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CUSTOMER SATISFACTION AND CUSTOMER LOYALTY WITHIN PART-TIME STUDENTS

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ABSTRACT

Several empirical studies in the field of measuring customer satisfaction indicate that the measurement of customer satisfaction itself is not effective if it is not related to customer loyalty or any other variables, which in the service profit chain influence business results. The examination of the customer satisfaction-customer loyalty link has been far largely neglected in the case of part-time students irrespective of the fact that for some Higher Education Institutions part-time students are the most important customers. The purpose of this study is to research whether customer satisfaction affects customer loyalty in the specific field of higher education industry in the case of part-time students. In this context our aim is to develop and test a measurement instrument, which could be used with high reliability to measure customer satisfaction and customer loyalty in higher education institutions. Survey research is conducted on the sample which consists of graduates of undergraduate and postgraduate part-time students at the Faculty of Commercial and Business Sciences in Slovenia. A key finding of this research is that customer satisfaction of graduates impacts their loyalty. Reliability of measuring the concepts of customer satisfaction and customer loyalty with three selected measurable variables for each construct is exemplary; in addition we also confirm validity of measurement. The research findings contribute to a better understanding of both concepts and offer mangers of higher education institutions a reliable measurement model to measure customer satisfaction and customer loyalty. Limitations of the research are stressed in final chapter, as well as directions for future research.

INTRODUCTION

"Competition in the higher-education sector is becoming increasingly fierce (Chen, 2011, p. 86)". Profound changes in this sector are seen in the USA and other European countries. "In the future, it is expected that this scenario of competition will become even more intense deriving from the implementation of the Bologna convention and the resulting harmonization of academic degrees across the European Unioin" (Alves & Raposo, 2010). The increasing competition in higher education in recognized also in Slovenia, former Republic of Yugoslavia, and today member of the European Union. There are many providers of educational programs especially in higher education. In addition to public institutions there are many privately owned institutions. All these institutions are struggling for the same students whose proportion is even going down due to demographic trends. At the same time establishment of new education institutions is growing; in recent years many new study programs are being created and many existing institutions establish their own programs at higher levels (e.g. Masters, PhD).

Several empirical studies in the field of measuring customer satisfaction indicate that the measurement of customer satisfaction is not sufficient if it is not attached to customer loyalty or any other variables, which in the service profit chain influence business results. Gee, Coates and Nicholson (2008) note that customer loyalty is important condition to create a strong and reliable base of customers. It seems academics and managers are starting to understand the central role that customer loyalty plays in achieving company's success in business. Even though exploring the link between customer satisfaction and customer loyalty started in 80s with Oliver (1980) and continued with other researchers like LaBarbera and Mazursky (1983) and frequently cited Fornell (1992), there is still a huge gap in literature about customer satisfaction and customer loyalty in higher education industry (Brown & Mazzarol, 2009, p. 81-82). The aim of this study is therefore to research whether customer satisfaction affects customer loyalty in the specific field of higher education.

Our objective is to offer a useful measurement instrument to measure customer satisfaction and customer loyalty in higher education institutions. Therefore the measurement instrument for the empirical study was developed in three phases (Pisnik Korda, Snoj & Žabkar, 2012): (1) some relevant items for the questionnaire were taken from the literature, (2) in-depth interviews with 10 graduates of undergraduate and graduate studies were conducted to check the applicability of the items in the higher education industry context and (3) a pilot study was conducted to test the internal consistency of the scales used.

A detailed literature review was made according to which we set reliable measurable variables that would enable us to measure the concepts of Customer Satisfaction and Customer Loyalty in the specific context of higher education industry.

Our empirical study aims to answer the research question: “Does customer satisfaction affect customer loyalty of part-time students in the specific field of higher education”. The answer to the question would fill the existing gap in marketing literature. While researching determinants of service quality has received much attention in the field of higher education (for ex. Kwek, Lau & Tan, 2010) the lack of researches of customer satisfaction - customer loyalty link remains.

Several studies have confirmed the positive link between customer satisfaction and customer loyalty in different industries, also service ones, but studies that would explore the problem in the specific field of higher education service industry are rare. Besides, the strength of connection between customer satisfaction and customer loyalty in different service industries varies tremendously. This fact is not to be neglected as the strength of the link between customer satisfaction and customer loyalty is important relationship indicator. For example Jones and Sasser conclude (1995) in the case of five different service industries (local telecom, airlines, hospitals, sales of computers, and car sales) that the connection between customer satisfaction and customer loyalty is observed in all industries, but the strength of this connection varies in different industries. In the case of local telephone service they found that customer satisfaction impacts customer loyalty very weakly. In more competitive industries (for example car sales) the connection was relatively strong. Another study (Šuster Erjavec, 2012) that examines the impact of customer satisfaction on customer loyalty with three different service industries (highways, mobile telephone, hairdressing services), concludes that customer satisfaction impacts customer

Loyalty but differences exist between industries. Therefore, we wanted to know what the relationship between customer satisfaction and customer loyalty in higher education industry is.

This article is structured as follows: first we review the literature of customer satisfaction and customer loyalty, in particular their conceptualizations and operationalization. We continue explaining methodology. After, results of qualitative research are shortly explained. We then describe the sample and present results of the quantitative study. We test hypotheses. We continue with discussion where we stress the importance of measuring customer satisfaction and achieving customer loyalty for institution in higher education industry. In conclusion we stress limitations of the study and refer the reader to further research.

LITERATURE REVIEW AND FORMING HYPOTHESES

Customer satisfaction according to Oliver (1997) which is most commonly accepted and cited definition is an emotional and cognitive evaluation of the experience with the product or service. His paradigm suggests that customer satisfaction is an assessment that product or service, or the characteristics of products or services achieve the level of performance that inspires a pleasant feeling. The result of comparing expectations with the actual perception may be positive confirmation if actual perception exceeds the expectations, or negative disconfirmation, if the perception is below expectations. In line with this, customer achieves customer satisfaction or dissatisfaction (Oliver, 1997, p. 13).

Kotler and Keller (2009, p. 124) also form their definition of customer satisfaction on a comparison between perceived performance and customer expectations. They describe customer satisfaction as a feeling of comfort or frustration, depending on whether the product or service operates better or worse than expected.

Fornell (1992, p. 12.) defines customer satisfaction as a function of pre purchase expectations and post purchase perceived performance (of the respective product/service), both of which are expected to have a positive effect.

Most studies of higher education focus on students as "customers" (Chen, 2011, p. 76). In this context "student satisfaction is an evaluative summary of direct educational experience, based on the discrepancy between prior expectation and the performance perceived after passing through the educational cycle (Munteanu, Ceobanu, Bobâlca & Anton, 2010, p. 125)".

We summarize that customer satisfaction in the literature is defined as emotional or cognitive reaction or a set of emotional and cognitive components. In recent literature customer satisfaction is defined mostly as an emotional reaction. It defines what a subject of customer satisfaction is and usually compares it with some pre-defined standard. Many definitions though are not so precise with defining what type of reaction customer satisfaction is, but as Fornell (1992, p. 11) says: "customer satisfaction is an overall post purchase evaluation«.

"Because customer satisfaction is a psychological state, the efforts of measuring it are oftentimes ridden with caveats […] therefore student satisfaction is not an easy task to attempt (Munteanu et al., 2010, p.125)."

Customer satisfaction literature offers numerous indexes of customer satisfaction, which employ measurable variables that have been tested and supported in a large number of service industries and across different geographical settings.

Fornell, Johnson, Anderson, Cha and Bryant (1996) operationalize customer satisfaction with those manifest variables: customer satisfaction as an estimation how expectations were fulfilled, and as comparison with the ideal service or product. This choice they explain as consistent with the orientation of American consumer satisfaction index (ACSI). We find this operationalizations of customer satisfaction also in empirical studies by Johnson, Gustafsson, Andreassen, Lervik and Cha (2001) in the proposed new model of customer satisfaction, based on ACSI, and in empirical studies by Türkyilmaz and Özkan (2007) in the index of customer satisfaction with Turkish mobile services and in studies by Kristensen, Martensen and Grønholdt (2000) in the European customer satisfaction index (ECSI). Kristensen et al. (2000) add also a measurable variable "evaluation of the services compared to competition".

According to these findings we have operationalized Customer Satisfaction with three manifest variables:

1. "My expectations about the studies at the Faculty are totally met."
2. "Studies at the Faculty are consistent with my idea of ideal Faculty."
3. "Studies at the Faculty are better than studies at other Faculties."

Proposed measurable variables have been tested in many studies. Thus, we posit:

H1: Operationalizations of Customer Satisfaction with 3 selected manifest variables offer a reliable instrument for measuring customer satisfaction in higher education institutions.

Sirdeshmukh and Singh (2000, p. 150) identified customer loyalty as a marketing currency of the 21st century. Marketers wish to build relationships with their customers, but they are aware of difficulties doing it. Customer loyalty is seen as a deep commitment of customer to certain product that he or she buys and intends to prefer it in the future, regardless of the marketing efforts of the competitors (Oliver, 1997, p. 392). Customer loyalty is a long-term attitude and a long-term pattern of behavior that is stimulated by a variety of experiences, acquired by the customer over time (Gee et al., 2008, p. 360).

Literature review on popular conceptualizations of customer loyalty states that there is no universally agreed definition. Instead, there are three popular conceptualizations (Uncles, Dowling & Hammond, 2003, p. 294):

1. Customer loyalty as primarily an attitude that sometimes leads to a relationship with the brand;
2. Customer loyalty mainly expressed in terms of revealed behavior (i.e. the pattern of past purchases);
3. Customer loyalty as buying concept moderated by the individual's characteristics, circumstances, and/or the purchase situation.

Despite the diversity of definitions of customer loyalty, two major approaches have been developed over time: behavioral and emotional (Walsh, Evanschitzky & Wunderlich, 2008, str. 988). initially, researchers have focused on the behavioral approach. In this approach, loyal customers are seen as those who buy and re-buy the same brand, appreciate that exact brand and are not looking for information on competitive brands. In academic researches behavioral loyalty is measured through the frequency of re-purchase the same brand or through relative share of this

brand in the total consumption of the customer. Later, academics defined customer loyalty from the emotional point of view, which shows customer's attitudes to certain product. It refers to company's commitment, willingness to recommend the company and demonstrates positive emotions and feelings to the company or its products.

Different researchers in service industries further operationalize customer loyalty differently. In particular sector of higher education the concept of loyalty has been insufficiently researched (Alves & Raposo, 2010, p. 76).

Table 1
OPARATIONALIZATION OF LATENT CONSTRUCT CUSTOMER

MANIFECT VARIABLE	SOURCE
Customer speaks positively about the institution	Boulding, Kalra, Staelin & Zeithaml (1993); Webb & Jaguan (1997); Henning-Thurau, Langer & Hansen (2001); Athiyaman (1997)
Customer recommends institution to others	Parasuraman, Berry & Zeithaml (1988); Webb & Jaguan (1997); Brown & Mazzarol (2009)
Customer remains loyal to the institution	LaBarbera & Mazursky, 1983; Rust & Zahorik (1993); Henning-Thurau et al. (2001); Nguyen & Leblanc (2001); Brown & Mazzarol (2009)

According to these findings we have operationalized Customer Loyalty with three manifest variables:

1. "I speak only positively about this Faculty."
2. "I will recommend this Faculty to friends and colleagues."
3. "If I were to start my studies, I would have chosen this Faculty again."

We decided for these operationalizations because they are consistent with measuring customer loyalty in current academic researches. The first two variables refer to the measurement of the emotional aspect of customer loyalty, while the third variable measures customer loyalty from the behavioral point of view.

We postulate:

H2: Operationalizations of Customer Loyalty with 3 selected manifest variables offer a reliable instrument for measuring customer loyalty in higher education institutions.

Although there are many studies that established empirical link between customer satisfaction and customer loyalty (Bennett, R. & Rundle-Tiele, 2004) the link is not yet well researched in the field of higher education. The classic example of an industry where customer satisfaction and loyalty are not positively related is the banking sector. On the other hand Leonidou, Kvasova, Leonidou and Chari (2013) made a study in Cyprus among indigenous customers aged 18 and above and confirmed that significant relationship between customer

satisfaction and customer loyalty was revealed ($\beta = 0.89$, $p < 0.01$). Extensive study (Arif & Ilyas, 2011) conducted with students of a private university in Pakistan on the basis of correlation analysis found that student loyalty is significantly correlated with satisfaction with campus life ($\beta = 0.358$, $p < 0.01$). Our second objective is therefore to research whether customer satisfaction of graduates influences their customer loyalty. We therefore propose the following hypothesis:

H3: The higher the level of customer satisfaction of graduates, the higher the customer loyalty to the Faculty.

METHODOLOGY

The basic goal of scientific research is to establish the legality on which we can explain and predict phenomena. The quality of measurement instruments which are designed for an empirical basis is crucial for achieving this goal (Kogovšek & Ferligoj, 2003, p. 127).

Scientific approach to measuring customer satisfaction and customer loyalty presents a challenging area. Among the promising approaches methodologists stress the advantages of combining different methods and approaches, including quantitative research, qualitative research, econometric modeling and more cooperation between practitioners and academics. In this respect, the scientific approach of measuring customer satisfaction has already reached significant progress (Anderson & Mittal, 2000, p. 119). We followed these principles in our study.

According to the conceptualization of the concepts of customer satisfaction and customer loyalty we have developed measurable variables. First we reviewed existing empirical studies on customer satisfaction and customer loyalty. A detailed review of researches in various service industries in different geographical settings was conducted to conceptualize and operationalize the constructs of customer satisfaction and customer loyalty. Manifest variables were developed to cover the most essential features of individual concepts.

The first part of our research was a qualitative research with in-depth interviews. The research consisted of 10 in-depth interviews with graduates of undergraduate and graduate studies. The aim of this preliminary research was to ensure that the concepts are measured in the way as perceived by graduates in Higher Education Institutions.

The second part of the research was a quantitative research. We developed the research instrument. We formed the claims in the way that support our operationalizations formed according to literature review and perceptions of students revealed by qualitative research.

Hill, Brierley and MacDougall (1999, p. 57) believe that the measurement scale is one of the most important aspects in a questionnaire for measuring customer satisfaction. We reviewed the current knowledge of measurement scales in questionnaires within education service industry and found out that the most commonly used scale in measuring customer satisfaction is Likert's five level scales. A study of customer satisfaction aiming to find student satisfaction with various aspects of technology services to mark risk factors associated with student loyalty used a questionnaire designed on Likert's five level scales (Arif & Ilyas, 2011). According to the nature of the problem, the method of data collection and previous studies in the field of higher

education we have selected Likert's five level scales ranging from 1 "Strongly disagree" to 5 "Strongly agree".

We conducted a quantitative research on a sample of graduates of undergraduate and postgraduate studies at the Faculty of Commercial and Business Sciences. An online survey was performed.

The questionnaire was peer reviewed for content validity and was pilot tested with 30 graduates before administering it for the final study.

The sample consists of all part-time students who have graduated in the period from 1 October 2012 to 30 September 2013 at Faculty of Commercial and Business Sciences throughout in Slovenia. We sent emails with online survey attached to 352 graduates and we received 158 answered surveys. The survey was anonymous. The response rate was 44,9 %.

Data were statistically analyzed with the software package SPSS.22. We calculated descriptive statistics of all measurable variables and the latent variables which were formed as an average of the measurable variables that present each of the concepts. We then performed the reliability analysis. We computed alpha coefficients for all item statements for both concepts (like for ex. Kwek, 2010). The idea behind reliability is that any significant results must be more than a one-off finding and be inherently repeatable (Shuttleworth, 2008). Reliability is a precondition of validity of measurement, which together ensure the quality of measurement. Saris and Gallhöfer (2007, 211) suggest factor analysis for estimating validity of the data. The validity of measurement for the concepts was therefore tested with confirmatory factor analysis and hypotheses were evaluated.

RESULTS OF PRELIMINARY QUALITATIVE RESEARCH

Because we wanted to ensure that the concepts of customer satisfaction and customer loyalty are measured in a way as perceived by graduates of part time studies, we have conducted a preliminary qualitative research. We have performed 10 in-depth interviews with graduates of part time studies at the Faculty of Commercial and Business Sciences in Slovenia. They have lasted about 60 minutes each.

The aim of these interviews was to research how part time students perceive customer satisfaction and customer loyalty and to compare their perceptions with the literature review study made on a detailed review of researches in various service industries in different geographical settings.

We realized that students evaluate customer satisfaction through their experience which is a result of a comparison with expectations (Marko: "I'm satisfied with this Faculty since I got exactly what I have expected"). Students also evaluate their satisfaction through comparing a Faculty with their idea of ideal Faculty (Kaja: "First I make a picture in my head about how Faculty should look like for me to be satisfied and then I compare my Faculty to this picture"). Students seldom evaluate the services that Faculty provides compared to the competition they know (Manja: "I compare studies at my Faculty with what I hear from friends about other Faculties… and I can say I am quite satisfied with my Faculty"; Denis: "Here studies are much better than at …").

On these findings we have confirmed operationalization of customer satisfaction with three manifest variables that were first proposed according to literature review:

1. “My expectations about the studies at the Faculty are totally met."
2. “Studies at the Faculty are consistent with my idea of ideal Faculty."
3. “Studies at the Faculty are better than studies at other Faculties."

As the aim of the in-depth interviews was also to research how part time students perceive customer loyalty we proceeded with questions regarding customer loyalty. The answers confirmed their perception of loyalty as a behavioral and an emotional construct.

In their answers loyalty is seen as a behavioral construct. Marko: “I studied at undergraduate studies and then I continued graduate studies at the same Faculty.” Nejc: “I don’t even think to switch to any other Faculty, because I’m loyal”. Maja: “I’m not so loyal. I’m thinking of enrolling my master studies at other faculty”. Manja. “If I could choose again, I would definitely go with this Faculty”.

Besides behavioral view, emotional view of customer loyalty is also very much perceived by part time students: Denis: “I brought my best friend to this Faculty”. Maks: “Whenever someone asks me, which Faculty to go, I recommend this Faculty”. When graduates were asked how they speak about the Faculty outside, Kaja said: “Only the best. You see, I’m loyal”.

On these findings we have confirmed operationalizations of customer loyalty with three manifest variables that were first proposed according to literature review:

1. "I speak only positively about this Faculty."
2. "I will recommend this Faculty to friends and colleagues."
3. "If I were to start my studies, I would have chosen this Faculty again."

We conclude that operationalizations set according to the detailed literature review of researches in various service industries are in line with the perceptions of customer satisfaction and customer loyalty by part-time students. Therefore we proceed with quantitative research.

RESULTS OF QUANTITATIVE RESEARCH

Description of the Sample

The sample consists of 158 part-time students that have graduated at the Faculty of business and Commercial Sciences in Slovenia. 69.6% women and 30.4% men. 38% of all respondents are over 41 years old, 31.6% are between 31 and 40 years old, 21.5% are between 26 and 30 years and 8.9% are between 21 and 25 years old. Most students (35.4%) were attending studies in Celje, further Ljubljana (27.2%), Maribor (17.1%), Murska Sobota (7.0%), Nova Gorica (5.7%) and Slovenj Gradec (0.6%). 70.3% of the students in the sample are undergraduate part-time students and 29.7% are graduate part-time students. Majority of students are employed (81.0%).

Description of manifest and latent variables

First we calculated descriptive statistics of all measurable and latent variables. In table 2 are presented descriptive statistics of measurable variables for the latent variable customer satisfaction and in table 3 are presented descriptive statistics of measurable variables for the latent variable customer loyalty.

Table 2
MEASURABLE VARIABLES OF THE LATENT VARIABLE CUSTOMER

	N	Mean	Std. deviation
My expectations about the studies at the Faculty are totally met.	155	3.99	0.806
Studies at the Faculty are consistent with my idea of ideal Faculty.	156	3.56	0.932
Studies at the Faculty are better than studies at other Faculties.	156	3.50	0.846
Valid N (listwise)	155		

Note: Listwise deletion based on all variables in the procedure.

Measurable variables of the latent variable customer satisfaction have very high mean. The highest mean (3.99) has the variable "My expectations about the studies at the Faculty are totally met." The lowest mean (3.50) but still higher than 3, which represent the middle of the scale, has the variable "Studies at the Faculty are better than studies at other Faculties."

Table 3
MEASURABLE VARIABLES OF THE LATENT VARIABLE CUSTOMER

	N	Mean	Std. deviation
I speak only positively about this Faculty.	155	4.17	0.828
I will recommend this Faculty to friends and colleagues.	156	4.07	0.836
If I were to start my studies, I would have chosen this Faculty again.	154	3.91	0.973
Valid N (listwise)	154		

Note: Listwise deletion based on all variables in the procedure.

The measurable variables that form the latent variable customer loyalty have also very high mean, even higher that the variables of customer satisfaction. The variable »I speak only positively about this Faculty." has the highest mean (4.17), even greater than 4, which on a 5 Likert scale means “agree”. The lowest mean (3.91) has the variable "If I were to start my studies, I would have chosen this Faculty again” which measures the behavioral aspect of customer loyalty.

We calculated the average of all three measurable variables for customer satisfaction and the average of all three measurable variables for customer loyalty. This new calculated variables present the latent variables of customer satisfaction and customer loyalty. Their descriptive statistics are shown in table 4.

Table 4
DESCRIPTIVE STATISTICS OF LATENT

	N	Mean	Std. deviation
Customer Satisfaction	155	3.69	0.757
Customer Loyalty	154	4.06	0.774
Valid N (listwise)	152		

Note: Listwise deletion based on all variables in the procedure.

Reliability Analysis

Reliability refers to the stability of the measurement instrument. Reliability is the extent to which a set of variables included in a measurement instrument is consistent in what is intended to measure (Hair, Black, Babin & Anderson, 2010).We calculated internal consistency reliability. Constructs of Customer Satisfaction and Customer Loyalty are operationalized with 3 manifest variables each. Each manifest variable measures a specific aspect of the construct. Therefore certain consistency must exist between those measurable variables. We calculated Cronbach's Alpha (Cronbach, 1951) that presents an average of individual coefficients that are calculated from half of the items in the sample. Cortina (1993 in Field, 2005) notes that the value of this coefficient increases with the number of variables that measure the construct, which should be considered when interpreting the results.

The calculated reliability of measurement for both concepts is exemplary as coefficients are greater than 0.80 (table 5). Although individual constructs were measured only with three measurable variables, estimates of reliability measurements show a very high internal consistency. We can therefore confirm hypotheses:

H1: Operationalizations of Customer Satisfaction with 3 selected manifest variables offer a reliable instrument for measuring customer satisfaction.

H2: Operationalizations of Customer Loyalty with 3 selected manifest variables offer a reliable instrument for measuring customer loyalty.

Table 5
THE RELIABILITY ANALYSIS OF LATENT

Latent Variable	Cronbach's Alpha
Customer Satisfaction	0.862
Customer Loyalty	0.867

Note: Listwise deletion based on all variables in the procedure.

Groups of measurable variables that we formed show a high reliability for measuring the concepts of customer satisfaction and customer loyalty. This indicates that the questionnaire is extremely reliable (Chen, 2011). We proceed with testing validity of the measurement.

Analysis of Validity

"Validity encompasses the entire experimental concept and establishes whether the results obtained meet all of the requirements of the scientific research method" (Shuttleworth, 2008). We conducted Confirmatory Factor Analysis (CFA) for each construct (latent variable). The results for both analyses are presented in tables 6 - 9.

Table 6
CFA FOR CUSTOMER SATISFACTION: KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.692
Bartlett's Test of Sphericity	Approx. Chi-Square	121.617
	Df	3
	Sig.	.000

Table 7
CFA FOR CUSTOMER SATISFACTION: TOTAL VARIANCE

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	2,352	78,390	78,390	2,352	78,390
2	,440	14,660	93,050		
3	,209	6,950	100,000		

Table 8
CFA FOR CUSTOMER LOYALTY: KMO AND BARTLETT'S

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.750
Bartlett's Test of Sphericity	Approx. Chi-Square	152.473
	Df	3
	Sig.	.000

Table 9
CFA FOR CUSTOMER LOYALTY: TOTAL VARIANCE

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	2,395	79,827	79,827	2,395	79,827
2	,375	12,503	92,330		
3	,230	7,670	100,000		

Both factor analyses for the concepts of customer satisfaction and customer loyalty have shown the existence of one factor (Sig. < 0.001). The Quality of measurement as suggested by Bearden et al. (1993 in Ferligoj, Leskošek & Kogovšek 1995, p. 159) is evaluated as exemplary.

Correlation Analysis and Regression Analysis

We conducted correlation analysis to test relationships between variables (as for ex. Arif & Ilyas, 2011, p. 565). We first explored probability of normal distribution. Both latent variables are normally distributed; therefore we conducted a Pearson Correlation Coefficient (table 10).

Table 10
PEARSON CORRELATION BETWEEN CUSTOMER SATISFACTION AND CUSTOMER LOYALTY

		Customer Loyalty
Customer Satisfaction	Pearson Correlation	.806**
	Sig.	.000
	N	152

Note: ** Correlation is significant at the 0.01 level.

The correlation between the selected latent variables is significant (Sig. < 0.001). Correlation is positive and very strong (Pearson Correlation is 0.806). This means that the more satisfied the graduates are with the Faculty, more loyal are they to this Faculty. Therefore, we confirm the hypothesis:

H3: The higher the level of customer satisfaction of graduates, the higher the customer loyalty to the Faculty.

"What is helping the university to gain loyalty (Arif & Ilyas, 2011, p. 655)?" In the following stage regression analysis has been performed in order to investigate significance of the impact of student satisfaction on student loyalty.

Table 11
RESULTS OF SIMPLE REGRESSION FOR CUSTOMER LOYALTY

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.806[a]	.650	.648	.45940	.650	278.663	1	150	.000

a. Predictors: (Constant), customer satisfaction
b. Dependent Variable: customer loyalty

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.011	.186		5.423	.000
	customer satisfaction	.824	.049	.806	16.693	.000

a. Dependent Variable: customer loyalty

The model explains 64.8% of the variance of the concept of customer loyalty (F Change = 278.7 and Sig < 0.001) and can be written using the following regression equation:

Customer Loyalty = 1.011 + 0.824 × Customer Satisfaction

Customer satisfaction is important variable in the prediction of customer loyalty.

MANAGERIAL IMPLICATIONS

To answer the question imposed by Arif and Ilyas (2011, p. 655), it is the customer satisfaction that helps the university to gain loyalty. Our empirical study found that customer satisfaction of part-time students positively and very strongly affects their customer loyalty. This means that the more satisfied the graduates are with the Faculty, more loyal are they to this Faculty.

Although studies that examine the relationship between customer satisfaction and customer loyalty are common in literature, there is a lack of studies that examine this relationship in higher education institutions within a specific group of part-time students. In times of increasing competition and decline of full-time students due to demographic trends part-time students are becoming an increasingly important target group. Our finding that customer satisfaction of graduates strongly and positively impacts customer loyalty is consistent with the findings of Jones and Sasser (1995, p. 88-99), who conclude that the relationship is particularly strong in industries dominated by strong competition. Because higher education industry is highly competitive, our finding is therefore not surprising.

These findings provide evidence of the importance of customer satisfaction to student loyalty and in this sense is consistent with study of Brown and Mazzarol (2009) that revealed the importance of institutional image and student satisfaction to loyalty within students in Australian universities. The result is also in line with the satisfaction study conducted with students of a private university in Pakistan where positive correlation between satisfaction with campus life and loyalty was confirmed (Arif & Ilyas, 2011).

National Commission for Quality of Higher Education has set criteria and standards by which all higher education institutions should continually monitor the quality of their services. Within these frameworks they have prescribed the implementation of surveys of customer satisfaction for students and graduates. Our finding confirms that these guidelines are proper.

Conceptualization and operationalization of our latent variables present an important methodological contribution to the scientific method of measuring customer satisfaction and customer loyalty in higher education institutions.

Customer Loyalty was conceptualized as a behavioral and an emotional variable. According to this conceptualization customer loyalty was operationalized with three manifest variables. The first two variables ("Speaks positively about the Faculty" and "Recommends Faculty to others") refer to the measurement of the emotional aspect of customer loyalty, while the third variable ("I would choose this Faculty again") measures customer loyalty from the behavioral point of view. Reliability of measurement has proven to be exemplary; we also demonstrated good validity. We decided for these operationalization because they are consistent with measuring customer loyalty in current academic researches and also because our qualitative research confirmed that they are consistent with perceptions of the part-time students.

Dilemmas how to conceptualize and operationalize Customer Satisfaction are also common in the literature. We have operationalized Customer Satisfaction with three manifest variables, which include: an estimation how expectations were fulfilled, a comparison with the ideal service and the evaluation of the services compared to competition. The reliability of the measurement is evaluated as exemplary; validity of the measurement is also confirmed.

Therefore, this study offers a measurement model for evaluation of customer satisfaction and customer loyalty of part-time students and in this respect is a useful conceptual tool for university administrators. High reliability and good validity confirm the quality of the measurement instrument. In this way, this research contributes toward deepening the knowledge about customer satisfaction of part-time students and its importance for higher education institutions in retaining as well as attracting new part-time students.

But since the topic that we have studied is relatively less researched, it opens great opportunities for future research. In the proceeding section some open questions that are in our opinion worth future consideration are exposed, as well as the limitations of the study are stressed.

LIMITATIONS AND FUTURE RESEARCH QUESTIONS

This study fills the gap in existing marketing literature in higher education industry; Nevertheless, the limitations of the study have to be stressed.

One of the main drawbacks of the study is its sample size. Further, the study is made on the sample that consists only of part-time students graduating at the Faculty of Business and Commercial in Slovenia. Due to the limitations of this research we recommend to broaden the research setting in other cultures by incorporating more higher education institutions from other countries and drawing more respondents who have finished various undergraduate or graduate programs which would enhance the validity and generalization of this research. For a more comprehensive analysis such a research should look for a mediating role of individual student demographic or psychograph factors.

Since academics note that the relationship between customer satisfaction and customer loyalty is unique and that customer loyalty in service industries is affected by other factors, such as for example quality of services, image of the service provider, perceived price or quality of staff, it would be useful in future to include other factors and look for connections between them in Higher Education Institutions. This is beyond the scope of this paper therefore opens further paths of research in this area.

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COLLEGE FACULTY'S LABOR SUPPLY ELASTICITY: ESTIMATES USING SUMMER TEACHING STIPENDS

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ABSTRACT

In this paper, we attempt to measure the impact of a significant – and likely permanent – wage cut on university faculty's labor supply decisions. Using data from a mid-size public university in Texas, we investigate how individual faculty respond to a cut in summer compensation (i.e., the per-course stipend for teaching summer classes). We find that the average (across faculty) reduction in the stipend was 26 percent, while the reduction in an average faculty's overall annual income (salary plus summer stipend) was only 3 percent. We find that the income effect of a cut in compensation (slightly) dominates the substitution effect, as faculty in general chose to teach more. We also calculate the resulting elasticity of the supply of summer teaching with respect to the stipend for every individual faculty in our data; while the values range from about -14 to 19.4, the average elasticity is negative and small in magnitude, suggesting that even a substantial cut in summer stipends causes only a small decrease in courses taught.

BACKGROUND

In 2011, Texas legislators were faced with a $27 billion budget deficit that they proposed to fix without raising taxes or using the state's rainy day funds (Mangan, 2011). In order to begin to close this gap, the Texas legislature proposed to make drastic cuts to higher education funding throughout the state. Specifically, colleges and universities were at risk of losing up to 7.6 percent of their state funding, and some onlookers worried that cuts could potentially displace many minority students and students in need of financial aid (Mangan). Hacker (2011) noted that mid-year 2011 lawmakers decided to cut state funding by about 7 percent for public colleges and universities for the 2012-2013 academic year causing staff layoffs and student tuition hikes. Although many colleges in the state continued to increase tuition and fees during this time, several institutions have sought to implement cost reductions such as decreasing spending on campus aesthetics. Other potential strategies included taking advantage of technology in the class rooms, offering more online classes, and increasing class sizes.

