words, a lower interest rate (an easy monetary policy) leads to a higher inflation during the short run, but leads to a lower price over the long run. Note that Sargent and Wallace (1986) states that under

above condition a tight current monetary policy to fight inflation leads to higher future inflation. If this relationship holds the reverse should also hold.

A. The Model

We will use Kia's (2006a) model to estimate the long-run relationship between the price level and money supply in the United States. To the best knowledge of the authors, Kia's model is the only model in the literature which is capable to test the impact of the money supply and interest rate (monetary policy) on the price level over the long run (Sargent and Wallace view) while debt, deficit and debt management are also included. That is, this model is a monetary approach to an inflation model which also considers fiscal variables. This model also used by other studies, e.g., Wilson (2009). The price relationship in this model is:

$$lp_t = \beta_0 + \beta_1 lMs_t + \beta_2 i_t + \beta_3 ly_t + \beta_4 lq_t + \beta_5 i^*_t + \beta_6 lg_t + \beta_7 defgdp_t + \beta_8 debtgdp_t + \beta_9 fdgdp_t + u_t. \quad (1)$$

In this equation lp is the log of the price level, lMs is the log of nominal money supply, i is the log of the domestic gross interest rate ($i_t = \log(R_t/1+ R_t)$), R is the risk-free domestic interest rate, ly the log of real income, lq is the log of the real exchange rate, i* is the log of the gross foreign interest rate ($i^*_t = \log(R^*_t/1+ R^*_t)$), R* is the foreign risk-free interest rate, lg is the log of the real government expenditure on goods and services, defgdp, debtgdp and fdgdp are real government deficits per GDP, the government debt outstanding per GDP and the government foreign-financed debt per GDP, respectively. Trend is a linear trend. Since $\beta_1 = 1$, the model is a pure monetary approach and, in fact, β_2, the coefficient of i_t, reflects the impact of monetary easing/tightness on the price level.

In Equation (1) βs are the parameters to be estimated, where $\beta_0 <0$, $\beta_1 = 1$, $\beta_2 >0$, $\beta_3 <0$, $\beta_4 = ?$, $\beta_5 >0$, $\beta_6 >0$, $\beta_7 >0$, $\beta_8 >0$, $\beta_9 >0$. Since we expect all variables in Equation (1) to have a unit root this equation can be is a long-run cointegrating equation. In such a case, according to this model a monetary easing should result in a higher inflation rate (priced level) over the long run as $\beta_1 = 1$. However, since $\beta_2 >0$ a lower current interest rate, for a given money supply, should result in a lower inflation rate (price level) over the long run, i.e., Sargent and Wallace's view is satisfied.

B. Long-Run Empirical Methodology and Results

lp is the logarithm of CPI and following Kia (2006a) and Wilson (2009), lMs is the logarithm of nominal M1 and i is the logarithm of (R/1+R), where R is three-month Treasury Bill rate at the annual rate, in decimal points. Variable y is the real GDP, which is the nominal GDP divided by GDP deflator. Following Wilson (2009), E is the average of daily figures of a weighted average of the foreign exchange value of the U.S. dollar against the currencies of a broad group of the major U.S. trade partners. The broad currency index includes the Euro Area, Canada, Japan, Mexico, China, United Kingdom, Taiwan, Korea, Singapore, Hong Kong, Malaysia, Brazil, Switzerland, Thailand, Philippines, Australia, Indonesia, India, Israel, Saudi Arabia, Russia, Sweden, Argentina, Venezuela, Chile, and Colombia. Following Kia (2006a) and Wilson (2009), foreign interest rate i* is the logarithm of (R*/1+R*), where R* is the LIBOR (3-month London interbank) rate at the annual rate, in decimal points. The industrial countries unit value export price index was used as a measure for the foreign price p*. Variables defgdp, debtgdp and fdgdp are deficits, outstanding debt and foreign debt per GDP, respectively. All

variables are seasonally adjusted, some at the source of the data and some were seasonally adjusted.

