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Chief Editor:
Ahmad Tootoonchi
College of Business and Global Affairs
University of Tennessee at Martin
100 Business Administration Building
231 Lovelace Avenue
Martin, TN 38237
Tel: 731-881-7227
Tootoonchi@utm.edu

Editor:
Michele A. Krugh
University of Pittsburgh
4200 Fifth Avenue
Pittsburgh, PA 15260
Tel: 412-526-4271
michele.krugh@pitt.edu

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Editorial Note

The November 2023 issue of the *Journal of International Business Disciplines (JIBD)* has been the result of a rigorous process of blind reviews, and in the end, the reviewers recommended three articles for publication in this issue of *JIBD*.

JIBD is committed to maintaining a high standard of quality in all of its publications.

Ahmad Tootoonchi, Chief Editor
Journal of International Business Disciplines

PERCEPTION OF INTERNATIONAL TRADE: GENDER AND GENERATIONAL DIFFERENCES?

Turgut Guvenli, Minnesota State University – Mankato
turgut.guvenli@mnsu.edu

Hope Torkornoo, Kennesaw State University
htorkorn@kennesaw.edu

Rajib Sanyal, University of Washington – Bothell
rajibs@uw.edu

ABSTRACT

Through a cross-sectional and longitudinal study, we examined the attitudes of men and women at two time periods, 20 years apart, towards a set of social and ethical issues in international trade using a 10-item survey questionnaire. While women are more concerned than men in both time periods, this concern has declined over time for both groups. In 1999, women were significantly more disturbed than men over child labor, working conditions and human rights violations in exporting countries. In 2019, women were significantly more concerned about lower wage rates, use of prison labor, and deficient environmental standards, in addition to poor working conditions. Use of prison labor and undemocratic nature of foreign governments were the least important issues for both groups in either time periods. The findings suggest that quality of life issues in developing countries concern women more than men and the relevance of issues change from one generation to another. While no support was found for trade critics' assertion that low wages are a source of unfair competition, policy makers, advocacy groups, and corporate leaders need to be mindful of how trade is viewed by women.

INTRODUCTION

Differences between men and women have been a long-standing subject of academic research. Studies from business settings have pointed to noticeable variations between the two sexes in their attitude and behavior on a wide range of subjects, including ethics, bribery, and corruption. In this paper, we look at how they view 10 specific issues of concern surrounding international trade and how these same issues are viewed twenty years later.

Since the end of the Second World War, national and multilateral policies have vastly expanded global trade and investment flows. The impact of globalization is felt acutely across society through jobs and income levels, availability and choice of products, in public policy formulations and geo-political tensions, and in corporate decisions and conduct. Some markers of globalization include the creation of the World Trade Organization (WTO), China forming Special Economic

Zones offering attractive incentives to domestic and international investors to manufacture and export, the U.S. granting "most favored nation" treaty status to China (which gave a turbo boost to China's exports) and the expansion of an existing free trade agreement between the U.S. and Canada to include Mexico (North American Free Trade Agreement – NAFTA).

Concerns Over Trade

This liberalization of trade and investment also gave rise to concerns over their "downsides": increased incomes and economic growth came on the back of low wages, adverse working conditions, poor governance, and degradation of the environment, among other deleterious practices, in many less developed exporting countries. Opposition emanated from various interest and advocacy groups – labor unions, human rights activists, religious denominations, environmentalists, and businesses wary of competing with cheaper imports (Compa & Diamond, 1996). The success of trade sanctions against South Africa, imposed to pressure that country's minority government to dismantle apartheid (a race-based policy that discriminated against non-Whites), was seen by activists as evidence that abhorrent practices abroad could be changed through public pressure and legal changes in that country's trading partners.

Critics averred that unfettered trade and investment flows would neither be "free" nor "fair" (Shoch, 2000). In many less developed exporting countries, low wages, employing of children or prisoners, poor working conditions, absence of laws (or of their enforcement) to protect the natural environment or intellectual property (IP), and undemocratic political regimes that ignored workers' well-being and denied its citizens basic human rights would enable companies to produce and export goods at low prices that would also harm domestic manufacturers in the importing country. Benefitting from lowered trade barriers and taking advantage of low labor costs and minimal or no regulations, products made in these countries and subsequently exported to developed nations such as the U.S., competed on an unfair basis (Rodrigues, 2018). The removal of trade barriers encouraged multinational firms to locate to or source from low-cost, less regulated countries.

Opponents of trade liberalization pushed for the inclusion of a social clause in bilateral and multilateral trade treaties. Such a clause would link improvements in labor standards in developing countries to greater access to markets in developed nations (Sanyal, 2001). The goal was to ensure that trade was not only free but also "fair." Companies engaged in international commerce were told that their stance on human rights and working conditions would be considered part of their performance and that they would be expected to confront the governments that host them on issues ranging from political repression to child labor – in effect, exercise corporate social responsibility (Cowell, 2000). In negotiations that led to the creation of the WTO, ministers from the 123 member countries approved a declaration that worker rights must be on the agenda of the new organization (Preeg, 2012). NAFTA with Mexico included supplemental clauses covering labor rights and environmental protection. In 1999, the United Nations launched Global Compact, a call to companies to align strategies and operations with universal principles on human rights, labor, environment, and corruption to advance societal goals (Global Impact). The U.S. Department of Labor (2018) is obliged by law to issue an annual report that lists goods

produced by child labor around the world. Companies adopted voluntary codes of conduct and international organizations enacted rules calling for adherence to social and ethical issues. The mantra of "people, planet, and profit" came into vogue (Elkington, 2018).

Since the late 1990s, the U.S. economy has become even more integrated with those of other countries. For instance, the proportion of imports of goods and services into the U.S. has risen from 4.2 percent of the country's GDP in 1960 to 11.81 percent in 1995 to 14.6 percent in 2019 (World Bank, 2021).

Public Attitude Towards Trade

Public attitudes in the U.S. toward international trade have fluctuated over the past few years. Gallup began tracking this attitude in 1993 when the favorable-unfavorable ratio was 44:48. However, since 2013, most Americans have viewed it as a net positive for the U.S. With an economic recession and high unemployment resulting from the pandemic's impact on everyday life, more Americans in 2021viewed trade as a threat (compared to the previous year) – though a majority still saw it as an opportunity for the U.S. economy – 63 percent versus 32 percent compared to 79 percent versus 18 percent in 2020 (Younis, 2021).

Despite this positive outlook on trade, social and ethical issues have continued to dominate headlines. Accidents such as the collapse of a factory building housing garment manufacturing in Bangladesh killing 1,132 people in 2013, allegations over use of convict labor in China to produce goods for exports, reports of children being employed to stitch soccer balls in Pakistan, among many other stories, have put pressure on the U.S. government (and those of other developed countries) to renegotiate existing trade agreements (International Labour Organization, 2016-20). U.S. companies and the U.S. government have accused foreign governments and foreign state-owned enterprises of acquiring IP through questionable means. In 2016, Mr. Donald Trump secured the U.S. presidency on a campaign platform that criticized foreign countries for unfair trading practices. In office, his administration renegotiated NAFTA, championed a "Make in U.S.A." policy, withdrew from the Trans-Pacific Trade Agreement (Amadeo, 2020), and entered into new trading arrangements with China (Swanson & Rappaport, 2020). That trade is strictly a commercial function with no immediate connection to societal concerns has evaporated under the pressure of political and social forces generated by the globalization of the economy. More recently, concern about environmental issues (e.g., global warming and activities contributing to it, rain forest destruction, zero waste, recycling, and sustainable development) and human rights (e.g., harassment of women in the workplace, discrimination against minorities, and prejudice against Black people) have come to the fore. Additionally, public opinion in the U.S. towards certain countries (e.g., Russia and Saudi Arabia) have become less positive, for various reasons, including worries over economic espionage, authoritarian practices, and undemocratic conduct.

Impact on Women

International trade has a mixed impact on women. It has played a transformational role in improving women's lives, creating new jobs, enhancing consumer choice, and increasing their bargaining power in society. However, though they represent half the world's population, they contribute only 37 percent of the global GDP. While this gap is lessening, it is happening at a very slow pace. Trade also led to job losses for women and their concentration of employment in lower-skilled jobs. Korinek et al. (2021) argue that closing the gender gap makes good economic sense and targeted policies and socially responsible conduct by businesses can help women maximize the benefits from global trading. These include removing barriers that impede women's access to education, financial services, and digital technologies.

Trade policies, while not *de jure* discriminatory, tend to be biased against women, resulting in lower levels of employment and higher prices for consumer goods. Although countries do not overtly imposes import tariffs according to gender, implicit biases can amount to "pink tariffs" that put women at an economic disadvantage. Compared to men, women tend to spend a larger share of their income on goods with high tariffs (such as food). Eliminating import tariffs could help women gain 2.5 percent more real income than men. So that trade can increase opportunities for both men and women, policy makers need to assess the potential impact of trade rules on various segments of the society and develop policy responses based on evidence (World Bank & World Trade Organization, 2020).

Against this backdrop, we conducted surveys to ascertain opinion with respect to how various social and ethical issues in foreign countries were viewed in the U.S. by men and women. We first started sampling attitudes in the late 1990s. In the late 2010s, we carried out the same survey with a similar population. The topics in the survey instrument have remained relevant despite the twenty years that elapsed since we created and administered it. This large set of data drawn in two time periods form the basis of this study reported here.

REVIEW OF EXTANT LITERATURE

That businesses needed to be socially responsible in their international operations emerged as a major topic of academic research in the 1980s as growing number of child labor and sweatshop scandals involving apparel and footwear companies and mounting awareness of global environmental issues (such as depletion of ozone layer and deforestation) dominated news headlines. Outlets such as the *Journal of World Business* and the *Journal of International Business Studies* saw many research articles in this field (Kolk, 2016). A paper by Guvenli and Sanyal (2002) found that public concern was highest with respect to the use of child labor, human rights violations, and poor working conditions in the exporting countries. More recently, Guvenli et al. (2022) reported that over a twenty-year time period between 1997-99 and 2019-20, there had been a marked lessening of concerns in the U.S. over ethical and social issues in foreign countries, though subjects such as use of child labor, violation of human rights, and poor working conditions remained as the leading subjects of disquiet.