At one public university, it was announced in early 2012 that to partially offset the budgets cuts, faculty pay for summer teaching would be reduced. Specifically, per-course compensation was changed from a fixed proportion of a faculty member's nine-month salary, to a series of stipends. Under the previous policy, full-time faculty members were paid 1/12 of their nine-month salaries per course. Table 1 shows the new compensation scheme for one course.

Table 1

COMPENSATION AFTER THE BUDGET CUT	
Nine-month Salary	**One-course Stipend**
Up to $41,999	1/12 salary
$42,000 - $59,999	$3,500
$60,000 - $69,999	$4,000
$70,000 - $79,999	$4,500
$80,000 and over	$5,000

In other words, the salary cut is progressive so that as salary increases, cuts increase as well. For example, if a faculty member earns $42,000 in income, her compensation both before and after the cut is $3,500 per course. However, if a faculty member has a $60,000 salary, her compensation is reduced by $1,000 per course, and if she has a $90,000 salary, the cut is $2,500 per course.

In this paper we examine how faculty reacted to this cut in wages, including whether faculty members decided to teach more, less, or the same number of courses. In addition, the study will explore any systematic differences in behavior: for example, whether higher income earners reacted differently than lower income earners or whether there were any differences in behavior across genders or teaching disciplines.

We also explore the relationship between faculty behavior and compensation vis-a-vis its relevance to the higher education community as a whole. Texas, like much of the United States, has had to tighten its budget due to the recent recession. Institutions of higher education have had to make difficult choices about how to increase revenues or decrease costs. Faculty response to a cut in summer teaching stipends – i.e., the elasticity of the supply of labor – is a crucial piece of information that administrators need to know to be able to predict the extent of actual cost savings of such a move.

THEORY

Economic theory has much to say about how wage changes affect a worker's willingness to work. Neo-classical labor supply theory describes a rational agent as making a choice between leisure, a normal good, and income, which can be used to buy goods and services in the market. Time spent working is compensated and translates into ability to buy more goods and services but necessarily leads to less leisure time. When wages change, workers are pulled in two separate directions. When a worker's wage decreases, the opportunity cost of leisure decreases as well and as the cost of leisure time has decreased, and workers will consume more leisure and work less. This is known as the *substitution effect* of a wage change. Simultaneously, a wage cut makes the same worker feel poorer as the new wage is unable to buy as many goods and services. This worker will consume less leisure and desire to spend more hours working. This *income effect* of

a wage decrease pulls the worker in the opposite direction from that of the substitution effect. When it is impossible to separate these two conflicting impacts, a wage decrease can increase, decrease, or not change a worker's preferences for time spent in the labor market in the static, one-period labor supply model.

PREVIOUS STUDIES

Past empirical studies of labor supply theory are few and far between because researchers do not often observe exogenous wage changes, and also because most workers are not able to decide their own work hours. However, some creative studies of occupations with flexible wage and hours do exist. Economists observe labor markets such as hot dog vendors, taxi cab drivers, and even pigeons – in an experimental laboratory setting – because they provide the opportunity to test labor supply behavior in situations where workers are not constrained to a fixed number of daily work hours. One problem that has plagued many empirical investigations of labor supply effects is that when little response to a wage change is found, it is not clear whether the income and distribution effects are both large or both small (though it is apparent that they offset each other; see, for example, Kimbal and Shapiro (2008).)

Studies of Income and Substitution Effects of Wage Changes

Farber (2003) models the labor supply of taxicab drivers using an inter-temporal utility function and extends the classic labor supply model to multiple periods, where workers choose labor supply to maximize lifetime income. His results suggest that the income effect of a daily wage change is small, which he interprets as support for the standard inter-temporal labor supply model. Farber also tests the target earning model: if taxicab drivers are target earners then they would quit early on the days in which wages are high and work longer hours on days when wages are low. Farber finds that New York taxicab drivers are not target earners, which suggests that the average cab driver is more likely to stop work due to the amount of hours on the job rather than the amount of daily wages earned. In other words, there appears to be no significant income effect in cab drivers' behavior.

In contrast to Faber's results, Goette, Huffman, and Fehr (2004) do find some evidence of an income effect. They propose an alternative to the standard neoclassical labor supply model that draws on recent work in linking psychology and economics (see, for example, Kahneman and Tversky (2000).) In Goette et al.'s model, workers experience loss aversion to earnings below a "reference" level and diminishing sensitivity to earnings above this target level. The model suggests that workers are target earners and that they exert less effort on days when wages are higher than normal and more effort when wages are low.

In a study of baseball stadium vendors, Oettinger (1999) finds some evidence of a pronounced substitution effect. As with taxi drivers, stadium vendors experience large variations

in expected wages and have some flexibility in choosing their work hours. They are free to choose their work days but they are expected to work the game until the seventh inning. In the experiment, the vendors were paid through a commission rate and therefore had wages that depended on game attendance. Oettinger finds that labor participation changed as opportunity to earn more in a given day changed: on average, vendors chose to work those game days in which their expected earnings were equal to or exceeded their opportunity cost of work. Influences on the decision to work include the visiting team's popularity, the game's importance, and day of the week. Oettinger concludes that, in every model used, the labor supply elasticity of the vendors was strongly positive. This means that his findings agree with the standard labor supply model rather than the model of reference dependent utility.[1]

Studies have shown that the income and substitution effects influence genders and age groups somewhat differently (Peracchi and Welch, 1994; Eklof and Sacklen, 2000; Blau and Kahn, 2006.) This is likely due to the option to retire faced by elderly workers and the different roles men and women traditionally have held in the family. According to past research, the income and substitution effects on men aged 25 to 55 are minimal. Married women have shown to have a similar response rate to that of men when it comes to changes in the hours of work associated with a wage change. But, married women differ from men in that they have shown to be more responsive than men to a wage change when deciding to participate in the labor force.[2]

Econometric Studies of Responses to Wage Changes

Many of the empirical studies of labor supply responsiveness employ a discrete choice model of one kind or another (Haan, 2004; Kornstad and Thoresen, 2007; Peichl and Siegloch, 2010, and van Soest, 1995 among others.) This approach more accurately reflects workers' decision to, say, work full- or part-time (or not work at all). The reported results on estimated wage elasticities typically indicate a small positive response, but the magnitudes of elasticity estimates do not seem to converge to a consensus; for example, van Soest (1995) finds significant positive own-wage elasticities for both men and women, when labor supply decisions are made by spouses as a family. Peichl and Siegloch (2010) find that the positive labor supply response to a simulated workfare reform – requiring individuals receiving welfare to perform work tasks – is offset by as much as 25 percent by labor demand elasticity. They argue that not including a measure of labor demand responsiveness biases the resulting supply elasticity estimates.

Kornstad and Thoresen (2007) examine how costs of childcare affect mothers' decisions to participate in the labor market and the choice of work hours. They find a positive but small participation elasticity with respect to wages and a negative elasticity with respect to other, non-labor income. As expected, labor supply elasticity with respect to childcare costs is negative.

Chetty et al. (2011) include adjustment costs into their model of labor supply and taxation and conclude that these adjustment costs may be responsible for ``bunching'' of workers at the kink points in the tax schedule. Because this bunching varies across occupations and

demographic groups in a way that is correlated with labor supply responsiveness, the authors conclude that the presence of adjustment costs may be responsible for the discrepancy between studies using micro data (which tend to report small elasticities) and those using macro data (which tend to find large elasticities).

SUMMER SCHOOL

Background

Faculty are typically not required to teach during the summer, but they may choose to do so for extra income. A decrease in compensation for the summer term necessarily decreases the opportunity cost of a faculty member's leisure time. Faculty members who choose to work during the summer term must work the full term and are required to work on a day to day basis unlike, say, taxicab drivers or stadium vendors. As a result, it is impossible for faculty members to select the exact number of hours they wish to work on a given day or during the summer term. However, faculty members affected by the wage can choose to teach more/fewer courses, find work elsewhere, or cease teaching in the summer entirely.

The college and university summer term is often perceived as a time when many higher education faculty choose to rest from the rigors of the fall and spring semesters to either travel or spend their time elsewhere focused on research or personal hobbies. Summer school traditionally provides a smaller number of course offerings than do regular semesters and is often used to teach special classes and aid resident students in gaining credit hours to shorten their time to graduation (Kobayashi, 1996-1997).

The idea of a summer session was introduced to the academic world in the late 1800's to help students accelerate their degree plan; however, many higher education facilities have failed to attract resident students to enroll in summer school because of the students' need to work or lack of student interest in attending summer school. In the 1960's, some colleges and universities experimented with implementing the trimester where the summer term was included into the full academic year in order to meet the demands of the increasing number of students enrolling in school, but this system never became commonplace.

Summer Faculty Compensation and Effect on Productivity and Morale

Comm and Mathaisel (2003) explore the relationship between faculty compensation and faculty morale for the full academic year and how this relationship may affect the quality of an institution. The researchers state that the main goal of higher education institutions is to prepare future employees for the job market and, in order to successfully accomplish this goal college and university faculty must play an active role in their students' education. However, for faculty members to properly fill their educational roles they should be adequately compensated for their time invested in their students and other academic priorities. Comm and Mathaisel found that over half of the faculty members sampled from a small private college felt that they were undercompensated as compared to similar colleges or universities.

In addition, the researchers found that the majority of faculty members studied were taking on teaching responsibilities beyond their full time jobs for extra income and half of the faculty studied sought additional income outside of the university in some form such as consulting. Findings such as these could call into question faculty commitment and the quality of academic services they are providing to the institution.[3] Hearn (1999) analyzed salary data and historical patterns in order to determine the relationship between salary and productivity and to discuss possible salary policies to increase faculty productivity at research universities. Hearn states that salaries should be strongly connected to the productivities of workers which would suggest that as a worker's productivity increases, so should wages. However, he describes the connection between productivity and compensation as tenuous and often ignored by higher education policies. An example of such a policy would be to more tightly link faculty salaries to performance, although quantifying productivity to compensate faculty for their effort can be very difficult. Additionally, tying faculty compensation to productivity could have some undesired effects such as large disparities in income among faculty members.

The results in these studies help to provide insight into the relationship between financial compensation and its effects on faculty morale and productivity, which institutional policy makers may find useful when developing faculty compensation policies. These may include a decrease in the number of faculty members willing to teach during the summer term, a decrease in time faculty are willing to devote to classes and the university, a decline in faculty morale, and a difficulty in retaining faculty. Ehrenberg et al. (1990) use a large longitudinal database to examine the causes of faculty turnover. Although they do not specifically examine the impact of summer pay on faculty retention, they do find that higher compensation leads to increased retention rates for assistant and associate professors. The results suggest no such link for full professors, who may have stronger links to their institutions, and also may not have as many alternative employment opportunities.

It should also be noted that the new summer compensation policy may not equally affect faculty members due to differences in wealth, age, gender, or status at the university. For example, an older, more experienced professor is likely to hold a more secure and well paid position than a younger, less experienced professor. Moreover, that same professor will likely possess greater wealth than his younger colleague because he has had a greater amount of time to invest and save his money. Thus the more experienced professor is less dependent on income earned during the summer term than the less experienced professor.

DATA DESCRIPTION

We obtained the data on faculty summer teaching assignments in 2011 and 2012 from the university's administrative software system (“Banner”). Data on faculty salaries employed by state institutions are public; we used the *Annual Budget for Fiscal Year 2010-2011* as our source. Because there were no salary increases (i.e., raises) from a designated “merit” pool in 2011, the nine-month contract salaries of faculty remained largely the same in 2012.[4]

We eliminated observations on adjunct faculty (sometimes referred to as "instructors") since they do not have a permanent position with the university and do not always have the opportunity to teach in any given term. We also dropped observations on teaching assignments that were obviously non-standard courses such thesis supervision, practicums, internship supervision, and undergraduate sections of graduate courses, which are often created simply for accounting purposes and do not represent separate classes. Finally, we dropped observations for faculty who joined the University in fall of 2011 (and thus had no opportunity to teach in the summer of 2011) as well as those who left the University before summer of 2012. Our resulting dataset contains 246 total observations.

The mean nine-month salary in our sample is $60,749.40. The mean one-course stipend paid in the summer of 2011 is $5,062.48. The mean stipend paid in 2012 is $3,878.81, approximately 24 percent lower than the year before. The mean total compensation received for summer teaching in 2011 is $8,363.87; in 2012, it is $6,327.67 – about 21 percent less. In other words, there is at least some suggestion of an adjustment by faculty vis-a-vis their teaching choices as the impact on total summer pay is (slightly) smaller.

Table 2

MEAN AND MEDIAN SALARIES BY COLLEGE						
	Business	**For. & Ag.**	**Sci. & Math**	**Education**	**Lib. Arts**	**Fine Arts**
Mean	$78,270.34	$65,785.82	$59,650.52	$58,695.99	$53,937.23	$52,184.50
Median	$83,304.00	$63,423.00	$56,448.50	$56,442.00	$49,478.50	$50,557.50

To investigate this further, we compared the average income (= salary + summer compensation) actually received by faculty in 2011 and 2012.[5] The average total income, as defined above, fell from $69,113.27 in 2011 to $67,077.07 in 2012, for only about a 3 percent decrease. We interpret this as mild evidence of the income effect in aggregate.

Turning to the demand side, the total cost of summer school to the university – that is, the cost of all sections taught, in terms of faculty compensation – in 2011 is $2,057,511, while in 2012 it is $1,556,606. It is worth noting that the total number of sections taught stayed nearly the same: there were 411 total sections taught in 2011 and 405 in 2012. This suggested that the demand the university faces for teaching faculty's services is very inelastic.

Table 3

SUMMER TEACHING COURSE LOAD CHANGES BY INCOME QUARTILES				
	Top Quartile	**3rd Quartile**	**2nd Quartile**	**Bottom Quartile**
Increased	16	12	11	21
Decreased	11	23	17	9
No Change	35	26	33	31
Total	62	61	61	61

RESULTS

Of the 233 faculty who saw their compensation reduced, 119 did not change their behavior, 58 faculty increased the number of sections they taught, while 56 individuals taught fewer sections. We calculated the implied elasticity for each individual in our dataset (elasticities were computed using the "midpoint" or "arc" formula to calculate changes in both *P* and *Q*.) The resulting values range from -14.2 to 19.4 with a mean of -0.0365. This suggests, once again, that on balance, the income effect is more pronounced than the substitution effect.

We were also interested in whether gender or income matters in explaining an individual's response to a reduction in wage. Estimated correlation coefficient between the dummy *male?* and elasticity is 0.038, while correlation between *salary* and elasticity is 0.039, neither of which is statistically significant. It appears that the response to a wage change is independent of those factors.

Table 4

MEAN ELASTICITY BY GENDER	
Male	0.0627
Female	-0.16

Table 4 summarizes mean calculated elasticities by faculty gender; Table 5 presents mean elasticities broken down by faculty discipline (i.e., college), and Table 6 breaks down mean elasticity by faculty salary. Table 7 provides a two-way glance at the changes in teaching load by both college and gender.

There do not appear to be substantial differences across teaching disciplines: all of the mean elasticities by college are small in absolute value, suggesting that there is a full spectrum of individual responses within each college. The income quartiles, on the other hand, do reveal

an interesting pattern: faculty in the middle of the salary distribution (i.e., middle two quartiles) tended to teach more in response to a decrease in stipends, while faculty at both extremes of the income distribution taught less. Given rather small group sizes, it is difficult to draw any definitive conclusions from these results, even if the standard *t*-test suggests that there is a significant difference at the 5 percent level.

Table 5

MEAN ELASTICITY BY COLLEGE					
Business	**Forestry & Agric.**	**Sci. & Math**	**Education**	**Lib. Arts**	**Fine Arts**
0.05	0.08	0.089	0.24	–0.8	1.09

Table 6

MEAN ELASTICITY BY NINE-MONTH SALARY QUARTILE			
Top Quartile	**3rd Quartile**	**2nd Quartile**	**Bottom Quartile**
–0.014	0.38	0.38	–1.1

NOTES AND CAVEATS

Several caveats are worth mentioning at this point. First, we get to observe in our data the actual teaching assignment of each faculty in both summers. This does not necessarily imply that that would have been each individual's optimal choice had they been given complete freedom to choose any number of courses to teach. Some departments allocate the scarce sections among faculty using some mechanism (e.g., seniority, a rotation of some kind, etc.) and limit any faculty to, say, two courses per summer. Other departments have plenty of teaching opportunities to go around – i.e., sections to fill – and are only constrained by the University policy limits on summer teaching.

Second, a cut in the summer teaching stipend for a faculty is clearly not the same as an hourly wage cut for an hourly employee in terms of its effect on the decision to supply more or less labor. Faculty are generally not free to choose the number of hours they work given their teaching assignment; in other words, a professor is forced to make an all-or-nothing decision of whether to teach a class in exchange for a fixed stipend, not how many hours to work for per- hour wage. With that said, it is also entirely plausible that some faculty may respond by agreeing to teach a course but reducing their effort in other ways – spending less time preparing for class, switching to less labor-intensive testing methods, reducing office hours, and so forth. We do not get to observe the level of effort exerted in our data, either before or after the wage change.

Table 7: Summer Teaching Course Load Changes by College and Gender

	Business				Education				Fine Arts				Forestry and Agriculture				Liberal Arts				Science and Math			
	M		W		M		W		M		W		M		W		M		W		M		W	
	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)	Number	(% of group)
Increased	7	25	3	23	6	26	11	23	4	29	1	25	2	29	0	0	10	31	6	21	8	24	2	22
Decreased	6	21	1	8	5	22	18	38	5	36	0	0	1	14	0	0	9	26	5	18	7	21	3	33
No change	5	54	9	69	12	52	19	40	5	36	3	75	4	57	4	100	15	43	17	61	18	55	4	44
Total	**28**		**13**		**23**		**48**		**14**		**4**		**7**		**4**		**34**		**28**		**33**		**9**	

CONCLUDING REMARKS

In this study, we examine the labor-supply response of college faculty at a public university in Texas to a significant reduction in per-course stipends offered for teaching during the summer session. We are able to observe individuals' teaching choices over the course of two summers – before and after the cut in compensation – which allows us to control for many unobservable factors (i.e., a natural experiment.) We find that, while individual responses varied widely, on balance the number of course sections taught remained virtually unchanged. This suggests that the university administration may be able to get away with paying significantly less for summer courses, as the supply of teaching appears to be quite inelastic, at least in aggregate.

While we do not find significant differences in faculty behavior across genders, there does appear to be some variation over income levels: those with salaries in the middle two quartiles chose to teach more, while those with low and high salaries taught less.

As an extension of this work, it would be interesting to follow up with these faculty for another year (stipends remained unchanged for the 2013 summer session). Another year gives college professors a chance to make additional adjustments – find alternative employment, make labor-supply decisions involving spouses, etc. – that may reveal a different pattern of responses. A priori, we would surmise that the longer-run labor supply elasticity is greater than the short-run elasticity we find from examining just one year of data.

ENDNOTES

1. Laboratory studies and animal test subjects have also been used to test `worker' response to wage changes. Battalio et al. (1981) test whether pigeons' behavior is consistent with the labor supply model, where wages were measured in payoffs per pigeon peck – more pecks to dispense a fixed amount of food translated to a lower wage and fewer pecks translated to a higher wage. Because of the laboratory conditions, the authors were able to separate the income and substitution effects and they found that these pigeons reacted to a wage change much like economic theory would suggest.
2. It should be noted that more recent studies are concluding that married women's response rate when deciding to participate in the labor force are becoming similar to that of men.
3. Tracey (1980) surveyed the faculty members at the University of Maryland, College Park and found indicated that faculty teaching in the summer indicated an overall need for money as a key motivation for teaching during the summer. In addition, the faculty members were asked to indicate the worst parts about summer schooland overall the faculty response predominantly concerned the inadequate compensation for their time devoted to the university. Overall, faculty members agreed that the university could improve the summer term by increasing compensation and offering more courses to compensate for the difficulties in covering all the appropriate class material in the five and one-half week summer term.
4. Even in years when there are no “merit” raises, some salaries are adjusted using the “equity pool.” These are typically relatively small raises and affect only a small proportion of faculty.
5. We assume here that faculty did not turn to other sources of income when faced with a cut in teaching stipends. Clearly, this may overstate the impact of the cut, especially on those who chose not to teach in 2012. However, we believe this may not be a substantial effect for two reasons. First, the stipend reductions were announced sufficiently late in the academic year so that faculty had either already committed to teach or would have difficulty finding other sources of income if they wanted to engage in other paying activities (consulting, seeking grant funds, etc.). Second, given the university's rural location, few faculty have opportunities such as consulting readily available to them nearby as may be the case for schools located in urban areas.

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ASSOCIATION OF RAINFALL AND DETRENDED CROP YIELD BASED ON PIECEWISE REGRESSION FOR AGRICULTURAL INSURANCE

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ABSTRACT

Agricultural insurance is one of the most useful tools for managing the financial risks associated with farming. However, traditional insurance has several drawbacks, specifically in developing countries because of high transaction costs and other challenges that may hinder the protection from risk. Index based insurance is more likely to be a superior and viable alternative to traditional insurances for many developing countries because of its independent and objective nature. Various weather related factors are one of the major uncertainties that effect crop growth and yield. In order to develop an effective weather based insurance model, crop yield needs to be correlated with the weather factor(s) such as rainfall. However, crop yield pattern may be dependent on other external factors and in general create an increasing or decreasing trend in the yield. In our analysis, we observe that both downtrend and uptrend exists in our crop yield data with a threshold in the middle and thus creates a rare trend pattern that is cyclical. In order to identify the explicit relationship between yield and rainfall, we detrended crop yield by using piecewise regression. In addition, crop yield data that are collected from the field are usually noisy and the relationship between weather factors and yield responses are in general weak. Thus, a three-period moving average smoothing technique was applied on the data to make the pattern of the trend more visible. Consequently, identification of proper trend pattern, such as, cyclical-trend rather than a simple linear trend for detrending the crop yield appeared to be significant in this research study. As a result, our study adds significant contribution in this field of research concerning the influence of unobservable factor(s) on the crop yield that creates threshold effect. The implication of these findings in this study is significant for developing an appropriate associative model for creating weather based index insurance.

INTRODUCTION

Agricultural practices are main source of income for the large percentage of the population in developing countries. Farming usually tops the list among the agricultural practices that generate income for the majority of the population. In Ghana farming represents 36 percent of the country's GDP and is the main source of income for 60 percent of the population. In recent years, economic growth in agricultural sectors in Ghana has surpassed growth in the non-agricultural sectors. Income from agricultural sectors have expanded by an average annual rate of 5.5 percent compared to 5.2 percent overall growth of the whole economy (Bogetic et al., 2007). Along with other developing countries, climate changes in Ghana have negatively impacted their agricultural economy (Etwire et al., 2013). Loss of agricultural income including destruction of crops and livestock drive poor farmers into complete poverty and left them with very little chance for reclaiming their livelihood. Indirect impacts from loss of income include sub-optimal management of financial risk exposures, for example, selecting low-risk, low-return assets and activity portfolios that reduce the risk of greater suffering, that limit growth potential and investment incentives. This situation deteriorates more by reduction in nutrient intake, withdrawing of children from school, and hiring them out to work. The problem exacerbates further by the reaction of financial institutions and by their decision to restrict lending to farmers in order to minimize exposure of financial risk. All of these consequences collectively hinder overall economic growth (Barnett et al., 2008).

One of the major factor that may have varying impact on crop growth and crop yield is weather. However, the weather related effects on crop growth and crop yield depends on other agronomic factors, such as, fertilizer use, plant density, soil type, and soil condition. One of the major weather conditions that have an impact on crop yield is the amount of rainfall received during growing season (availability of water for regions without any access to irrigation). In many parts of the world rainfall amount affect water availability in the soil, crop type, growth patterns of crops, and yield outcome of crops (Al-Kaisi & Broner, 2011). The relationship between water availability and yield outcome is depended upon the particular crop's sensitivity to water deficiency during growth stages. In general, crops are more sensitive to water deficiency during emergence, flowering, and early fruit formation stages. Consequently, amount and timing of rainfall can cause heavy crop losses for farmers. One way, in which farmers can deal with these losses is through agricultural insurance. It has been one of the most useful tools for managing the financial risks associated with farming. However, traditional insurance has several drawbacks, specifically in developing countries because of its high transaction costs and other challenges that may hinder the protection from risk for financial institutions (Skees, 2008). In order for an insurance to work, the purchasers must perceive that the premiums and expected benefits offer value; while the sellers must see opportunity for a positive actuarial (statistically reliable) profitable outcome over time. An example of a traditional insurance is a "yield insurance" that provides yield guarantee, based on regional average yield or on individual

historic yield, where the main risks affecting yield (e.g. drought) are comprised. In developed countries such as USA, this type of insurance is also called combined or multi-peril insurance. This type of traditional crop insurance relies on direct measurement of the loss or damage suffered by an individual farmer. However, field loss assessment is normally costly or not feasible, particularly where there are large numbers of small-scale farmers or where insurance markets are undeveloped and creates a challenge in the implementation process.

An alternative to traditional insurance is index based insurance instruments. Index based insurance is an agricultural insurance system that pays for losses based on an index, an independent and objective measure that is very much correlated with crop losses due to extreme weather. Index insurance contracts, such as rainfall insurance, attempt to circumvent the moral hazard and adverse selection problems that plague traditional insurance (Skees, 2008). International Research Institute (IRI) for Climate and Society at Columbia University (Hellmuth et. al., 2009) quotes United Nations Secretary General Kofi Annan "As an innovation, index insurance may hold answers for some of the more obstinate problems faced by the poor and the vulnerable." The International Fund for Agricultural Development (IFAD) has been working for many years on index insurance as part of its commitment to reduce vulnerabilities faced by rural smallholders and open their access to a range of financial services with the sole aim of improving their livelihoods (IFAD and WFP, 2010).

In general, average crop yield is expected to stay same over time if there is no technological change (improvement or deterioration) or policy change that may impact crop yield differently. However, other external changes, such as, weather factors (e.g., drought, flood, hail, etc.) can impact the crop yield and may change the average crop yield over time. The primary purpose of crop insurance is to provide protection for farmers against yield shortfalls due to external factors. As a result, an associative modeling process to understand the crop yield pattern that accounts for yield variations over time is a preferable method. Researchers have explored various procedures, such as linear trend, quadratic trend, polynomial trend (see, Just and Weninger**,** 1999; Cooper, 2010) in order to detrend the crop yield over time. In addition, other non-linear methods, such as, piecewise regression have been applied and found to be useful for understanding crop yield patterns (see, Skees et al., 1997). Several studies have identified critical thresholds (Prasad et al. 2006) that occur due to external influences to improve their model's performance. Critical thresholds occur when the outcome of a process over time is not a single linear (or nonlinear) function of time, but changes abruptly at some threshold point. Abrupt changes in the response outcome can also occur in other systems. Changes in management regimes may have threshold type effects if response processes are viewed over time. For example, a change in chemical (fertilizer) application due to environmental regulation may cause a threshold in the long-term crop yield dynamics. In this paper we apply piecewise-regression model to detrend crop yield data that are effective in modeling abrupt threshold.

DATA AND RESEARCH METHODOLOGY

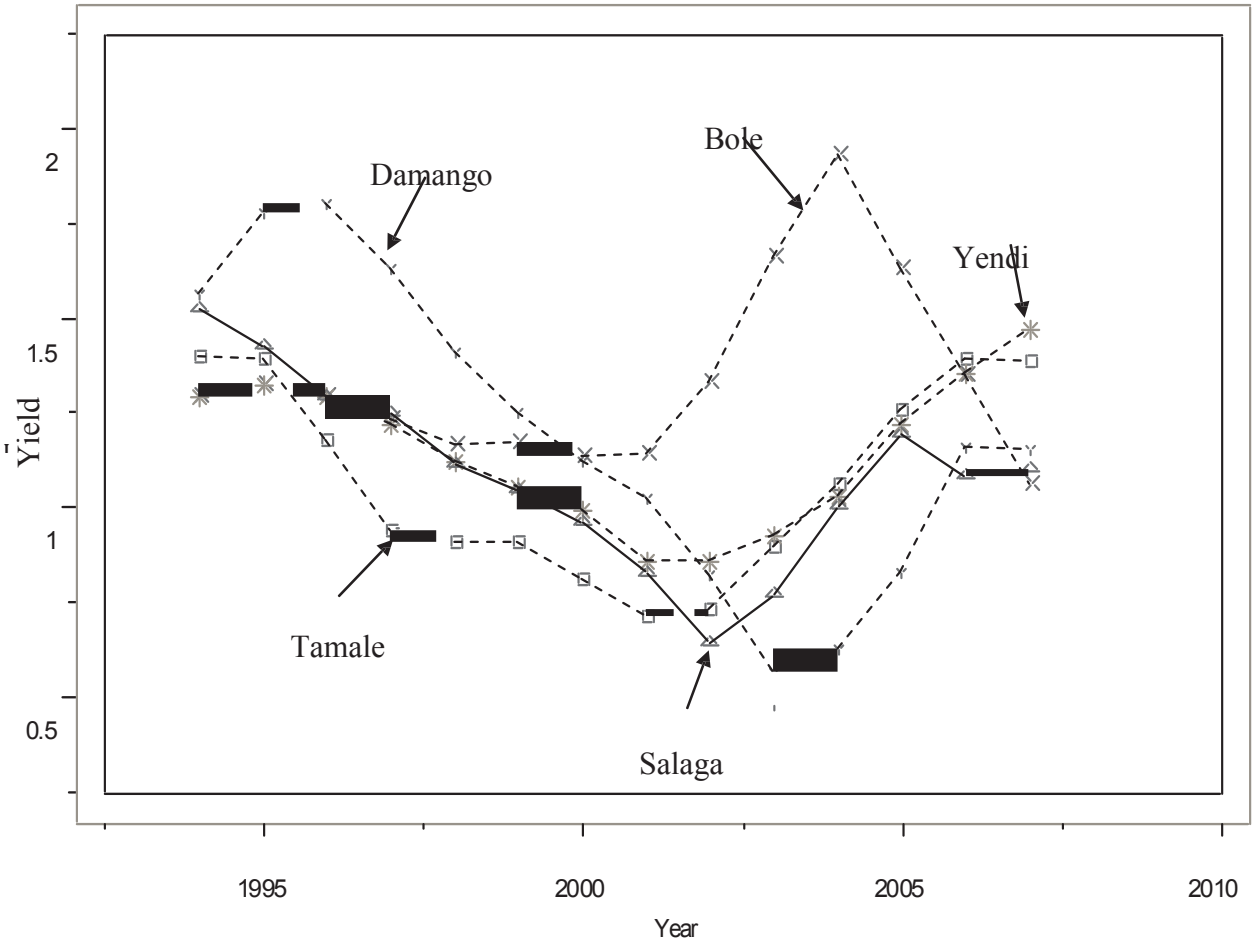
Crops that are likely to be suitable for weather based index insurance include rain-fed maize and rice. Crop yield estimation can be done with crop simulation models or empirical associative statistical models relating crop yield with explanatory variables, such as rainfall. These associative models performance generally improve after trends are eliminated from the crop yield. Therefore, the primary focus of this paper is to provide a statistical technique that may effectively eliminate or at least reduce the unknown trend effect from the crop yield. By using this technique, an absolute relationship between crop yield and weather factor "rainfall" can be observed explicitly. Adequate formulation of the response function is very important for understanding crop yield pattern and identification of external association. Crop yield data that are collected from the field are usually very noisy and the relationship between weather factors and yield responses are in general unclear due to amalgamated variations. To address this variations, we have used three-period moving average (MA (3)) smoothing technique both for the crop yield and the rainfall data, so the yield pattern and its trend are easily discernible. Moreover, it is necessary to take into account the diminishing effects of water need and the monotonically increasing nature of the yield response function. We also assume that the higher the rainfall amount, the higher the yield, until at some point the added rainfall reach a saturation point and does not improve the yield further. Therefore, we formulate the response function as a quadratic equation whenever feasible. To be specific, we formulated the response function as either linear or quadratic function of rainfall on the detrended yield. We carried out the detrending of yield by applying piecewise regression.