Following Kia's (2006b) suggestion, we also allow the short-run dynamics system to be affected by policy regime shifts and other exogenous shocks, which could affect the U.S. price level (inflation rate) during the sample period. These policy regime changes and other exogenous shocks include the following: (i) The Persian Gulf War, which began on August 2, 1990, and ended on February 28, 1991. (ii) The North American Free Trade Act (NAFTA), which went into effect on January 1, 1994. This act provided unprecedented freedom in trade among the United States, Canada, and Mexico. (iii) On October 7, 2001, the U.S. declared war on Afghanistan. (iv) The credit crunch and financial crisis which started on August 2007 and ended the third quarter of 2009.

Accordingly, the following dummy variables used to represent these potential policy regime shifts and exogenous shocks: pwar = 1 from 1990Q3- 1991Q1, and = 0, otherwise, nafta = 1 since 1994Q1 and = 0, otherwise, awar = 1 since 2001Q4 and = 0, otherwise and uscrisis = 1 from 2007Q3 to 2009Q3, and = 0, otherwise.

According to the results reported in Table 1, variables lMs, i, ly, lq, i*, lg, defgdp, debtgdp, fdgdp and lcpi are not stationary, but all have a unit root. However, the variables lMs, i, i*, lg and fdgdp are not homogeneous of degree one according to Zivot test result. But since the other two test results confirm these variables are homogeneous of degree 1 we accept this result.

To estimate the long-run relationship (1) we estimate trace test developed by Johansen and Juselius (1991). Note that the set of dummy variables that constitutes the policy regime changes and exogenous shocks explained above is allowed to affect the short-run dynamic of the system. In determining a long-run relation between the domestic price level and its determinants, conditional on the foreign price level and the interest rate, we need to test whether the price level contributes to the cointegrating relation.

In determining the lag length one should verify if the lag length is sufficient to get white noise residuals. As it was recommended by Hansen and Juselius (1995, p. 26), set number of endogenous variables (p) equal to the number of cointegration number (r) and test for autocorrelation and ARCH. LM(1) and LM(2) will be employed to confirm the choice of lag length. According to both LM(1) test (*p*-value=0.06) and LM (2) test (*p*-value=0.17), a lag length of five quarters was sufficient to guarantee the lack of autocorrelation. Furthermore, according to both LM(1) test (*p*-value=0.25) and LM (2) test (*p*-value=0.07) the error is not heterskedasic. The critical values, using the procedure in CATS in RATS Version 2.01, with 2500 replications and length of random walks of 400 are simulated. According the trace result, adjusted for small-sample error, using Bartlett Small Sample Correction method, 128.88 < 145.92 (*p*-value=0.27) we cannot reject the rank r=3 among the variables, see Table 2. Note that the foreign price was assumed to be weakly exogenous.

Table 2[(1)]: Long-Run Test Result

Tests of the Cointegration Rank										
H_0= r	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Diagnostic tests** *p*-**value**
Trace[(2)]	365.38	253.06	188.63	**128.88[a]**	93.42	61.33	37.44	18.88	4.94	**Autocorrelation**
Trace 95[(3)]	264.31	221.37	182.97	145.92	113.87	85.58	59.85	38.49	20.19	LM(1)[(4)] 0.06 LM(2)[(4)] 0.17 **ARCH** LM(1)[(4)] 0.25 LM(2)[(4)] 0.07
***p*-value[(4)]**	0.00	0.00	0.03	0.27	0.40	0.62	0.71	0.78	0.90	**Normality** 0.00 **Lag length = 5**

Identified Long-Run Relationships for r=3.											
Normalized	**lMs**	**i**	**lp**	**ly**	**Lq**	**i***	**lg**	**defgdp**	**debtgdp**	**fdgdp**	**constant**
Lcp (Price Eq.)		0.18	-	-0.39	0.15	-0.09	0.62	1.70	0.10	0.03	
(*t*-statistics).	Restricted =1	(17.05)		(-20.58)	(6.52)	(8.09)	(9.84)	(9.71)	(4.38)	(0.70)	Restricted =0
i (Mon. Demand Eq.)	-9.46		9.46	0.68	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	12.55
(*t*-statistics)	(-24.09)	-	(24.09)	(1.84)	=0	=0	=0)	=0	=0	=0	(3.61)
Ly (Agg. Supply Eq.)	Restricted	Restricted	0.36		Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	7.59
(*t*-statistics)	=0	=0	(10.82)	-	=0	=0	=0	=0	=0	=0	(43.03)

(1) a =means accept the null of r=3.
(2) By using Bartlett correction the Trace test statistic is corrected for the small sample error, see Johansen (2000 and 2002).
(3) Because of the inclusion of the dummies in the short-run dynamics of the system the limit distribution of the rank statistics should be simulated. The CATS 2 in RATS computer package was used to simulate the critical values. The number of replications was 2500 with a length of random walks of 400.
(4) The approximate *p*-value using the corrected test statistic. LM(1) and LM(2) are one and two-order Lagrangian Multiplier test, respectively.