Since the primary focus of this paper is to discover if men and women differ in their views with respect to the social issues that accompany trade, we examined some of the literature on how these two groups differ on social, political, and ethical dimensions. The concept of masculinity-femininity was introduced by Hofstede (1980) where he posited cultural differences between the two genders and demonstrated with scores that led him to conclude that some countries tend to have more "masculine" characteristics and others more "feminine" characteristics as a part of a continuum. Countries with "high" femininity scores were likely to exhibit a greater commitment to quality of life and empathetic human relationships. Similar ideas were advanced by Trompenaars (1993). One could conclude from their scholarship that women, as a group, differed markedly from men on what is important to and how society is configured, what values need to be emphasized, and that social well-being need to be given more weight than material goals. Hofstede categorized the U.S. as more of a high masculinity country.

Gilligan (1982) explained that men and women differ in their moral reasoning and judgments, contending that men look at moral issues in terms of justice, rules, and individual rights while women tend to consider such issues in terms of relationships, caring and compassion. Her research, traced back to the work of Freud, holds that gender identity becomes established at a very early age through the mother-child relationship and is thereafter, irreversible. Gender socialization theory predicts that as adults the sexes will bring different ethical values to their work roles, shaping in different ways their work-related decisions.

A substantial body of work has explored the differences in the behavior and attitudes of men and women in various economic transactions. Empirical and experimental research show that overall, men and women differ with respect to ethical issues. Croson and Gneezy (2009) in a review of studies on the subject concluded that both nature and nurture are responsible for the gender differences. Dawson (1995) tested six workplace scenarios and found that the response of men and women differed significantly in four cases. Studies show that women commit fewer crimes than men. Steffensmeir et al. (2013), for example, examining 83 cases of corporate fraud, found that women were not typically part of conspiracy groups and if they did, their role was minor. There were two main ways in which women were involved – they had close personal relationship with a male co-conspirator, or they occupied a corporate position with gateway access to financial matters.

Studies also show that men and women differ in the preference for taking risks – women are more risk averse than men when taking investment decisions (Harris et al., 2006). Similarly, women's preference for competitive situations are lower than for men. Several studies have found that women are more altruistic and socially conscious than men (Andreoni and Vesterlund, 2001). Hence, actions that undermine the public good (such as accepting and giving bribes) are less likely to be undertaken by women.

Guvenli and Sanyal (2012), examining attitudes in the U.S. toward bribery in international businesss, found significant differences by sex with respect to specific hypothetical business situations with men more likely to give bribes in exchange for providing services. Alatas et al. (2009), in an experimental study, found Australian women to be less tolerant of corruption than Australian men; however, no gender difference in corruption tolerance was found in India, Indonesia and Singapore, leading them to conclude that gender difference in the attitudes towards

corruption, and hence the corruptibility of women, may be culture specific and not a universal phenomenon. Similarly, other studies (e.g., Goetz, 2007) have noted it is not that women are fundamentally different from men when it comes to corrupt behavior but that factors such as family obligations, cultural issues, democratic practices, institutional integrity, and gender status play a role. The explanation offered is that differences between men and women towards illegal and unethical conduct is the result of an "unfair" system rather than the "innate" higher moral nature of the fair sex.

A review of 14 studies by Ford and Richardson (1994) comparing the two sexes in terms of their ethical behavior found that the results of seven studies supported females being more ethical than males. The remaining seven studies found no significant difference between the two in terms of their ethical behavior. Borkowski and Ugras (1998) conducted meta-analysis on 47 studies. Their finding reveals that 49% of them yielded significant differences between females and males in terms of ethical behavior, 34% not significant and 17% mixed results.

Difference between men and women was popularized in the culture with the publication of *Men are from Mars, Women are from Venus*, a non-fiction book that became a runaway best seller (Gray, 1993). Thirty years later, the debate on how and why the two sexes are different and what it means for their roles in society remains unsettled. Pew Research Center surveys have found that majority of Americans say that men and women are basically different, but there is no consensus on the origins of these differences (Parker et al., 2017).

Gender inequality in the U.S., has been declining throughout its history but disparity persists in political representation, corporate leadership, occupational segregation, income and wealth, and household responsibilities. However, in education and school enrollment today, the numbers for women match or even exceed that for men. The 2021 United Nations Development Programme (UNDP) Report shows that the Gender Development Index for the U.S. is 0.994 (HDI – Human Development Index – for men is 0.928, for women 0.922), placing it among the highest in the world.

Research on gender and international trade has been limited due to insufficient data and an insufficient understanding of the relationship between the economic roles played by women as workers, consumers, and decision-makers. Extant research suggest that women tend to be more protectionist than men. Burgoon and Hiscox (2008) found that women in the U.S. (and in developed countries generally) are more likely to support restrictions on trade than men. This divergence in attitude can be traced in part to differences in exposure to economic ideas and information. Mansfield et al. (2015) too found that women were less favorably inclined towards international trade. They attributed this to less favorable attitudes toward competition among women, less willingness on their part to relocate for jobs, and a preference for a more isolationist non-economic foreign policy.

Drawing on our data set, we focused on determining whether (a) women and men perceived the challenges of free trade differently and (b) whether women and men in 1997-99 perceived these challenges differently from their counterparts in 2017-19. There does not appear to be any study focused on this subject – attitude toward social and ethical issues in international trade. This study is an attempt to shed light on this important aspect of global business.

In general, lack of gender-specific data reinforces biases against women in both corporate conduct and trade policy formulation. Decomposing data by sex is needed to determine how these impact men and women differently. The changing nature of the world economy – growth in services, global value chains, and digital technology – is bringing to the fore new trading issues and opportunities for women. Thus, this study offers an additional set of sex-disaggregated data over two distinct time periods to inform our understanding of how trade issues are perceived.

DATA AND METHODOLOGY

A survey instrument was developed that sought responses on a five-point scale to ten most common issues of social and ethical concerns in international trade and business. These issues were identified from news headlines in the U.S. in the late 1990s, political and public reactions, and extant studies. The issues are: employment of child labor, employment of prison labor, poor working conditions, low wages, violation of human rights, authoritarian/non-democratic nature of foreign governments, insufficient protection of IP rights, low or no environmental standards, non-enforcement of environmental standards, and unfair competition based on low wages. The rationale for including the last issue in the survey was to ascertain whether respondents would associate low wages with unfair competition. The questionnaire was administered in 1997-1999 (referred to as Time 1) and twenty years later, in 2017-2019 (called Time 2).

In the context of the notion of including a social clause in trade treaties, survey participants were asked whether they would support restrictions on the import of goods into the U.S.A. if those products had been made in countries where employment conditions and business practices identified in the previous section prevailed. Responses could range from strongly disagree (1) to strongly agree (5). Thus, a score of 1 indicated little concern over this issue while 5 meant the highest level of disquiet. Low scores would indicate less inclination to impose restrictions on trade and investment with the countries where these issues prevailed while a high score would reflect strong opposition to importing from those countries. The focus was on countries, not individual firms.

The survey respondents were students in a state-supported U.S. university in the upper Midwest of the country. The sample size in the 1997-99 surveys is 336 (46 percent female; 54 percent male). In the 2017-19 surveys, 240 completed responses (46 percent female; 54 percent male) were used. Participants in the study, upper classmen studying for an undergraduate degree in business, were in the 21-24 age bracket. This experimental design enabled a controlled comparison of two groups of respondents with very similar profiles at two different time periods. The participants, we stress, were fully exposed to and familiar with economic theories and ideas and knowledgeable about international trade.

The survey results were tabulated and statistically analyzed. T-tests were used to compare the two groups and each of the 10 items.

RESULTS

In Table 1, we present the mean scores for both demographic groups for both Time 1 (1997-99) and Time 2 (2017-2019) periods for each of the ten ethical and social issues of concern.

TABLE 1. MEAN SCORES FOR WOMEN AND MEN IN TIME PERIODS 1 AND 2

	Mean Scores			
Issue	Time 1		Time 2	
	Females	Males	Females	Males
Employment Conditions -				
Use of child labor	4.39	4.09	3.94	3.69
Poor working conditions	4.18	3.77	3.83	3.52
Low wage rates	3.05	3.01	3.07	2.78
Use of prison labor	2.64	2.47	3.00	2.74
Unfair competition due to low wages	3.41	3.27	3.23	3.08
Politics and Law –				
Undemocratic governments	2.49	2.45	2.71	2.50
Human rights violations	4.37	4.01	3.95	3.92
IP rights violations	3.54	3.44	3.66	3.57
Physical Environment –				
Low or no environmental standards	3.65	3.48	3.43	3.17
Non-enforcement of standards	3.75	3.65	3.48	3.25

Note: Respondents answers ranged on a scale of 1 to 5 with 5 indicating the highest level of concern with the prevalence of that issue.

Four statistics in Table 1 stand out. One, on all the ten topics, for both time periods, the mean scores for women are higher than those for men, indicating that women are more concerned with these issues than men. Two, compared to Time 1 the mean scores for women for five of the ten issues were lower in Time 2. In contrast, for men, the scores were down for seven of the issues. In

Time 2, no item averaged a score above 4 on the five-point scale. Twenty years earlier there were 5 items with mean scores of over 4 – one for men and four for women. These indicate a general decline in disquiet over these subject matters. Three, on 3 topics – use of prison labor, undemocratic foreign governments, and inadequate protection of IP rights – the concern of both men and women rose in Time 2 compared to the previous period. This suggests, that over time, these three issues have become salient in a noticeable way in the media, in the political arena, and in public discourse. Four, the top three concerns for women in Time 1 were the same in Time 2. For men, these were the top concerns in Time 1; in Time 2, concerns over IP violations had replaced poor working conditions as a top three concern.

In Tables 2 and 3 we look at whether the mean scores for the two groups for each item are significantly different. Table 2 looks at the results from Time 1. T-tests are used to measure the difference between the two groups.