For this study, we have collected data from The Ministry of Food & Agriculture, the main government organization responsible for implementing agricultural policy in Ghana. Their statistical service department is an independent government department that is responsible for the collection, compilation, analysis, publication and dissemination of official statistics in Ghana for general and administrative purposes. In this paper, crop yield (metric tons of crop production per hectare) refers to the ratio of total production in a district (region) divided by total land cultivated in that district. The areas (regions) are administrative units called districts, as this is the scale at which most socioeconomic data and crop statistics are available. Rainfall data were collected in the rainfall station of that district and are reported in millimeters (mm).

Weather conditions can be a source of uncertainty when considering crop yield production in large areas. A robust array of research have been conducted to identify effects of weather factors and the uncertainty it triggers on crop yield by researchers modeling crop yield and researchers modeling climate and weather (Russel & Gardingen, 1997). Crop yield models concentrates on soil condition (Pachepsky & Acock, 1998) and weather factors that affect crop yield to ascertain the uncertainties in yield management. Whereas, the climate model researchers focus on identifying the weather conditions that affect crop production and quantifies the crop yield outcome related to climate change (Hoogenboom, 2000; Mearns et al., 2001; Semenov and

Porter, 1995). Many of the research related to weather factors and crop yield have suggested that when assessing a large area (such as a province or district), weather factors are more related to crop yield uncertainties than soil variations (Etwire et al., 2013; Hansen et al., 2006; Jones et al., 2000). Northern region of Ghana is considered to be the major bread basket of the country and therefore our research is concentrated in that region. This region is also the most susceptible to weather variation specifically to the lack of rainfall. All agricultural practices including farming in this region are practically 100 percent dependent on rainfall (Stutley, 2010). Our study will explore maize production in five districts from the northern part of Ghana to correlate crop yield with rainfall over time.

Graph 1
PLOT OF MAIZE YIELD FOR FIVE DISTRICTS: 1994-2007.



Graph-1 presents plot of crop yields for five different districts. These yield plots over time exhibit some similar patterns of downward trend for the beginning years and upward trend pattern for the last several years. These districts ended their downtrend of yield around year 2002/2003. Thus, the breakpoint for piecewise regression is identified as year 2002/2003 depending on the district. To unravel these complex trend movements in the

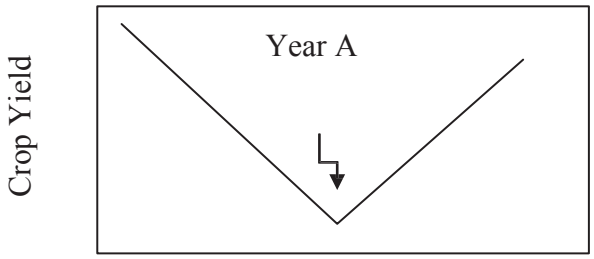
yield, we developed piecewise regression models to detrend the yield data that are applied separately to each district to capture the specific trend pattern for that district. This method was applied to observe the real relationship between crop yield and rainfall without the influence of possible external factors on the yield. The following paragraphs describe the concept of piecewise regression model briefly, which we have implemented in our research study for the purpose of detrending the crop yield.

Piecewise Regression

Crop production and subsequently the crop yield processes are influenced by a number of factors, including spatial and temporal variability in crop growth. Variations in crop production have been attributed to fluctuations occurring by several external factors, including weather (Hansen & Indeje, 2004; Jones et.al, 2000), the soil condition (Serraj & Sinclair, 2002; Lecoeur & Sinclair, 1996), and the management practices (Moran, et al., 1997; Lobell & Asner, 2003). As a result, crop yield can exhibit exceptionally high variability, often up to an order of magnitude or greater in a given year. However, when yields are smoothed for a shorter time period, then they are relatively predictable patterns that appear in many situations. In many cases crop yield variations over time can be modeled as linear trend, quadratic trend, or polynomial trend that have been explored by researchers (see, Just & Weninger**,** 1999). Piecewise regression model have been found to be useful (see, Skees et al., 1997) when critical threshold is present in yield pattern.

When analyzing a relationship of crop yield over time, *t*, it may be apparent that for different ranges of *t*, different linear relationships occur for the yield. In addition to technological changes, these could also be due to government policy change to improve agricultural productivity. In these cases, a single linear function may not provide an adequate specification of the function. Piecewise linear regression may be a better representative function that allows multiple linear (or nonlinear) models to be fit to the data for different ranges of time. Breakpoints are the values of *t* (time) where the slope of the linear function changes (see, graph below). The value of the breakpoint may or may not be known in advance. In this study, breakpoint t (year A) is assumed to be known, although they are not same for all districts.

In other words, relationships that has different direction or magnitude of slopes at different time segments in the response variable with time, can be modeled using piecewise linear segments of models combined together that has different slopes for different time segments. Let us assume the scenario below (see graph):



The combined piecewise model can be expressed as:

$$Y_t = \beta_0 + \beta_1 T_{1t} + \beta_2 (T_{1t} - A) T_{2t} + \varepsilon_t \quad \text{.... (1)}$$

Where, T_{1t} = time trend (years: 1, 2, …, t), and

$$T_{2t} = \begin{cases} 1, & \text{if } T_{1t} > \text{Year } A \\ 0, & \text{if } T_{1t} \leq \text{Year } A \end{cases}$$

(see, Mendenhall & Sincich, 1996; McGee & Carleton, 1970).

Therefore, when year is less than or equal to "A" the equation (1) becomes:

$Y_t = \beta_0 + \beta_1 T_{1t} + \varepsilon_t$, which is the first segment (or piece).

The second segment is obtained when year is greater than "A" and the equation (1) becomes:

$Y_t = (\beta_0 - A\beta_2) + (\beta_1 + \beta_2) T_{1t} + \varepsilon_t$.

Consequently, we expect β_1 to be negative (which is the slope of the first segment) and $(\beta_1 + \beta_2)$ to be positive (which is the slope of the second segment) in the above scenario. Therefore, we expect $(\beta_2 > \beta_1)$ in absolute value.

To observe the relationship between crop yield and rainfall; two separate analyses were performed. First, we applied piecewise regression on crop yield using threshold factor (breakpoint) to estimate the trend that can be used to detrend the yield. Then, detrended yield (crop yield adjusted for trend) is regressed on the predictor rainfall to observe the association of crop production behavior. It is expected that increase in rainfall should increase the crop production, since higher amount of water will be capitalized into a higher amount of crop production. In addition to the linear rainfall factor (rainfall amount in a month), we have also explored quadratic rainfall factor to observe the effect of more rainfall amount on the crop yield. Even though, increase in rainfall amount should increase the crop production, and thus increase crop yield; however, the effect of additional rainfall amount diminishes as they reach a certain saturation point. Therefore, these relationships between crop yield and rainfall amount do not appear to be linear and therefore may be better captured by introducing a quadratic term in the model. Thus, we introduce a quadratic equation to understand the associative behavior of crop yield with rainfall. To test these hypotheses, two separate regression models were estimated in this research study.

Specification of the final regression model is of the following form (Month of rainfall may be different depending on the district):

$$Detrended\ \ Yield = \beta_0 + \beta_1 Rain\ \ Month + \beta_2 Rain\_sq\ Month \quad \text{..... (2)}$$

Where:

Detrended Yield: Amount of yield per hectare (three year moving average) that is detrended using the results from piecewise regression.

Rain Month: Amount of rainfall in a specific month, e.g., March or some other month(s) (using three year moving average of rainfall) depends on the district.

Rain_sq Month: Amount of rainfall square in a specific month (using three year moving average of rainfall).

Thus, two sets of regression models were run in two steps using SAS software (see, SAS/STAT User's Guide, 1993) on relevant factors to understand the associative nature of rainfall and yield. These analyses after controlling for external factors effect are to observe the differential effect of the crop yield due to rainfall occurrence at specific time (month) of the year due to different districts (or regions). Therefore, this research structure is designed to test the hypothesis that crop yield fluctuation is rainfall, time of the year, and location dependent.

Table 1

REGRESSION RESULTS OF DETRENDED YIELD FOR BOLE. (CORRECTED FOR AUTOCORRELATION – USING MAXIMUM LIKELIHOOD ESTIMATES)					
Variables	**DF**	**Parameter Estimates**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	1	-0.2243	0.0728	-3.08	0.0131
March Rain	1	0.006444	0.001880	3.43	0.0075
R-Square	0.5664				

Note: The regression residuals model is identified as, $(1-\phi_1 B-\phi_2 B^2)\nu_t=\varepsilon_t$ and the estimated first and second order autoregressive (AR) parameters from SAS are, $(1-0.8199\,B\ +0.7892\,B^2)\nu_t=\varepsilon_t$.
$(-4.01)^{***}\qquad(3.86)^{***}$.

Autoregressive parameter's t-statistics are reported in the parentheses. They are both significant at the one (***) percent level of significance.

EMPIRICAL RESULTS

There is a visible similarities in crop yield trend pattern over time among the districts (see, Graph-1), they exhibit some downward trend pattern in the beginning periods and then followed by upward trend pattern for the other years (except for Bole). This suggests that due to some unobservable phenomena crop yield may differ in different time periods and continues a downtrend or uptrend up to a certain threshold point before reversing. In addition, there are slight differences in declining trend segment's breakpoint at a different year for different districts. Therefore, it appears that there are two opposite directional trends in crop yields are in play which creates the crop yield trend-cycle that split up at a breakpoint around the year 2002/2003.

It is possible that this may be due to a weather cycle and/or management practice change or some other unobservable source of similar nature and this effect may also be location (geographic) specific. Therefore, we have analyzed our data for each district separately to isolate the location specific outcome. Thus, the idea of this study is to understand and observe explicit relationship between crop yield (detrended) and weather factor "rainfall" (water need), such that, the association effect of unobserved external factors on crop yield is eliminated through piecewise regression modeling process. The following results address the finding of our research study on the detrended crop yields' relationship with rainfall in different districts.

Table 2

REGRESSION RESULTS OF DETRENDED YIELD FOR TAMALE					
Variables	**DF**	**Parameter Estimates**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	1	-0.74233	0.26761	-2.77	0.0197
July Rain	1	0.00850	0.00341	2.49	0.0318
July Rain_sq	1	-0.00002257	0.00001014	-2.22	0.0503
R-Square	0.6062				

Piecewise regression models that are used in step one to estimate the trend-cycle component fit well with higher coefficient of determinations except for the Bole district (regression results' tables are not reported). Among all the districts "Damango" has the best fitted piecewise regression model with the highest R^2=0.9630 followed by R^2 of 0.9215, 0.8978, 0.8863, and 0.0999 for districts "Tamale", "Yendi", "Salaga, and "Bole" respectively. These piecewise regression models largely explain the variations due to unknown trend-cycle effect on the yield for most of the districts. Thus, our research results show that piecewise regression model provides better estimate for trend pattern in crop yield at a district level in this geographic region compared to other simple linear models and was an important tool to detrend the yield.

Table 3

REGRESSION RESULTS OF DETRENDED YIELD FOR YENDI (After corrected for autocorrelation – using Maximum Likelihood Estimates)					
Variables	**DF**	**Parameter Estimates**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	1	-0.0105	0.0296	-0.35	0.7312
March Rain	1	0.0101	0.003101	3.25	0.0100
March Rain_sq	1	-0.000331	0.0000674	-4.90	0.0008
R-Square	0.8893				

Note: The regression residuals model is identified as, $(1-\phi_1 B)\nu_t = \varepsilon_t$ and the estimated first and second order autoregressive (AR) parameters from SAS are, $(1+0.6436\,B\,)\nu_t = \varepsilon_t$.
$(2.52)^{**}$.
Autoregressive parameter's t-statistics are reported in the parentheses. It is significant at the five (**) percent level of significance.

Multiple regression results of detrended yield on rainfall are reported in Tables1-Table5. All these models appeared to fit well in determining the relationship between the crop yield and rainfall. The best fitted model appears to be in "Yendi" with the highest coefficient of determination (R^2) 0.8893 after corrected for autocorrelation, which is identified as first order autoregressive error model (see, Table 3). These results indicate that March rainfall in general impact the crop yield positively. However, to control for diminishing effect of rainfall on the crop yield we have included the quadratic term in the regression model and the results show that our hypothesis of lesser effect of additional rainfall is established. However, timing of rainfall does not seem to affect crop yield equally among the districts. As for example, April rainfall seem to be a better predictor for "Salaga" (see, Table 4) with a moderate coefficient of determination (R^2) 0.3357. On the other hand, better condition for crop yield improvement by rainfall is July for "Tamale" and "Damango" (see, Tables 2 and 5). Thus, our analysis reveals that there are differences in rainfall effect on the crop yield that are geographic location (districts) dependent.

Table 5

REGRESSION RESULTS OF DETRENDED YIELD FOR SALAGA.					
Variables	**DF**	**Parameter Estimates**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	1	-0.17021	0.07425	-2.29	0.0426
April Rain	1	0.00146	0.000619	2.36	0.0380
R-Square	0.3357				

Table 6

REGRESSION RESULTS OF DETRENDED YIELD FOR DAMANGO.					
Variables	**DF**	**Parameter Estimates**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	1	-1.72795	0.53754	-3.21	0.0093
July Rain	1	0.03087	0.00955	3.23	0.0090
July Rain_sq	1	-0.00013301	0.00004118	-3.23	0.0090
R-Square	0.5113				

CONCLUSION

We made significant contribution in understanding and implementation of detrending process of crop yield pattern in this literature. This research provides additional evidence of differential effect of rainfall on crop yield with respect to timing of rainfall and location of crop harvest (districts). It is apparent in this study that in addition to plant characteristics external factors such as, timing of measurable rainfall also affect crop yield. Specifically, we observe that a crop yield trend-cycle does exist in most of our data sets, which starts with the downtrend that ended around 2002/2003 and then reverse to an uptrend for next several years that creates a crop yield trend-cycle. This suggests that crop yield trend pattern is likely to be a cyclical pattern rather than a linear trend for this region. A possible explanation for this time dependent trend cycle of crop yield may be attributed to change in the weather pattern and/or change in management practices.

Consequently, these results add another dimension in this field of research concerning the effect of unknown factor(s) on the crop yield that has threshold effect. In addition, identification of proper trend pattern, such as, cyclical trend (uptrend and downtrend combined) rather than a simple linear trend for detrending the crop yield appears to be significant in this research. For a successful operation of weather based index insurance policy to work, the crops grown in different locations (districts) need to be properly detrended. Additional research study will be helpful, particularly with regard to the linkage between these factors and crop yield dynamics. To determine the length of downtrend or uptrend to understand the cause of trend cycle of crop yield, future research could examine some phenomena, such as, weather pattern change over different time periods. However, the power of piecewise regression model that was applied in this paper to eliminate the presence of crop yield trend-cycle does not depend on identifying the relevant factor(s).

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STUDY HABITS AND EXAMINATION PERFORMANCE IN AN ONLINE LEARNING MICROECONOMICS COURSE

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ABSTRACT

In light of the increased prevalence of online courses and web-based instruction offered in traditional courses, it is imperative to understand determinants of college students' academic achievement under the online instruction. Using a unique panel data collected from a university's e-learning server, this paper examines students' online study patterns and how study habits affect their learning outcomes. We find that many students enrolling in the sampled online microeconomics course finished viewing online course materials right before examinations, rather than spreading study time evenly over the semester. The estimation results also show that study habits are significantly correlated with students' examination performance.

INTRODUCTION

With the availability of new technologies, cyber classrooms are gaining ground in higher education. More and more universities are offering web-based instruction or completely online courses. Online courses provide a unique opportunity to scrutinize students' behavior, the associated academic results and the effectiveness of the technology being offered. Students' examination performance can be regarded as an education production function which highly correlates with students' efforts, instructors' efforts and some demographic characteristics of students. Among all educational inputs, study habit has been shown to be a good predictor of examination performance.

Study habits include frequency of studying sessions, review of material, rehearsal of learned material, self-testing and studying in a conductive environment (Credé & Kuncel, 2008). Good study habits, such as trying not to do too much studying at one time, reviewing notes before beginning an assignment and reviewing school work over the weekend help students learn better and improve their test scores. Many studies conducted in this line of research used self-reported study habits data and reached the conclusion that study habits are significantly correlated with students' grades (Borg, Mason & Shapiro, 1989; Okpala, Okpala & Ellis, 2000; Credé & Kuncel, 2008; Nonis & Hudson, 2010).

Instead of using self-reported study habits data, this paper utilizes a unique panel data set collected from a university's e-learning server and investigates the relationship between study habits and examination performance under the online mode. With the details of students' use of online materials and their examination performance, we are able to examine how study habits affect students' learning outcomes in an online microeconomics course. This paper adds a piece to the puzzle of learning students' study habits in online learning economics courses and makes

contribution to exploration of the relationship between online study habits and academic performance.

DATA DESCRIPTION

Data were collected from an online undergraduate intermediate microeconomics course for fall 2009 in a public university in Taiwan. There were 107 students in our sample. 12 instructor pre-recorded weekly lectures were available at the beginning of the semester on the website administered and maintained by the university's e-learning server.

The online class met in a classroom from 9:10 a.m. to 12:00 p.m. on Fridays five times during the sample semester for three examinations and two in-class project presentations. Other than that, students viewed pre-recorded lectures, read textbooks, solved assigned problem sets, studied past examination questions, and used Internet enhancements such as emails and discussion boards to aid their learning.

One feature of online courses is that students do not need to attend live lectures taught in traditional face-to-face ways. Instead, students may choose when and where to view online course materials, and may also view videos repeatedly. Students' viewing patterns here can be viewed as their study habits in online courses.

There were 12 instructor pre-recorded lectures for this course, and these pre-recorded materials were assigned to 12 specific weeks. We expect that good study habits such as reviewing online materials during the assigned week or finishing watching online recorded lectures before examination help students learn better.

We first explore students' online study habits by examining their course website usage patterns. As can be seen from the Figure 1, students visited the course website more frequently on Thursdays and Fridays. The average number of daily visits reaches the highest right before the first midterm during the entire period. Most students visited the course website in the evening, from 6 p.m. to 12:00 a.m.

For each lecture, all students' viewing patterns are further assigned to one of the following seven categories according to when they finish watching the online lecture for the first time.

1. The student finished watching for the lecture during the examination week
2. The student finished watching the lecture after the assigned week but before the examination week
3. The student finished watching the lecture during the assigned week
4. The student finished watching the lecture before the assigned week
5. The student only watched part of the lecture (more than 50%)
6. The student only watched part of the lecture (less than 50%)
7. The student has never watched the lecture

Figure 2 presents the distribution of online viewing by lecture. For each lecture, on average, 11.83% of students did not watch online lectures even though they could easily view online materials at anytime and anywhere. Notably, the percentage of never watch online lectures is increasing as the semester goes on. Also, 28.50% of students viewed pre-recorded lectures during the examination week; 23.91% of students viewed pre-recorded lectures after the

Figure 1: Frequency of Course Website Usage

(Daily Visits Per Student)

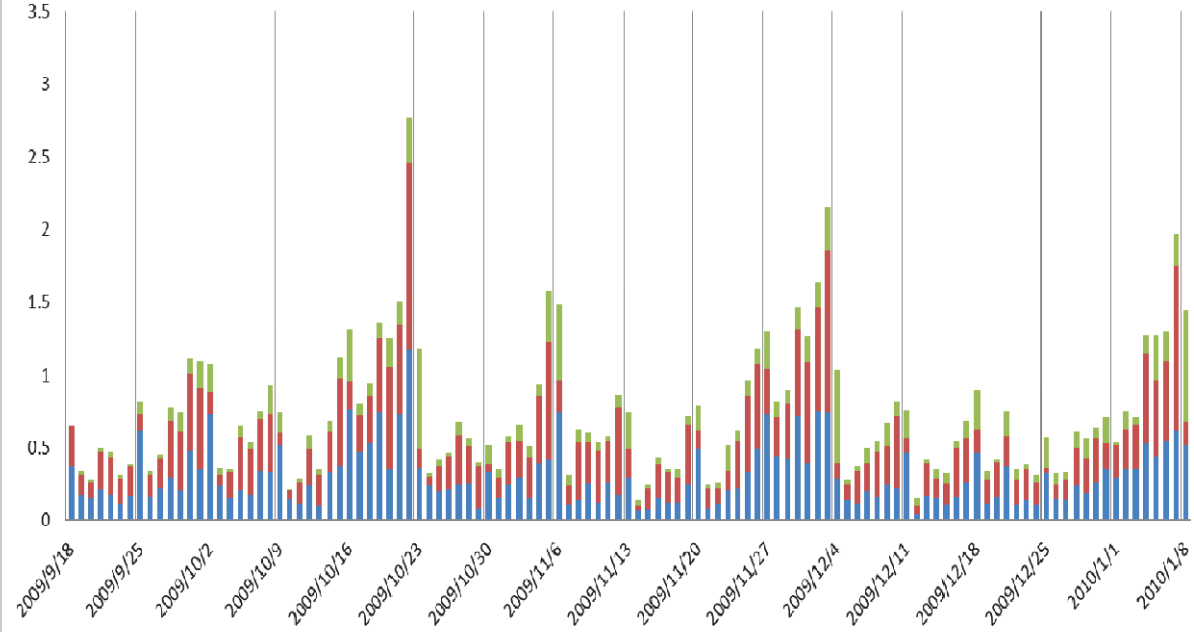
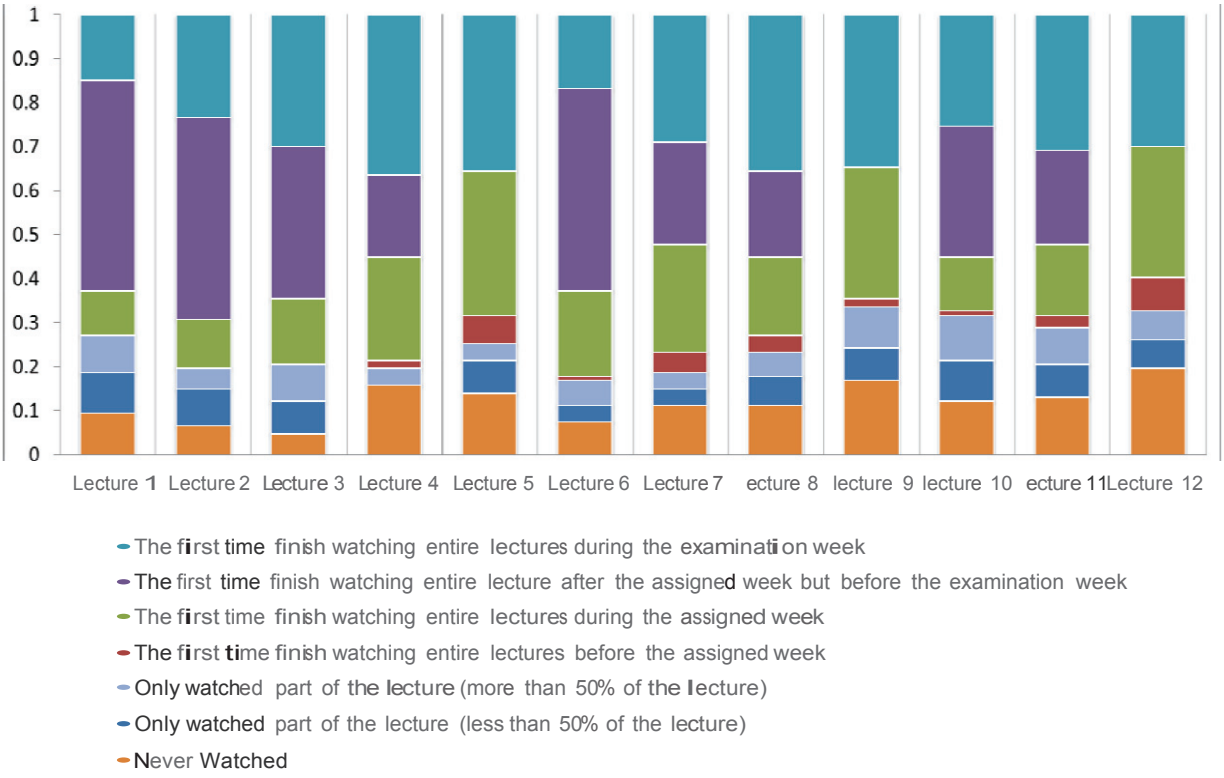


Figure 2: Distribution of Online Viewing Patterns



assigned week but before the examination week; only 20.17% of students viewed pre-recorded lectures during the assigned week.

PANEL DATA ANALYSIS

The major research question is that whether or not online lecture viewing patterns or study habits affects students' learning outcomes. Specifically, we link students' viewing patterns to their examination performance. For each examination question, we know the corresponding lecture and students' viewing behavior of that particular lecture. This enables us to employ panel data method to take into account students' time invariant heterogeneity like motivation, and estimate the effects of online viewing patterns on examination performance.

A linear model describing the relationship between a student's examination performance and various online viewing pattern variables is shown below.

$$y_{ij} = Kr_{ij} + \mathbf{I}_i + \hat{U}_j + \dot{I}_{ij}, \qquad i = 1, 2, \ldots, I, j = 1, 2, 3, \ldots, J \qquad (1)$$

I denotes total number of students and J denotes total number of examination questions. y_{ij} corresponds to student i's observed examination performance on question j. r_{ij} refers to online learning pattern variables. K represents the correlation between online viewing patterns and grades, the major interest of this paper. $\mathbf{I}_i$ represents student i's time-invariant individual effect, $\hat{U}_j$ represents question j's specific effect, and $\dot{I}_{ij}$ is a random disturbance term.

There were three examinations in the sample semester. Total number of questions was 52, and total number of students was 107. Table 1 shows the estimation results of least square models for the pooled data, fixed and random effects models. The dependent variable is the percentage of correctness for each examination question. The viewing pattern variables described above are the main independent variables. Examination question and student dummy variables were used as covariates to better control for question and individual heterogeneity.

The first three columns only include one major independent variable, "Watched the lecture". It is defined as 0 if the student had never watched or did not finish viewing online lecture; otherwise, it is coded as 1. We find a positive association between students' viewing of online lectures and their grades. The result shows that students who chose to access online course materials do better than those chose not to access online materials. The sign and magnitude of "watching lecture" effect here are comparable to the attendance effects in the literature (Stanca, 2006; Lin & Chen, 2006).

The fourth, fifth, and sixth columns show the results of detailed online viewing patterns on examination performance. "Finish watching lectures before the assigned week", is combined into "Finish watching lectures during the assigned week" in this part of estimation. Also, "Only watched part of the lecture" includes "Only watched part of the lecture (more than 50% of the lecture)" and "Only watched part of the lecture (less than 50% of the lecture)". The reference group here is "Never watched the lecture". All the viewing pattern variables except "Only watched part of the lecture" are found positively correlated to students' examination performance. Our results support the argument that study habits are significantly correlated with students' academic performance. In the fixed effects model, the magnitude of "Finish watching entire lecture during the examination week" is the greatest among all viewing pattern variables. This

Table 1
FACTOR AFFECTING STUDENT'S EXAMINATION PERFORMANCE

Dependent Variable (% of Correctness)	OLS	Fixed Effects	Random Effects	OLS	Fixed Effects	Random Effects
Watched the lecture	0.0461***	0.0555***	0.0538***			
	(0.0165)	(0.0211)	(0.0184)			
Only watched part of the lecture				0.0210	0.0341	0.0317
				(0.0203)	(0.0238)	(0.0211)
The first time finish watching entire lectures during the assigned week				0.0935***	0.0410*	0.0519**
				(0.0180)	(0.0236)	(0.0215)
The first time finish watching entire lecture after the assigned week but before the examination week				0.0504***	0.0694***	0.0671***
				(0.0188)	(0.0237)	(0.0208)
The first time finish watching entire lectures during the examination week				0.0162	0.0772***	0.0658***
				(0.0134)	(0.0160)	(0.0153)
Constant	0.668***	0.659***	0.661***	0.663***	0.654***	0.655***
	(0.0452)	(0.0437)	(0.0380)	(0.0451)	(0.0439)	(0.0379)
Hausman Test Statistics		0.09			20.99	
R-squared	0.233	0.352	.	0.238	0.353	.
Number of Observations	5,564	5,564	5,564	5,564	5,564	5,564

Note: The exam question dummies are included in all models, and student dummies are only included in the fixed effects models. "***" is at 0.01, "**" is at 0.05 and "*" is at 0.1 Type I error levels. White (1980) robust standard errors are in parentheses. All Hausman test statistics are not significant from zero.

implies that students that wait until the last minute to cram for examinations using online resources do pay off in our sample. This result is in line with that in Chen and Lin's 2012 paper (Chen & Lin, 2012).

CONCLUSION

As the computer technology advances, learning economics in higher education has become more digitalized. Availability of online courses has given students an alternative choice to learn economics. This paper utilizes online usage data collected by a university e-learning

server and explores the effects of study habits on students' examination performance in an online learning microeconomics course.

We find that many students spend their study efforts during the examination period, i.e. they wait until the last week to cram for examinations. The results demonstrate that study habits in terms of online viewing patterns are significantly correlated with students' examination performance. Students with study habits such as finishing watching online lectures during the assigned week, finishing watching online lectures after the assigned week but before examination date or finishing watching online lectures during the examination week perform better than those never watched online lectures and those viewed only partial online materials. However, for this online course, crammers' examination performance is not statistically different that of those learning and reviewing online materials before examination week. It may imply that, in the short run, last minute exam preparation does pay off. This explains why many students choose to wait until the last minute to cram for exams.

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DETERMINANTS OF GRADUATION RATES OF HISTORICALLY BALCK COLLEGES AND UNIVERSITITES

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ABSTRACT

Historically Black Colleges and Universities (HBCUs) play a crucial role in providing higher education for African Americans. It was reported that the 6-year graduation rate for 4- year HBCUs is lower than the national college graduation rate for African Americans. The role of HBCUs in providing higher education for African Americans has been challenged.

This paper examines the factors influencing HBCU graduation rates using data from College Results Online. We investigate the effects of college quality, college cost, student characteristics and local labor market on HBCU graduation rates. We set up a theoretical model of education production and estimate the model using Instrumental Variables method to account for the endogeneity of college cost.

We find that college quality and college cost are the important factors affecting the graduation rate of HBCUs. Specifically, college quality has a positive effect, college cost has a negative effect and financial aid has a positive effect on graduation rate of HBCUs. Improving the quality and reducing the net price of college education are among the effective measures to improve the graduation rate of HBCUs.