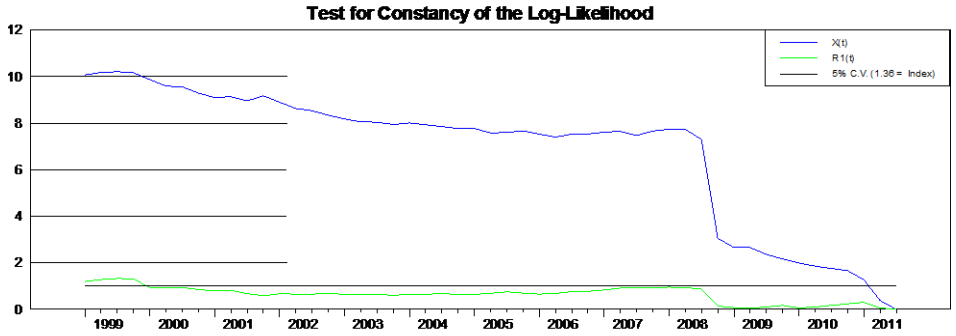
The sample period is 1972Q1-2011Q3. lq is the log of the real effective exchange rate, where q is the real effective exchange rate, lrm1 is the log of real M1 and i is the log[R/(1+R)], where R is three-month TB rate in decimal points. ly is the log of the real GDP, lrg is the log of real government expenditures on goods and services, defgdp and debtgdp are deficit and outstanding debt per GDP, respectively. fdgdp is the amount of foreign financed debt per GDP and lcom is the log of commodity price. i* = log(R*/1+ R*), where R* is the (3-month London interbank) rate at the annual rate, in decimal points. Con is the constant term.

Since we found more than one cointegrating relationship we need to identify the estimated cointegrating vectors. Namely, in order for the estimated coefficients of cointegrating equations to be, in fact, economically meaningful, identifying restrictions must be imposed to ensure the uniqueness of the coefficients. In this case, we need three identifying conditions to be satisfied in order for the uniqueness of coefficients to be ensured. Furthermore, the normalization of a variable, when there is more than one cointegrating rank, makes the resulting equation interpretable and meaningful if these conditions are satisfied. These conditions include generic identification, empirical identification and economic identification. As explained by Johansen and Juselius (1994) the generic identification is related to the linear statistical model and requires the rank condition, which is given by their Theorem 1, to be satisfied. The empirical condition is related to estimated parameters values and finally, the economic identification is related to the economic interpretability of the estimated coefficients of an empirically identified structure.

Following, e.g., Johansen and Juselius (1994 and 1991) and Johansen (1995), we can test for the existence of possible economic hypotheses among the cointegrating vectors in the system. The bottom panel of Table 2 reports the identified relationships.

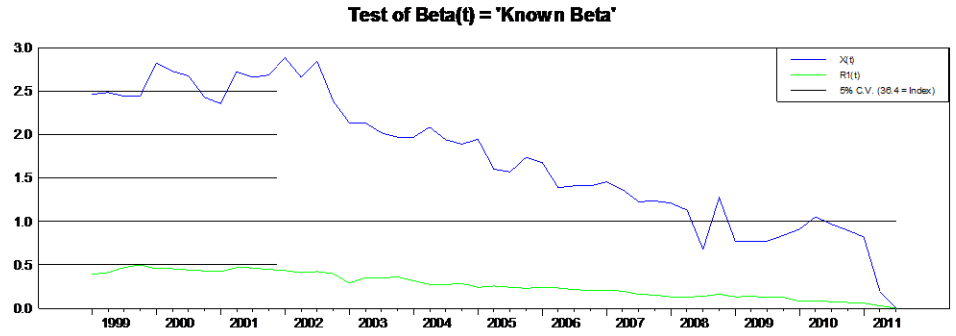
Figures 1 to 5 plot the calculated values of the recursive test statistics for the long-run identified relationships. Note that these figures respectively show recursive likelihood-ratios, constancy of all betas and coefficients of all identified equations, all normalized by the 5 percent critical value. Thus, calculated statistics that exceed unity imply the rejection of the null hypothesis and suggest unstable cointegrating vectors. The broken line curves plot the actual disequilibrium as a function of all short-run dynamics variables, while the solid line curves plot the "clean" disequilibrium that corrects for short-run effects. We hold up the first 27 quarters for the initial estimation. As these figures show, all these identified equations appear stable over the long run when the models are corrected for the short-run effects. Having established that the long-run equations are stable, we will analyze the identified long-run equations.