TABLE 2. GENDER DIFFERENCES IN TIME PERIOD 1 (T-TESTS)

	Mean Scores			
Issue	Females	Males	t value	p value
Employment Conditions -				
Use of child labor	4.39	4.09	2.61	0.01***
Poor working conditions	4.18	3.77	3.73	0.00***
Low wage rates	3.05	3.01	3.07	0.75
Use of prison labor	2.64	2.47	1.31	0.19
Unfair competition due to low wages	3.41	3.27	1.24	0.22
Politics and Law –				
Undemocratic governments	2.49	2.45	0.31	0.76
Human rights violations	4.37	4.01	3.26	0.00***
IP rights violations	3.54	3.44	0.92	0.36
Physical Environment –				
Low or no environmental standards	3.65	3.48	1.53	0.13
Non-enforcement of standards	3.75	3.65	0.85	0.40

Significance level: ***0.01

The results indicate that on three topics – use of child labor, poor working conditions, and human rights violations – women were significantly more concerned than men. As noted above, these issues with mean scores of 4.39, 4.18, and 4.37 were of the highest concerns for women among all the 10 topics. There are no significant differences with men on the other seven items.

Table 3 presents the same analysis as table 2, but for Time 2.

TABLE 3. GENDER DIFFERENCES IN TIME PERIOD 2 (T-TESTS)

	Mean Scores			
Issue	Females	Males	t value	p value
Employment Conditions -				
Use of child labor	3.94	3.69	1.45	0.15
Poor working conditions	3.83	3.52	1.92	0.06*
Low wage rates	3.07	2.78	2.12	0.04**
Use of prison labor	3.00	2.74	1.66	0.1***
Unfair competition due to low wages	3.23	3.08	1.02	0.31
Politics and Law –				
Undemocratic governments	2.71	2.50	1.62	0.11
Human rights violations	3.95	3.92	0.21	0.83
IP rights violations	3.66	3.57	0.62	0.52
Physical Environment –				
Low or no environmental standards	3.43	3.17	1.87	0.06*
Non-enforcement of standards	3.48	3.25	1.56	0.12

Significance levels: ***0.01; ** 0.05; * 0.10

Between the two generations, the difference among men and women have narrowed to only one issue – low wage rates -- at the p=<0.05 level of significance. At the p=<0.1 level, we find more issues over which women were more concerned than men – poor working conditions, use of prison labor, and low or no environmental standards in the exporting countries. There was no statistical difference between the two sexes on their views on human rights violations and IP rights violations.

We looked at the responses of women for the two time periods to gain an inter-generational perspective. They are reported in Table 4.

TABLE 4. COMPARING SCORES OF WOMEN IN TIME 1 AND TIME 2 (LONGITUDINAL ANALYSIS)

	Mean Scores			
Issue	Time 1	Time 2	t value	p value
Employment Conditions -				
Use of child labor	4.39	3.94	3.10	0.00***
Poor working conditions	4.18	3.83	2.61	0.01***
Low wage rates	3.05	3.07	-0.22	0.83
Use of prison labor	2.64	3.00	-2.52	0.01***
Unfair competition due to low wages	3.41	3.23	1.38	0.17
Politics and Law –				
Undemocratic governments	2.49	2.71	-1.94	0.05**
Human rights violations	4.37	3.95	3.01	0.00***
IP rights violations	3.54	3.66	-0.93	0.35
Physical Environment –				
Low or no environmental standards	3.65	3.43	1.76	0.08*
Non-enforcement of standards	3.75	3.48	2.02	0.04**

Significance levels: ***0.01; ** 0.05; * 0.10

The results reveal that women's attitudes have evolved over time. On five of the items – use of child labor, poor working conditions, human rights violations, low or no environmental standards, and non-enforcement of these standards -- their concerns have declined significantly. However, on two issues -- use of prison labor and the undemocratic nature of foreign governments -- their alarm has increased significantly. These two subjects, though, rank at the bottom of the league of concerns, with mean scores of less than 3.0. On the remaining three topics, there have been no significant changes.

We performed a similar comparison of men from the two generations. The results are shown in Table 5.

TABLE 5. COMPARING SCORES OF MEN IN TIME 1 AND TIME 2 (LONGITUDINAL ANALYSIS)

	Mean Scores			
Issue	Time 1	Time 2	t value	p value
Employment Conditions -				
Use of child labor	4.09	3.69	2. 90	0.00***
Poor working conditions	3.77	3.52	1.87	0.06*
Low wage rates	3.01	2.78	1.84	0.07*
Use of prison labor	2.47	2.74	-1.84	0.07*
Unfair competition due to low wages	3.27	3.08	1.38	0.17
Politics and Law –				
Undemocratic governments	2.45	2.50	-0.39	0.70
Human rights violations	4.01	3.92	0.67	0.50
IP rights violations	3.44	3.57	-1.06	0.29
Physical Environment –				
Low or no environmental standards	3.48	3.17	2.51	0.01***
Non-enforcement of standards	3.65	3.25	3.11	0.00***

Significance levels: ***0.01; ** 0.05; * 0.10

Paralleling the responses of women, for men too, there was significantly less concern over use of child labor, poor working conditions, low wages, absence or insufficient environmental standards, and their non-enforcement. Only on one item – use of prison labor – was there significantly higher concern in Time 2 compared to Time 1. However, the mean score for men on this subject was a middling 2.74 on a five-point scale. Though the mean scores show an increase in concern over undemocratic governments and IP rights violations in Time 2, they are not statistically significant.

ANALYSIS OF RESULTS

The results offer clear insights regarding the views of men and women on trade issues what it implies for policy makers, advocacy groups, and businesses engaged in and impacted by international business.

The crucial finding is that women are more sensitive to ethical and social issues in international trade than men – they were 20 years ago, they were 20 years later too. In a sense, this confirms the broader scholarship finding that women, generally speaking, are more sympathetic to quality of life, ethical, and socially related issues than men. The top three concerns for women -- use of child labor, poor working conditions, and human rights violations – were significantly higher than men although these were the top three rated issues for men too. These topics are humanistic issues, less connected with competition, materialism, and profit-inducing factors. In Time 2, while the top 3 concerns have remained unchanged for women, for men, IP violations have replaced poor working conditions. Women were significantly more concerned than men in Time 2 on a wider set of issues: low wages, use of prison labor, and lower environmental standards. These are also all quality-of-life issues. These findings also echo earlier studies that women are less enthusiastic about international trade than men.

A second finding of this distinctive longitudinal study is that perspectives shift from one generation to another towards the same issues over time. For both men and women, the concern is lower for all the issues in Time 2 except for use of prison labor; the higher score for it may well reflect persistent media reporting on the subject in recent years. In general, while women are more concerned than men over six of the ten issues, there is no difference between them on the other four, and overall, the level of concern on all issues save prison labor, is markedly lower. The lower scores in Time Period and a reordering of the ranks of the listed issues suggest other topics may be emerging that are of concern – such as women's rights, climate change, and political rivalries.

A third finding was that men and women did not differ significantly in either time period with respect to believing that the source of unfair competition were the low wage rates in the developing countries. Their middling mean scores of about 3.0 suggest they were neutral on this issue. Additionally, unfair competition stemming from low wages was not ranked among the top three concerns by either men or women in Time 1 or Time 2. It appears that respondents understand that differences in labor costs across locations is a source of competitive advantage for certain goods and countries and that in of itself does not equate to unethical or exploitative conduct.

What explains the general decline in concern for most of the issues for both men and women? We offer three explanations.

First, during this period (1999 through 2019), the world continued to experience growth in international trade and investment. To a large extent, this expansion and accompanying rise in income in the U.S. was the result of lower wages, poor working conditions, lax environmental standards, and other social deficiencies and ethical laxities in many of the countries from which products were imported. In effect, these factors were the source of competitive advantage for many

of the less developed exporting countries. Thus, with the widespread benefits of international trade so palpable, disquiet over these issues has softened.

Second, expansion in trade and investment has been accompanied by many regulatory and monitoring mechanisms at national and inter-governmental levels, by both international agencies and advocacy groups. These efforts have to a considerable extent alleviated some of the harshest and most egregious negative social and ethical conditions. At the same time, it has become starkly apparent that (a) the pace with which change can be brought about in the political, economic, social and cultural conditions in a foreign country is slower than had been hoped or wished and (b) there is a limit to how much pressure from outside – government or non-government – that can be brought on a foreign sovereign country to change and reform. As a result, the feeling is that this is as much that can be accomplished, and any improvements can at best be incremental. Thus, concern over many of the issues has declined.

Third, while the survey instrument used reflected international trade worries in the late 1990s, twenty years later, other global concerns have come to the fore, such as climate change, rights of indigenous peoples, treatment of Black people, and sustainability. While these issues were not in the survey given in 2017-19, it can be that attention and concern have moved to these issues, relegating the subjects that agitated the population a generation ago. The nature of global trade has been changing – growth in trade in services, the reliance on long and complex supply chains, and the digitization of economic activities.

IMPLICATIONS OF THE FINDINGS

For trade policy makers, it means that subjects of concern have shifted over time. In negotiations and other dealings with foreign governments, emphasis has to be given to protecting the intellectual property rights of the companies of the U.S. and push to stop import of products made by prisoners. The government can find support among its populace to seek restrictions on trade with countries that are seen to benefit from these acts. In short, trade agreements need to be regularly revisited and recalibrated to address changing concerns among the consumers in the importing country. Since conditions in exporting countries change (e.g., nature of government, environmental protection, economic development, etc.), public attitudes change too.

For companies trading and investing in foreign countries, it behooves them to be mindful of what issues are of importance to their customers and suppliers. Importers of products made by child or prison labor may experience reputational damage, public backlash, and sanctions. At the same time, they have to be vigilant that fake products do not fool their customers. The public affairs strategy of these firms needs to be revised to reflect the sentiments of the various constituencies it serves – protecting and advocating its interests and leveraging public support when it is there.

For advocacy groups that blacklist companies and pressure foreign governments, they too need to pick the issues to focus on that will have the most impact and garner public support. Some issues recede in importance or public awareness while other subjects emerge. This inter-generational study indicates that advocacy groups need to be prepared to shift this mission, resources, and

strategies to adapt to changing realities. For example, in recent years, issues of sustainability, reducing the carbon footprint, loss of wildlife habitats, and reducing waste have emerged as key issues overtaking topics such as low wages or unfair competition.