INTRODUCTION

The college wage premium increased substantially in the 1980s. Consequently, the college enrollment rate grew rapidly in the past 30 years for all racial groups (Digest of Education Statistics 2009, Table 201). The college enrollment rate of recent high school completers for African Americans rose from 42.7% in 1980 to 55.7% in 2008. Recent high school completers are defined as individuals who obtained a high school diploma or completed a GED in the past 12 months. It has been well documented that Historically Black Colleges and Universities (HBCUs) play a crucial role in providing higher education for African Americans. Among black students enrolled in 4-year institutions, 21.3% of them attend HBCUs. HBCUs produce 21.5% of the Bachelor's degrees conferred to African Americans (Provasnik & Shafer, 2004). However, it was reported that the 6-year graduation rate for 83 federal designated 4-year HBCUs is only 37%, 4% lower than the national college graduation rate for black students (Stripling 2010). The role of HBCUs in providing higher education for African Americans has been challenged. It is critical to know what factors determine the graduation rates of HBCUs.

This paper uses institutional data from College Results Online to test the effects of college quality, college cost and financial aid, student characteristics and local labor market on the completion rates of HBCUs. We find that college quality and college cost are the important

factors influencing graduation rate of HBCUs. College quality has a positive effect, college cost has a negative effect, and financial aid has a positive effect on HBCU graduation rate. Improving the quality and reducing the net price of college education are among the effective measures to improve the graduation rate of HBCUs.

LITERATURE REVIEW

Studies in college choice assume that agents are rational in the sense that they make decisions to maximize the expected life-time utility of wealth given their borrowing constraints. Most studies on college choice assume the college attendance decision to be a static process, in which people make a once-and-for-all choice on college attendance at a point of time after they complete high school. (Christensen, Melder & Weibrod, 1975) find students' ability and the socioeconomic variables (education of mother, education of father, occupation of father and family income) have positive effect on college attendance. With controls for selection bias, (Willis & Rosen, 1979) find expected gains of lifetime earnings from education affect college choices. (Gustman & Steinmeier, 1981) show that wage and youth unemployment rate affect college choices. (Fuller, Manski & Wise, 1982) and (Manski & Wise, 1983) find schooling cost, foregone earnings and individual academic ability relative to the academic standards of a college are the factors affecting college choices. By examining the college enrollment behavior of two age cohorts, (Corman, 1983) confirms that the cost of higher education (tuition and the density of postsecondary institutions), family income, and unemployment rate are important factors influencing college attendance. Altonji (1993) finds that academic ability, family background and high school curriculum influence the ex-ante return to college. Besides emphasizing the importance of socioeconomic background, academic ability, the price of college education and unemployment rate in influencing the choice of two-year college vs. four-year college, (Rouse, 1994) adds return to college into the multinomial probit model of college attendance, and finds a positive effect of return to college on college attendance. (Card & Lemieux, 2000) study the slowdown of educational attainment in the 1970s. They find that tuition cost and local unemployment rate affect college enrollment decisions. They also find that cohort size has a negative effect on educational attainment and the return to college education positively affect college enrollment and college completion. (Card, 2001) formulates educational choice in a static framework and shows that optimal schooling level is achieved when the marginal benefit of schooling equals to the marginal cost of schooling.

(Cameron & Heckman, 1998 & 2001) and (Light & Strayer, 2000) is among the fewer studies that model schooling choice in a dynamic environment, in which the educational choice at stage t is based on all choices made at previous stages. (Cameron & Heckman, 2001) argue that credit constraint is not the key factor that affects college choice. It is long term factors such as parental characteristics and family environment that have significant effect on educational choice. (Light & Strayer, 2000) study the impact of the match between student ability and school quality on college completion. They find that student ability has a significant positive effect on college completion if student ability and college quality match well.

Whether schooling choice is formulated statically or dynamically, it is agreed that the direct cost of education, the forgone earnings, the expected gains of life-time earnings from education, the individual academic ability, family background (parental education and family income) and economic conditions (local wage level and unemployment rate) are among the most important factors influencing college entry decisions. Some studies find that men and women may respond differently to the same factors when they make educational choices.

THEORETICAL MODEL AND ESTIMATION STRATEGY

Suppose the education production function is defined as:

$$G_i = f(\mathrm{Q}_{i,}\mathrm{C}_i, \mathrm{X}_i, \mathrm{I}_i, \mathrm{L})$$

Where G_i is the graduation rate of institution I, Q_i denotes the quality of institutional i,C_i denotes the cost of institution I, X_i denotes student characterstics of institution I,i_i denotes institutional characterstics and L donates the local labor market condition.We use the first year retention

rate, student-related expenditures per full-time equivalent undergraduate, the rejection rate among applicants for admission, and the median ACT score to measure the college quality. The in-state tuition and fees, average federal financial aid, average state financial aid and average institutional financial aid are used to measure college cost. Student characteristics include percent of undergraduates receiving Pell grant, percent of women, percent of part-time undergraduates and percent of undergraduates above 25 years old. College characteristics include the location of the institution, enrollment of the institution, Carnegie classification of the institution, and the sector of the institution (private vs. public). We use state unemployment rate to measure the local labor market conditions and the average weekly earnings of production employees in manufacturing industry to measure the opportunity cost of attending college.

Suppose the graduation rate is a linear function of the educational inputs Q_i, C_i, X_i, I_i and L, then the education production function can be written as

$$G_i = \alpha Q_i + \beta C_i + \gamma X_i + \delta I_i + \theta L + \varepsilon_i$$

Where ε is the error term. Then

$\alpha = \frac{\partial G_i}{\partial Q_i}$,which represents the effect of college quality on graduation rate.

$\beta = \frac{\partial G_i}{\partial C_i}$, which represents the effect of college cost and financial aid on graduation rate.

$\gamma = \frac{\partial G_i}{\partial X_i}$, which represents the effect of student characteristics on graduation rate.

$\delta = \frac{\partial G_i}{\partial I_i}$, which represents the effect of institutional characteristics on graduation rate.

$\theta = \frac{\partial G_i}{\partial L}$ which represents the effect of local labor market on graduation rate.

α,β,γ, δ and θ are the parameters of interest in this study.

DATA AND EMPIRICAL RESULTS

The data in this study is retrieved from the websites' of College Results Online (http://www.collegeresults.org/) and Bureau of Labor Statistics (http://www.bls.gov/). College Results Online provides detailed information on graduation rates, retention rates, degrees, college characteristics, student characteristics, admissions, cost and financial aid, college expenditures and faculty characteristics from 1997 to 2012. This study explores the graduation rates of four-year HBCUs in 2009. The data provided by College Results Online come from Department of Education's Integrated Postsecondary Education Data System (IPEDS). The state unemployment rate and the average weekly earnings of production employees in manufacturing industry are retrieved from Bureau of Labor Statistics' website. The state unemployment rate is retrieved from http://www.bls.gov/news.release/archives/srgune_03032010.pdf . The average earnings of production employees in manufacturing industry by state are retrieved from http://www.bls.gov/sae/eetables/sae_annavg310.pdf.

Table 1 presents the sample characteristics of the data set. Variable definitions are available at http://www.collegeresults.org/aboutthedata.aspx#question-2. There are 81 HBCUs in the sample. The mean graduation rate is 31.2%, varying between 3.4% and 82.8%. The average first-year retention rate is 61.6%, with the lowest retention rate being 20% and the highest retention rate being 86%. The mean rejection rate is 34.8%, ranging from 0% to 89%. The estimated median ACT scores for these 81 institutions are from 12 points to 27 points. The expenditure per student varies between $4,901 and $25,521. The in-state tuition and fees are between $2,922 and $20,531. As far as student financial aid is concerned, the federal grant aid per receiving student ranges from $1,190 to $6,686; the state grant aid per student ranges from $113 to $1,916; and the institutional grant aid per student ranges from $200 to $17,822.

The average undergraduate enrollment is 2,633. Undergraduate enrollment varies between 416 and 8,934. Among the 81 HBCUs, 48% of them are public institutions, 64% of them are located in a city and 93% of them are located in the south. According to Carnegie Classification, 58% of them are Baccalaureate Colleges, 42% of them are Master's Colleges and Universities and 10% of them are Doctoral Colleges and Universities. Among students enrolling in these HBCUs, 63% of them receive Pell Grants, 59% of them are females, 11% of them are part-time students, and 19% of them are 25 years old or older. With regards to local labor market conditions, the average state unemployment rate in 2009 is as high as 9.2% due to the recession of 2007 to 2009. The state unemployment rates vary between 6.4% and 11.7% in 2009. The average weekly earnings of production employees by state range from $564.21 to $835.99.

Table 1 Sample Characteristics					
Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
Graduation Rate	81	31.17	13.53	3.4	82.8
College Quality					
Retention Rate	81	61.59	12.63	20	86
Student and Related Expenditures / FTE	81	9693.28	3623.44	4901	25521
Percent Rejected	81	34.84	26.13	0	89
Estimated Median ACT	54	17.73	2.58	12	27
College Cost and Financial Aid					
In-State Tuition and Fees	81	8560.68	4468.65	2922	20531
Average Federal Grant Aid per Receiving Student	81	4303.67	813.32	1190	6686
Total State Grant Aid $ / FTE (Statewide)	81	843.47	540.59	113	1916
Average Institutional Grant Aid / Full-Time First-Time Student	80	4746.99	2901.73	200	17822
Student Characteristics					
Percent of Undergraduates Receiving Pell Grants	81	63.26	15.98	13	96
Percent Women	81	58.96	12.03	0	100
Percent Part-Time	81	10.53	8.55	0.9	48.8
Percent 25 and Over	81	18.80	11.87	2.7	49.6
Institution Characteristics					
Full-Time Equivalent Undergraduates	81	2632.94	1948.13	416	8934
Public Institution	81	0.48	0.50	0	1
Private Institution	81	0.52	0.50	0	1
Baccalaureate Colleges	81	0.58	0.50	0	1
Master's Colleges and Universities	81	0.32	0.47	0	1
Doctoral Colleges and Universities	81	0.10	0.30	0	1
Located in a City	81	0.64	0.48	0	1
Located in the Midwest	81	0.05	0.22	0	1
Located in the Northeast	81	0.02	0.16	0	1
Located in the South	81	0.93	0.26	0	1
State Labor Market					
State Unemployment Rate	81	9.18	1.61	6.4	11.7
Average Weekly Earnings of Production Employees	79	659.82	81.56	564.21	835.99

Table 2 presents the effect of college quality on graduation rates. It shows that college quality alone can explain 65% of the variation in graduation rates among the 81 HBCUs. All four measures of college quality have positive effects on graduation rate. The effect of first-year retention rate is significantly positive at 1% level and the effect of the median ACT score is significantly positive at 5% level.

Table 2 THE EFFECT OF COLLEGE QUALITY		
Independent Variables	Coefficient.	P-Value
Retention Rate	0.8101636	0.00
Percent Rejected	0.0772484	0.17
Expenditures / FTE	0.274451	0.39
Median ACT	1.073047	0.05
Number of Observations	54	
Adjusted R-Square	0.65	

Table 3.1 presents the effects of college cost and financial aids on college graduation rates. College cost and financial aids can explain 27% of the variation in graduation rates. It shows that tuition and fees have a significantly positive effect on graduation rate. One explanation for the significantly positive effect of tuition is that tuition is endogenously determined. Tuition is positively correlated with unobserved characteristics of the institution that promote college graduation rate. The OLS estimate of the effect of tuition on graduation rate may be upward biased due to the omitted variable bias.

Table 3.1 THE EFFECT OF COLLEGE COST AND FINANCIAL AID WITHOUT ACCOUNTING FOR THE ENDOGENEITY OF TUITION AND FEES		
Independent Variables	Coefficient	P-Value
In-State Tuition and Fees	0.8057597	0.02
Average Federal Grant Aid	1.326412	0.42
Average State Grant Aid	4.329687	0.08
Average Institutional Grant Aid	1.237815	0.02
Number of Observations	80	
Adjusted R-Square	0.27	

To account for the endogeneity of tuition, I use the location, sector (public vs. private) and Carnegie classification of colleges as instruments for in state tuition. Table 3.2 presents the instrumental variables regression results. It also shows the result of first stage estimation and Hausman test for endogeneity of tuition and fees. Hausman test rejects the hypothesis that tuition is exogenous at 1% significance level. Table 3.2 shows that college cost and financial aid can explain 18% of the variation in graduation rate. We can see that tuition has a negative effect on graduation rate and all three measures of financial aid have a positive effect on graduation rate. However, the effects of tuition and average federal grant aid are insignificant. The effects of average state aid and average institutional aid are significant at 5% level and 1% level respectively.

Table 3.2 **INSTRUMENTAL VARIABLES REGRESSION ON THE EFFECT OF COLLEGE COST AND**		
Independent Variables	Coefficient	P-Value
In-State Tuition and Fees	-0.2281496	0.60
Average Federal Grant Aid	2.071226	0.24
Average State Grant Aid	5.778937	0.03
Average Institutional Grant Aid	1.994614	0.00
Number of Observations	80	
Adjusted R-Square	0.18	
R-Square from First Stage Regression	0.79	
P-value from Hausman Test	0.00	

Table 4 presents the effect of student characteristics on graduation rate. It shows that student characteristics can explain 48% of the variation in graduation rate. We can see that percent of undergraduates receiving Pell grant and percent of part-time undergraduates have a significantly negative effect on graduation rate. Percent of undergraduates 25 years old or older also has a negative effect on graduation rate, but the effect is not significant. Percent of women has a significantly positive effect on graduation rate.

Table 4 **EFFECT OF STUDENT CHARACTERISTICS**		
Independent Variables	Coefficient	P-Value
Percent Pell Grants	-0.4368487	0.00
Percent Women	0.2857683	0.00
Percent Part-Time	-0.6998728	0.00
Percent 25 and Over	-0.1689516	0.25
Number of Observations	81	
Adjusted R-Square	0.48	

Table 5 shows the effect of local labor market on graduation rate. The local labor market conditions can only explain 3% of the variation in graduation rate. It shows that state unemployment rate has a significantly positive effect on graduation rate, which is consistent with findings in schooling literature. Average weekly earnings of production employees in manufacturing sector have a positive effect on graduation rate, but the effect is not significant.

Table 5 **EFFECT OF LOCAL LABOR MARKET**		
Independent Variables	Coefficient	P-Value
State Unemployment Rate	1.950511	0.05
Average Weekly Earnings	0.0085105	0.66
Number of Observations	79	
Adjusted R-Square	0.03	

Table 6 presents the instrumental variables regression on determinants of college completion. Overall, college quality, college cost and financial aid, student characteristics and local labor market conditions can explain 73% of the variation in graduation rates among HBCUs. College quality has a positive effect on college completion. Among the four measures of college quality, retention rate and median ACT scores have a significantly positive effect on graduation rate. Tuition and fees have a negative effect on graduation rate, though the effect is insignificant. Financial aid has a positive effect on graduation rate. Among the three measures of financial aid, the average institutional aid has a significantly positive effect on graduation rate. As far as local labor market conditions are concerned, state unemployment rate has a significantly positive effect on graduation rate and average weekly earnings of production employees has a insignificantly positive effect on graduation. As far as the effect of student characteristics are concerned, we can see that percent of undergraduates receiving Pell grant and percent of part-time undergraduates have a significantly negative effect on college completion.

Percent of women and percent of undergraduates above 25 years old have a significantly positive effect on graduation rate. Undergraduate enrollment has a negative effect on graduation rate, though the effect is not significant

Table 6
DETERMINANTS OF GRADUATION RATE

Independent Variables	Coefficient	P-Value
College Quality		
Retention Rate	0.6509453	0.00
Percent Rejected	0.0454512	0.37
Expenditures / FTE	0.1885821	0.58
Median ACT	0.9328552	0.09
College Cost and Financial Aid		
Tuition and Fees / 1000	-0.1442201	0.75
Average Federal Grant Aid / 1000	2.263139	0.24
Average State Grant Aid / 1000	1.676375	0.46
Average Institutional Grant Aid / 1000	0.7812455	0.09
Student Characteristics		
Percent Pell Grants	-0.3214633	0.01
Percent Women	0.163682	0.07
Percent Part-Time	-0.7802127	0.02
Percent 25 and Over	0.3466393	0.04
State Labor Market		
State Unemployment Rate	1.750947	0.04
Average Weekly Earnings	0.0020796	0.90
Enrollment	-0.6288831	0.44
Number of Observations	53	
Adjusted R-Square	0.73	

In conclusion, college quality and college cost are important factors influencing graduation rate. College quality has a positive effect and college cost has a negative effect on graduation rate. As far as college quality is concerned, if first year retention rate increase by 1%, the graduation rate will increase by 0.7%. If average student-related expenditures increase by $1000, the graduation rate will increase by 0.2%. If the median ACT score increases by 1 point, the graduation rate will increase by 0.9%. As far as college cost is concerned, if in-state tuition decreases by $1000, the graduation rate will increase by 0.14%. If average federal aid increases by $1000, the graduation rate will increase by 2.3%. If average state aid increases by $1000, the graduation rate will increase by 1.7%; and if average institutional aid increases by $1000, the graduation rate will increase by 0.8%.

CONCLUSIONS AND POLICY IMPLICATIONS

HBCUs have been well recognized for promoting higher education for African Americans. The observation that the graduation rate of HBCUs is lower than the national graduation rate for African American students challenges the role of HBCUs in providing higher education for African Americans. It is crucial to know the determinants of graduation rates of HBCUs. Using data from College Results Online, this study finds that college quality and college cost are the important factors affecting the graduation rate of HBCUs. Specifically, college quality has a positive effect; college cost has a negative effect; and financial aid has a positive effect on HBCU graduation rate. If we are intended to promote the graduation rate of HBCUs, we need to improve the college quality or reduce the net price of college.

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REAL EXCHANGE RATE ADJUSTMENTS TO FOREIGN EXCHANGE INFLOWS IN A FIXED EXCHANGE RATE SYSTEM

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ABSTRACT

Focusing on developing countries with a fixed exchange rate system, this paper analyzes the adjustment mechanism of their real exchange rates in response to a surge in foreign exchange inflows. According to standard theories, these countries should witness a rise in domestic price level and a real exchange rate appreciation as their levels of international reserves and money supply increase. However, we observed that a number of developing economies underwent periods of surging inflows with little inflation or changes in their real exchange rates. In some of these cases, the central bank engaged in sterilization activities in order to control the monetary base and to mitigate the impact of the inflows on the domestic price level under its fixed exchange rate regime. However, there were episodes in which the public increased their holdings of real monetary balances because of a rise in income or change in preferences. By demanding as cash balances what might otherwise be excess liquidity, it helped alleviate some of the inflationary pressure on the economy, and thus making further real exchange rate adjustment unnecessary. In addition, the easing of import restrictions also achieved similar effects by offsetting some of the extra foreign exchange coming into these countries.

INTRODUCTION

We have seen a wide range of exchange rate arrangements being adopted in developing countries in the past few decades. Although many of the countries have let their currencies float, some of them choose to maintain a fixed or pegged exchange rate regime in order to control inflation or to achieve macroeconomic stability. Furthermore, a number of countries that describe themselves as having a flexible regime de jure also exhibit a fear of floating, and have often actively intervened in the foreign exchange markets to keep their exchange rates within a relatively narrow band (Calvo & Reinhart, 2002).

As the developing countries are becoming more open to free trade and international capital flows, they are also more susceptible to shocks such as fluctuations in world demand, sudden reversals in the size and direction of capital flows, and productivity and technological advances. In order to restore equilibrium in the trade and capital accounts in the face of such disturbances, adjustments in the relative price between domestic and foreign goods are often called for. For countries with a fixed exchange rate, however, the full adjustment must take place through the price level of nontradables (an internal variable) relative to that of tradables (an external variable). That is to say, as the real exchange rate moves from one equilibrium to another, the main domestic variable involved in the adjustment is the internal price level.

This paper focuses on the impact of foreign exchange inflows because it is a variable that consolidates a number of types of shock—e.g., capital inflows, price increase of the country's exports, remittances, and productivity advances in the tradable sector—all of which lead to similar reactions from the economy, given that they all entail more foreign exchange flowing

into the economy. To prevent huge fluctuations in the nominal exchange rate, the central bank will purchase the extra foreign currency inflows and add them to its international reserves, leading to an increase in the money supply. Assuming that the demand for real monetary balances remains stable, the monetary approach to the balance of payments predicts that the real exchange rate will appreciate if the excess real money balances are at least partly spent on nontradables (Calvo, Leiderman & Reinhart, 1992; Edwards, 2000). At the same time, the theory suggests that imports will rise as the money supply increases and the real exchange rate falls (i.e., appreciates).

Many developing countries did witness a rising domestic price level and a real exchange rate appreciation as their levels of international reserves and money supply increased, while some experienced a substantial increase in imports following the real appreciation that helped draw down the accumulated reserves. However, we observed that a number of developing economies underwent periods of surging inflows with little inflation or changes in their real exchange rates. In some of these cases, the central banks engaged in sterilization activities, a common practice among developing countries, in order to control the monetary base and to mitigate the impact of the inflows on the domestic price level under its fixed exchange rate regime. However, there were episodes in which the "sterilization" was largely done by the public. By demanding as cash balances what might otherwise be excess liquidity due to an increase in income or a change in preference, the public's action helped alleviate some of the inflationary pressure on the economy, and thus making further real exchange rate adjustment unnecessary. In addition, the easing of import restrictions also achieved similar effects by offsetting some of the extra foreign exchange coming into these countries.

The concept, definition, and measurement of the real exchange rate are explained in the next section ("The Real Exchange Rate"). The section titled "Foreign Exchange Inflows and Real Exchange Appreciation" examines the typical responses of the real exchange rate, imports, and reserves to a surge in foreign exchange inflows using standard theories and presents a few country examples to demonstrate such adjustment mechanism. We then focus on countries that experienced large inflows with moderate to little adjustments in their real exchange rates and seek to explain such phenomenon. The last section summarizes the implications of our study, and concludes.

THE REAL EXCHANGE RATE

To understand how the adjustments come about in countries that have or had fixed exchange rate regimes, we should first define the real exchange rate and explain how it is measured. The real exchange rate can be expressed as

$$RER = E \times \frac{P^*}{P_d},$$

where E is the nominal exchange rate between the home and a given foreign currencies (in terms of the number of units of domestic currency per each unit of foreign currency), P_d is the domestic price level, and P^* is the foreign price level, expressed in the given currency used for E. This measures the price of the home country's goods relative to that of another country or group of countries. A rise in the real exchange rate implies a real depreciation of the domestic currency

and vice versa. When a country adopts a float or managed float regime, adjustments in the real exchange rate can come from both the nominal exchange rate and the domestic price level. However, if it is under a fixed exchange rate system, the adjustments can only be accomplished through changes in the domestic price level.

In practice, there are many factors to be taken into consideration when calculating the real exchange rate (and hence many ways to compute it), such as the appropriate measurements for the domestic and foreign price levels, the choice of foreign countries to be used in the comparison, and the weights that are assigned to each foreign country. In this paper, the consumer price index is selected for the domestic price level, P_d, which contains both tradable and nontradable components in its baskets of goods because of its broad coverage and availability. For the choice of the foreign price level, P^*, we employ the SDR-WPI series developed by Harberger (2004), which is an index of the general price level of tradable goods in the world. We take the wholesale price indices (WPI) of five major industrial countries—France, Germany, Japan, the United Kingdom, and the United States—and multiply them by the bilateral nominal exchange rates with the United States such that all series are expressed in a common currency. The five WPI series are given the weights assigned by the International Monetary Fund in calculating their time series for Special Drawing Rights (SDR). The SDR-WPI is then calculated as a weighted sum of the dollar-denominated WPIs. Lastly, the nominal exchange rate, E, employed in the calculation of the real exchange rate should be the rate between the home currency and the common currency that we selected for the SDR-WPI; in this case, the U.S. dollar. The real exchange rate calculated this way can be re-interpreted as the number of baskets of domestic consumption goods needed to purchase one standard basket of world tradables. The dollar-denominated SDR-WPI series between 1980 and 2012 is presented in Figure 1.

The real exchange rates for the countries covered in this study were calculated, and their movements over periods where the nominal rates were either fixed or kept within a narrow band were tracked. The time paths of the exchange rates and price indices as well as the activities in the money and external accounts for each country are presented in Figures 2 through 10. A summary of the annual percentage changes of key variables is shown in Table 1.

FOREIGN EXCHANGE INFLOWS AND REAL EXCHANGE APPRECIATION

This section provides a theoretical framework that incorporates the monetary approach to the balance of payments to explain the economic adjustments that will take place when a country is faced with a surge in inflows of foreign exchange. Specific attention will be given to the movements of imports and international reserves in the adjustment process of the real exchange rate. Following the theoretical exposition are a few country examples that illustrate the adjustment mechanism.

The Monetary Approach to the Balance of Payments

According to the monetary approach, any disequilibrium between the current money supply and the long-run demand for money will give rise to changes in international reserves. It has been prominent in academic thinking for a number of decades and has served as the foundation for policymakers at the International Monetary Fund (IMF) and around the world when analyzing economic decisions that have both real and monetary consequences.[1]

The essential assumption of the monetary approach is that the demand for money is a stable function of a limited number of macroeconomic variables such as output, the interest rate, and the expected inflation rate, and is determined by the economy as a whole. The supply of money, on the other hand, is generated through the central bank and the rest of the banking system and consists mainly of domestic credit and net foreign assets. When the real money supply exceeds the amount that the public is willing to hold, economic agents will get rid of the excess by spending part of it on tradable goods and part on nontradables. While the increased demand for nontradables will lead to a rise in domestic prices, the expenditures on tradables will lead to a loss in international reserves if the country is pursuing a fixed exchange rate policy (Dornbusch, 1973; Blejer, 1979; Frenkel & Mussa, 1985; Harberger, 2005).

When there is an increased inflow of foreign currency into the economy and the nominal exchange rate is not allowed to adjust freely, the central bank will have to purchase the extra foreign exchange at the predetermined exchange rate, leading to an increase in international reserves. In the process of absorbing the foreign exchange, the central bank prints new money and injects additional liquidity into the banking system, resulting in an excess supply of real monetary balances over the demand for them. The monetary approach would claim that, over time, the excess real balances will tend to be spent on tradables and nontradables. Under this framework, imports will play a key role in restoring equilibrium in the goods and capital markets as part of the process of real exchange rate adjustments. There are three channels through which these changes can take place. First, an increase in inflows is often accompanied by a rise in output or income.[2] People in the economy are therefore induced to spend part of their extra income on tradables, which include imports. Secondly, according to the monetary approach, people tend to spend a portion of their excess real money balances on tradables, generating a rise in real imports. Finally, the new income and the excess cash balances will cause people to increase their spending on nontradables. As the prices of nontradables are bid up and the domestic price level rises accordingly, the real exchange rate will appreciate, increasing peoples' incentive to substitute away from nontradables and towards imports and exportables.[3]

If the inflow of foreign exchange is a one-time occurrence, the increased demand for foreign exchange due to imports will help draw down the initial rise in international reserves until the economy returns to its original equilibrium.[4] However, if there is an increase in the rate of inflows, the rise in imports (and the decline in exports) will continue until it fully reflects the increase in inflows. Specifically, during the transition period, any amount of the inflows that are not offset by the increased imports and reduced exports will be added to international reserves. The resulting expansion in money supply will lead to an excess supply of real monetary balances and real exchange rate appreciation, further stimulating imports and reducing exports. The adjustment process will continue until the net increment to reserves becomes zero and the economy attains its new equilibrium. Regardless of whether the inflows are transitory or permanent, the real exchange rate will continue to adjust as long as there is an imbalance in the money market, i.e., an excess supply of real monetary balances.

Country Experiences

Argentina is an example of a country that received a transitory inflow of foreign exchange and witnessed a period of significant real exchange rate appreciation abetted by an accumulation of international reserves between early 1991 and the end of 1993 (see Figure 2). After experiencing hyperinflation episodes in the 1980s, Argentina implemented the

Convertibility Law in 1991 and pegged the Argentine peso to the U.S. dollar under a currency board type of arrangement. With the price level stabilizing, foreign investors began to pour capital into the economy via both direct and portfolio investment (Daseking, Ghosh, Thomas & Lane, 2003). Net portfolio investment contributed most to the surge in capital inflows, which rose by US$34.4 billion between 1991 and 1993. Total inflows of foreign exchange increased by US$22.4 billion over the same period to peak in 1993, before declining by US$9.4 billion in the 1993-95 period.[5] Consequently, the consumer price index increased by 19.3 percent, while the SDR-WPI remained fairly stable, leading to a real exchange rate that appreciated by 15.6 percent over the period. Amid the foreign exchange inflows and economic expansion, real imports of goods and services increased by US$4.6 billion over the 1992-95 period. According to our estimations, roughly 66 percent of the increase in real imports was due to a rise in real GDP, 26 percent came from an excess supply of real monetary balances, and the remaining 8 percent from a real exchange rate appreciation.[6]

As the country experienced a transitory increase in foreign exchange inflows, it also went through a period of reserves accumulation, followed by a period of decumulation. The period of reserves accumulation, approximately between 1991 and 1994, was marked by an increase in total inflows of foreign exchange that exceeded the rise in aggregate imports as the real exchange rate appreciated. As the central bank of Argentina purchased the extra foreign exchange according to the currency board arrangement, net foreign assets rose by US$3.4 billion to reach US$11.8 billion in 1993 and remained flat in 1994. However, as the total inflows began to decline in 1993, the level of imports became higher than that of inflows, leading to a sharp loss in net foreign assets in early 1995. Consequently, the appreciation in the real exchange rate came to an end in the beginning of 1994 as the country slowly returned to its original equilibrium.

In contrast to Argentina, South Korea experienced a continuous increase in foreign exchange inflows from 1986 until the onset of the Asian currency crisis in 1997 (Figure 3). The surge in inflows occurred as the country accelerated its efforts to open the domestic market and liberalize its current and capital accounts beginning in 1983 (Sakong, 1993). A transitional period, roughly from 1986 to 1989, was identified as the level of foreign reserves increased from US$1.2 billion at the end of 1985 to US$15.5 billion in 1989. Total accumulated foreign exchange inflows over the 1986-89 period, amounting to US$213 billion, exceeded the US$198 billion recorded for aggregate imports. The positive net increment to reserves leads to growth in base money at an average rate of 17.8 percent per year. Reflecting the rapid money growth, the real exchange rate appreciated at an annualized rate of 5.0 percent, when the Korean won was pegged to a basket of currencies of its major trading partners throughout the period (Nam & Kim, 1999). Beginning in 1990, the reserves accumulation came to an end as the rise in inflows of foreign exchange was fully reflected in the increased demand of imports. As a result, the appreciation in the real exchange rate slowed sharply, so that the real exchange rate remained fairly stable throughout the first half of the 1990s.

ANOMALOUS RESPONSES OF THE REAL EXCHANGE RATE

Contrary to the experiences of the emerging economies discussed above, there were countries that underwent periods of surging inflows and vast reserves accumulation with little inflation or changes in their real exchange rates. One may argue that the lack of inflationary pressure is due to policy actions taken by the central banks that were aimed at cutting short the series of natural consequences described above. For example, a central bank may choose to

engage in sterilized intervention by selling government bonds in the open market and use the proceeds to buy the extra foreign exchange. By doing so, it avoids expanding the monetary base through issuance of new domestic currency and keeps the real exchange rate from appreciating (Obstfeld & Rogoff, 1995). Alternatively, the authority can achieve similar effect by tightening domestic credit in the consolidated banking system (Saxena & Wong, 1999). Regardless of which actions the authorities choose, the goal is to offset the inflows by absorbing the excess liquidity and controlling the growth in money supply, hence reducing the inflationary pressures on the economy. However, we observed cases in which a country's money supply increased tremendously despite its central bank's efforts to sterilize the inflows. If the lack of domestic price adjustment or real exchange rate appreciation in these countries was not merely a product of the sterilization operations engaged by the central bank, how else could we explain such "anomaly" of low inflation combined with high money growth? To investigate a phenomenon like this, we first look at the unique case of China in the late 1990s to the early 2000s.