Figure 1: Recursive Likelihood Ratio Tests*



*X(t) = the actual disequilibrium as a function of all short-run dynamics and dummy variables.
R1(t) = the "clean" disequilibrium that corrects for short-run effects.

Figure 2: Test for the Hypothesis that Betas of Each Sub-Period Equal to Betas of the Entire Sample of Model*



*X(t) = the actual disequilibrium as a function of all short-run dynamics and dummy variables.
R1(t) = the "clean" disequilibrium that corrects for short-run effects.

Figure 3: Test for Constancy of the Parameters of the First Restricted Model

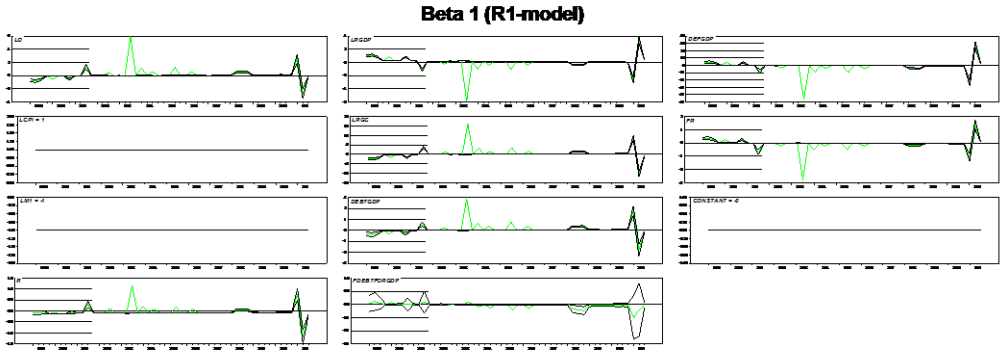


Figure 4: Test for Constancy of the Parameters of the Second Restricted Model

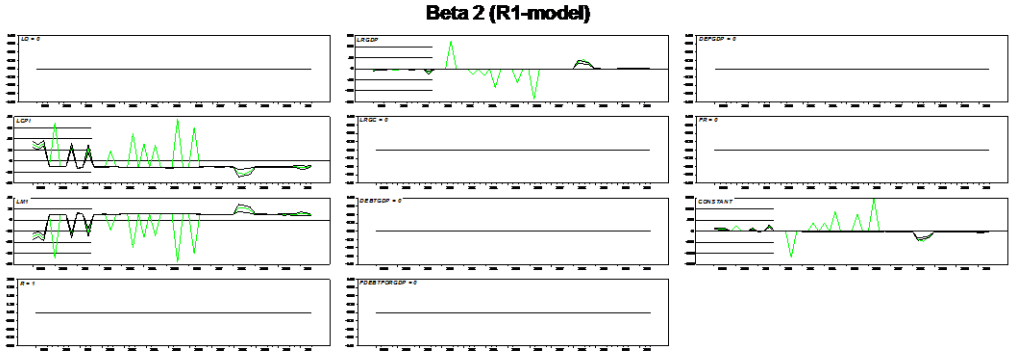
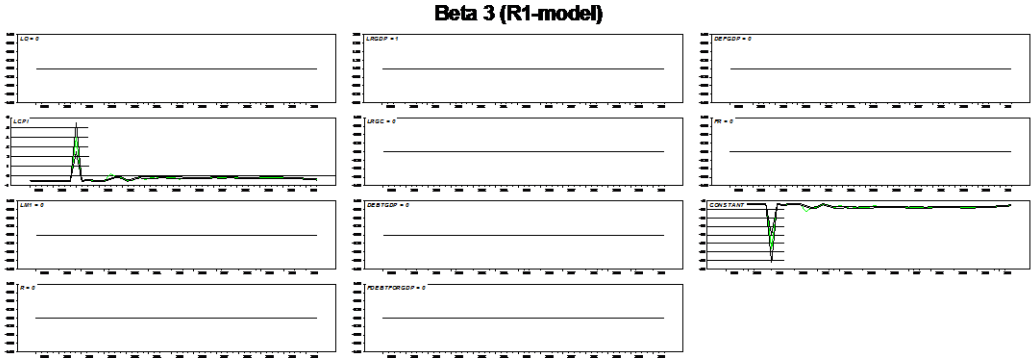