For all constituencies in the U.S., it is worth remembering that the concerns that animate women cannot be ignored. The impact on women of trade policies and corporate conduct has been reiterated. Given the high level of empowerment of women in the U.S. and their growing presence in senior corporate leadership, legislative bodies, state agencies and not-for-profit organizations, social media, in addition to rising financial clout, they are a potent force to influence and sway public policy and legislative agendas. It also feeds into the programs of NGOs, which may be able to garner female support and exercise greater influence by focusing on those topics that are important to them. This may also lead to pressure on U.S. firms to distance themselves from doing business with countries where ethical lapses are egregious. Similarly, firms based in, and governments of, exporting countries can benefit from this knowledge and accordingly address the changing concerns of the constituencies in the U.S.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The study, first conducted in the late 1990s, reflects the social and ethical issues informing trade at that time. Staying focused on them enabled this current longitudinal study to be conducted. Going forward, researchers can recognize new and emerging societal issues impacting global business (e.g., sustainability and global warming, etc.) and include those in similar studies.

The data underlying this study comes from surveys of business students – men and women. To ensure a broader and representative societal perspective is obtained, responses could be sampled from a more diverse pool of respondents in terms of education (non-business students and individuals without college degrees), age, income levels, ethnicity, gender diversity, and those in other parts of a large country.

This study could also be expanded into a wider, multi-country comparative examination of these concerns. Multi-country perspectives would allow for a fuller understanding of the importance of these issues in individual countries. Studies on how these issues are perceived in exporting countries would offer a complementary and fuller picture of trading relationships, expectations, challenges, and anxieties.

The respondents to the surveys belonged to two different generations. The “second” generation was answering questions at a time when the world economy was more globalized compared to 20 years ago, with more information and insights available, including the efficacy of various policies and approaches in the U.S. to drive reforms in developing nations. Thus, the Time 2 respondents are affected by the “time lapse” effect. Since the authors plan to continue the survey, the results from future periods would provide additional perspectives on how perceptions towards international trading issues change or do not change and if such changes are seen differently by various segments of the public.

CONCLUSIONS

This cross-sectional (men and women) and longitudinal (two time periods separated by 20 years) study contributes to the literature on how sensitivity to international business issues may vary between men and women. Our findings show that women are more concerned than men over social and ethical issues surrounding international trade. While the concern has declined on the part of both men and women over the two decades, overall, women continue to remain more troubled on all the ten issues examined. Given the very high and nearly equivalent level of human development for both sexes in the U.S, continuing divergence between men and women on how they view trade issues suggests additional indication of gender difference. It also appears that topics of worry change over time, with new issues emerging to gain the attention of the population. For instance, though not statistically significant, there is greater uneasiness in the second generation over IP violations. The overall findings signal the value for international trade negotiators, policy makers, foreign governments, corporate leaders and advocacy groups to be mindful of what concerns women (and different demographic groups) and to recognize that public concerns shift over time.

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EFFECTS OF FINANCIAL AND MACROECONOMIC FACTORS ON THE FINANCIAL PERFORMANCE OF A COMPANY

Morsheda Hassan, Grambling State University
hassanmo@gram.edu

Raja Nassar, Louisiana Tech University
nassar@latech.edu

ABSTRACT

In this study, we investigated the relationships between financial performance of a company (as measured by return on assets (ROA)) and its financial ratios as well as macroeconomic variables that impact the national economy. The financial ratios used were debt-to-equity ratio (DER), free cash flow per share (FCFSH), price-to-book ratio (PB), and current ratio (CR). The macroeconomic variables were inflation (CPI), unemployment rate (Unempl), GDP, and bond rate (Bond). The data considered were over the period 2005 to 2019 for the companies listed on the Dow Jones Industrial Average. Results showed that GDP and DER were major contributors to financial performance. GDP had a positive relationship with the financial performance of a company and DER had a negative relationship. DER can be viewed as a key indicator of a firm's financial performance.

INTRODUCTION

Financial performance of a company is of importance to investors, analysts, and lenders. It reveals the economic health of the company and how well it is managed. Also, it can be used to compare similar firms across the same industry. Investors are not the only ones who care about financial performance. Analysts use financial performance data to forecast future earnings and growth. Also, lenders use this information to assess whether a company is creditworthy.

Return on assets (ROA) is the most often used measure of financial performance in the literature. Also, some studies used return on equity (ROE) as a measure of financial performance. ROA is calculated by dividing a company's net income by its total assets. On the other hand, ROE is calculated by dividing a company's net income by its assets minus its debt. The two measures are related. It is recognized that ROA is a better measure than ROE for the simple reason that ROE does not consider debt in its assets (the denominator in the ROE formula is total assets minus debt). The higher ROA, the better the company's performance. However, this is not the case with ROE. A higher ROE does not necessarily mean better financial performance of the company, since a high ROE can be caused by high debt, in which case the company may not be in good financial health because of its high debt burden and its effect on a company's solvency. In this study, we use ROA as a measure of financial performance.

Analyses in the literature use least squares regression on time series data grouped over companies. Since the seminal study of Granger and Newbold (1974), it is known that the residuals in regression on non-stationary time series are often auto correlated and renders the F test for model significance invalid, which gives rise to spurious regression. Furthermore, time series data used in least squares regression is often non-stationary with a trend. Non-stationary data are unpredictable and cannot be modeled or forecasted. Hence, results obtained from analysis on non-stationary time series may be spurious. In order to receive consistent, reliable results, the non-stationary data needs to be transformed into stationary data as in time series analysis (Nason, 2006).

For investment purposes, it is more useful for the investor to gain information about individual companies rather than a group of companies. Also, from the analysis on individual companies one can gain information with regard to the group of companies. Hence, a proper approach using time series non-stationary data is to use time series methodology on individual companies that remedies the effects of autocorrelation and non-stationarity and gives reliable results. The literature on factors affecting financial performance deals mostly with emerging markets and is lacking in its treatment of the relationships between financial performance and financial ratios as well as macroeconomic variables.

In this study, we use the appropriate time-series analysis, with regard to individual companies listed on the Dow Jones Industrial Average, DJIA, to determine the effects of financial ratios and macroeconomic variables on a company's financial performance as measured by ROA. The interest in these companies stems from the fact that they are of economic importance in that they determine the DJIA index, which has a long-term positive equilibrium relationship with the GDP. These DJIA stocks reflect the U.S. economy and stock market as a whole.

REVIEW OF LITERATURE

Rababah et al. (2020) studied the effect of COVID-19 pandemic on the performance of Chinese companies. Return on assets was used to represent a company's performance. The authors used pooled ordinary least square (OLS) regression. ROA was the dependent variable. The independent variables were company size, industry, year, debt-to-equity ratio, growth rate of the income of the company, and total revenue of the company. Results showed that COVID-19 pandemic had a negative effect on ROA or company financial performance. Also, the debt-to equity ratio had a negative effect on financial performance.

Nguyen et al. (2022) investigated the effect of corporate strategic initiatives relating to Environment, Social, and Governance (ESG) on firms' financial performance measured by ROA, return on equity (ROE), and Tobin Q. The analysis utilized the two-stage least squares (2SLS). Results showed that ESG was positively related to financial performance as measured by ROA, ROE, or Tobin Q. This indicates that having a better practice of ESG enhances firms' financial performance.

Mukaddam and Sibindi (2020) studied the effects of debt-to equity ratio (DOE) and debt-to capital ratio (DDE) on financial performance, measured by ROA and ROE, of 18 South African retail

firms listed on the Johannesburg Securities Exchange. The data were over a ten-year period, from 2010 to 2019. Panel regression was used to conduct the analysis. Results showed a negative relationship between DOE and DDE and financial performance. It was noted by the authors that ROA had a higher correlation with DOE and DDE, which meant that ROA was better than ROE as a performance variable.

Osamor and Adebanjo (2020) investigated the effects of financial variables on financial performance of seven oil and gas firms in Nigeria over the years 2007-2018. Multiple linear regression for the pooled data was used for the analysis. Return on assets was the financial performance dependent variable and fixed asset ratio, proprietary ratio, debt ratio, and equity ratio were the independent variables. Results showed that only the debt ratio was significant, and it was negatively related to financial performance.

Pasaribu et. al. (2021) studied the effects of gender diversity, debt-to-equity ratio, interest coverage ratio, CEO business expertise, and debt ratio on the financial performance (represented by ROA) of transport and hospitality companies in Indonesia, Malaysia, and Thailand for the period 2015-2020. The sample consisted of 25 companies over the 6-year period. The authors used multiple regression analysis on the pooled data of 150 observations. Results of the analysis showed that gender diversity, debt-to-equity ratio, and interest coverage ratio had significant positive relationships with financial performance. On the other hand, the CEO's Business Expertness and debt ratio were negatively related to firm financial performance.

Shatnawi et al. (2022) investigated the effect of audit committee (AC) on financial performance of firms listed on the Amman Stock Exchange. The study sample consisted of 92 firms over the period 2009 to 2017. Multiple linear least square regression was used on the pooled data. Financial performance as the dependent variable was measured by ROA, ROE, and Tobin's Q. Firm Size, Firm Age, and Leverage ratio were used as control variables. The interaction of enterprise risk management (ERM) and audit committee was introduced in the regression model to test for moderating effect. Regression results showed that AC and firm size had positive relationships with ROA, ROE, and Tobin's Q, while leverage and firm age had negative relationships with ROA, and Tobin's Q. Also, ERM had a positive moderating effect on the relationships between AC and ROA and ROE.

Abu-Abbas et al. (2019) reported on the relationship between financial performance (ROA) and financial leverage with regard to 56 firms for the period 2011 to 2014 on the Amman stock exchange. The authors used least squares multiple linear regression on the data, pooled over time and firms. The study showed that financial leverage was negatively related to financial performance.

Olaniyi et al. (2017) studied the causal relationship between CEO pay and firm's performance. The sample consisted of 63 non-financial firms in Nigeria for the period 1998-2010. The authors used the Granger test to determine the causal relationship. The Granger test results showed a bi-directional relationship between CEO pay and performance. CEO pay Granger-caused performance and performance Granger-caused CEO pay.

Maqbool and Sheikh (2022), using path analysis, investigated the relationship between performance and financial decisions of the firms listed on the Pakistan stock exchange. ROA was used for financial performance and Tobin's Q for market performance. The sample consisted of 292 non-financial firms. Results of the path analysis showed that debt financing (ratio of total liabilities to the total assets) and investment (ratio of operating fixed assets to total assets) had a negative impact on financial performance. However, dividend (ratio of total dividends paid to the total number of shares outstanding) had a positive relationship with financial performance. On the other hand, dividend and debt financing were positively related to Tobin's Q and investment was negatively related.