China (1998-2006)

China has gone through one of the most dramatic shift in its money demand function over the last decade, specifically during its fixed exchange rate period between 1998 and 2006. While enjoying tremendous capital inflows and exports growth mainly due to rapid economy growth and liberalization of its trade and capital accounts, the economy showed little sign of overheating despite the rapid expansion in its broad money supply. Accompanying the inflows was an accelerated accumulation of international reserves and expansion in monetary base, which normally would create tremendous inflationary pressure on the economy. However, instead of observing a surge in the domestic price level, inflation in China averaged less than one percent a year. We even witnessed moderate real exchange rate depreciation over the 2002-2006 period as the rise in world price level dominated the relative price movements.

As shown in Figure 4, the total inflows of foreign exchange in China escalated from US$170 billion in 1998 to over US$1 trillion in 2006, an increase of over sixfold. The surge in inflows was mainly due to the trade and capital accounts that had become increasingly open as the country prepared its accession to the World Trade Organization (WTO) in December 2001. Consequently, exports in goods and services jumped from US$200 billion in 1998 to over US$1 trillion in 2006, amounting to an average growth rate of about 20 percent a year. On the other hand, China also began to liberalize its capital account in 2002 by allowing qualified foreign investors to invest in Chinese stocks and bonds, which resulted in a steady increase in portfolio investment (Prasad, Rumbaugh & Wang, 2005). While the inflows of foreign exchange contributed to an accelerated accumulation of international reserves, the increased demand for foreign exchange due to imports helped draw down the rise in reserves. Over the 1998-2006 period, total imports rose from US$164 billion to US$853 billion, partly due to the inflows of capital and rapid growth in the country's GDP. However, the growth in imports was also a result of the trade liberalization that began in the 1990s.[7] The average tariff rate, which stood at 36 percent in 1995, was reduced to a relatively low level of 9.7 percent in 2005.[8] Also, virtually all import licensing requirements and import quotas were eliminated by the same year. The result of the loosening of import restrictions was evidenced by an import to GDP ratio that rose from 0.13 in 1998 to almost 0.30 in 2004. The reduction in trade barriers helped accelerate the process of transitioning to the new equilibrium in China, as a large amount of the increment of international

reserves is offset by the imports expansion, hence reducing the inflationary pressure on the economy.

Despite the surge in import demand, the payment surplus continued to contribute to an accelerated accumulation of international reserves, which rose from US$143 billion in 1998 to almost US$1.1 trillion in 2006. This seems to be in line with the mechanism ensured by the standard theories. However, the domestic price level in China only rose by 6 percent over the 1998-06 period, equivalent to an average inflation rate of less than one percent per annum. We even witnessed a real exchange rate depreciation between 2002 and 2006 as the increase in world price level dominated the relative price movements. As mentioned, one possible explanation of the lack of real exchange rate adjustment is that the People's Bank of China (PBC) might have engaged in sterilization activities in order to control the monetary base and to mitigate the impact of the inflows on the domestic price level under its fixed exchange rate regime. One such way was to withdraw excess liquidity in the banking system through an increase in reserve requirements. The PBC raised the required reserve ratio from 6 percent in 2003 to 9 percent in 2006. However, according to Ma, Yan, and Xi (2013), it was not until 2007 that reserve requirements became a regular and significant policy tool for the PBC. As shown in the central bank's balance sheet, domestic credit in China expanded steadily over the 1998-2006 period, rising from $1.8 trillion RMB in 1998 to $3.1 trillion RMB in 2006.

Another way for the central bank to offset the inflows is through a corresponding sale of domestic securities in the open market, the so-called "sterilized intervention." Looking at the liability side of the central bank's balance sheet, we see limited bond selling activities prior to 2002. However, the monetary authority began to intensify its sterilization effort by increasing its issuance of central bank bills from $150 billion RMB in 2002 to almost $3.0 trillion RMB in 2006. Additional measures and financial market reforms were carried out during this period with the aim of withdrawing some of the high-powered money and bringing the excessive growth in broad money under control (Wang, 2010). In summary, we see some evidence of the Chinese authority's attempt to sterilize the inflows of foreign exchange through open market operations. However, the expansion in domestic credit offset roughly 40 percent of the sterilization efforts produced by increase in bond sales over the 2002-06 period (domestic credit increased 1.4 trillion RMB versus an increase in bond sales of 3.4 trillion RMB).

Despite the sterilization operations that began in 2002, money supply grew tremendously over the 1998-2006 period. The stock of broad money expanded at an average growth rate of 15.9 percent a year, reaching $40 trillion RMB in 2006 from about $9.2 trillion RMB in 1998. In fact, the growth rates were as high as 18.3 percent in 2002 and 19.6 percent in 2003 despite the bond selling activities. A plausible explanation for this puzzling phenomenon, as proposed by Harberger (2008), is that the Chinese people were "sterilizing" the inflows by increasing their willingness to hold much larger monetary balances. As the central bank is obliged to purchase the foreign exchange inflows under a fixed exchange rate system, it prints domestic currency and injects money into the economy. Domestic prices will go up only if the public views the extra money as unwanted balances and spends it at least partly on nontradables. However, if the people choose to increase their money holdings instead of spending them down, no inflationary pressure will emerge. China appears to have undergone such changes in people's demand for monetary balances, particularly prior to 2002. The effect was similar to sterilization by the central bank, but in this case, what might seem to be excess liquidity was offset by actions taken by private agents in the economy.

There are many reasons as to why people are willing to hold greater monetary balances as the foreign exchange pours in. The change in money holdings can be endogenized by viewing money demand as a function of aggregate income in the economy. As real income rises, people will want to hold proportionally more cash balances in order to carry out their everyday transactions. However, the increase in demand can also be generated through changes in the tastes of the public. In the case of China, we saw the income effect at work as people demanded more money for the purchase of goods and services as a consequence of the rapid growth in real GDP, which averaged 9.2 percent a year over the period. On the other hand, the income elasticity of demand for real monetary balances needed to fully explain the change in money demand implied by the data is 1.55, compared with an elasticity of 1.44 estimated by the author,[9] suggesting that a change in preference might also be at work to induce the public to hold larger monetary balances per unit of real GDP. Such a change in tastes might partly be a result of the economic restructuring and deterioration of the social safety net in China. The Chinese people have increased their precautionary savings due to the reduction in healthcare coverage, unemployment insurance, and workers' compensation provided through the government and their employers. The lack of coverage of the pension system, as well as the need to finance education expenditures, also motivated people to save more (Lardy, 2006; Ma & Wang, 2010). On the corporate side, the limited access to credit due to an imperfect financial system helped explain the needs of Chinese firms to accumulate larger amount of liquid assets to insure themselves against uncertainties or to fund future projects (Jha, Prasad & Terada-Hagiwra, 2009; IMF, 2009).

Similar Experiences in Developing Economies

Motivated by the experience of China in the past decade, we now look into other developing countries that have undergone large inflows of foreign exchange without significant appreciation in their real exchange rates. We identify similar experiences in emerging economies such as Russia and India, which, as in China, involved some degree of sterilization by the people. Some countries also went through a simultaneous reduction in barriers to imports, which helped further mitigate the impact of the inflows on the real exchange rate.

India (2002-2006)

The first such case we will investigate is India in the early 2000s. Between 2002 and 2006, the country saw its total inflows of foreign exchange increased by roughly US$160 billion to reach US$254 billion in 2006 (Figure 5). On the capital account side, the inflows mainly came from an increase in external private borrowings and portfolio investment as the country slowly liberalized its financial markets. Net external commercial borrowings went up by US$21.0 billion over the period, while net portfolio investment rose by US$8.5 billion to stand at US$9.5 billion in 2006. Net foreign direct investment (FDI) also increased moderately as the government eased its restrictions on FDI in several sectors. The impressive growth of the current account recorded in the service sector also contributed to the inflows of foreign exchange. The balance of trade in services increased from a net import of US$1.6 billion in 2002 to a net export of US$11.8 billion in 2006, with the surge in exports of software and information technology-related services being the main driving force. A rise in workers' remittances also brought the country extra foreign exchange over the period (Joshi & Sanyal, 2004; Mohan, 2008).

The increase in capital inflows was accompanied by an appreciation of the rupee at 0.8 percent a year in nominal terms, but a mild depreciation in real terms as the world price level increased relatively faster than the domestic price level. Although the Reserve Bank of India (RBI) allowed the nominal exchange to absorb some of the pressures created by the inflows, it had intervened heavily in the foreign exchange market (Joshi & Sanyal, 2004; Behera, Narasimhan & Murty, 2008; Goyal & Arora, 2010), as evidenced by the vast accumulation of international reserves which expanded by nearly $5.5 trillion rupees over the 2002-06 period, up from an initial value of $2.3 trillion rupees in the end of 2001. In order to absorb part of the excess liquidity, the RBI engaged in sterilization operations by tightening its credit to the government in 2002 and 2003. Claims on government were reduced by almost $1 trillion rupees in those two years before climbing back up again by $443 billion between 2004 and 2006. Beginning in early 2004, the RBI further tightened the monetary conditions by gradually raising the repo rate from 6 to 7.25 percent and the reverse repo rate from 4.5 to and 6 percent over the course of two years.[10] The cash reserve ratio was also increased from 4.5 percent in mid-2003 to 5.5 percent in the end of 2006. Lastly, the RBI introduced the Market Stabilization bond in March 2004 with the sole purpose of using it as a sterilization instrument.[11]

On the back of rising investment and strong domestic demand, the Indian economy expanded by 40 percent over the 2002-06 period, or at an average rate of 7.8 percent per annum. Total imports of goods and services also increased threefold to reach US$230 billion in 2006 from US$75 billion in 2002, causing the current account balance to turn negative in both 2005 and 2006.[12] The increase in total imports was partly a natural response to the growing domestic economy and the presence of excess liquidity created by the inflows. However, initiated in the early 1990s, the trade liberalization process that continued through the 2002-06 period also played a role in it. The greater openness of India's trade account was evidenced by the increase in total merchandise imports and exports, which rose from 21 percent of GDP in 2002 to roughly 32 percent in 2006. According to the review of the WTO, India had continued to reduce its barriers to imports between 2002 and 2007. The average applied Most-Favored Nation (MFN) tariff went down from over 32 percent in 2002 to 16 percent in 2007, while the use of import restrictions was also on the decline. In addition to participating in the WTO, India also engaged in regional trade agreements by offering preferential tariff rates to most countries in the South Asian Free Trade Area (SAFTA). The reduction in import tariffs helped lower the relative prices of tradable goods and increased people's incentive to purchase imports over nontradable products. The higher level of imports accelerated the absorption of the increment of reserves and reduced the rate of monetary expansion. Combining with a strong surge in aggregate income and an excess supply of money, the increase in imports helped offset roughly 85 percent of the extra foreign exchange flowing into the economy over the period, hence dampening the impacts of the inflows on the domestic price level and the real exchange rate.

Despite the central bank's intervention to limit monetary expansion and the government's efforts to relax trade controls, the level of real broad money grew by 74 percent, or at an average annual rate of 11.8 percent over the 2002-06 period, reflecting some degree of sterilization by the people. In the case of India, the expansion of real money demand was predominantly a reflection of the rapid increase in aggregate income, which grew by 45 percent or at an average annual rate of 7.8 percent.[13]

Russia (2002-2007)

At first glance, Russia appeared to be another standard case of a country undergoing real exchange appreciation in response to huge inflows of foreign exchange over the 2002-2007 period, where the country experienced a period of impressive economic growth following the financial crisis in summer of 1998. However, with an annualized rate of growth of over 30 percent for its foreign exchange inflows and 38 percent for its broad money, Russia's real exchange rate appreciation, at little over 7 percent, appeared to be relatively subdued. As shown in Figure 6, Russia received a windfall of foreign exchange during the period, with total inflows increasing by 4.5 times to reach over US$430 billion in 2007. The increase was mainly driven by the soaring prices in oil and natural gas, the country's major export commodities. Crude oil exports rose from US$29 billion in 2002 to US$121 billion in 2007, thanks to an average crude oil price that jumped from US$21 to US$64 per barrel over the period. Similarly, exports in natural gas nearly tripled to stand at US$45 billion in 2007, with the increase in total value almost fully accounted for by the rising per unit price.[14] Beginning in 2006, the country's net capital inflows started to turn positive and hit a record US$84 billion in 2007.

There was tremendous pressure on the ruble to appreciate over the period as the foreign exchange had become increasingly abundant. To keep the nominal exchange rate within a narrow band, the Bank of Russia intervened by buying dollars on the foreign exchange market.[15] Consequently, the appreciation in the real exchange rate was accomplished through a combination of adjustment in the nominal exchange rate and a rise in the domestic price level. The nominal exchange rate of the ruble appreciated steadily against the U.S. dollar, declining by 18 percent over the 2002-2007 period, while domestic prices almost doubled.

The central bank's intervention in the foreign exchange market led its international reserves to increase by more than tenfold to end at US$457 billion in 2007. Despite the vast accumulation in reserves, the central bank largely restricted its sterilization efforts to oil-related inflows. Following the examples of many oil-exporting countries, the government set up the Stabilization Fund of the Russian Federation in January 2004 with the aim of accumulating revenues when the world price for oil exceeded certain value, and drawing them down when the external conditions worsened.[16] According to the Ministry of Finance, the Stabilization Fund, which was held in several government accounts at the Bank of Russia, totaled US$157 billion at the end of 2007, up from US$19 billion at the end of 2004.[17] The sterilization function of the Fund arose from the fact that the foreign exchange earned from commodity exports appear on the liability side of the central bank's balance sheet as government deposits. The sterilization efforts by the central bank were further augmented when the Russian government used the capital of the Fund to repay its external debt in advance.[18] The repayments amounted to US$22.6 billion in 2005 and US$23.0 billion in 2006.

As the foreign exchange interventions were only partially sterilized, the money supply ended up increasing by sevenfold to reach $14.6 trillion rubles in 2007. Accompanying the monetary expansion was a domestic price level that rose at an average rate of 11.8 percent per annum. Although inflation remained high in Russia, it was surprising that the price increase was not larger, given that M2 grew at an average annual rate of 38 percent over the period. It appears that, as the money stock expanded, the country also underwent a rapid growth in its demand for real monetary balances that allowed the domestic economy to absorb some of the excess liquidity generated by the foreign exchange inflows. Without such change in money demand, a larger real exchange rate adjustment might have been called for. It appeared again to be a case of

sterilization by the people where the increase in demand for monetary balances helped reduce the excess supply of money that would otherwise be spent on tradable and nontradable goods. Consequently, the Russian economy was able to grow at a rapid rate without causing runaway inflation in the face of a windfall in foreign exchange inflows.

Similar to the case of China, we found the rapid growth in income to be the main factor that caused a higher demand for cash balances in Russia. With the real GDP growing at an average annual rate of 7.3 percent over the 2002-2007 period, the increase in money stock was a natural consequence of the increased money demand for transaction purposes. However, we also see evidence that the public was adapting their preference for money holdings to the changing macroeconomic conditions. The ratio of total broad money to GDP rose from 0.26 to 0.44. Such increase in money demand might partly be due to the decline in inflation expectations that had taken place in recent years. Russia's domestic price level had been highly unstable in the previous decade, with its 12-month inflation rates peaked at 1,066 percent in late 1993 after the removal of price controls by Yeltsin's government, and again at 126 percent in mid-1999 following the financial crisis. Since then, the country has undergone a series of substantial reforms with the aim of stabilizing the economy and re-establishing credibility in its policies. With the implementation of inflation targeting and a managed floating regime, the domestic inflation rate slowly came down and remained stable at around 10 percent per annum between 2003 and 2007, while volatility in the exchange rate was greatly contained.[19]

On the other hand, as the public regained confidence in the ruble and the banking system, they also began a process of de-dollarization and remonetization by gradually decreasing their holdings of U.S. dollars in favor of the domestic currency (Korhonen & Mehrotra, 2007). According to the IMF, the share of foreign-currency deposits as a percentage of total deposits decreased from 35 percent in 2002 to 12 percent in 2007. Alternatively, the broad money supply in ruble rose from $1.6 trillion rubles in December of 2001 to $13.3 trillion rubles in December of 2007, an increase of over sevenfold. As a result, the increase in demand for ruble helped offset some of the appreciation pressure on Russia's real exchange rate as its foreign reserves expanded.

Jordan (2001-2007)

Jordan experienced the combination of an acceleration in foreign exchange inflows and a mild depreciation in its real exchange rate between 2001 and 2007. Total inflows increased by US$10.6 billion to reach US$16.4 billion in 2007 (Figure 7), mainly as a result of the strong growth in manufacturing exports and a significant boom in FDI. Total exports rose by US$5.3 billion, of which roughly 70 percent was due to increase in export prices. Net FDI surged from a mere 2 percent of GDP in 2001 to almost 24 percent in 2006, before retreating to approximately 11 percent of GDP in 2007.

Although the Jordanian dinar is officially linked to the SDR, Jordan has de facto pegged its currency at 0.71 dinars per U.S. dollar since October of 1995. With a fixed exchange rate, any adjustments in the relative price have to be channeled through changes in domestic prices. Inflation in Jordan averaged 4.1 percent per annum over the period, slightly lower than the 5.8 percent annual increase in the world price level. As a result, the real exchange rate depreciated moderately by 21 percent over the 2001-07 period.

The inflows were largely offset by an outpouring of foreign exchange stemming from a rapid increase in imports as the strong economic expansion boosted domestic demand.

Approximately 81 percent of the cumulated foreign exchange earnings were used to finance the imports of goods and services over the period. Nevertheless, the strong surge in export receipts and private capital inflows enabled the Central Bank of Jordan (CBJ) to raise its level of net foreign assets by $3.3 billion dinars to a record $6.1 billion dinars in 2007. To keep the growth of domestic liquidity under control, the CBJ conducted open market operations, particularly through the issuance of Certificates of Deposit (CDs),[20] and increased the overnight window deposits held at the central bank. As a consequence, only 55 percent of the increase in net foreign assets was reflected in an expansion in base money.

The partial sterilization by the central bank was justified by the fact that the public was at the same time sterilizing the inflows by increasing their demand for real balances, as evidenced by the steady increase in real broad money supply over the 2001-07 period. Nominal M2 grew at an annual rate of 13 percent, while domestic inflation only amounted to 4 percent per annum on average. The rising level of money demand was partly a reflection of the increase in economic activities as people's income went up.[21] However, with a M2/GDP ratio that increased from 1.15 in 2001 to 1.4 in 2007, it also suggests that there was a change in the tastes of the public. Different factors may have contributed to such change, including the increasing demand for money balances arising from larger cash-based trade with Iraq.[22]

Pakistan (2004-2007)

Pakistan has implemented significant structural reforms and prudent macroeconomic policies since the turn of the new century. Along with the relatively stable macroeconomic condition came a greater influx of foreign exchange which nearly doubled in four years to reach US$39.7 billion in 2007 (Figure 8). Net FDI and portfolio flows, both increased by roughly fivefold over the period, contributed most to the increase in inflows.[23] On the other hand, total exports of goods and services increased moderately by 36 percent over the 20004-07 period, while private transfers rose by 32 percent.

Although the State Bank of Pakistan (SBP) classifies its exchange rate policy as a managed float, its currency has been pegged to the U.S. dollar de facto since late 2004. On the back of the record-high foreign exchange inflows, its real exchange rate remained virtually unchanged during the period as the domestic price level in Pakistan went up at about the same rate as the world price level.

As explained earlier, if the increase in inflows was continuous, Pakistan should experience a period of reserves accumulation, rising domestic price level, and imports expansion combined with exports decline as the economy transitioned to its new equilibrium. However, Pakistan did not experienced a rapid pileup of reserves between 2004 and 2005 as a pickup in import growth helped offset nearly all of the foreign currencies coming into the economy during the period. Total imports continued to increase in subsequent years, although not as fast as the inflows of foreign exchange. The strong import demand was partly due to a rapid expansion in the domestic economy, which grew at an impressive average rate of 7 percent a year over the 2004-07 period, and a rise in import prices.

On the other hand, the fact that the imports as a share of GDP increased from 19 percent in 2004 to 23 percent in 2007—compared with a steady 15 percent in the four preceding years—suggests that the growth in import demand have other contributing factors. According to the WTO, Pakistan liberalized its trade policies and reduced its import restrictions considerably over the 2002-07 period. For instance, the average tariff on agricultural products was reduced from

22.1 percent in 2001 to 14.8 percent in 2007, while the average tariff on non-agricultural goods declined from 20.4 percent to 14.5 percent over the same period. Most of the import prohibitions have also been either lifted or relaxed. In Pakistan's case, the increase in imports induced by factors such as trade liberalization and high economic growth helped offset roughly 81 percent of the influx of foreign exchange over the 2004-07 period, hence reducing some of the inflationary pressure created by the inflows on the economy, and thus making further real exchange rate adjustment unnecessary.

Despite the increase in imports, the level of net foreign assets at SBP rose 61 percent between the end of 2003 and 2007 to reach a record $830 billion rupees. The SBP began to tighten its monetary policy in January of 2004, as reflected in a rise of the Monetary Conditions Index (MCI), a composite indicator that measures the policy stance of the monetary authority (Hyder & Khan, 2007).[24] However, the sterilization efforts of the central bank were complicated by the expansionary impact of an increase in its lending to the government, which rose by $491 billion rupees over the 2004-07 period. The resulting effect was a broad money supply that expanded at an average rate of 17.8 percent per annum, compared with an average annual inflation rate of 8.4 percent over the four-year period. Again, we observe a partial sterilization by the people as they increased their demand for real cash balances in conjunction with an accelerated inflow of foreign exchange. The rising level of real M2 in Pakistan's case was, in all likelihood, due mainly to the growth in real GDP, which averaged 7.1 percent over the period.

Hungary (2002-2007)

Inflows of foreign exchange to Hungary increased rapidly between 2002 and 2007. Total inflows more than doubled to reach US$107 billion in 2007 (Figure 9). The extra foreign exchange was largely coming from an increase in exports, machinery and equipment in particular, which rose from US$42 billion in 2002 to over US$111 billion in 2007. Net capital inflows also increased more than fivefold to peak in 2005, mainly due to heavy external borrowings, before retreating to around US$9.2 billion in 2007.

Despite the heavy inflows, Hungary's real exchange rate only appreciated moderately at 3.7 percent a year over the period, while its nominal exchange rate was pegged to the euro within a narrow band. Over the period, net foreign assets at the National Bank of Hungary (NBH) rose nearly threefold to stand at $4.3 trillion forints in 2007. However, only 44 percent of the reserves accumulation was reflected in a rise of base money, as the central bank reduced its credit to the central government by over $1.5 trillion forints over the five-year period on the back of continued efforts by the government to reduce fiscal deficits. Despite the contraction of claims on central government, base money expanded by 79 percent over the period, while the broad money supply almost doubled to end at $13.8 trillion forints in 2007, an increase of 12.1 percent per annum on average. On the other hand, inflation averaged at a moderate 5.5 percent over the 2002-07 period.

Hungary experienced some degree of sterilization by the people, with a broad money supply that grew faster than the domestic price level. The monetary expansion in real terms was partly a direct result of the real output growth in Hungary, which increased at an annual rate of 3.8 percent over the period. However, the Hungarians also increased their money holdings per unit of GDP starting 2000 as the country's price level began to come under control after a period of hyperinflation for the most part of the 1990s.[25] The inflation rate had averaged 22.1 percent a year over the 1990-99 period and fell to 6.3 percent during the period between 2000 and 2007.

Indonesia (1987-1996)

Before the currency crisis hit the economy, Indonesia had enjoyed a period of high economic growth and relatively stable inflation rates between 1987 and 1996. As the economy went through a period of financial reforms and structural changes, total inflows of foreign exchange surged from US$17.6 billion in 1987 to US$63.9 billion in 1996 (Figure 10). The extra inflows were mainly foreign exchange earned from goods exports, which increased threefold to reach US$50.2 billion in 1996. Net FDI also increased by US$5.2 billion over the period, while net portfolio investment picked up in 1993 and rose by US$5.1 billion.

Despite the inflows, Indonesia's real exchange rate remained fairly stable over the decade, while its nominal exchange rate depreciated steadily over the managed float period. As the central bank purchased the extra inflows, its net foreign assets rose by more than fourfold to reach US$2.6 billion in 1996. In an enforced sterilization move, major state-owned enterprises were required to increase their deposits at the central bank beginning in January of 1991. Liabilities of the Indonesian central bank to other depository corporations (a base money component) jumped from $1.5 trillion rupiahs in 1990 to over $10.9 trillion rupiahs in 1991, and continued to climb until the onset of the financial crisis. The resulting expansion in base money amounted to $28.6 trillion rupiahs, reflecting 55 percent of the rise in foreign reserves. Nevertheless, the sterilization operation by the central bank did not prevent a tremendous increase in broad money supply, which rose tenfold at an annual average rate of 26.2 percent over the period, as banks continued to expand their credits to the private sector. Yet, in spite of this rapid growth in liquidity, the domestic price level rose at a much slower rate of 8.1 percent per annum, reflecting a major increase in people's demand for real monetary balances.

Again, the rise in real demand of broad money was partly due to an increase in economy activity as the real GDP of Indonesia grew at an average annual rate of 6.9 percent over the period. However, the monetary expansion was also accompanied by a fall in the income velocity of broad money, which declined from 3.7 in 1987 to 1.9 in 1996. Dekle and Pradhan (1999) attributed it to the process of financial liberalization and rapid monetization as the country eased its control on deposit and lending interest rates and increased competition in the banking system through deregulation. Regardless of the causes of the increase in money demand, the sterilization by the people in Indonesia helped hold inflation down and keep the real exchange rate stable.

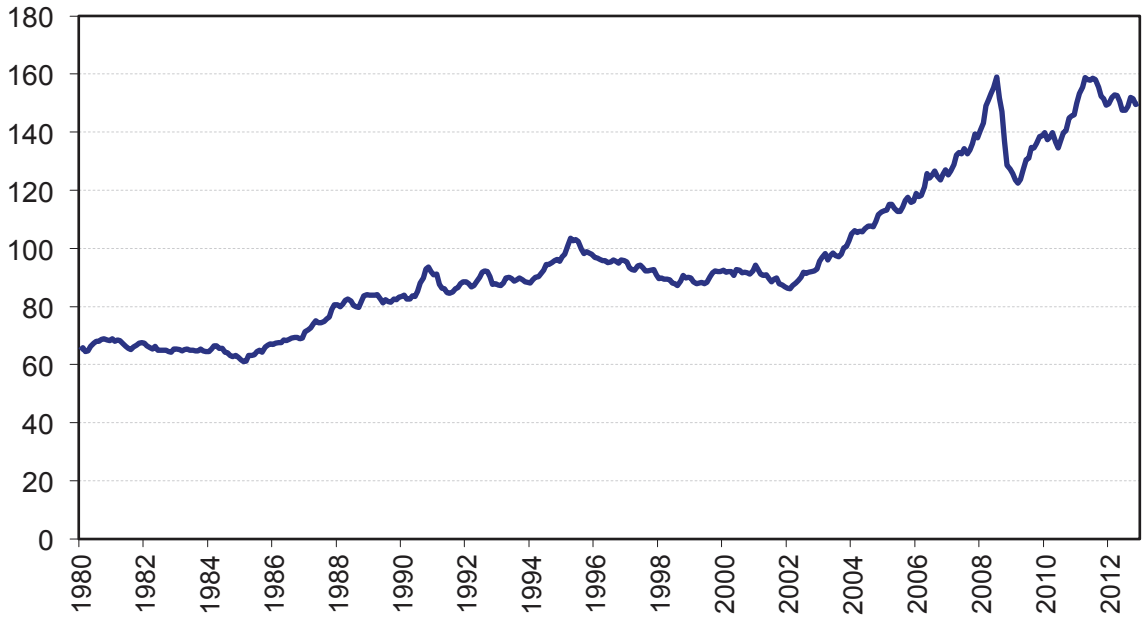
CONCLUSION

This paper examines the response of real exchange rate in fixed exchange rate countries that experienced increasing inflows of foreign exchange. According to standard theories, such country should witness a rise in domestic price level and a real exchange rate appreciation as the stocks of foreign reserves and broad money supply increase. However, we observed that a number of developing economies underwent periods of surging inflows and vast reserves accumulation without significant inflation or changes in their real exchange rates. Although in some of these episodes there were sterilization activities performed by the central banks aimed at limiting the expansion of their money supply, there were circumstances where additional economic forces operate in conjunction with the increase in inflows and the economic adjustments that follow. This paper argues that sometimes such sterilization can be initiated by the people, meaning that the public increased their holdings of real monetary balances because of a rise in income or a change in preferences. By demanding as cash balances what might

otherwise be excess liquidity, it helped alleviate some of the inflationary pressure on the economy, and thus making further real exchange rate adjustment unnecessary. In addition, the liberalization of imports also achieved similar effects by offsetting some of the extra foreign exchange coming into those countries.

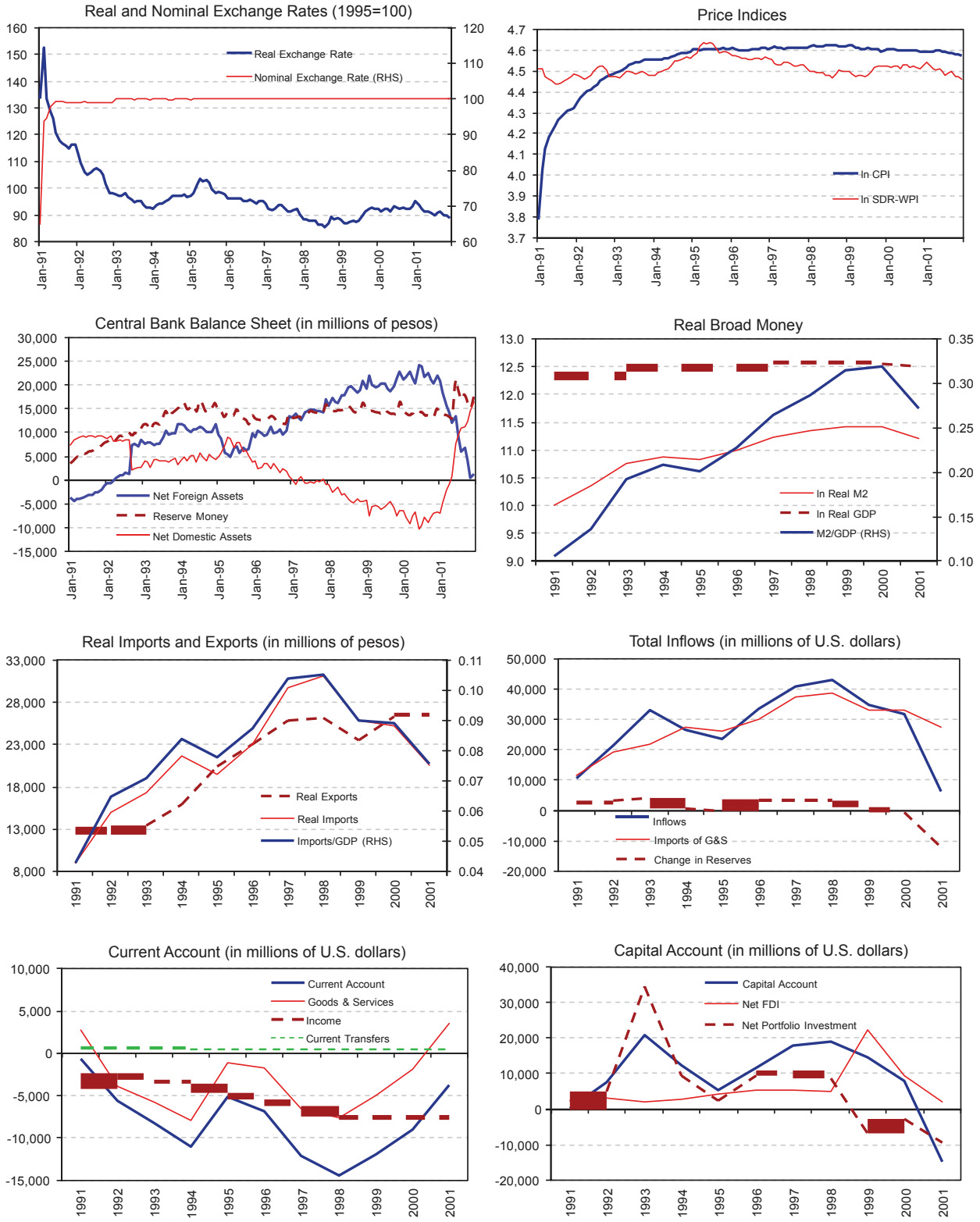
Among the countries under study, China has gone through the most dramatic shift in its money demand function over the last decade. While enjoying tremendous capital inflows and exports growth, the economy showed little sign of overheating despite the rapid expansion in its broad money supply. The current study help shed some light on the controversy over a potential real exchange rate misalignment in China since the beginning of the century. Many policymakers have claimed that the Chinese authorities have kept their currency undervalued, as indicated by its real exchange rate depreciation, current and capital account surpluses, and surging international reserves, suggesting potential imbalances in the country's external and internal macroeconomic environment. Our findings cast doubt on such assertions, as such rapid reserves accumulation, in tandem with lack of real exchange rate adjustment, could be an equilibrium phenomenon rather than an active manipulation by the government.