Figure 5: Test for Constancy of the Parameters of the Third Restricted Model



(A) Long-Run Price Determination

The first row of the bottom panel in Table 2 reports the identified long-run price determination.

(i) Monetary policy: According to our model, Equation (1), we would expect the level of interest rate to have a positive influence on the price level over the long run. Based on our estimation result, the estimated coefficient of interest rate is statistically significant and is positive, implying current monetary easing leads to a lower price level over the long run. This

result is consistent with Sargent and Wallace's view. Considering the effective real exchange rate as a monetary instrument, a depreciation of the domestic currency leads to an increase in the price level.

(ii) Fiscal policy: The long-run estimated coefficient of the log of real government expenditures is positive, as our model predicts, and statistically significant. The long-run estimated coefficient of all fiscal variables is positive and, except foreign-financed debt per GDP, is statistically significant. The positive estimated coefficients of these variables justify our model. This result implies that fiscal policy in the United States can significantly reduce inflation over the long run. Specifically lowering government expenditure, deficits per GDP and debt per GDP can effectively reduce the price level in the United States over the long run.

(iii) External factors: Foreign interest rate, contrary to what our theoretical model predicts, has a negative impact on the price level in the U.S. and is statistically significant. One possible explanation for this result is that as foreign interest rate increases demand for foreign deposits/bonds will go up and the demand for goods and services, therefore, will fall with a depressing impact on price.

In general, so far we found domestic factors, controlled by monetary and fiscal authorities, can be very effective in curbing inflation in the United States. Finally, the impact of real GDP as expected theoretically is negative and statistically significant.

(B) A Long-Run Demand for Money

The second row of the bottom panel in Table 2 reports a long-run demand for money. Since the demand for money is the demand for the real balances we restricted the coefficient of lp to be equal to the negative coefficient of lMs. The scale variable (ly) has a correct sign (positive) and is statistically significant.

(C) Long-Run Aggregate Supply

The third identified equation, last row of the bottom panel of Table 2, resembles an aggregate supply relationship. The estimated coefficient of lp is, as it is expected positive and statistically significant.

V. Conclusions

This paper focuses on long-run estimation of the price equation in the United States. The monetary model of price level developed by Kia (2006a), which is capable of incorporating both monetary and fiscal policies as well as other internal and external factors, was used and tested on the U.S. data. The main objective of the study is first to investigate if there is any coordination between monetary and fiscal policy in the United States and then to test the Sargent and Wallace's view that an easy monetary policy today will result in a lower price level over the long run when debt and deficit exist. It was found there was not a fiscal or monetary dominate environment in the United States during our sample period (1973Q1-2011Q3). Furthermore, the estimation results proved the validity of the Sargent and Wallace's view as it was found a positive and statistically significant relationship between domestic interest rate and price level over the long run.

Furthermore, it was found that, over the long run, a higher real exchange rate (lower value of domestic currency) leads to a higher price level. It was also found that the fiscal policy is very

effective in the United States to fight inflation as the increase in the real government expenditures, deficit as well as debt cause inflation. Finally it was found, the foreign interest rate has a depressing impact on the price level over the long run.

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Book Review

The Emerging Markets Century: How a New Breed of World-Class Companies is Overtaking the World
Antoine van Agtmael
Free Press; annotated edition, 2007
ISBN: 978-0743294577, hardcover

Reviewed by: HAMID YEGANEH*

I. Introduction

In his book 'The Emerging Markets Century,' Antoine van Agtmael discusses a tectonic shift that is taking place from the developed world to the undeveloped or 'Third World' economies. While many authors have addressed the rise of emerging markets, the Agtmael's account is particularly insightful as he examines the emerging markets at the corporate level and shares his valuable experience as an investment manager.