Olayiwola and Okoro (2021) examined the impact of tax planning and corporate governance on the financial performance (ROA) of 50 non-financial companies in Nigeria for the period 2007 to 2018. Multiple linear regression was used on the pooled data. Results showed that ownership structure and capital intensity had a significant positive relationship with return on assets. However, board diversity and tax planning (total debt/total equity) had a significant negative relationship with return on assets.

Pandey and Diaz (2019) investigated the effects of firm-specific factors on the financial performance (ROA) of U.S. technology and financial firms listed on the New York Stock Exchange from 2014–2017. The authors used ordinary least squares multiple linear regression on the data, pooled over firms and time. Results showed that return on equity was negatively related to ROA, while return on sales had a positive relationship with ROA for both technology and financial firms. On the other hand, current ratio had a positive relationship with ROA of financial firms, while the relationship was negative for the technology firms. Firm size was positively related to ROA for the technology firms.

Almehdawe et al. (2020) studied the effects of certain factors on the financial performance (ROA) of credit unions in Canada. The sample consisted of 189 credit unions for the period 2007-2017. Panel regression was used for the analysis. Results of the least squares regression analysis showed that total assets, income diversification, capital adequacy ratio, market penetration, and inflation were positively related to ROA. On the other hand, membership size, unemployment rates and provincial GDP were negatively related to performance.

Kinyua et al. (2022) investigated the effect of internal equity capital on the lower-tier commercial banks in Kenya. The sample for the study included 26 commercial banks from 2016 to 2020. Using least squares hierarchical regression, it was determined that internal equity had a positive and significant impact on the financial performance (net profit margin) of lower-tier commercial banks. Bank size had no effect on the relationship between net profit margin and internal equity.

Elmghaamez and Olarewaju (2022) examined the effect of corporate social responsibility (broken into Environmental, Social, and Governance score) on the financial performance of firms listed on the London Stock Exchange. The study used data for 50 firms for the period 2008- 2017. Results, using the least squares analysis on the pooled data, showed that environmental performance had a positive impact on stock price of both product and service-based firms. On the other hand, it enhanced the return on capital for product-based firms while reducing it for service-based firms. However, social activity had a significant negative impact on stock price of product and service-

based firms. Also, it had a negative effect on the return on capital of service-based firms. Governance disclosure was not significantly related to stock price or the return on capital for both product and service-based firms.

Alketbi et al. (2022) investigated the moderating effect of sustainability performance on the relationship between firm strategy and financial performance of banks on the UAE financial markets from 2009 to 2019. Control variables used were type of bank (Islamic or commercial), leverage measured by total debts/total assets, size of the bank measured by logarithm of total assets, and age of the bank. Results of the regression analysis on the pooled data showed that bank strategy had a positive impact on financial performance, which was measured by return on equity. However, it was found that sustainability performance moderated the relationship between strategy and financial performance. When sustainability performance was high, bank strategy was not related to bank performance.

Jung and Im (2022) studied the mediating effect of social responsibility on the relationship between country-level social trust and firm financial performance. It was hypothesized that country trust has a positive impact on corporate social responsibility, which in turn has a positive impact on firm financial performance. ROA and ROE were used for financial performance and Tobin's Q was used for market performance. The study analyzed firms from 34 countries for the period 2006 to 2015. Results from the regression analysis showed that corporate social responsibility mediated the relationship between country trust and firm-level financial performance.

METHOD

Data

Quarterly data (using Macrotrends) of free cash flow per share (FCFSH), debt-to-equity ratio (DER), price-to-book ratio (PB), current ratio (CR), and return on assets (ROA) were obtained for companies on the Dow Jones Industrial Average (DJIA) for the period 2009 to 2019. Quarterly data of inflation (CPI), unemployment rate, GDP, and bond rate were also obtained for these companies using the Saint Louis Federal Reserve economic database. The interest in studying these companies was because of their economic importance and of the DJIA positive long-term relationship with the GDP. In this case, the companies can be considered to be the population (Zar, 1984). From the statistical point of view, this is a fixed model in the sense that conclusions drawn are applicable to the companies under study and not beyond. The statistical analysis utilized for this study included time-series regression analysis using the transfer function approach which corrected for non-stationarity and autocorrelation in the time series data (Wei, 2006).

Time series analysis

In this study, we use the transfer function approach in time series to relate stationary input time series (independent variables) to a stationary output time series (dependent variable). We

demonstrate the model for one input series. The model relating a stationary output series y_t to a stationary input series x_i is expressed as

$$y_t = v(B)\, x_t + a_t, \quad (1)$$

where a_t, is the residual and

$v(B) = w(B)B^c/d(B)$.

Here, $w(B) = w_0 - w_1B - \ldots - w_sB^s$

$d(B) = 1 - d_1B - \ldots - d_rB^r$.

and c represents the time delay (or lag) until the input variable x_t produces an effect on the output variable y_t.

We assume that the input series follows an ARMA process, $\frac{\varphi(B)}{\theta(B)}\ x_t$. The function v(B) with its lags is determined from the cross correlations between the white noise input series $\frac{\varphi(B)}{\theta(B)}\ x_t$ and the filtered output series $\frac{\varphi(B)}{\theta(B)}\ y_t$ (Wei, 2006).

Once v(B) is identified, one can express a_t in Eq. (1) as

$$a_t = y_t - v(B)\, x_t \quad (2)$$

and identify the appropriate time series model for Eq. (2). With a_t known, one can determine the final model in Eq. (1).

For this analysis, each dependent and independent variable was tested for stationarity using the Phillips-Perron test and the augmented Dickey-Fuller test. Where a variable was not stationary, we used its first difference, which was stationary. Thus, all variables that entered the model were stationary. The backward elimination variable selection technique (Montgomery et al., 2001) was used so that the final model included only the independent variables that were significantly related to the dependent variable.

RESULTS AND DISCUSSION

Results in Table 1 show that debt-to-equity ratio (DER) is significantly related to company's performance in 62% of the firms on the DOW Industrial average. In all cases (except for Amgen, Home Depot, Walgreen, and IBM) DER was significantly negatively related to performance (ROA). In 24 of the 29 companies (82.8%) DER was negatively related to performance, but the relationship was significant in 14 companies. As such, DER seems to be a major contributor to financial performance and may be considered a key performance indicator. Another financial ratio related to performance was the price-to-book ratio (PB). In 7 firms (24%), the relationship was positive. The current ratio (CR) was significantly elated to performance in 10 firms (34.5). In 6 of these firms, the relationship was positive. Free cash flow per share was positively related to performance in only 3 firms (10%). These ratios (CR, PB, and FCFSH), however, seem to be of less importance than the DER ratio.

The primary macro variable related to performance is the GDP. In 19 (65.5%) of the companies, it was positively related to performance. However, only 10 (34.9%) were significant. Inflation (CPI) was significantly related to performance in 8 (27.6%) of the companies. The relationship was mostly negative. In 6 (20.7%) firms, there was a significant relationship between bond and performance. The relationship was mixed in sign. Unemployment was significantly related (positively and negatively) to performance in 6 (20.7%) of the companies.

It appears that DER and GDP ae the two most important variables that relate to financial performance. As expected, the GDP relationship is positive and that of DER is negative.

The GDP, as a measure of economic growth, has a positive effect on a company's profit, which translates into a higher return on assets. On the other hand, a company with a high DER is risky and might be unappealing to investors and lenders. This can translate into less profitability and a fall in its ROA. For investment purposes, DER seems to be an indicator of a company's financial performance. A high DER could indicate poor financial performance.

TABLE 1. EQUATIONS RELATING THE DEPENDENT VARIABLE (RETURN ON ASSETS, ROA) TO THE INDEPENDENT VARIABLE(S) FOR DIFFERENT COMPANIES

Company	Dependent Variable	Independent Variable(s)	$a_t = f(e_t)$
AMEX	$ROA(1)_t$	Mean $FCFSH_{t-6}$ $FCFSH_{t-7}$ $DER\ (1)_t$ $BOND\ (1)_t$ -0.099 0.064 0.039 -0.834 -0.303 $GDP\ (1)_{t-1}$ 2.24E-6	$a_t = e_t/ (1- ø_2 B2)$ $ø_2 = 0.563$
Amgen	$ROA(1)_t$	Mean $DER\ (1)_{t-3}$ $CPI\ (1)_t$ 0.155 3.80 -0.939	$a_t = et/ (1- ø_1B)$ $ø_1 = =0.139$
Apple	$ROA(1)_t$	Mean $CPI(1)_t$ $GDP(1)_{t-3}$ 0.349 -0.774 1.565E-6	$a_t = e_t/(1- ø_1B)$ $ø_1 = 0.547$
Boeing	$ROA(1)_t$	Mean $PB\ (1)_{t-2}$ $CR\ (1)_{t-3}$ $CPI\ (1)_{t-4}$ $CPI\ (1)_{t-5}$ 0.074 -0.0022 5.915 o.618 -0.749	$a_t = e_t/ (1- ø_1B)$ $ø_1 = 0.625$
Caterpillar	$ROA(1)_t$	Mean $CR\ (1)_{t-5}$ $BOND\ (1)_{t-2}$ $GDP\ (1)_{t-4}$ -0.0428 3.158 0.697 2.306E-6	$a_t = e_t/(1- ø_2 B2)$ $ø_2 = 0.341$
Chase	$ROA(1)_t$	Mean $CPI\ (1)_{t-4}$ 0.0248 -0.031	$a_t = e_t + 0.203e_{t-1}$ $+ 0.558e_{t-2}$