Figure 1: DOLLAR-DENOMINATED SDR-WPI (1995=100)



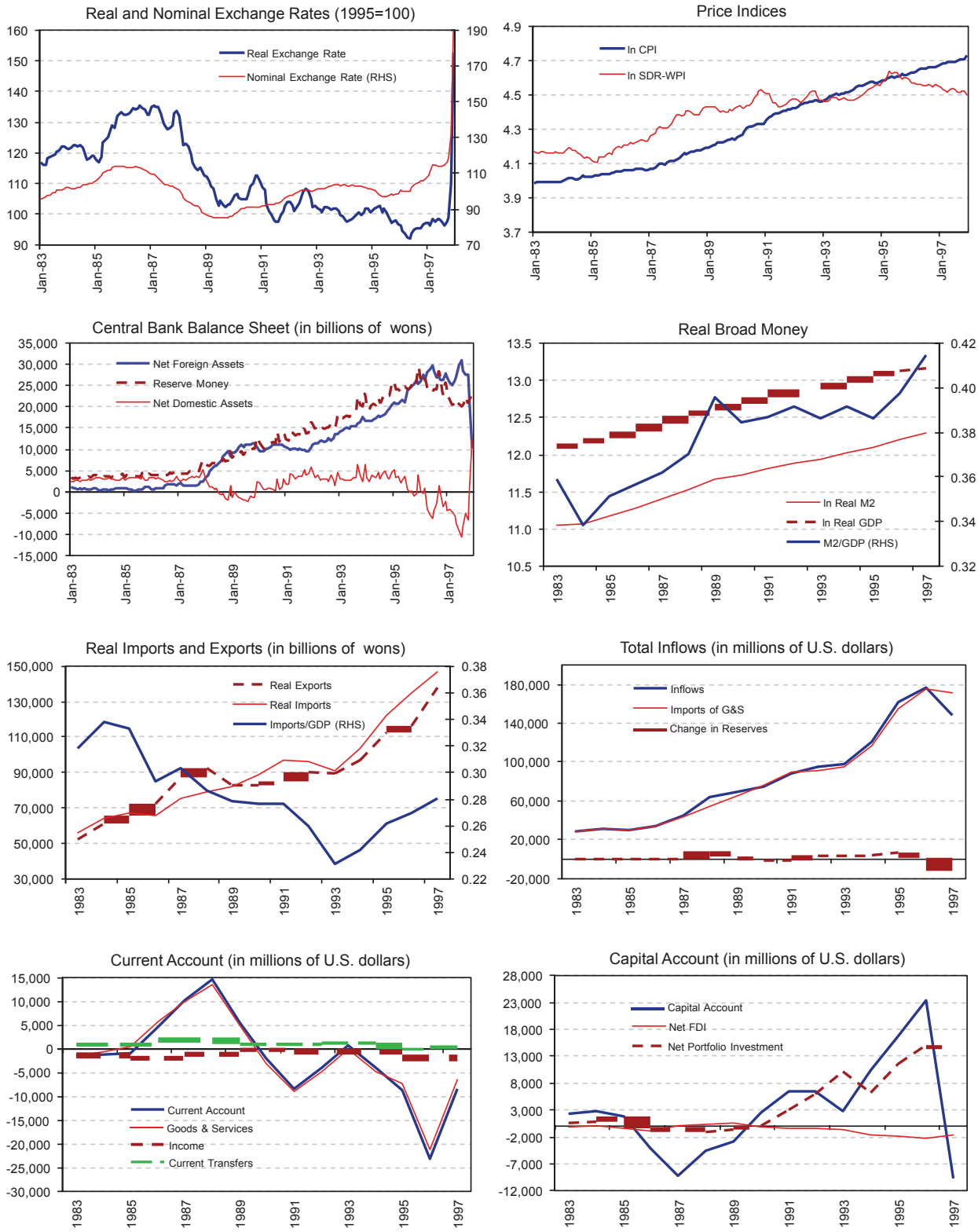
Sources: International Financial Statistics; author's own calculation.

Figure 2: Argentina (1991-2001)



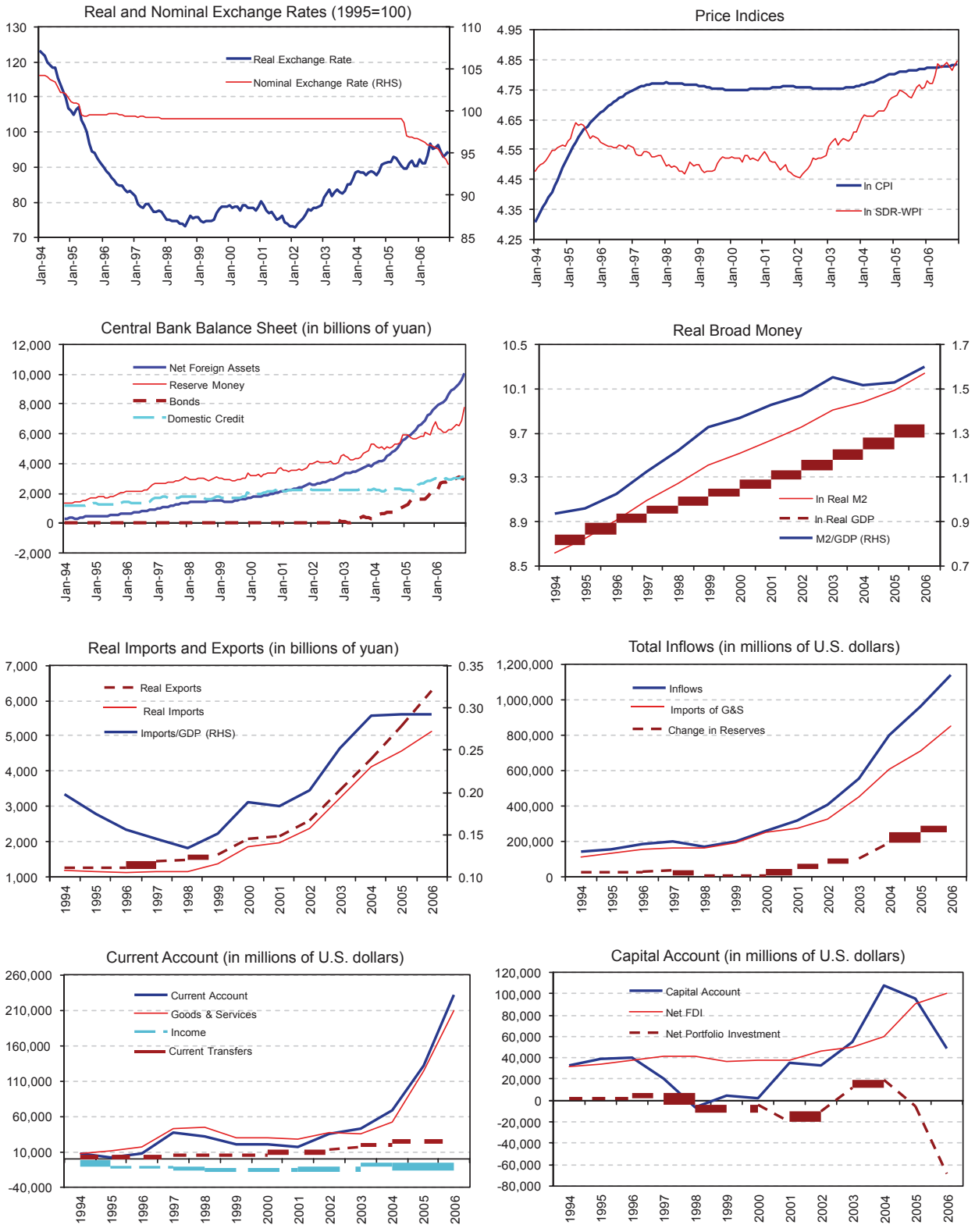
Sources: International Financial Statistics; author's own calculation.

Figure 3: Korea (1983-1997)



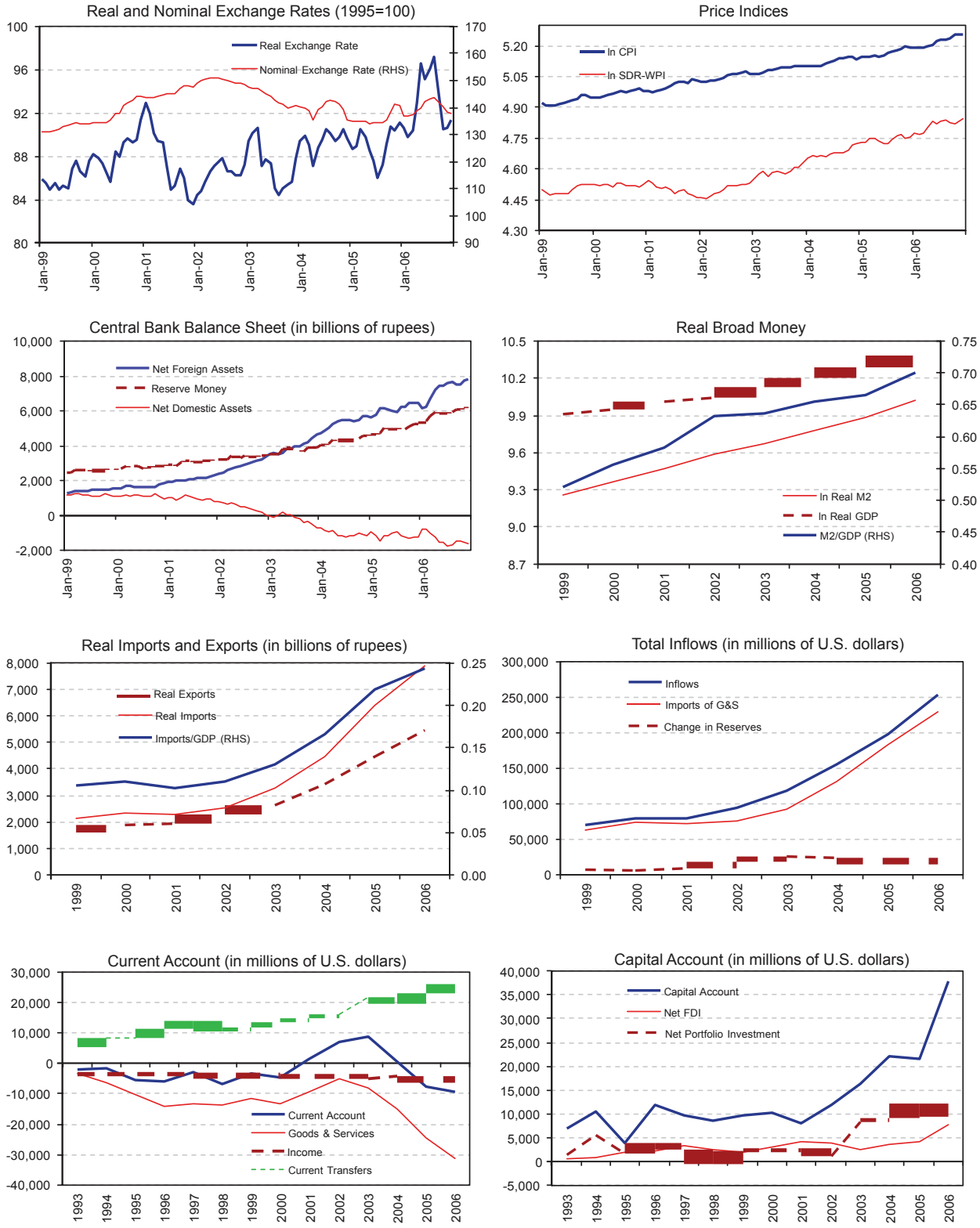
Sources: International Financial Statistics; author's own calculation.

Figure 4: China (1994-2006)



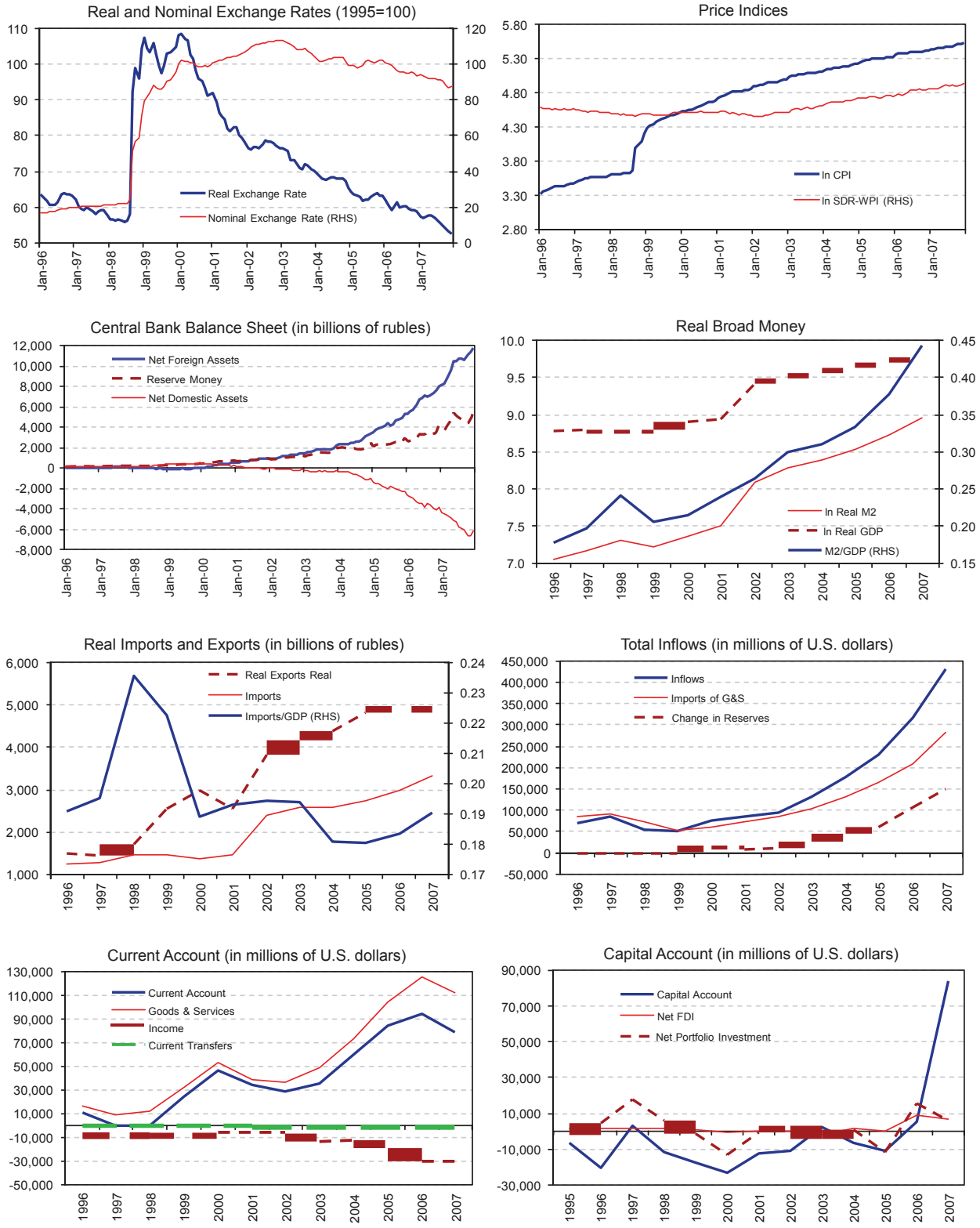
Sources: International Financial Statistics; author's own calculation.

Figure 5: India (1999-2006)



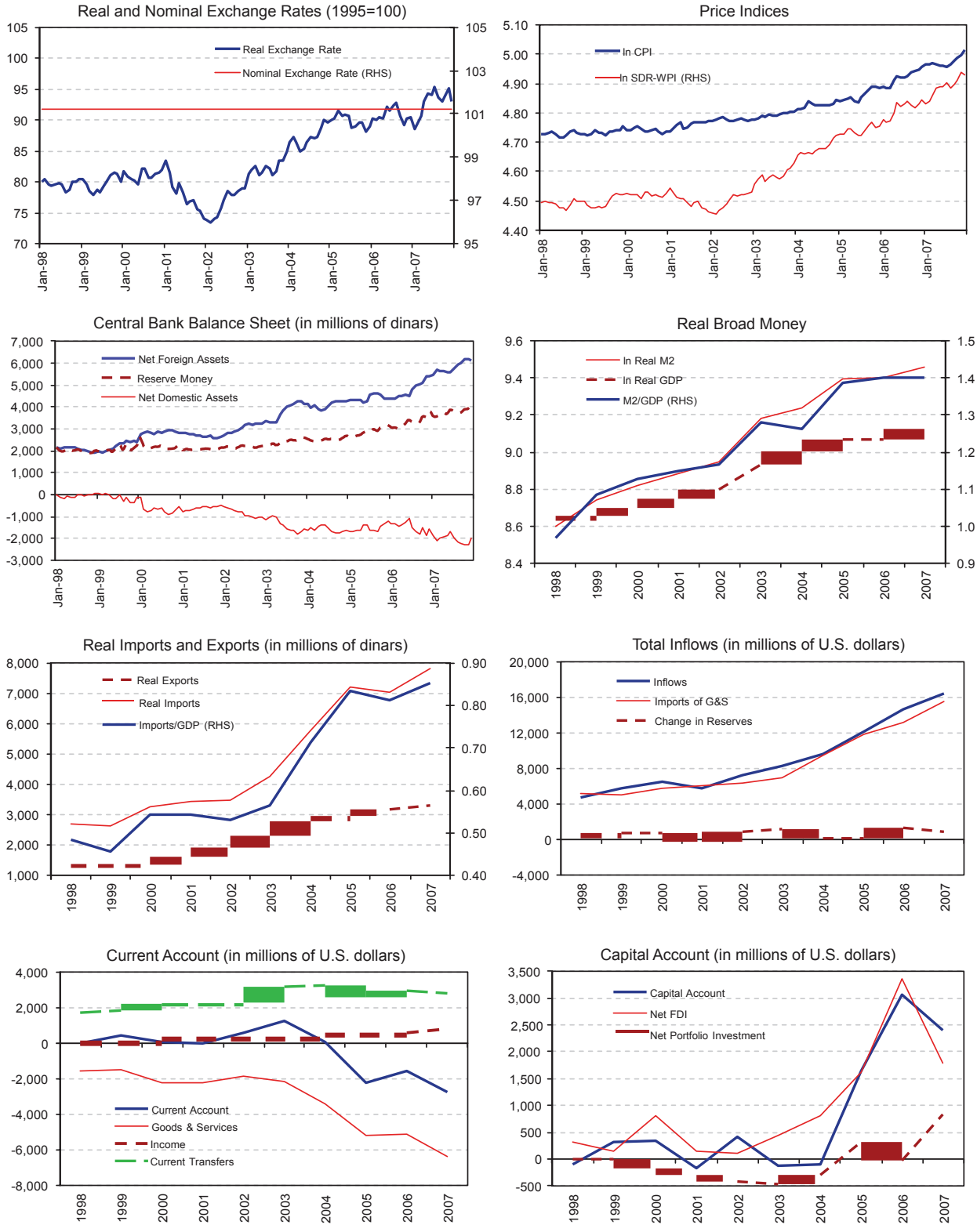
Sources: International Financial Statistics; author's own calculation.

Figure 6: Russia (1996-2007)



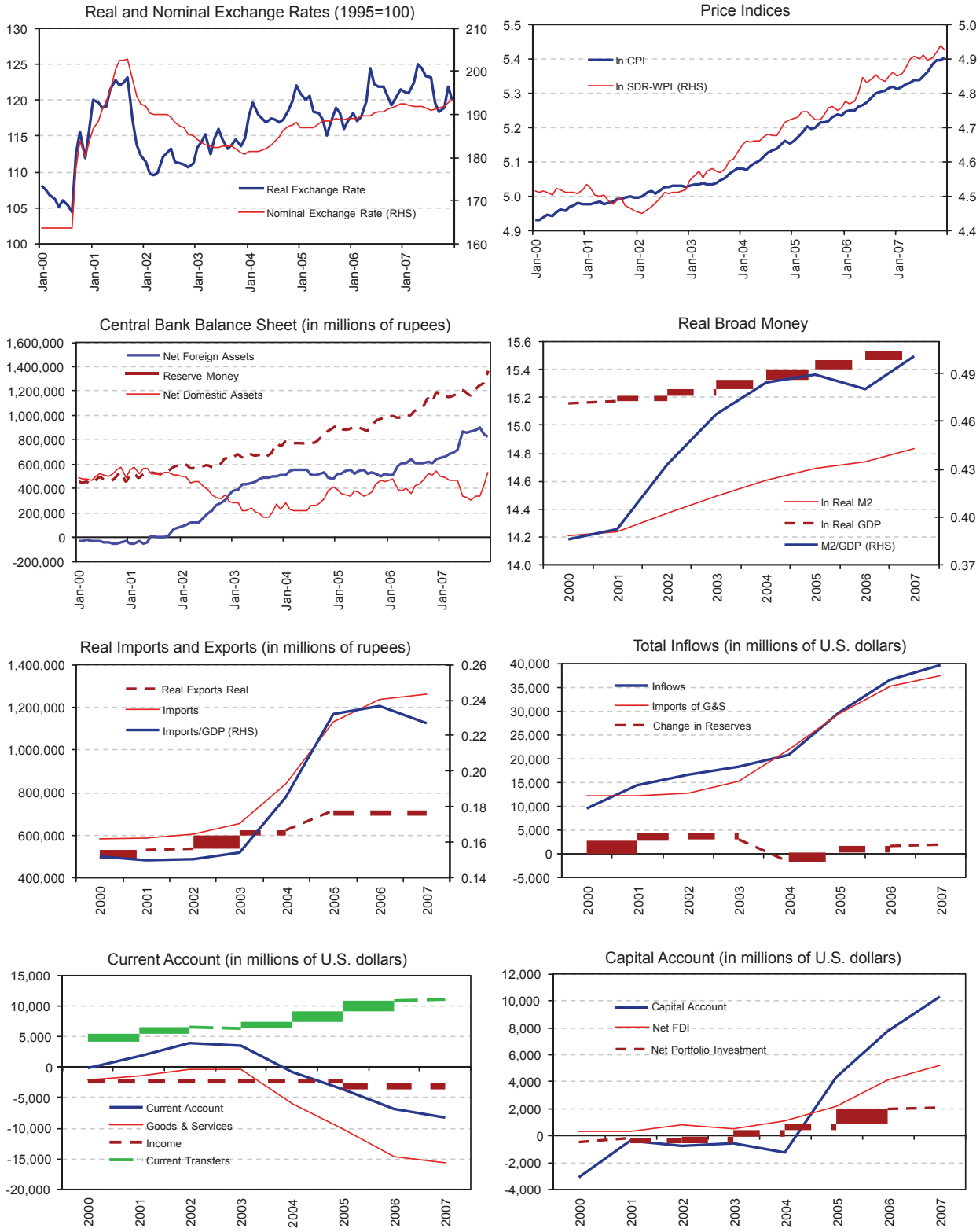
Sources: International Financial Statistics; author's own calculation.

Figure 7: Jordan (1998-2007)



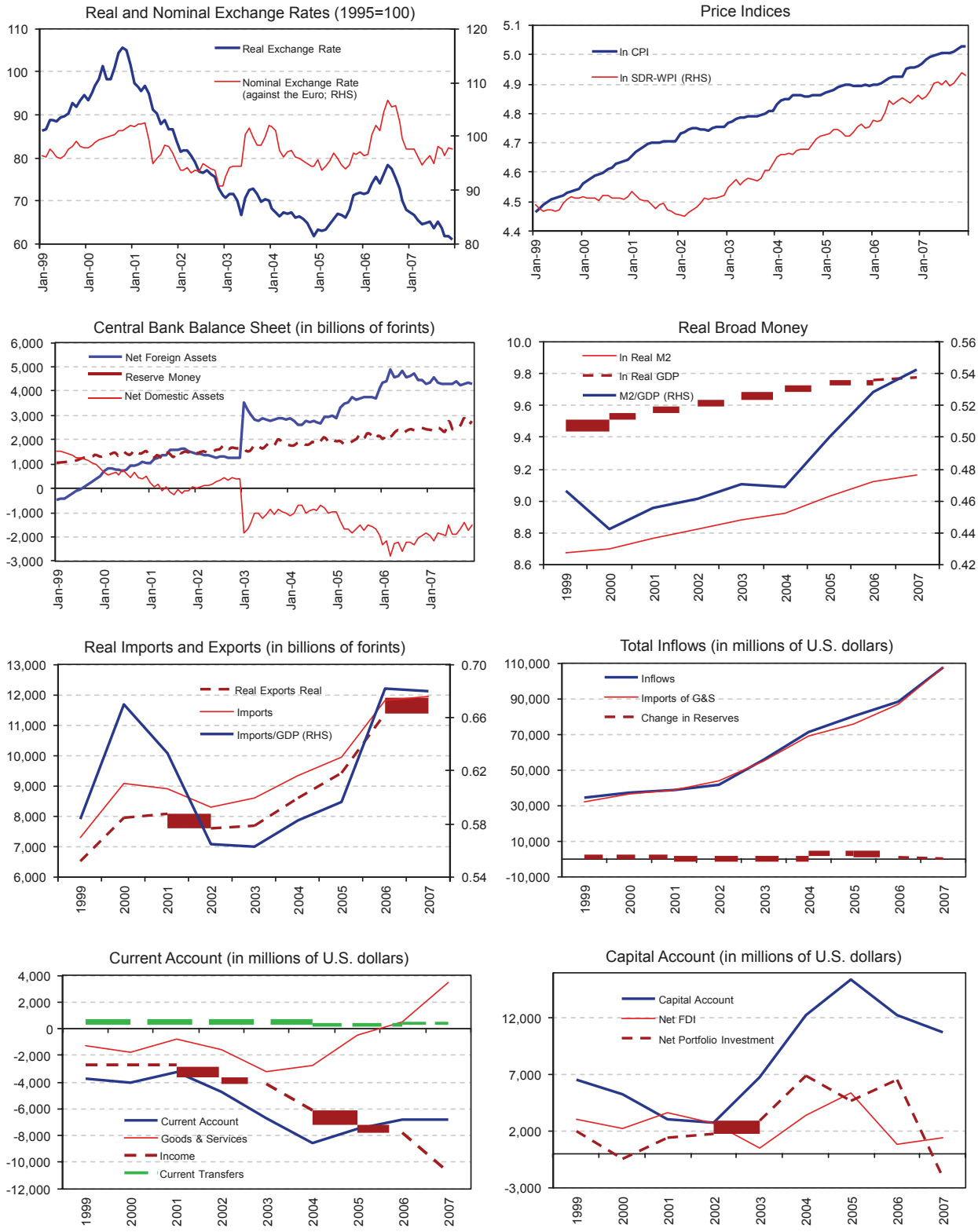
Sources: International Financial Statistics; author's own calculation.

Figure 8: Pakistan (2000-2007)



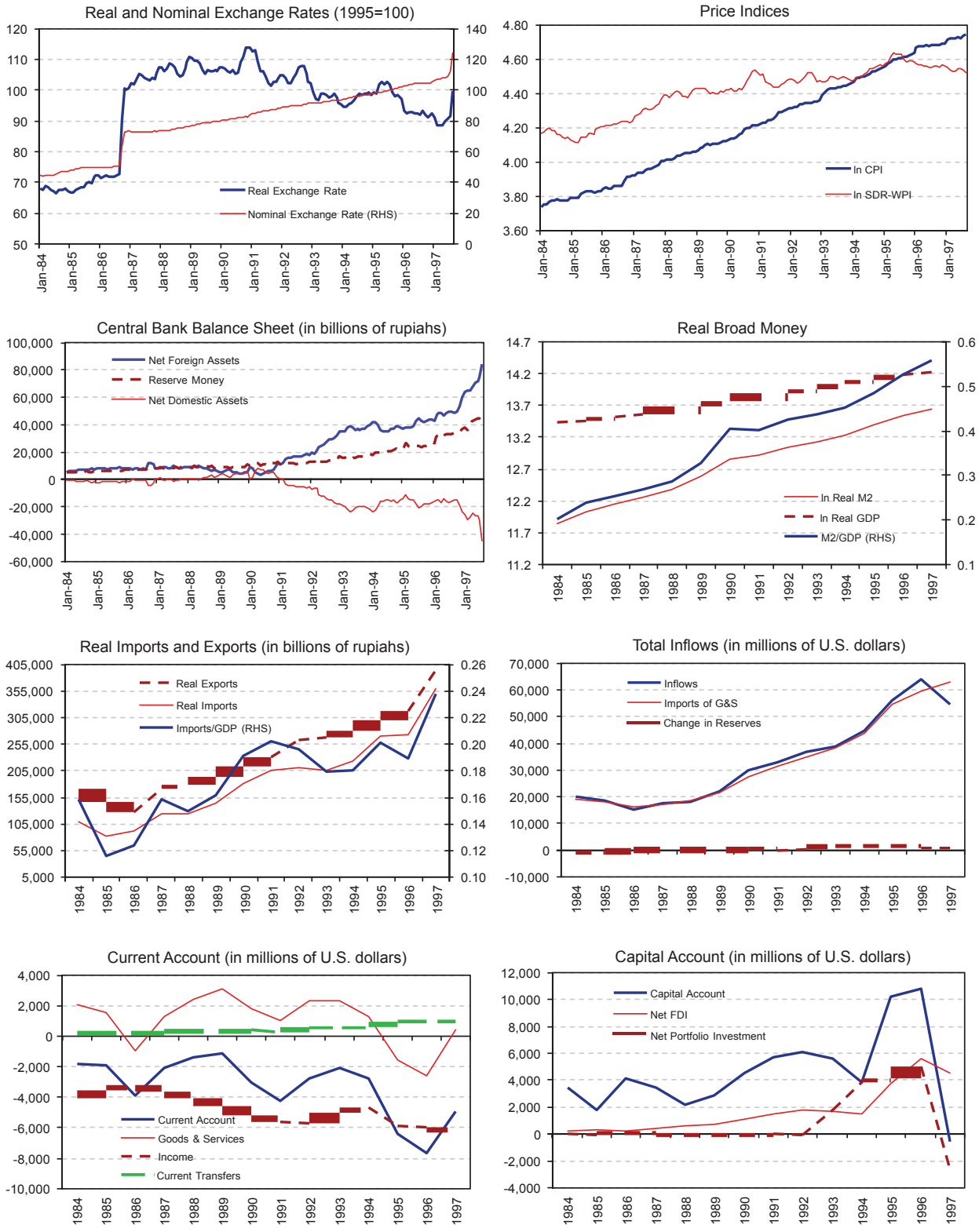
Sources: International Financial Statistics; author's own calculation.