Emerging market is a broad term which may refer to a country that is involved in political, social, and economic evolution and which is experiencing a rapid economic growth (Fan, 2008). Agtmael relies on ample evidence to demonstrate that the extraordinary growth of emerging countries is ushering us to a new century very different from what we have known for the past centuries. According to Goldman Sachs projections, the four emerging economies namely, Brazil, Russia, India, and China will overtake the seven largest industrialized countries (United States, Japan, Germany, France, UK, Italy, and Canada) by 2040 (Agtmael p. 11). Consistent with the same projections, Brazil, Russia, India, China along with the next eleven economies (The next 11) will be larger than the G7 soon after 2030 (Agtmael, p. 11). The manifestations of the shift from the West to the emerging markets are clearly observed at the corporate level. Indeed, the leading corporations originated in the emerging countries such as Korea, Taiwan, China, India, Brazil and Russia are not really that far behind their counterparts located in more developed nations of the West (United States, Europe, Japan, Australia, and New Zealand). Examples are abundant: Korean Samsung's global brand is now better recognized than Sony's, its Research and Development budget is larger than Intel's and its 2005 profits were higher than those of Dell, Nokia, Motorola, Philips, and Matsushita. CEMEX, a Mexican cement company is the largest cement company in the United States, second largest in the UK, and third largest globally and the leading cement company in many other markets. Computers are now not just made, but largely designed in Taiwan and China. Most of the technical support on fixing these computers comes from India. Likewise, Modelo, a company headquartered in Mexico, sells more beer (Corona) to Americans than Heineken.

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II. Myths about Emerging Markets Multinationals

An emerging market multinational (EMM) may be defined as a multinational company which is headquartered mainly in an emerging country (Fan, 2008). Agtmael relies on many examples to refute some popular myths about the emerging markets multinationals (EMM). For instance, it is widely but wrongly assumed that EMMs are unprofitable, inefficient, and clumsy businesses owned and managed by governments which rely only on cheap labor and plentiful natural resources to produce low-quality products and services. The author points out that just in the past ten years, EMMs have been becoming increasingly independent, efficient, sophisticated, and profitable. He explains that fifty-eight of Fortune magazine's top 500 global corporations are headquartered in emerging markets. Many of these companies are not less but more profitable than their peers in the United States, Europe, or Japan (Agtmael, p. 15). In 2006, six of these companies that were on the Fortune 500 list were also considered world-class contenders: Samsung Electronics, Hyundai Motors, POSCO in Korea, Petrobas in Brazil, Hon Hai in Taiwan and Reliance Industries in India (Agtmael, p. 38). As little as ten years ago, putting a name with an EMM would have been difficult, but there are currently at least 25 EMMs that are considered world-class companies.

III. EMMs' Evolution over Time

Agtmael distinguishes three main waves that help us to understand the evolution of the EMMs. In the first wave that started shortly after the World War II, Western multinationals saw the opportunity of opening manufacturing plants in the third world economies in order to take advantage of some benefits such as cheap labor, raw materials, and presence in future markets. Those countries that welcomed the Western multinationals received capital and technology and more importantly acquired the Western management standards. In the second wave, the undeveloped countries gained access to capital markets, technology, and skilled workforce. Therefore, the firms from developed countries opted for outsourcing and off-shoring non-core activities to companies from emerging economies (*The Economist*, 2006). Furthermore, during 1980s and 1990s the advances in transport and telecommunication facilitated many exchanges between firms form undeveloped and developed companies. Gradually, the level of the technology of outsourced processes was increased, and the firms from undeveloped countries were responsible to provide progressively sophisticated products and services. More recently, as the level of technology and sophistication enhanced, the companies from emerging countries started to compete with their counterparts in developed countries.