Chevron	$ROA(1)_t$	Mean $UNEMPL(1)_{t-3}$ $PB(1)_{t-1}$ $DER(1)_t$ -0.209 - 0.319 2.245 -11.332	$a_t = e_t/(1- ø_1B)$ $ø_1 = 0.506$
Cisco	$ROA(1)_t$	Mean $PB(1)_{t-4}$ $GDP(1)_{t-4}$ $DER(1)_t$ 0.0153 2.757 4.516E-6 -11.367	$a_t = e_t/(1- ø_1B)$ $ø_1 = 0.0022$
Coca-Cola	$ROA(1)_t$	MEAN -0.185	$a_t = e_t/(1- ø_4 B^4)$ $ø_4 = -0.467$
Disney	$ROA(1)_t$	Mean $CR(1)_{t-4}$ $GDP(1)_{t-3}$ 0.0438 -1.178 8.314E-7	$a_t = et/(1- ø_1B – ø_4B^4)$ $ø_1 = 0.421$ $ø_4 = - 0.727$
Goldman Sachs	ROA_t	Mean $FCFSH(1)_t$ $DER(1)_{t-5}$ $CR(1)_{t-3}$ $GDP(1)_{t-2}$ 0.830 0.00131 -0.00523 0.177 9.179E-8	$a_t = e_t – 1.591e_{t-1}$ -0.591 e_{t-2}
Home Depot	$ROA(1)_t$	Mean $PB(1)_{t-2}$ $DER(1)_{t-1}$ $Unempl(1)_{t-1}$ $GDP(1)_{t-2}$ 0.160 0.0058 0.021 -0.239 1.0674E-6	$a_t = e_t/(1- ø_1B)$ $ø_1 = 0.644$
IBM	$ROA(1)_t$	Mean $DER(1)_{t-4}$ $CR(1)_{t-1}$ $Unempl(1)$ $BOND(1)_{t-5}$ -0.205 0.265 -2.180 0.591 -0.631 $GDP(1)_t$ 3.452E-6	$a_t = e_t/(1- ø_4B^4)$ $ø_4 = -0.560$
INTEL	$ROA(1)_t$	Mean $CPI(1)_{t-5}$ $GDP(1)_t$ $GDP(1)_{t-1}$ 0.214 -0.776 2.243E-6 1.482E-6	$a_t = e_t/((1- ø_1B)x (1- Ø_4B^4))$ $ø_1 = 0.501$ $ø_4 = -0.639$
Johnson & Johnson	$ROA(1)_t$	Mean $DER(1)_t$ $DER(1)_{t-3}$ -0.095 -5.796 -2.094	$a_t = e_t/(1- Ø_4B^4))$ $ø_4 = -0.989$
McDonald	$ROA(1)_t$	Mean $CR(1)_{t-1}$ $Unempl(1)_{t-2}$ 0.0869 0.653 0.462	$a_t = e_t/(1- ø_4B^4)$ $ø_4 = -0.606$
Merck	$ROA(1)_t$	Mean $DER(1)_t$ $CR(1)_{t-1}$ $CPI(1)_{t-1}$ $CPI(1)_{t-2}$ -0.311 -6.370 1.991 -1.110 1.906	$a_t = e_t/(1- ø_4B^4)$ $ø_4 = -0.360$

Microsoft	$ROA(1)_t$	Mean $DER(1)_t$ -0.026 -4.508	$a_t = e_t/(1- ø_2B^2 - ø_4B^4)$ $ø_2 = 0.356$ $ø_4 = -0.575$
MMM	$ROA(1)_t$	Mean $DER(1)_{t-1}$ $CPI(1)_{t-5}$ 0.137 -1.246 -0.344	$a_t = et/(1- ø_1B – ø_2B^2)$ $ø_1 = 0.625$ $ø_2 = -0.401$
Nike	$ROA(1)_t$	Mean $DER(1)_t$ $PB(1)_{t-2}$ 0.0422 -14.945 1.666	$a_t = e_t/(1- ø_3B^3)$ $ø_3 = -0.379$
Honeywell	$ROA(1)_t$	Mean $PB(1)_{t-1}$ $DER(1)_t$ $CR(1)_t$ $Unempl(1)_t$ -0.314 0.892 -5.981 -3.779 1.407 $FCFSH_t$ 0.182	$a_t = e_t/(1- ø_3B^3)$ $ø_3 = -0.810$
Procter & Gamble	$ROA)1)_t$	Mean $DER(1)_t$ 0.018 -13.658	$a_t = e_t/(1- ø_4B^4)$ $ø_4 = -0.334$
Salesforce	$ROA(1)_t$	Mean $DER(1)_{t-3}$ -0.087 -1.924	$a_t = e_t/(1- ø_1B- ø_2B^2 – ø_3B^3)$ $ø_1 = 0.302$ $ø_2 = 0.228$ $ø_2 = -0.351$
Travelers	$ROA(1)_t$	Mean $DER(1)_t$ $Unempl(1)_{t-1}$ $GDP(1)_{t-2}$ -0.034 -1.455 -0.144 5.890E-7	$a_t = e_t/(1- ø_1B- ø_4B^4)$ $ø_1 = 0.239$ $ø_4 = -0.311$
UnitedHealth	$ROA(1)_t$	Mean $DER(1)_t$ $DER(1)_{t-1}$ $DER(1)_{t-2}$ $DER(1)_{t-3}$ 0.0067 -1.043 -0.839 -0.716 - 1.196 $PB(1)_t$ $PB(1)_{t-1}$ $CR(1)_t$ $CR(1)_{t-1}$ 0.302 0.412 1.801 3.059	$a_t = e_t/(1- ø_5B^5)$ $ø_5 = 0.633$
Verizon	$ROA(1)_t$	Mean $CPI(1)_{t-1}$ $Bond(1)_t$ $PB(1)_{t-3}$ -0.214 0.872 1.467 0.168	$a_t = e_t/(1- ø_4B^4)$ $ø_4 = -0.719$
Visa	ROA_t	Mean $Bond(1)_t$ 10.65 -0.623	$a_t = e_t/(1- ø_1B)$ $ø_1 = 0.871$

Walgreen	$ROA(1)_t$	Mean $PB(1)_t$ $DER(1)_{t-1}$ -0.107 0.449 1.511	$a_t = et/(1- ø_4B^4)$ $ø_4 =$ -0.467
Walmart	$ROA(1)_t$	Mean $CR(1)_t$ $BOND(1)_{t-3}$ -0.034 -2.683 -0.305	$a_t = e_t/(1- ø_1B)$ $ø_1 =$ 0.520

The symbol (1) refers to the first difference.

CONCLUSION

In this study, we investigated the relationships between a company's financial performance and its financial ratios as well as the macroeconomic variables that may have an impact on the stock market. Time series analysis was used on quarterly time series data, over the period 2005 to 2019, of companies listed on the Dow Jones Industrial Average. The quarterly financial ratios used were free cash flow per share (FCFSH), debt-to-equity ratio (DER), price-to-book ratio (PB), current ratio (CR), and return on assets (ROA). The quarterly macroeconomic variables were inflation (CPI), unemployment rate, GDP, and bond rate. Return on assets was used as a measure of financial performance.

Results showed that of all the variables considered, GDP and DER were most important in their relationship with ROA. GDP had a positive relationship with ROA or financial performance of a company and DER had a negative relationship with ROA. DER seems to be a key indicator of a firm's financial performance. The higher the DER of a company, the lower its financial performance.

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DOES HIGH INFLATION HAVE AN EFFECT ON THE REACTION OF EXCHANGE RATES TO INTEREST AND INFLATION RATES?

Mark Farley, The University of Tennessee at Martin
mfarley4@utm.edu

ABSTRACT

Currency exchange rates are one of the most important determinants of international commercial and financial market activity. Inflation rates, a recent problem in many developed countries, and interest rates are commonly accepted theoretical determinants of changes in exchange rates, yet published research contains many puzzles regarding the relation between interest, inflation, and exchange rates. This article evaluates interest, inflation, and exchange rates relations between the U.S. and eight developed economies to determine whether higher-than-expected inflation has an effect on the short-run stability of these relations. This study applies both time-series and panel tests including differences-in-differences estimation and finds that exchange rates react differently in the short-run when inflation rates increase beyond inflation policy targets.

1. INTRODUCTION

The importance of currency exchange rates for international commerce cannot be overstated due to their immediate effects on the relative price of similar goods across international borders. Exchange rates become one of the most important determinants of imports and exports. All else equal, home currency appreciation increases imports because a nation's residents will buy more goods abroad as they become relatively cheaper. Simultaneously, home currency appreciation decreases exports as that nation's goods become more expensive abroad (Arize et al., 2000). Exchange rates have further effects on overall national income (Keynes, 1919), international capital flows (Friedman, 1953), financial asset prices (Lucas, 1978), and wealth (Schumpeter, 1911; Fisher, 1930).

The recent world pandemic shocked policymakers struggling to balance the provision of consumer goods with the protection of consumers. World economies experienced varying levels of idled resources that reduced supply while fiscal and monetary stimuli were employed to stabilize demand. The result of these policies was more money chasing fewer goods, some economists' basic definition of inflation (Friedman & Schwartz, 1982). Inflation is not usually considered a problem until it is high, but high inflation has no official, commonly accepted definition. Economists may substitute higher-than-expected inflation rates when the general price level grows at a rate beyond market expectations or outside of policy targets, usually greater than four percent per year. Inflation rates approaching double digits introduce uncertainty resulting in unexpected goods and labor market instability (Friedman & Schwartz, 1982) as well as higher nominal interest rates (Wicksell, 1907; Fisher, 1930). High inflation has been a recent problem in many developed

countries resulting from policymakers' reluctance to retreat from crisis policies for more stable economic policies despite their attempts at dissuading markets from reacting to high inflation even as rates began to increase and persist.

This article evaluates interest, inflation, and exchange rates relations between the U.S. and eight developed economies to determine whether higher-than-expected inflation has an effect on the long-run stability of these relations. The remainder of this article is organized as follows: Section 2 provides a review of relevant literature. Section 3 describes the data and methodologies used. Section 4 presents quantitative results and important findings. Section 5 concludes and suggests further research.

2. REVIEW OF RELEVANT LITERATURE

Common theoretical techniques used to forecast changes in exchange rates rely on relations of interest rates and inflation rates among other known, commonly accepted determinants of exchange rates, which include national income (gross domestic product), government intervention in international commerce (increases and decreases in trade barriers), currency market interventions by speculators and central banks (forward rates), and changes in consumer preferences. Three prevailing financial economic theories attempt to explain fluctuations in exchange rates: purchasing power parity (PPP), interest rate parity (IRP) and international Fisher effect (IFE). PPP relies on relative price fluctuations from economy to economy. IRP relies on relative changes in nominal interest rates. IFE relies on the real interest rate, which combines interest and inflation rates into a single, meaningful measurement (Fisher, 1930). All else equal, each of these three relations is theoretically used to predict the direction and magnitude of changes in exchange rates.