Figure 9: Hungary (1999-2007)



Sources: International Financial Statistics; author's own calculation.

Figure 10: Indonesia (1984-1997)



Sources: International Financial Statistics; author's own calculation.

Table 1
SUMMARY

Country	Period	FX Inflows	RER	NER	CPI	NER/CPI	SDR-WPI
		(average annual percentage change)					
Argentina	1991:1993	75.53	-12.37	2.35	17.54	-12.92	0.99
China	1998:2006	26.83	2.90	-0.47	0.72	-1.18	4.13
Hungary*	2002:2007	20.73	-3.69	0.71	5.29	-4.35	8.10
India	2002:2006	28.01	1.84	-1.74	4.40	-5.89	8.20
Indonesia	1987:1996	15.40	-1.32	4.01	8.31	-3.97	2.75
Jordan	2001:2007	19.00	2.95	0.00	3.64	-3.51	6.71
Korea	1986:1989	27.12	-6.61	-8.67	5.44	-13.39	6.54
Pakistan	2004:2007	24.24	0.91	1.40	8.19	-6.28	7.26
Russia	2002:2007	35.06	-6.27	-3.98	11.17	-13.63	8.10

*The nominal exchange rate is measured against the euro.

ENDNOTES

1 The seminal paper on the monetary approach by Polak (1957) and articles written by other staff members of the IMF can be found in Rhomberg and Heller (1977).

2 Studies show that various sources of foreign exchange inflows—such as capital inflows, exports, and remittances—lead to economic growth: for positive relationships between capital inflows and economic growth, see Borensztein, De Gregorio, and Lee (1998), Bekaert, Harvey, and Lundblad (2005), and Aizenman, Jinjarak, and Park (2013); for exports, see Xu (1996) and Kristjamnpoller and Olson (2014); for remittances, see Nsiah and Fayissa (2013) and Imai, Gaiha, Ali, and Kaicker (2014).

3 Magud and Sosa (2013) provide a good survey of the theoretical and empirical studies on the relationships among foreign exchange inflows, real exchange rate appreciation, and factor reallocation in the tradable and nontradable sectors.

4 There will also be a decrease in the supply of foreign exchange as the increased demand for exportables reduces total exports.

5 For details on the capital inflows into Argentina in the early 1990s, see Calvo, Leiderman, and Reinhart (2011).

6 See Chan (2015).

7 Santos-Paulino (2002) found a strong positive relationship between trade liberalization and import growth in 22 countries over the 1976-98 period.

8 According to the World Bank's World Development Indicators.

9 See Chan (2015).

10 The repo rate is the rate at which the RBI repurchases government securities from the commercial banks, while the reverse repo rate is the return earned by commercial banks on excess funds deposited with the central bank against government securities. Introduced in June 2000, the repo and reverse repo auctions are part of the Liquidity Adjustment Facility (LAF) used by the RBI to adjust short-term liquidity in the banking system.

11 The data and information are obtained from the RBI website, IMF (2007), and Mohan (2011).

12 The nominal exchange rate experienced a mild depreciation between August 2005 and August 2006 as the current account record a deficit in 2005-06.

13 The results are in line with an income elasticity for money demand of 1.3 estimated by the author.

14 Data from the Central Bank of the Russian Federation (CBR) website.

15 Although Russia adopted a managed float regime de jure, the IMF classified its exchange rate policy as a de facto pegged arrangement (IMF, 2008).

16 The Stabilization Fund was replaced by the Russian Reserve Fund in January 2008.

17 As reported by the Russian Ministry of Finance, the currency composition of the Stabilization Fund was 45 percent in U.S. dollar, 45 percent in euro, and 10 percent in British pound in 2007.

18 Early external debt repayments were made to the International Monetary Fund, the members of the Paris Club, as well as the Vnesheconombank.

19 According to the author's estimation, a one percent point reduction in inflation expectation raised the real demand for broad money by 0.7 percent over the 2001-06 period.

20 The amount of CDs issued by the CBJ increased from $1.2 billion dinars in Dec-2001 to peak at $2.5 billion dinars in Dec-2004 before coming down to $2.0 billion dinars in Dec-2007.

21 Assuming the income elasticity of money demand to be 1.1 in Jordan, consistent with the author's estimation, the growth in real GDP would explain roughly 56 percent of the increase in real M2 demand over the 2001-07 period.

22 According to the 2008 IMF Staff report.

23 An important source of FDI in Pakistan was privatization proceeds, which reached US$1.5 billion or 40 percent of net FDI in 2006. On the other hand, the increase in portfolio inflows was mainly due to the successful sales of eurobond and GDRs beginning in 2003.

24 The MCI is calculated as a weighted average of short-term interest and exchange rates.

25 According to the author's estimation, a one percent point reduction in inflation expectation would lead to a 0.64 percent increase in real money demand.

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THE COASE THEORM AND THE ALASKA NATIVE CLAIMS SETTLEMENT ACT

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ABSTRACT

The focus of this paper is an application of the Coase theorem to the Alaska Native Claims Settlement Act (ANCSA). The ANCSA was a major event that settled issues of Native land claims and property rights in Alaska, and had profound implications for economic, social, political, and cultural aspects of life for Alaska Natives and non-natives alike. In particular, the issues of clearly defined and secure property rights, and positive transaction costs will be analyzed, as they both play a key role in the outcome of the negotiations. An analysis of the Coase theorem to the ANCSA is particularly relevant here, since the Coase theorem states that under a situation with minimal to no transaction costs, economic agents will bargain with one another to reach an agreement that is socially optimal. The introduction of economic frictions, including transaction costs and insecure property rights, is particularly relevant since they are reflective of the bargaining situation between the Alaska Natives and the United States federal government. These frictions had a profound effect on the bargaining outcome, as is evinced by the outcome and subsequent impact of the ANCSA on the Alaska Native people.

INTRODUCTION

The Coase theorem states that under a situation with minimal to no transaction costs, economic agents will negotiate with one another to reach an agreement that is socially optimal (Coase 1960). As long as property rights are fully enforced, this outcome will hold true, regardless of the initial allocation of property rights. As a consequence, disputes over so called market failures in the form of positive or negative externalities can be resolved by individual agents engaging in private transactions to negotiate for mutually beneficial outcomes.

The aim of this paper is to contribute to the law and environmental economics literature by examining for the first time the application of the Coase theorem and all its assumptions and implications toward the Alaska Native Claims Settlement Act (ANCSA, or "the Act"). The relevance of the Coase Theorem to the ANCSA is rich and varied. The ANCSA was a major event that settled Native land claims and had profound implications for Native law. It was unprecedented in terms of size and scope, with enormous influence on the economic, social, political, and cultural aspects of life for Alaskan Natives and non-natives alike. With so many issues including those of property rights, transactions costs, and complex negotiations, it seems relevant to apply an analysis of the theorem to the ANCSA. This paper will look at the role of economic frictions and how these affected the bargaining process between the US federal government and the Alaska Native peoples and the resulting outcome of the negotiations. In particular, the issues of clearly defined, secure property rights and nonzero transaction costs will be analyzed, as they both play a key role in the negotiations and settlement. This work is unique in that it is the first analysis of the Coase theorem as it applies to the Alaska Native Claims Settlement Act.

The structure of the paper is as follows. Section II provides an overview of the Coase theorem, with a discussion of its main aspects and brief summary of its various applications in environmental economics and law. Section III contains a brief summary on the history of Alaska and the main events leading up to the Alaska Native Claims Settlement Act. Section IV provides the theoretical model that will be applied toward the case of bargaining with insecure property rights with nonzero transaction costs, as was evinced in the negotiations between the Alaska Natives and the United States federal government. Section V concludes.

THE COASE THEOREM

In his 1960 paper "The Problem of Social Cost" Coase used an example of the cattle rancher whose grazing cattle cause damage to crops on a neighboring farmer's field. The actions of the cattle generate a social cost (a negative production externality). Traditional economic theory regarded this as a market failure, whereby markets do not account for this externality, and private costs are not aligned with social costs. The typical response to address the externality was to implement a Pigouvian style governmental intervention, via either the establishment of a regulation or the imposition of a penalty to limit the amount of damage the cattle could cause to the farmer. In the traditional Pigouvian sense, a governmental intervention would resolve the discrepancy between private and social costs. The damaging party would be held liable for the damages caused and he would pay the damaged party a compensation for the damage done. Thus the externality would be internalized, and all would be well.

Coase's view was different. He theorized that as long as each party had clearly defined property rights, the two of them could negotiate for a mutually beneficial and socially optimal agreement, provided that transactions costs were minimal or zero. A decentralized solution was perfectly adequate to address the externality problem, and in fact, could lead to an outcome that is the lowest cost solution, cheaper than the Pigouvian one. The damaging party (the rancher) can be held fully liable for the harms to the crops, and the pricing system works fully to determine the value of the damages. It is important to note that the farmer's property rights over his fields must be strictly defined and enforced as Coase stated. If this is so, the farmer can request and receive compensation for the damage done to his fields.

In the decentralized solution, the rancher and farmer would privately negotiate to determine a socially optimal outcome. The end result would be that either the rancher would reduce the amount of cattle he raises in order to reduce the grazing herd's damage to the farmer's crops, the farmer would collect monetary damages from the rancher, or the rancher would bribe the farmer to reduce his crop fields. The rancher can choose whether he prefers to pay the fines or bribes, or reduce his herd, and he will choose the option that is the lowest cost to him. The externality is internalized in any case.

Alternatively, if the rancher is not held to be the damaging party, the farmer could bribe the rancher to reduce his cattle herd and thereby reduce the damages done to the farmer's crops. The cost to the farmer would be the same: either cost of damages done by the cattle trampling his crops, or cost to bribe the rancher. The farmer will choose a payment level that is at most equal to the damages that can be incurred via the grazing cattle. The amount of cattle raised (or crops raised) will be exactly the same as before. No governmental intervention, either via the establishment of a regulation or the imposition of a penalty was even necessary to reach an outcome that was optimal for society. Private party negotiation was effective in achieving the least cost solution and the problem was solved in a satisfactory manner for both individuals.

Based on this analysis, Coase summarized the situation as follows. Coase never explicitly states his famous theorem in his 1960 paper, but what follows is the closest statement of it in the paper.

> "It is necessary to know whether the damaging business is liable or not for damage caused since without the establishment of this initial delimitation of rights there can be no market transactions to transfer and recombine them. But the ultimate result (which maximizes the value of production) is independent of the legal position if the ricing system is assumed to work without cost." (Coase 1960)

Other economic and legal scholars have stated the theorem in numerous ways. George Stigler was one of the first, followed by many others. The theorem has had many statements and explanations and the following is a selection of a few, starting with Stigler's formal statement in The Theory of Price in 1966.

- "The Coase theorem thus asserts that under perfect competition private and social costs will be equal." (Stigler, 1966)

- "If one assumes rationality, no transaction costs, and no legal impediments to bargaining, all misallocations of resources would be fully cured in the market by bargaining." (Calabresi, 1968)

- "In a world of perfect competition, perfect information, and zero transaction costs, the allocation of resources in the economy will be efficient and will be unaffected by legal rules regarding the initial impact of costs resulting from externalities." (Regan, 1972)

- When parties can bargain together and settle their disagreements by cooperation, their behavior will be efficient regardless of the underlying rule of law" (Cooter and Ulen, 1988)

The statements of the Coase theorem are varied, with slightly different interpretations and implications based upon on the precise wording of each. However, an examination of each reveals two assertions that can be made about the main outcomes of the various statements of the theorem. The first claim, which can be deduced from all of the above statements, is that the initial allocation of property rights is irrelevant, since rational parties will bargain and reach an agreement about how the resources are to be best allocated. The final resulting allocation of resources will be efficient, and no outside intervention is necessary. This claim is often referred to as the 'efficiency hypothesis' (Medema and Zerbe 1999) and it can be seen as a conclusion of all the above statements of the Coase theorem. The second claim, which does not appear in all statements of the Coase theorem is the so-called 'invariance hypothesis' (Mederma and Zerbe 1999). The invariance hypothesis states that no matter what the initial allocation of rights is, the end result of bargaining will result in an efficient allocation of resources.

Debates about the correctness or validity of the Coase theorem are centered on the validity of these hypotheses, with arguments based on different versions of the theorem: the strong version that includes both hypotheses and the weak version that includes only the first. (Medema and Zerbe, 1999). There have been many attempts to prove the theorem either theoretically, or empirically via a real world environmental issue.

In any of these analyses, the emphasis of the theorem is on the importance of clearly defined and enforced property rights and private party bargaining and negotiation. As a result, there is no need for state intervention to achieve a socially optimal outcome. Externalities can be internalized in the most efficient and least cost solution is counter to the traditional Pigouvian answer of governmental intervention.

Coase's theorem has had a wide range of applications in economics, law, and other fields. In particular, a clear analysis of property rights and Coasian bargaining are relevant to environmental goods and services, especially when property rights are insecure and contested. The issue of insecure property rights is especially relevant to a variety of environmental disputes. These can include endangered species protection or the restoration of wildlife to their natural habitats like the protection of elephants from poachers in Kenya or the reintroduction of grey wolves in Yellowstone National Park. Other examples of property rights insecurity include disputes over water use and appropriation in the western United States, watershed development and management around the world, and rights for gold mining in various regions of Alaska. Insecure property rights were a prime component of the discussion and debate over native land claims prior to the building of the trans-Alaska pipeline, since this issue had to be settled before the oil extraction and transport could begin. Further discussion of Native Alaskans' insecure property rights will be provided in section IV.

The application of property rights towards seemingly common property resources such as clean air, clean water, forests, and other such resources seems counterintuitive. The instinct is to put in place governmental regulations or penalties to either protect these resources or penalize the damaging parties for their actions. But an analysis via the Coase theorem shows that these actions are not necessary and will not lead to the most efficient, lowest cost solution. A number of empirical and theoretical studies have been done to interpret, model, and resolve issues that arise from either externality problems or property rights issues and the lack of clearly defined markets in environmental economics.

There have been many applications of bargaining and property rights to determine optimal allocations of environmental goods and services, and to resolve issues of externalities. A few examples from the literature are as follows. Ellickson (1986) gives empirical evidence in support of the Coase theorem with an investigation of the cattle vs. rancher parable from Coase's original 1960 paper. He finds that the parties involved cooperate and settle their dispute via informal means in order to minimize transaction costs. Social norms are relied upon to determine culpability and compensation for damages, with bargaining occurring in the "shadow of the law" (a phrase first coined by Mnookin and Kornhauser, 1979). Cheung's "fable of the bees" (1973) is one of the first attempts to provide empirical evidence on the validity of the Coase theorem. In it, Cheung studies whether the commoditization of a positive externality: orchard farmers contracting with beekeepers for the pollination services of their bees, and whether these contractual agreements are an efficient allocation of resources. Hanley and Sumner (1995) consider the problem of externalities in the case of the red deer population in Scotland. Rising deer populations cause economic damage to farmers and forest owners, and the authors suggests a Coasian bargaining solution to resolve the externality. Another study by Quiggin (2001) investigates increasing agricultural development in Australia and how it has resulted in pollution externalities for the Murray-Darling river system in the form of increased water salinity, harmful algal blooms, and waterlogging. The author includes an analysis of the conflict between private property rights and common rights, and how these affect the development of water markets to efficiently allocate water among competing uses.

In many of these works, economists and legal scholars discuss the role transaction costs and how they affect bargaining outcomes. The problem of transaction costs is an important one that cannot be easily overlooked. In reality, they are often large and have a significant influence on the outcomes of bargaining. Transaction costs can include "search, negotiation, monitoring, and enforcement" (Coase 1960), and/or "resource losses incurred due to imperfect information" (Medema and Zerbe, 1999). Other definitions make references to property rights including "the costs associated with the transfer, capture, and protection of rights" (Barzel 1989), and that they include "the resources used to estimate and maintain property rights" (Allen, 1991). One implication that can be drawn from these definitions is that if property rights are complete and well defined, there are no transaction costs involved in bargaining. Each party will have complete information and can make a fully informed assessment of the offers made by the counter-party, with zero cost. Therefore, the importance of clearly defined property rights cannot be understated, as they have enormous implications for bargaining efficiency and outcomes. Less secure property rights will impede efficient bargaining, with parties either opting for an outside option or engaging in costly bargaining battles. Both of these were possibilities or realities in the lengthy negotiations between the federal government and the Alaska Natives over native land claims.

Although transaction costs can overwhelm or impede the gains from trade and negotiation, this is not to say that the standard Pigouvian solution is necessarily the superior solution. Rather, it points to the importance of a proper accounting of transaction costs in all such externality and property rights situations. A due consideration of whether the remedy to the externality is better or worse than simply accepting the externality is necessary before making any final decisions. As with any case of bargaining over environmental goods and services, clearly defined property rights and nonzero transaction costs play important roles, in particular in the case of bargaining over lands and subsurface rights in Alaska, which culminated in the Alaska Native Claims Settlement Act. The next section covers background information on the ANCSA to properly establish the framework for understanding the connection to the Coase theorem.

BACKGROUND

Some background information on the Alaska Native Claims Settlement Act is necessary to set the stage and make the connection with the Coase theorem. In 1971, Congress enacted the ANCSA. Its purpose was to settle native land claims and provide clearly defied property rights for the ownership of land, subsurface deposits, and natural resources in the state of Alaska for its Native people. The impetus for its creation and indeed Alaska statehood stemmed from the discovery of oil reserves in the Kenai Peninsula and gold deposits in the northern part of the state. Prior to these discoveries, the United States' purchase of Alaska from Russia in 1867 was initially scorned as "Seward's Folly", after U.S. Secretary of State William Seward who had advised Congress for the purchase of the lands. Public opinion quickly changed after the aforementioned discoveries, and spurred the push for Alaska statehood, as well as the settlement of Native land claims in the state.

When Alaska attained statehood in 1959, Congress gave the state the right to select and develop 102.5 million acres of federal land. However, controversy over the state's land selections led Native Alaskans to file formal protests in 1961. The controversy led the Secretary of the Interior, Stewart Udall, to institute a "land freeze" in which no more land transfers would be granted to the state until the Native claims had been settled. During this time there were

additional discoveries of oil fields in Prudhoe Bay in the North Slope. The need to settle land claims once and for all was necessitated by the fact that oil extraction and transport from the North Slope necessitated the development of extensive infrastructure. Before oil companies could begin their construction projects, they had to know the ownership of the lands and subsurface rights to oil and other valuable deposits. Various parties including government officials from the federal and state levels, Alaska Native groups, and representatives from the oil industry and other business concerns worked together in an effort to determine land claims. The ANCSA was intended to clearly delineate the ownership rights once and for all before work would be started on the extraction and transport of the oil reserves in the North Slope.

In simple terms, the ANCSA involved the dissolution and relinquishment of all Native land claims to over 360 million acres of land in Alaska. In exchange for this, Alaska Natives would receive both a clear title to 45.5 million acres of land in other parts of the state, and payments totaling $962.5 million. In addition, Native groups were required to form corporations at both the regional and local levels in order to oversee the management of the lands and the monies received in the settlement. With consideration to geography and heritage, twelve Native regional corporations were formed. These regional corporations also symbolically represented the Alaska Native communities and arguably provided a cultural and political structure for Native groups. A thirteenth corporation was also formed to represent the interests of those Natives who were not residing in the state. Each Native Alaskan who was alive on December 18, 1971 was issued 100 shares of regional corporation stock, based on their geographical residence. The regional corporations were for-profit institutions and on a local level, Native villages were required to incorporate with the regional corporations in order to receive any of the benefits outlined in the ANCSA. The ANCSA was a settlement designed to both satisfy and compromise with varied interests, including those of Alaska Natives, business interests, and state and federal governments. Further discussion of the various aspects of ANCSA can be found in Chaffee (2008) and the ANCSA USC.

THE COASE THEOREM AND THE ANCSA

The application of the Coase theorem to the ANCSA has several aspects and each will be investigated in turn. There are the issues of transaction costs, and secure and insecure property rights. Each of these will be investigated in turn, following the model of Coasian bargaining with secure and insecure property rights by Cherry and Shogren (2005).

Transaction Costs

The issue of transaction costs is particularly important to the ANCSA. Economic frictions in the form of nonzero transaction costs, and insecure property rights have a significant impact on the efficiency of Coasian bargaining outcomes. If transaction costs exist, they introduce a stumbling block to efficient and rational bargaining. Coase himself never assumed a zero transaction cost world. In fact, he explicitly stated “what my argument does suggest is the need to introduce positive transaction costs explicitly into economic analysis so that we can study the world that does exist” (Coase 1988). Transaction costs can include the “costs that arise from creating and evaluating offers and counteroffers that include meetings, search fees, legal fees, and computation fees” (Cheung, 1989, Williamson, 1982). Extensive work has been conducted on the effect of nonzero transaction costs on Coasian bargaining, including work by Cherry and Shogren (2005), Rhoads and Shogren (1999)

Since transaction costs play such an important role in actual bargaining, a careful analysis of them is necessary to see the impact on the resulting outcome. This work draws on previous work by Rhoads and Shogren (1999) and Cherry and Shogren (2005) on Coasian bargaining with transaction costs, and property rights security. This work is an extension of those previous works in that it is a specific application towards the ANCSA and the resulting effect on the Alaskan economy as a result of the Act. As Cherry and Shogren note, the level of property rights security has a significant impact on the efficiency of Coasian bargaining outcomes.

The Model

The model is based on the framework of Cherry and Shogren (2005) with their analysis of Coasian bargaining, transaction costs, and property rights security. In their work, they assert that economic friction (in the form of transaction costs, delays, or enforcement costs) matters less for bargaining efficiency if property rights are less secure. If property rights are strong, then bargaining efficiency is lessened; those property owners don't have much to lose when they are non-cooperative in a bargaining situation. They can always exercise an "outside option" and walk away from the negotiations, even though they may be leaving money on the table, since it is relatively cheap for them to do so. In addition, the strength of property rights (secure versus insecure) has an inverse relationship with bargaining efficiency. If property rights are more secure, then bargaining is less efficient, and vice versa.

In this bargaining environment, two players, A and U, bargain over lottery tickets γ_A and γ_U. These lottery tickets define the chance of winning a monetary payoff M. There are nonzero transaction costs associated with bargaining $C = c_A + c_U$, where $c_i = P^o o_i + P^e e_i + P^x x_i$, i = A, U, represents the cost each player bears, in terms of offers o_i, the cost to evaluate each offer e_i, and all counter-offers z_i, and the associated price per unit P. Each player also has an initial endowment of lottery tickets, ε_A and ε_U help offset the transaction costs, so the total number of lottery tickets is $\gamma_T = \varepsilon_A + \varepsilon_U + \gamma_A + \gamma_U + \gamma_H$, where γ_H represents the lottery tickets that are unclaimed and left on the table (i.e. when the "house" wins and money is left on the table when negotiations fail).

In terms of property rights security, assume that player U is the controller. Player U has an outside option he can choose at any time during the bargaining with player A. Thus, Player U has a "threat point" since he can quit negotiations at any time and choose the outside option. Player U has a fallback position and player A does not. The probability that player U will win the monetary reward is denoted by γ_U^o.

Next, it is necessary to define the strength of property rights. Property rights are secure when a strong government protects and defends the entitlements that represent ownership over a resource if and when those rights are challenged. Let $0 \le r \le 1$ represent the strength of property rights. Note that if r = 1, then property rights are secure and will be upheld if challenged, and if r = 0, there are no secure unilateral rights. When $0 \le r \le 1$, there are insecure property rights. We Can define the expected payoff when secure property rights exist; for the controller,player U,it is merely his outside option and his initial endowment of lottery tickets $\gamma_u^0 + \varepsilon_u$ and for the noncontroller, player A, it is his simply initial endowment ε_A.

If there are no property rights, or insecure rights, we must derive the expected payoff for the two players via a non-cooperative contest from Dixit (1987). Based on the logit contest-

success function from Tullock (1980), each player chooses an optimal level of effort z to maximize the expected payoff. His optimization problem is as follows.

$$\underset{z_i}{\text{Max}} \frac{z_i}{z_i + z_j} \gamma_U^o - z_i + \varepsilon_i \quad \text{for i = A,U; j = A,U; i} \neq \text{j} \tag{1}$$

Taking the first order conditions, we can solve for each player's best effort functions

$$z_i = \sqrt{z_j \gamma_i^o} - z_j \text{ and } z_j = \sqrt{z_i \gamma_i^o} - z_i, \tag{2}$$

and consequently arrive at the Nash Equilibrium levels of effort

$$(z_A^{NE}, z_U^{NE}) = \left(\frac{\gamma_i^o}{4}, \frac{\gamma_i^o}{4} \right) \tag{3}$$

Plugging these Nash Equilibrium effort levels into the expected payoff functions, we can calculate each player's expected payoff.

$$EP_i^{NE} = \left(\frac{\frac{\gamma_U^o}{4}}{\frac{\gamma_U^o}{4} + \frac{\gamma_U^o}{4}} \right) \gamma_U^o - \frac{\gamma_U^o}{4} + \varepsilon_i = \frac{\gamma_U^o}{4} + \varepsilon_i, \text{ for i = A, U} \tag{4}$$

Insecure property rights are represented by $0 \leq q \leq 1$. If player U exercises his outside option, we can calculate the two parties' expected payoffs as follows.

$$EP_U^o = r(g_U^o + e_U) + (1 - r)EP_U^{NE} \tag{5}$$

$$EP_A^o = r\varepsilon_A + (1 - r)EP_A^{NE} \tag{6}$$

Next, the Nash bargaining solution can be derived. The two players' face potential gains from bargaining. They negotiate with one another to obtain rights over an existing property, and are motivated to do so by the potential gains from the outcome. These gains are represented by the optimal number of lottery tickets each player will receive after the negotiations end. The potential gains from bargaining come from the following optimization problem.

$$\underset{\gamma_U}{\text{Max}} \left[(\gamma_U - c_U - EP_U^O + \varepsilon_U)(\gamma_A - c_A - EP_A^O + \varepsilon_A) \right] \text{ subject to } \gamma_T = \varepsilon_U + \varepsilon_A + \gamma_U + \gamma_A + \gamma_H. \tag{7}$$

The optimal number of lottery tickets for player U can be derived using the first order conditions from the above constrained optimization problem. They are as follows.

$$\gamma_U = \left(\gamma_U^O + \frac{\gamma_H}{2} \right) - \sigma + \omega \text{ where} \tag{8}$$

$$\sigma = \left(\frac{2\gamma_U^O + \gamma_H + \varepsilon_U + \varepsilon_A - \gamma_T}{2} \right) (1 - r) \tag{9}$$

$$\omega = \left(\frac{c_U - c_A}{2} \right) \tag{10}$$

Note that the optimal number of lottery tickets for player U is affected by σ, which reflects the effect of insecure property rights when $0 \leq r \leq 1$. The impact of σ is negative on the optimal number of lottery tickets for player U; the more insecure the property rights, the smaller the value of r, and the bigger the impact on player U's optimal lottery tickets. The effect of transaction costs on player U's optimal number of lottery tickets is reflected in the value of ω, which represents the transaction costs that each player faces. The larger the difference in transaction costs between player U and player A, the bigger the impact on the optimal number of lottery tickets for player U. Overall, the equation for player U's optimal number of lottery tickets shows that he receives his outside option and half of the house's tickets (the bargaining surplus), but is penalized for insecure property rights and transaction costs. Player A, who has no outside option, has the following optimal allocation:

$$\gamma_A = \gamma_T - \gamma_U - (\varepsilon_U + \varepsilon_A) \quad (11)$$

Bargaining for is always preferred for both players. For player U, a comparison of equations (5) and (8) indicate that bargaining is better than taking the outside option.

The optimal allocation from bargaining leaves player U better off than not bargaining, since the payoff is higher than taking the outside option. No matter what the level of property rights security, this holds true, and the only case in which the controller prefers not to bargain is when transaction costs become too high to make bargaining worthwhile. Similarly, for player A, bargaining leaves him better off, as we can see from equations (4) and (6). Player A's expected payoff from bargaining is always larger than from not bargaining, based on the expected payoff given in equation (4). For player A, insecure property rights helps him, since his expected payoff will be bigger when $0 \leq r \leq 1$, and maximized when $r = 0$ (no secure property rights). But in any case, player A should always bargain since it leaves him better off, with a bigger expected payoff than his initial endowment εA.

The Coase theorem states that with minimal or no transaction costs, parties will bargain with one another to reach an outcome that is socially optimal. The assumption of minimal transaction costs is important, since the introduction of any economic friction can reduce bargaining efficiency (Rhoades and Shogren 1999). But we must introduce such frictions into the model in order to "study the world that does exist" (Coase 1988). We want to see how such frictions in the form of positive transaction costs and property rights insecurity can affect bargaining and efficient outcomes. In a perfect vacuum, rational bargainers will find the Nash equilibrium and minimize bargaining costs. However, bargaining in the real world rarely goes so smoothly. There are competing hypotheses for how economic frictions influence bargaining efficiency. Cherry and Shogren (2005) present two such hypotheses: the backsliding argument and the cost-of-non-cooperation counterargument. The first hypothesis, the backsliding argument, implies if a party has more secure property rights, this helps bargaining efficiency since that party can merely choose the outside option and avoid costly bargaining conflicts.

Although both parties lose out on unclaimed resources (e.g. what the "house" wins), that's better than engaging in an expensive and possibly counterproductive bargaining conflicts. On the other hand, greater insecurity in property rights will lead to even lower efficiency, since parties will engage in costly and time consuming battles over the property right and both end up the worse for wear.

The second, the cost-of-non-cooperation counterargument, implies that greater property rights security leads to greater inefficiency. If a party has secure rights, non-cooperation becomes less costly since the property owner knows he can hold out for a higher payoff. Of course, a player can always take the outside option, with the resulting loss in efficiency being whatever the "house" wins. If a party has a secure outside option to fall back on, that party can merely choose that outside option and avoid the effort and expense of bargaining.

Application to the Alaska Native Claims Settlement Act

The discovery of vast oil reserves in the Prudhoe Bay oilfields in the North Slope of Alaska spurred the drive to settle Native land claims once and for all. The oil had to be transported from the North Slope to the southern port city of Valdez. But before construction could begin on the physical infrastructure needed by oil companies to extract and transport the oil, the question of ownership and rights over land and oilfields had to be determined. A pipeline field study team comprised of the Atlantic Pipeline Company, Humble Pipe Line Company, and BP Exploration U.S.A. worked together to study the problem and to propose a design for the Trans Alaska Pipeline Project. The planned Trans Alaska pipeline system (abbreviated TAPS) would be 800 miles long and run from Prudhoe Bay in the North Slope to Valdez, the southern-most port in the state that is ice free year round. The construction of the pipeline, pump stations, and drilling platforms would be a major undertaking, with considerable environmental impact. Initially, the plan was to construct a buried pipeline, but the extreme challenges of such an endeavor due to the weather and physical geography of the state made the plan impossible. In the end, the pipeline was built with part of the line buried and part of it built on elevated supports. The pipeline project was projected to have significant impact on the environment of the lands through which it was planned to run. An extensive environmental impact study was conducted by the U.S. Department of the Interior, which issued a report on the estimated effects on the pipeline construction and operation.