According to this theory, at the third stage, the EMMs become extremely competitive and can capitalize on their branding. Agtmael explains that not all EMMs have the luxury to build a brand name from the ground up like the Korean company Samsung. Samsung's rise to power has been a two decade-long journey which has presented the classic linear long road to global branding. However, some EMMs do not have the time to take the classic long road, so they use other avenues such as the shortcut and the back road. The shortcut is much more accelerated and is concentrated on jumping over existing competitors and buying a brand. This is usually driven by the lack of time to establish a brand name or the lack of confidence in being able to establish a global brand name on its own. In 2004, Lenovo, a Chinese EMM tackled the global market and purchased IBM personal computer division for $1.25 billion in cash and stock (Agtmael, p.85). This was a critical point for Lenovo, as they decided to change from the long road and take the

shortcut in order to expand their brand name globally. In contrast to classic long road and short-cut, the back road strategy consists of gaining brand recognition almost through luck. An example would be Corona that gained a cult-like popularity through careful marketing (Agtmael, p. 83).

IV. EMMs Competitiveness and Strategies

Agtmael emphasizes the limits of imitation and explains how EMMs are now adopting well-tailored and sophisticated business models. In chapter eight, the author concentrates particularly on Embraer's business strategy and discusses how they have been able to find their niche in the airline manufacturing market. Only Boeing, Airbus and the Montreal-based Bombardier outsell the Brazilian plane maker. Embraer has found an opportunity in what the larger companies did the worst: smaller planes. As a general rule, we might assume that the EMMs supply the first world multinationals with the pieces required for the final products. However, Embraer as an EMM has done the exact opposite. They have designed their company so that everything is made in the established markets and shipped to them ready for assembly. This allows them to obtain the highest quality products for the cheapest prices from all over the world. This strategy also gives them the flexibility that other competitors cannot afford. Thus, through planning and strategy, Embraer is able to sell planes and perform better and quicker than their competitors. The newer EMMs are adopting strategies to explore the opportunity and profitability of the resources that are found around them. Instead of having to ship in resources from all around the world, they are beginning to vertically and horizontally integrate themselves, so the costs are cut. A leading example is the wood pulp company in Brazil Aracruz Celulose that took advantage of its natural resources to become a world-class multinational. Over the years most of the wood that has been used to make paper has come from colder climates such as Europe and North America. In Brazil, where there is tropical weather, the trees grow twice as fast and can be ready in as soon as seven years.

Agtmael highlights the importance of global competitiveness and argues that EMMs need to be the best within their industry, not just as measured against local competitors, but against the best world corporations (Agtmael, p. 35). Without putting themselves to the global test, these companies will never reach their fullest potential. Based on research and interviews with CEOs, CFOs, and other senior managers, Agtmael identifies five criteria to determine whether companies are world-class: 1) A leader in the industry globally, 2) Global presence in exports and production, 3) Top-three market share in foreign countries, 4) Globally competitive not just in price but in quality, technology, and design, and 5) Benchmarks against the biggest and best in the world.

V. Dealing with EMMs

The author discusses the challenges and opportunities emanating from EMMs and maintains that in dealing or competing with these companies, four important issues should be considered: 1) Adopting public-private partnership, 2) Avoiding protectionism, 3) Learning from the first adopter, and 4) Knowing the clients' needs. First, we should set aside our disbelief about permitting local, state, regional, and national governments to become partners in launching and sustaining private enterprises. Second, we should remember that protectionism ultimately impedes excellence. By staying in one spot and not advancing or taking risk, those who rely on protectionism, end up with mediocrity and obscurity. A good example is American car makers that sat in the same position for years and are now finally carrying out new technologies to try to increase sales and

profits. The third lesson to be learned from emerging markets is to learn from the adopter. By this I mean that the learning process will increasingly become a two-way street. Technology will be passed on to the First World countries along with other elements such as fashion or new designs. Fourth, we should figure out what clients need all over the world.

As EMMs are evolving, people, firms, countries, and civilizations must find a way to turn these threats into opportunities. People and companies will learn from each other if they implement a truly open and global state of mind. When faced with a competitive challenge, viewing the world as a zero-sum game of conflict usually leads to failure. We need to be adaptive and creative along with having a proactive response in order to be successful. Government officials and business executives are finding new ideas and spreading them across the world forming a new competitive challenge in this already demanding marketplace. Job losses from outsourcing are the most noticeable element of globalization when looking from the First World perspective. But outsourcing is also a two-way street because it is creating thousands of jobs in the U.S. and in Europe. It is interesting to note that five EMMs, namely Hyundai, CEMEX, TSMC, Sasol, and Samsung are the largest employers in the United States and are continuing to grow rapidly.