Research evaluating these three theories is full of "puzzles" and "disconnects." Though a long-standing theory, PPP (Cassel, 1918) has little empirical support and has become known as the PPP puzzle (Meese & Rogoff, 1983; Mark, 1990; Backus & Smith, 1993; Rogoff, 1996; Obstfeld & Rogoff, 2000; Engel & West, 2005). Support remains for a long-term, cointegrating relation between prices and inflation with no need to calculate PPP (Kamin & Klau, 2003; Cheung et al., 2019; Papell & Prodan, 2020). Studies on IRP have identified similar puzzles noting little empirical support for IRP (Fama, 1984; McCallum, 1994; Engel & West, 2006; Mark, 2009), demonstrating instead that Taylor rule fundamentals (lagged interest rates, inflation gap, and output gap) provide more accurate forecasting models for exchange-rate fluctuations (Molodtsova & Papell, 2009; Engel et al., 2019). A recent study implied that interest-rate policies consistent with IRP may avoid costly foreign exchange interventions that deviate from capital market arbitrage to achieve independent exchange rates (Amador et al., 2020). IFE studies continue to show puzzles as well. Most studies on the Fisher effect fail to observe any notable relation (Coppock & Poitras, 2000). Two studies on the USD/MXN exchange rate actually find the opposite, namely that over long terms, real interest rates react to exchange rates rather than the opposite relation predicted by IFE (Salas-Ortiz & Gomez-Monge 2015; Capasso et al., 2019), but a high real interest rate may also reduce exchange rate volatility (Benita & Lauterbach, 2007).

3. DATA AND METHODOLOGY

The theoretical relations described in Sections 1 and 2 support a simple specification that assumes exchange rates are a function of interest rates and inflation rates:

exchange rate = *f*(interest rate, inflation rate)

Using data obtained from XE.com (https://www.xe.com/currencytables/), eight historical spot exchange rates (USD/CAD, USD/CNY, EUR/USD, USD/JPY, USD/KRW, USD/MXN, USD/CHF, and GBP/USD) priced in USD were observed monthly from December 2006 to December 2022 providing 193 consecutive observations for each time series (1,544 for the panel). Using OECD data (OECD https://stats.oecd.org/index.aspx?queryid=86#), historical interest rates and inflation rates were observed monthly for nine currencies (Canada, China, European Union (EU), Japan, Korea, Mexico, Switzerland, United Kingdom (UK), and United States (US)) from December 2006 to December 2022 providing 193 consecutive monthly observations for each currency (1,737 for the panel). All exchange rates were restated as the natural log of the spot exchange rate priced in USD. Interest rates and inflation rates were restated as the natural log of the annualized percentage rate. High (higher-than-expected) inflation indicator variables were defined as a value of one if the inflation rate exceeds four percent (beyond common policy targets) and a value of zero otherwise. Higher inflation rate cutoffs were considered, but often resulted in very small sample sizes. Summary statistics of the panel are detailed below in Table 1.

TABLE 1. PANEL SUMMARY STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
exrate	1,544	.6378521	.6291002	.000653	2.075839
intrate	1,544	1.984901	2.306078	-1.15	10.82
infrate	1,544	2.087395	2.016687	-2.5	11.5
hiusinf	1,544	.1139896	.3179016	0	1
hiforinf	1,544	.1450777	.3522933	0	1

The full panel that results from the observed data provides eight panels with commonly observed, long-term cointegrating relations (noted in the literature review) further requiring specific time-series tests to avoid spurious results from panel regression. The first tests applied to each time-series use vector autoregression (VAR) models to identify the number of lags appropriate to test each time series in the panels by minimizing final prediction error (FPE) and information criteria (maximizing the test statistics provided by Akaike [AIC], Hannan & Quinn [HQIC], and Schwarz's Bayesian [SBIC] information criteria).

Next, tests are applied to each time-series and to the entire panel to determine whether each variable's means and variances are stationary over time. Non-stationary variables contain unit roots or are random walks. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) are tests recommended most often to test each time-series for unit roots and random walks (Dickey & Fuller, 1979; Phillips & Perron, 1988). Additional tests (Levin–Lin–Chu, 2002; Harris–Tzavalis, 1999; Breitung, 2000; Breitung & Das, 2005; Im–Pesaran–Shin, 2003; and Choi, 2001 Fisher-type

tests) were applied to the full panel. These tests share a null hypothesis that all panels contain a unit root. The final test (Hadri, 2000 Lagrange multiplier (LM) test) supposes a null hypothesis that all the panels are trend stationary.

Johansen-Juselius (JJ) tests are recommended to determine whether cointegrating relations exist between variables before any results can be obtained from the specification (Johansen & Juselius, 1990). Two separate tests are employed to identify cointegration vectors: a maximum eigenvalue test and a trace test. Both the maximum eigenvalue and trace tests presume a null hypothesis of $r = 0$ cointegrating relations versus an alternative hypothesis of $r + 1$ up to $n - 1$ cointegrating relations (where n equals the number of variables, in this case $n = 3$).

Once detected, cointegrated vectors may be tested using a variety of autoregression models. Among available alternatives, a vector error correction model (VECM) allows multiple cointegrating relations and can estimate both short and long-term effects by measuring how the dependent variable returns to an equilibrium after changes in explanatory variables (Engle & Granger, 1987). These benefits suggest VECM is the correct test to estimate these results.

Estimated results typically limit theoretical relationships to correlations. Whenever one time series' prior values predict another time series' future values, predictive causality (or more accurately, precedence, a temporal relation) can be measured (Granger, 1969). One variable can then be said to "Granger cause" (GC) another. Given this possibility and subject to the results of the cointegration and VECM tests performed herein, GC may be applied to the estimated results to test pairwise theoretical relations between the variables. Two null hypotheses are applied to each relation: 1) that X does not GC Y, and 2) that Y does not GC X. If one of the pair of null hypotheses is rejected, unidirectional GC exists for the other. If both null hypotheses are rejected, bidirectional GC exists. And if neither hypothesis is rejected, no GC exists.

Impulse response functions (IRFs) are modeled using VAR and describe how endogenous variables react over time to exogenous shocks. IRFs may provide additional information for robustness of the results obtained from cointegration tests, VECM estimates, and GC tests (Lütkepohl, 2008).

Finally, subject to stationarity test results, difference-in-differences estimation (DD) allows a natural experiment using historical panel data by analyzing the differences between responses in exchange rates for months with high inflation rates versus those without. DD removes unobservable, time-invariant differences as well as fixed effects between exchange-rates at the first difference but compares exchange-rate changes under high inflation to exchange-rate changes under low inflation at the second difference. This approach is similar to a treatment-control experimental design and a fixed-effects estimator. High inflation months are the treatment group, and low inflation months are the control group. The effects of high and low inflation rates on changes in the exchange rate are then measured and compared.

4. RESULTS

Table 2 shows selected results of lag selection-order criteria. Results are reported based on minimum FPE and AIC (noted by asterisks) for each country in the panel. All other lag selection-order results are omitted for space.

TABLE 2. SELECTED LAG SELECTION-ORDER CRITERIA

Sample: April 2007 - December 2022 Number of observations = 189

	lags	LL	LR	df	p	FPE	AIC	HQIC	SBIC
Canada	2	911.6	87.7*	9	0.000	1.6e-08*	-9.424*	-9.278*	-9.063*
China	3	861.8	24.6*	9	0.003	3.0e-08*	-8.802*	-8.593	-8.287
EU	2	998.0	146.9*	9	0.000	6.5e-09*	-10.338*	-10.192*	-9.978*
Japan	3	801.4	21.4*	9	0.011	5.7e-08*	-8.163*	-7.954	-7.648
Korea	2	970.3	90.4	9	0.000	8.7e-09*	-10.045*	-9.899*	-9.685*
Mexico	2	1137.2	179.7	9	0.000	1.5e-09*	-11.811*	-11.665*	-11.451*
Switz.	3	379.5	31.9*	9	0.000	5.0e-06*	-3.698*	-3.489*	-3.184
UK	2	1034.2	89.7*	9	0.000	4.4e-09*	-10.722*	-10.576*	-10.362*

Endogenous variables: natural log of exchange rate, natural log of interest rate, and natural log of inflation rate; Exogenous variable: constant

As shown in the results, three lags were preferred for China, Japan, and Switzerland and two lags for Canada, E. U., Korea, Mexico, and U.K. Tests for each individual time series used the respective country's preferred lag structure. Tests of the full panel imposed two lags where applicable regardless of the underlying countries' preferred lag structures.

Because of the differing lag structures reported in Table 2, ADF and PP results are presented for each variable by country in Table 3. The null hypothesis for ADF and PP tests is that the variable contains a unit root.

TABLE 3. RESULTS OF UNIT ROOT TESTS

	Exchange Rate Z(t) test statistics			
	Augmented Dickey-Fuller		Phillips-Perron	
Country	Level	First Difference	Level	First Difference
Canada	-1.266	-8.476***	-0.536	-15.682***
China	-2.895***	-5.903***	0.443	-9.461***
EU	-1.641*	-6.467***	-1.640*	-13.096***
Japan	-1.319*	-6.189***	-0.358	-12.615***
Korea	-2.695***	-7.602***	-1.032	-14.577***
Mexico	-1.440*	-7.420***	-1.508*	-12.537***
Switz.	-2.928***	-7.049***	0.502	-15.887***
UK	-2.007**	-6.409***	-1.509	-12.776***

Interest Rate Z(t) test statistics				
	Augmented Dickey-Fuller		Phillips-Perron	
Country	Level	First Difference	Level	First Difference
Canada	-2.381***	-4.080***	-0.801	-5.915***
China	-2.931***	-8.090***	-0.893	-15.127***
EU	-2.185**	-4.362***	-1.775	-5.161***
Japan	-1.436*	-4.493***	-1.594	-10.955***
Korea	-2.094**	-5.894***	-0.945	-6.650***
Mexico	-1.628*	-2.903***	0.641	-4.006***
Switz.	-2.425***	-6.515***	-2.090**	-14.987***
UK	-2.129**	-4.797***	-1.664*	-7.185***

Inflation Rate Z(t) test statistics				
	Augmented Dickey-Fuller		Phillips-Perron	
Country	Level	First Difference	Level	First Difference
Canada	-1.444*	-7.390***	-0.165	-12.051***
China	-3.405***	-5.179***	-1.596	-12.585***
EU	-0.438	-5.388***	2.146	-9.101***
Japan	-1.711**	-6.334***	-1.306	-10.807***
Korea	-1.575*	-8.878***	-0.442	-11.468***
Mexico	-1.585*	-8.176***	0.149	-10.027***
Switz.	-2.519***	-5.146***	-1.507	-10.870***
UK	-0.059	-5.188***	1.677*	-10.471***

Z(t) t-distribution					
Augmented Dickey-Fuller test N = 190			Phillips-Perron test N = 192		
Critical Values					
1%	5%	10%	1%	5%	10%
-2.347	-1.653	-1.286	-13.484	-7.961	-5.661
			-2.588	-1.950	-1.616

The results of the ADF tests show that the null hypothesis of the presence of a unit root can be rejected at various critical values for all countries for levels of each variable. The null hypothesis of the presence of a unit root on first differences can be rejected at the one percent critical value for all variables and all countries in the panel.

PP tests correct for autocorrelation and heteroscedasticity offering a more robust check on the presence of a unit root. The results of PP tests corroborate the ADF results and show that the null hypothesis can be rejected at the one percent critical value in all cases for first differences but not for levels. Results of panel stationarity test results corroborated the reported ADF and PP results but are omitted for space. The first differences of the variables are stationary and integrated of order one.

JJ tests require evaluating each rank in succession. If the first (r=0) cannot be rejected, then each successive rank is evaluated until the null is rejected or the last rank fails to reject. The results of JJ tests are presented in Table 4.

TABLE 4. RESULTS OF COINTEGRATION TEST

			Trace Critical Value		
			r=0	r=1	r=2
Country	n	lags	24.31	12.53	3.84
Canada	190	2	196.6754	104.4821	27.5623
China	189	3	143.7400	67.6340	32.8542
EU	190	2	134.5930	68.7259	16.4442
Japan	189	3	174.7914	79.6672	32.0252
Korea	190	2	200.4876	105.9559	29.4528
Mexico	190	2	170.8749	84.1957	16.3497
Switz.	189	3	216.8478	90.7228	36.9669
UK	190	2	157.2102	78.5968	25.2593

In this case, the results show that the null hypothesis (at least one variable is not cointegrated with another) cannot be rejected for $r = 2$. Therefore, two cointegrating relations exist over each panel suggesting a long-term relation between exchange, interest, and inflation rates.

The presence of stationary first differences and two long-term cointegrating relations allow VECM estimation. VECM results are presented in Table 5.

TABLE 5. RESULTS OF VECM ESTIMATION

		coefficients		
		interest	inflation	
Country	n	rate	rate	constant
Canada	191	-0.7292*	3.1830***	-3.9893
China	190	-0.3342***	0.1638***	2.1558
EU	191	-0.3123***	0.4417***	-0.8871
Japan	190	0.0504	0.8001***	3.8518
Korea	191	-0.2939***	0.3711***	6.8348
Mexico	191	7.3040**	-15.0745***	18.1667
Switz.	190	-3.9513***	6.2530***	-7.3149
UK	191	-1.1172***	1.8788***	-2.5395

VECM results show a direct, significant (1% confidence) relation for a change in the inflation rate to a change in the exchange rate for seven of the eight panels, and an inverse, significant (1% confidence) relation for a change in the interest rate to a change in the exchange rate for five of the eight panels. Mexico results show the opposite effects: an inverse, significant (1% confidence) relation for the inflation rate, and a direct, significant (5% confidence) relation for the interest rate. China's interest rate is significant at the 10% level, and a change in Japan's interest rate has no significant relation to a change in the exchange rate. This study will not opine about central bank policy actions, but different findings regarding both inflation and interest rates can be reasonably expected if central banks use different policy rules or varying levels of discretion in their monetary policy decisions.

Coefficients of log-transformed variables may be interpreted as elasticities, and each exchange rate is priced in USD. These restrictions suggest that USD/CAD will increase 3.183% (the USD price of CAD will increase, and CAD will appreciate against USD) for each 1% increase in CAD inflation rate and will decrease 0.729% (CAD will depreciate against USD) for each 1% increase in CAD interest rate. Each time-series may be interpreted in this manner using the respective coefficients. The signs and economy of each coefficient are consistent with theory because the relative differentials in interest and inflation rates between economies are of interest, not the levels themselves. Currencies are expected to appreciate against currencies with higher relative inflation rates because higher prices decrease imports resulting in a depreciating currency. Currencies are expected to appreciate against currencies with lower relative interest rates because higher interest rates increase financial capital inflows resulting in an appreciating currency. The lengthy results of IRFs, which corroborated VECM results, are omitted for space.

Finding a cointegrating relation is not the same as detecting causality. However, as previously noted, Granger causality testing may show that one time series predicts another providing a measurement of precedence. The null hypotheses applied to each pairwise relation are that *X* does not GC *Y*, and that *Y* does not GC *X*. These tests produce six hypotheses for each of the eight panels; therefore, complete results of Granger causality tests are omitted for space.

Selected results of Granger causality tests are presented in Table 6 and show each time a null hypothesis is rejected (each time one variable can be said to GC another) or that no null hypotheses were rejected for that exchange rate (no GC could be established for any relation).

TABLE 6. SELECTED RESULTS OF GRANGER TESTS

Complete Time Series		
Country	Null hypothesis	Chi^2 statistic
Canada	no null hypothesis was rejected	-
China	no null hypothesis was rejected	-
EU	no null hypothesis was rejected	-
Japan	INF does not GC EXR	15.239***
	EXR does not GC INT	10.267***
Korea	INT does not GC EXR	9.645***
	EXR does not GC INT	10.408***
Mexico	no null hypothesis was rejected	-
Switz.	no null hypothesis was rejected	-
UK	INF does not GC INT	15.239***

Low Inflation in the U.S.

Country	Null hypothesis	Chi^2 statistic
Canada	INT does not GC EXR	11.214***
China	no null hypothesis was rejected	-
EU	no null hypothesis was rejected	-
Japan	INF does not GC EXR	15.639***
Korea	INT does not GC EXR	11.382***
	EXR does not GC INT	11.010***
Mexico	no null hypothesis was rejected	-
Switz.	no null hypothesis was rejected	-
UK	INF does not GC INT	10.531***
	EXR does not GC INT	13.556***

High Inflation in the U.S.

Country	Null hypothesis	Chi^2 statistic
All	no null hypothesis was rejected	-

Low Inflation in the Foreign Currency

Country	Null hypothesis	Chi^2 statistic
Canada	INT does not GC EXR	11.214***
China	INT does not GC INF	9.457***
EU	no null hypothesis was rejected	-
Japan	INF does not GC EXR	15.239***
	EXR does not GC INT	10.267***
Korea	INT does not GC EXR	17.866***
Mexico	no null hypothesis was rejected	-
Switz.	no null hypothesis was rejected	-
UK	INF does not GC INT	11.013***
	EXR does not GC INT	12.513***

High Inflation in the Foreign Currency

Country	Null hypothesis	Chi^2 statistic
All	no null hypothesis was rejected	-

Results are mixed. Different panels show different Granger causality relations with no consistent result. However, this study also questions whether high inflation changes the long-standing cointegrated relations. Under high inflation in either the USD or the other currency forming the exchange rate, no null hypothesis can be rejected (no variable can be said to GC another). No definitive conclusion can be drawn yet. However, any long-standing GC relations between exchange, interest, and inflation rates noted in this study did not persist in the presence of short-run, higher-than-target inflation rates.

Because the first differences were stationary throughout the panel, the final test employs the entire panel to estimate results using DD with robust standard errors (Bertrand et al., 2004). The results are presented in Table 7.

TABLE 7: DD ESTIMATION

Outcome Variable	Exchange Rate	Standard Error	t score	p value
High Inflation in the U. S.				
Baseline				
Control	-1.058			
Treated	-0.953			
Diff (T-C)	0.106	1.801	0.06	0.953
Follow-up				
Control	-1.060			
Treated	-0.954			
Diff (T-C)	0.106	1.799	0.06	0.953
Diff-in-Diff	-0.000	0.003	-0.06	0.955
High Inflation in the Foreign Country				
Baseline				
Control	0.095			
Treated	-5.721			
Diff (T-C)	-5.816	1.704	-3.41	0.001***
Follow-up				
Control	0.092			
Treated	-5.716			
Diff (T-C)	-5.808	1.701	-3.41	0.001***
Diff-in-Diff	0.008	0.003	3.11	0.002***

Outcome variables (exchange rates) treated with high inflation in the U. S. showed no significant differences from the baseline or the control (inflation within policy targets). However, when the outcome variable was treated with high inflation in the foreign country, the resulting differences from baseline and control are significant. These results suggest that exchange rates do react differently to high inflation rates than they do to inflation rates within policy targets.

5. CONCLUSION AND FUTURE RESEARCH

Currency exchange rates remain important because of their effects on international commercial and financial market activity. The recent problem of higher-than-expected inflation in many developed countries has not been considered by research as a potential explanation to the many puzzles regarding the short-run relations between interest, inflation, and exchange rates noted in relevant literature. This study evaluated interest, inflation, and exchange rates relations between the U.S. and eight developed economies to determine whether higher-than-expected inflation has an effect on the short-run stability of these relations.

This study found that exchange rates do react differently in the short run when inflation rates increase beyond expected inflation. This study contributes to the relation of exchange, interest, and inflation rates in three ways. First, the long-term cointegrating relations found in prior studies also persist in the most recent data confirming theory regarding the reaction of exchange rates to interest and inflation rates. Variables remain stationary, and cointegrating relations are stable. Second, puzzles noted in prior research also persist in more recent data. The mixed results noted in this study's Granger causality tests are one example. Finally, this study applied vector error correction model estimation for each currency and differences-in-differences estimation to the entire panel and found that exchange rates react differently to inflation rates beyond expected inflation.

Additional panel regression over longer time periods may provide more insight into the general stability of long-term relations between inflation and exchange rates. However, future research should attempt to identify structural breakpoints in the long-term relation between inflation rates and exchange rates and consider utilizing long-run structural vector autoregression to estimate the results for each panel.

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