VI. Investment Strategies for Emerging Markets

In the final part of his book, Agtmael describes some practical rules that could be beneficial for investing in EMMs. The first rule is averaging rather than buying all at once. He adheres to a contrarian approach and says that investors should avoid markets that everyone is talking about and invest in those nobody likes. In addition, he believes that investors should invest less than ten percent of their emerging market exposure through individual stocks and invest the remainder though funds or ETFs (Agtmael, p. 297). He explains why to buy stocks that are underrated by the market. He reminds us that it is important to check out why the stock is cheap or expensive by analyzing the company's competitiveness, corporate governance, and management. In this regard, making plant visits, meeting with management and talking to competitors can be very smart. Agtmael tends to distrust the wisdom of the market, and like many guru investors, thinks that crisis may be a good way into a market because that market will ultimately bounce back and that investment may have a huge return. The notion of proven success should also be looked at when investing. He explains that the proven success is a major reason why some stocks become overrated and companies lose their market share. He suggests looking at companies that are entering the market with few competitors and who are on their way to becoming a world-class company. This strategy may lead to very high returns over a long-term period. By world-class, he means a company that will excel in the global market and will take on the global competition with success. Agtmael goes on to talk about how the world-class companies in his book are probably not the best investments in the future (Agtmael, p. 312). He adds that companies that are receiving government handouts should not be taken into consideration. Finally, Agtmael states that he would rather listen to the badmouthing to find the truth of a company rather than company management.

VII. Conclusion

Agtmael capitalizes on his extensive experience as an investment manager to provide a sharp analysis of the emerging markets' multinationals. He directs our attention to the fact that the EMMs are the results of structural socio-economic reforms after the World War II. As such,

the EMMs are very likely to continue their rapid growth in future. Based on a three-stage theory, it is argued that at the first stage, EMMs are dependent on the government help, are factor-driven, and consequently compete based on their factor endowments primarily cheap labor and abundant natural resources. At the second stage of their development, wages rise and companies develop more efficient production processes and enhance product quality (Porter, 1990; Reinert, 1995). At the third stage, the EMMs survive if their businesses are able to compete with new and unique products (Schwab, 2009; Porter, 1990). Agtmael's analyses confirm that many of the EMMs have already entered the second stage and some like Samsung are growing in the third stage. The evolution of EMMs implies that they should invest more in education and training and compete by relying on advanced and sophisticated production processes.

Over time, the EMMs have learned valuable lessons from creative destructions such as the Asian crisis of 1997 and accordingly have become more resilient and agile. Nowadays, while large parts of the European Union and the so-called first world are in deep financial crisis, the emerging countries seem to be in a better position. In addition, the growth of EMMs can be supported because they are generally seen as more flexible, cooperative and less arrogant than their established American and European competitors (Bell, 2009). What is more, the largest populations reside in the emerging countries and that is where disposable incomes and consumer demand are rising fastest. Therefore, the EMMs can rely more and more on their domestic markets to sustain their growth. For instance, the Chinese collectively consume more beer than Americans, and more household appliances are sold in China than in the U.S.A. The size of the Indian middle class is now greater than the total population of all the EU countries combined (Bell, 2009). As the number of consumers is growing in emerging countries, they will ultimately decide about products, designs, brands, and even fashions. The EMMs are likely to compete with their rich-world peers in technology, management, efficiency, and quality. Consequently, it is time we start adjusting to the idea that names we have become accustomed to hearing such as the IBM's, Ford's, Wal-Mart's, Panasonics, Honda's, and Sony's are in grave danger of being over-shadowed by lesser-known names of the emerging markets. This will have a profound impact not only on the world business, but also on all aspects of society. As EMMs grow, they will gain influence, they will dictate their managerial styles, they will shape consumption patterns/behaviors, and they will impose their own corporate cultures and practices. Zakaria (2008) pointed out that as the world moves from commercial domination by the U.S. and Western Europe to more of a multipolar orientation, populations in emerging economies will continue to become wealthier, more sophisticated and self-confident. Thus, we may agree with Agtmael that the rise of EMMs represents a seismic shift in the world business, perhaps "the biggest shift since the Industrial Revolution of the 18th century" (Agtmael, p. 247).

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