Property Rights

Since the idea of clearly defined and enforced property rights plays a predominant role in the Coase theorem and its application, it is relevant to start the analysis with this concept. One of the most important components of the ANCSA was to grant Alaska Natives sovereignty by giving them clear title to the lands they occupied. While it may seem obvious and self evident that the Natives should indeed already have a claim to the lands on which they had lived for generations, a closer examination of Native American law reveals why granting this clear title was necessary to begin with. In the landmark Johnson vs. M'Intosh case in 1823, the U.S. Supreme Court determined that European explorers' "discovery" of America had voided all Native land titles and claims. As a consequence the federal government owned title and holds in trust all Native lands. Furthermore, the federal government had the "exclusive power to extinguish" the right of Native Americans to occupy the land (see 21 U.S. (8 Wheat.) 543), since the United States "owned Native American land by obtaining title through conquest, and Native

American tribes became legally dependent on the federal government for their continued existence" (Chaffee 2008).

The ANCSA reversed all this. The Alaska Native corporations established under the Act received clear title to agreed upon lands and the federal government would no longer hold these lands in trust, representing a shift towards clearly defined property rights for Native groups over these lands. In this respect, the ANCSA was, by comparison, advantageous to the Alaska Natives in that it represented a departure from historical treatment of the U.S. federal government towards Native Americans in the rest of the United States.

The assignment of property rights over Native lands was a lengthy and often contentious process. Competition between various interest groups, including the Alaska Native people, conservationists, and business development interests (including various oil companies and the state of Alaska as well as the federal government) led to extensive legal battles and debates in Congress as each group sought to protect its needs and wants. Both environmentalists and the oil industry had a major role in shaping the ANCSA as they exerted a profound influence on Congressional voting as the legislation was written (see Boyce and Nilsson 1999). Further discussion of the ANCSA land selection process can be found in Berry (1975), and Lazarus & West (1976), and, with a detailed discussion of the clash of interests from business, government, and Native groups in the land selection. In short, the negotiations between the Alaska Natives and the United States federal government represented a bargaining situation with the United States as the controller with the outside option available to it.

However, the ANCSA reversed Johnson v. M'Intosh by giving clear title to settlement lands to the Alaska Native corporations. Since the federal government no longer holds these lands in trust for them, Native Alaskans can now freely use the lands, or sell them as they deem necessary, and are not beholden to the Bureau of Indian Affairs for supervision. The ANCSA arguably provided economic sovereignty to the Natives by giving them this clear title, since the lands and monies received could be used as a means of continued economic independence and future financial security. Given the outcome of the Johnson v. M'Intosh case, the federal government could have exercised its outside option at any time and simply appropriated the lands without compensation to the Native groups. The United States could at any time exercise the outside option, via historic precedents in Native law and simply claim Alaskan lands based on the fact that they were deemed to be federal lands.

In any case, the ANCSA provided funds and resources to Native groups in order to support and sustain their lives in a modern market based economy. However, implementation and execution of the dictates of ANCSA have been complicated. The language of the Act is "frequently ambiguous, and serious difficulties already have arisen in its implementation" (Lazarus and West 1976). One chief problem was the initial assigning of land rights to native villages. Village eligibility was determined by the number of native residents (a minimum of 25) residing in the village, and one "possessing a modern, urban character the majority of whose residents are non-native" (43 U.S.C. 1606). Unfortunately, the eligibility cases represented one of many cases where the ANCSA was administered in a way which "granted less than the law and regulations seemed to promise" (Lazarus and West 1976). Boundary disputes were also a common problem, (see the Central Council of the Tlingit and Haida Indians v. Chugach Native Association, civil case no. A-198-72), with Native groups pitted against each other in legal battles, a marked contrast to the peaceful coexistence once experienced by the Alaska Natives. It is clear that the assignment of property rights, counter to the traditional Native way of life and living with the environment, was not only insecure but also a cause for contentious disagreement.

Further discussion of the impact of the positive transaction costs of the negotiation and subsequent legal battles over land claims and use can be found in Walsh (1985) and Chaffee (2008). It is clear that although the two parties, the federal government and the Alaska Natives engaged in lengthy and involved negotiations over land settlements, the resulting outcome was not necessarily one generated the optimal outcome from a social perspective.

Transaction Costs

Although the Act was meant to determine Native land claims and bestow upon Native groups clearly delineated properties and boundaries, it seemed also to herald an era of new and difficult, not to mention expensive, legal problems and challenges. Prior to its implementation, there were extensive legal battles waged over land use and distribution, with Alaska Natives, conservationists, and business interests at odds with one another. Three conservation groups, the Friends of the Earth, the Wilderness Society, and the Environmental Defense fund filed a suit against the Department of the Interior. Their claim was that the DOI was in violation of the National Environmental Policy Act of 1969, from the permits it had granted to the owners of the trans-Alaska pipeline. Native groups also waged legal battles against the TAPS, claiming that the company had not hired Native contractors as had been promised. These are just a few examples of the lengthy and costly legal battles waged even prior to its full implementation.

Even after its implementation, the legal battles and costs did not end. A prime example is the case of the Koniag Corporation, one of the twelve Native regional corporations formed under the Act. Koniag encouraged the merger of the village corporations with the regional corporations in order to cut administrative costs and promote unity among the members. The regional corporation would assume control over all the village corporations' land, including valuable timber on those lands. Unfortunately, the village corporations filed suit against the regional corporation. It claimed that the regional corporation had deceived them as to the value of timber assets on their lands, with misleading statements sent to village corporation shareholders, resulting in a favorable vote for the merger. Legal costs were estimated to be $2.5 million dollars, a significant amount for a corporation that had received only $24 million from the ANCSA.

It is interesting to note that the costs of settling legal issues came from the funds awarded under the Act. Any legal or consulting fees resulting from any issues of Native land claims or pending claims were to be paid from the settlement funds (43 U.S.C. 1619, 2000). In effect, the Native corporations were responsible for their own legal costs for preparing for and settling any land claims associated with the Act. On the one hand, this move may have reduced the moral hazard problem associated with excessive litigation. On the other hand, it represented yet another way that the accounting of transaction costs (in this case, set up in a way to undermine the Native corporations if lengthy legal battles arose) is a vital component of the analysis of the outcome of the ANCSA.

CONCLUSION

The Alaska Native Claims Settlement Act was an unprecedented piece of legislation that determined Native land claims in the state of Alaska. Issues of clearly defined property rights and transaction costs in bargaining were particularly relevant as groups with competing interests sought to find a bargaining outcome that was mutually beneficial. The importance of transaction costs and secure and well defined property rights cannot be understated, as interest groups waged

legal battles over the use and allocation of lands in the state. The application of the Coase theorem to real world legal and economic situations necessitates a careful analysis of each of these, as they have a profound impact on bargaining and the outcomes of bargaining. Insecure property rights, as in the case of the Alaska Native groups indicates that bargaining may lead to more efficient outcomes. The application of the Coase theorem to the Act is an interesting one that considers the theoretical analysis and implications of the theorem to a complex legal question.

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A TEST OF TWO OPEN-ECONOMY THEORIES: THE CASE OF OIL PRICE RISE AND VENEZUELA

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ABSTRACT

Two major open-economy theories are the Keynesian and Monetarist theories. The goal of the study is to empirically discriminate between the two theories. Keynesian and monetarist views about the homeostatic mechanism are fundamentally different and provide a basis for constructing discriminatory empirical tests. The Keynesian theory holds that there is no, or only a very weak, homeostatic mechanism and, in the absence of government intervention, real income tends to remain below the level of full employment. In the monetary interpretation, the homeostatic mechanism is strong, and real income can be treated as though it were exogenous. This study examines the experience of Venezuela with respect to the sharp increase in oil prices in late 1973. The experience of Venezuela, as an oil-exporting country, supports the monetarist view.

INTRODUCTION

The Keynesian and monetarist theories dominate macro-economics, in general, and open-economies, in particular. The main goal of this study is to empirically discriminate between the two theories of open-economies.

Keynesian and monetarist theories contain fundamentally different views about the long-run equilibrium state of the economy. Their views differ on the effectiveness of market forces in re-establishing the full-employment level of real income. Keynesian theory views market forces as being weak in re-establishing the full-employment level of income, so that, in the absence of government intervention, real income tends to remain below the full-employment level. Monetarist theory, on the other hand, views market forces as being strong enough to re-establish full-employment relatively quickly. For classic references to the Keynesian approach, see Fleming (1962) and Mundell (1963, 1964). For classic references to the monetary approach to balance of payments, see Frenkel and Johnson (1976) and Johnson (1972, 1976).

This study, therefore, uses the different predictions implied by the two approaches with respect to the sharp increase in oil prices that took place in late 1973 to discriminate between them. The experience of Venezuela, as an oil-exporting country, is analyzed. The results support the monetarist view. For an exhaustive review of the theory and empirical evidence on the monetary approach to balance of payments and the limited ability of this literature in empirically discriminating between the Keynesian and monetary approaches, see Ardalan (2003, 2005a, 2005b, 2007, 2008).

This study is organized in the following way. Section II discusses the conceptual basis used for the construction of an empirical test to discriminate between the monetarist and Keynesian theories. Section III empirically tests the experience of Venezuela with respect to a major real shock, i.e., the sharp increase in oil prices in late 1973. Section IV summarizes the major conclusions.

CONCEPTUAL FRAMEWORK OF THE DISCRIMINATING TEST

This section discusses the construction of a test that can discriminate between the two open-economy theories. The approach is based on the different views Keynesians and monetarists have about the role of stability (homeostasis). This difference is considered the basis for constructing the discriminatory test. For a classic discussion of the ideas separating Keynesians and Monetarists, see Mayor (1978), Chapter 1, pp. 1-46. This paper uses the model and the methodology of Ardalan (2013) and applies it to the data from Venezuela. The model and the methodology of Ardalan (2013) are provided here for the reader's convenience.

The analysis concentrates on one of the fundamental issues separating monetarist and Keynesians – the effectiveness of market forces in re-establishing full-employment. In the monetary interpretation, market forces are strong and, in the long run, real income can be treated as though it were pre-determined. In Keynesian models, market forces are weak, and in the absence of government intervention, real income tends to remain below its full-employment level.

If market forces tending to re-establish equilibrium are strong and effective, the monetarist assumption that income can be treated as exogenous is reasonable. In that case, open-economy adjustment for a small country under fixed exchange rates must take place through changes in the stock of money or relative prices rather than through changes in employment and output. If market forces are weak and there is persistent under-employment, then income becomes endogenous as the positive feedback of multiplier analysis dominates the market feedback assumed by monetarists. In that case, open-economy adjustment normally involves alterations in employment and output. Restated, monetarists believe that a country's response to an external real shock will be through an adjustment in relative prices with no long-run change in employment and output. Keynesians believe that the adjustment will work through employment and output. These differing predictions provide a basis for the construction of a discriminatory test.

The controversy over stability (homeostasis) is based on different views about the effectiveness of market forces in re-establishing equilibrium. If market forces are effective, as monetarists believe, then if the economy is shocked, equilibrium tends to be re-established relatively quickly. If market forces are weak, as Keynesians believe, then the economy is at the mercy of random shocks and autonomous factors. If market forces tend to re-establish full employment quickly after some contractionary shock, then it is reasonable to view annual income as approximately determined by the existing labor force, capital stock, technology, etc. Keynesians, however, believe that it is only by coincidence that an economy is at full

employment because market forces are not strong, and a contractionary shock can lead to prolonged unemployment. In terms of the production possibilities frontier, monetarists believe that the economy is either on the frontier or moving towards it. Keynesians, on the other hand, believe that the economy tends to be inside the feasible set represented by the frontier. In terms of growth, given a random shock, monetarists permit a short-run deviation from the full-employment growth path, but believe that the economy tends to return to a full-employment growth path relatively quickly. Keynesians, on the other hand, believe that the economy will follow a new growth path, different from the original one. These differing views about the strength of market forces can provide the basis for the construction of a discriminatory test.

According to Keynesian theory, an increase in any autonomous expenditure results in multiple increases in income. In the international sphere, and under fixed exchange rates, this theory, which assumes exports are exogenous, implies the same multiplier relationship between exports and income.

Monetarists, on the other hand, have a different view. The macro-economic assumptions of the monetarists appear to rest, explicitly or implicitly, on the micro-economic foundations provided by the classical model of international specialization and exchange. In that framework imports are financed by exports and, in the absence of growth, there is no relationship between imports and income. A shift in tastes toward imports is an increased demand for imports and an increased supply of exports, either goods or assets. This shift in tastes may alter the composition of output, but it does not create unemployment.

For the monetarist theory, on a comparative basis, exports finance imports and there is no relationship between exports and income. The full-employment condition leaves no place for autonomous changes in exports to affect income. Admittedly, an autonomous increase in exports may cause output to increase in the short run, but over time, the economy will be pushed back to its original full-employment level and there will be no long-run increase in the output. This adjustment process can be visualized as an outward move of the economy beyond the production possibility frontier in the short run, and returning back to it in the long run. The price-theoretic approach of monetarists, of course, would be the vehicle for the adjustment process, i.e., the change in relative prices and the corresponding substitution in consumption and production.

Using time series data to estimate an export function, however, has no discriminatory power. In a growth context, monetarist theory also implies a positive relationship between income and exports. Given an outward shift in the production possibilities frontier, then income increases and so do normally the exports. An empirical link between exports and income, therefore, is consistent with both approaches and has no discriminatory power. However, if one were able to account for the effects of economic growth, then it might be possible to see if exogenous changes in exports affect income.

In order to account for growth, factors associated with growth can be introduced into the estimating equation (1):

Y = income

IM = imports X
= exports
POP = population
K = capital stock
T = index of technological progress
D = first difference operator

$$DY = a_0 + a_1.DX + a_2.DPOP + a_3.DK + a_4.DT \quad (1)$$

where population, the capital stock, and technological progress are treated as exogenous. Now, the effect of growth is captured by the last three variables. Therefore, a_1 can be interpreted as the effect of an autonomous increase in exports on income. From the foregoing analysis, a positive a_1 would support the Keynesian theory, while an insignificant a_1 would support the monetarist theory.

Unfortunately, this equation also does not provide a useful test. Exports are one of the constituents of income. Therefore, on an accounting basis, a positive relationship between income and exports is expected.

For the multiplier, i.e., equation (1), in order to overcome the problem of national income accounting, income can be decomposed into two elements: export income, X*, and non-export income, Y*. The foreign trade multiplier can now be expressed as follows:

$$DY^* = b_0 + b_1.DX^* + b_2.DPOP + b_3.DK + b_4.DT \quad (2)$$

In equation (2), Keynesians expect b_1 to be positive on the basis of the multiplier theory. In an IS-LM framework, and under fixed exchange rates, the increase in exports is shown as a shift of the IS curve to the right, and the resultant inflow of reserves increases the money supply which is shown by the LM curve shifting to the right. This process continues until IS and LM curves intersect at the fixed level of world interest rate, but at a higher level of income. For this issue, see Mundell (1963). Monetarists, on the other hand, expect b_1 to be negative. The reason is that an increase in exports, in conjunction with the long-run full-employment assumption, results in a decrease in non-export income. With a given production possibility frontier, an increase in the production of exports results in a reduction in the production of other commodities.

The idea reflected in equation (2) can be used to determine the effect of the oil price rise in late 1973 on Venezuela, because this country tended to retain fixed exchange rates. The basic idea behind equation (2) can be expressed as follows: Given an autonomous increase in exports, Keynesians believe that through the multiplier process output in the non-export sector will increase. Monetarists, on the other hand, permit a short-run deviation above full employment, but believe that the economy soon returns to the "natural rate of unemployment," which implies a reduction in the output of the non-export sector as resources are drawn into the production of exports.

In short, for the exporting country of an important raw material, an exogenous increase in the value of the raw material leads to two different outcomes by Keynesian and monetarists. Keynesians, based on the multiplier process, believe that when there is an exogenous increase in the value of an export, the income of the exporting country increases and stays high. Monetarists,

based on their view of market forces, believe that even though the income for the exporting country may go up in the short run, it will soon return to the full-employment level. This difference suggests that the test can be applied and evaluated, which is done in the next section. The exogenous shock examined is the increase in oil prices in 1973-74. The oil-exporting country considered is Venezuela.

STATISTICAL APPLICATION OF THE DISCRIMINATING TEST

The purpose of this section is to see whether the consequences of the oil price rise for an oil-exporting country are more consistent with the Keynesian or the monetarist theory. This section examines the response of Venezuela, an oil-exporting country, to the sharp increase in oil prices in late 1973. The annual data are obtained from various issues of I.M.F.'s "International Financial Statistics" for the 1953-1978 time period. Note should be taken that data collection was stopped at 1978 which marks the point of the next round of oil price rise.

A clear example of an exogenous shock in the international sphere is the sharp increase in oil prices in the mid 1970s. In late 1973, there was an unprecedented increase in oil prices, which is treated here as a purely exogenous shock to an oil-exporting country. It was exogenous because it was based on the negotiations that took place among Organization of Petroleum Exporting Countries (OPEC). It was a shock, because the magnitude of the change was huge and sudden; within three months oil prices tripled. There is a sizable literature on various issues related to the oil price shocks. See, for example, Farzanegan and Markwardt (2009), Jimenez-Rodriquez (2008), and Zhang (2008). On this issue see Jahangir Amuzegar (1977), p. 60.

Venezuela is chosen as the oil-producing and oil-exporting country. There are two reasons for this choice. First, this country is a member of OPEC, and oil exports constitute a major portion of its income. The oil price rise, therefore, is considered a major exogenous shock to this country. Second, Venezuela is one of the few OPEC members for which there are sufficient data. Iraq and Algeria, for example, were candidates, but the data for these countries were not continuous and did not go back far enough to constitute a sufficient number of observations for a reliable statistical test. Moreover, data for these two countries were not continuously available after 1973, so there was also not enough information about the consequences of the oil price rise of late 1973.

The tremendous increase in oil prices in late 1973 resulted in a huge increase in the value of oil exports for the oil-exporting country. Given fixed exchange rates, Keynesian theory implies that the export multiplier goes into effect and increases the output of the economy, i.e., the increase in oil exports results in an increase in both oil income (X*) and non-oil income (Y*) because of the increase in domestic aggregate demand. The monetarist theory, on the other hand, grants that non-oil income may increase in the short run, but not in the long run.

In terms of the growth path for non-oil income of the oil-exporting country, Keynesian theory suggests that the country will move on to a new higher growth path than the country would have otherwise followed, and the monetarist theory implies that even if non-oil income

deviates from its growth path in the short run, it will revert back to the original growth path in the long run.

As a statistical test therefore, if the growth path of non-oil income is predicted beyond 1973 on the basis of pre-1973 information Keynesian theory implies that the actual values for non-oil income will be higher than the predicted values, while monetarist theory implies that the values for non-oil income may deviate from the extrapolated values in the short run, but will coincide with them in the long run. This test is performed on non-oil income, as opposed to total income, because total income encompasses oil exports and the huge oil price rise will be reflected in total income. In order to overcome this problem, non-oil income, i.e., total income minus oil income, is analyzed.

Using the time trend approach, the non-oil income is regressed on polynomials of time of different degrees, and the best fit is chosen. Although such a procedure is far from ideal, it appears to be satisfactory for purposes at hand because there is no reason to believe that it biases the results in favor of either approach. The results for equation (3), below, are reported in Table 1. It is adjusted for serial correlation. In order to adjust for serial correlation, there is a two-step procedure. The first step is to find out the error structure by regressing the present error term on its past values. The second step is to incorporate this information and re-estimate the original regression. In the first step, the order or the degree of correlation is known, and in the second step, the original regression is estimated by accounting for the degree of serial correlation in the error term. Rho indicates the coefficient of serial correlation that is adjusted for.

$$\text{LOG } Y^* = c_0 + c_1.T + c_2.T^2 \qquad (3)$$

The estimated equation is used to predict non-oil income beyond 1974 under the assumption that oil prices would have behaved after 1974 as they did before 1973. The actual and predicted values for non-oil income are given in Table 2 and plotted in Figure 1. The 95 percent confidence limits for the predictions are given in Table 3 and plotted in Figure 2. The results support the monetarist theory. There is a surge in non-oil output in 1973, but within two years the country essentially has returned to its original growth path.

SUMMARY AND CONCLUSION

Two major open-economy theories are the Keynesian and monetarist theories. The goal of the present study is to empirically discriminate between the two theories. Keynesian and monetarist views about the homeostatic mechanism are fundamentally different and provide the basis for a discriminatory test. Keynesian theory holds that there is no, or only a very weak, homeostatic mechanism and, in the absence of government intervention, real income tends to remain below the level of full employment. In the monetary interpretation, the homeostatic mechanism is strong, and real income can be treated as though it were exogenous. This study examines the response of Venezuela to the sharp increase in oil prices in late 1973. The experience of Venezuela, an oil-exporting country, supports the monetarist view.

Table 1
TREND IN NON-OIL INCOME

c_0	c_1	c_2	R-squared	D-W	Rho
-1.769	0.065	0.001	0.98	1.44	0.47
(-58.70)	(27.80)	(8.07)			

The numbers in parentheses are t-statistics.

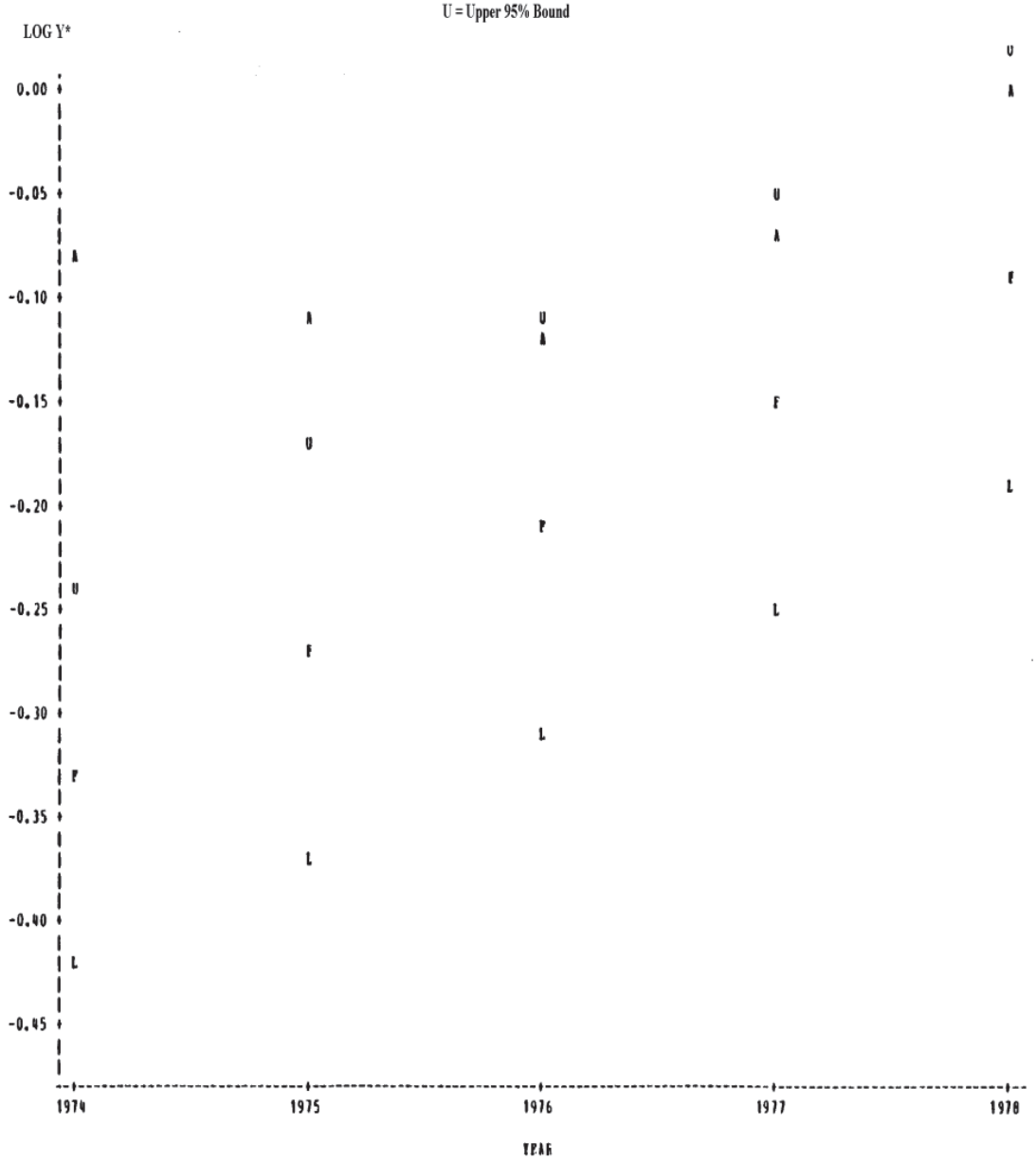
Table 2
ACTUAL AND PREDICTED VALUES FOR LOG Y*

Year	Actual	Predicted
1953	-1.7728	-1.7038
1954	-1.6679	-1.6384
1955	-1.5965	-1.5731
1956	-1.4796	-1.5078
1957	-1.3310	-1.4425
1958	-1.2868	-1.3771
1959	-1.2577	-1.3118
1960	-1.2853	-1.2465
1961	-1.1995	-1.1811
1962	-1.0952	-1.1158
1963	-0.9929	-1.0505
1964	-0.9924	-0.9852
1965	-0.9240	-0.9198
1966	-0.8719	-0.8545
1967	-0.8213	-0.7892
1968	-0.7353	-0.7238
1969	-0.6945	-0.6585
1970	-0.6039	-0.5932
1971	-0.5709	-0.5278
1972	-0.4605	-0.4625
1973	-0.3772	-0.3972
1974	-0.0821	-0.3291
1975	-0.1089	-0.2724
1976	-0.1195	-0.2118
1977	-0.0687	-0.1493
1978	0.0008	-0.0859

Table 3
ACTUAL, PREDICTED, UPPER, AND LOWER BOUNDS FOR LOG Y*

Year	Actual	Predicted	Upper Bound	Lower Bound
1974	-0.0821	-0.3291	-0.2394	-0.4188
1975	-0.1089	-0.2724	-0.1739	-0.3709
1976	-0.1195	-0.2118	-0.1106	-0.3130
1977	-0.0687	-0.1493	-0.0466	-0.2520
1978	0.0008	-0.0892	0.0181	-0.1899

Figure 2
Venezuela: Confidence Interval for Forecasted Value of LOG Y*
A = Actual
F = Forecasted
L = Lower 95% Bound
U = Upper 95% Bound



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WATER AND WEALTH: A GUATEMALAN CASE STUDY

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ABSTRACT

The world has invested billions of dollars on water supply and sanitation. A growing body of literature investigates the benefits of these investments. Significant research exists on relationships between drinking water and health; sanitation and health; drinking water and economics; and sanitation and economics. However, very little peer-reviewed, scholarly, quantitative research exists linking the four factors together: drinking water, sanitation, public health and economics. Even fewer of these studies are longitudinal. In addition to documenting the relationships, this manuscript builds a foundation upon which future studies can build an understanding of these relationships over time.

This paper investigates drinking water, sanitation and the economic situation of 160 families currently living in San Lucas Tolimán, Sololá, Guatemala. Over the past decades, the families have been able to purchase small plots of land in two small communities on the outskirts of San Lucas. The two communities are Sanik-Ya and Chitulul. Currently the families have to walk from one to four miles to reach their land. The 160 families want to move to their land in Sanik-Ya and Chitulul. The major problem facing the families is that the closest source of water is a number of miles away. Once the villagers install a drinking water system they will be able to move to their land, improving the quality of their lives substantially.

Sanik-Ya and Chitulul are working with the support of the non-governmental organization (NGO) Agua del Pueblo (AdP). AdP has built over 700 drinking water projects benefiting 20% of the rural population of Guatemala. This paper will also provide a brief history of AdP and a description of the proposed project.

At the time of this writing, the communities have installed the majority of the pipeline. Furman University in Greenville South Carolina and the People's Consultants (PC) have provided the majority of the capital costs to date. The People's Consultants is a non-profit organization founded in 1973 to help establish AdP. The Internal Revenue Service recognizes PC as a non-profit under section 501(c)(3). Donations for the project can be made through PC's web site: http://peopleswater.org/. The San Lucas Mission has also supported the project. The Rotary Clubs of Santa Cruz, California, the Peninsula Sunrise Rotary in Redwood City, California and Rotary International are also contributing to and considering supplying additional funding for the project.

The researchers collected the data through a survey of 40 randomly selected families of the160 families. The survey included qualitative and quantitative questions on current water, sanitation and economic conditions. The results of this survey show that the greater the family's wealth the more willing they are to support the water project financially, participate in conversations with others while collecting water, and use lake water. The data also demonstrated that the families living in certain parts of San Lucas were better off financially.

Key Words: Development, Water, Economy, Sanitation, Agua del Pueblo, Guatemala, Case study

INTRODUCTION

One of the United Nation's Millennium Development Goals is to halve the population without sustainable access to safe drinking water and basic sanitation by 2015 (United Nations, 2010). The goal will be challenging with 884 million people worldwide currently lacking access to safe drinking water and 2.6 billion lacking basic sanitation services. An important aspect of this goal is that it specifies sustainable access. Recent literature has demonstrated that sustainable development depends on a high level of community involvement, or more importantly, community management (Clemens, Karp, & Papadakis, 2002; Laverack, 2001; Shortall & Shucksmit, 2001; Wegelin-Schuringa 1998; Rifkin, 1990; Fox, 1992). Differences exist between the developed and developing world (Lasmin, 2011; Violet & Alexander, 2009). The difference between community involvement and community management is that community management involves the community in the decision making process. In community management, the community owns and eventually maintains the systems, leading to a stronger sense of ownership and empowerment. '… Local residents must be viewed as the key actors, the subject of their own problems and not as objects for who outside institutions must plan and do things' (Espinosa and Rivera, 1994:16). This is one of the key factors of interest in effective development and water development is the method used in this case study to create community empowerment. A similar study concluded that 'WD [water development] in its present form is a necessary but not a sufficient condition to sustain rural livelihoods. However, WD does carry the potential for enhanced livelihood security' (Reddy et al. 2004:324). Agua del Pueblo (AdP) is a non-profit, Non-Governmental Organization (NGO) founded in Guatemala with the goal of assisting rural communities to obtain improved water and sanitation systems. Arguably AdP's greatest success is its efforts to empower local communities. AdP's methodology ensures that communities develop themselves, assist other communities in development projects, and successfully maintain their own systems (Evans & Appleton, 1993). The director of AdP emphasizes that the goal of AdP is not merely water or sanitation, but to use these projects as a means to address poverty and underdevelopment (P. Quijivix, personal communication, May 25, 2011).

AdP and similar organizations have developed not only Guatemala, but throughout the developing world in order to combat poverty. Kay 1991 explains how the globalization of capitalism has almost forced these types of groups and disparities, even within countries. He goes on to explain the Centre-Periphery economic theory which argues that capitalist growth in the centre (developed countries) allows for growth and development, but simultaneously puts pressures on the periphery (developing countries) which prevent the areas from benefitting from market and technological advances as easily. The three main reasons to which he points are: surpluses in labour, a lack of unionization, and higher export competition when compared to the developed nations (Kay, 1991). A simple example of this problem was the highly variable price in coffee, a major cash crop grown by many in Guatemala. The varying price made living

difficult for many locals, before a supporter of AdP, the late Father Greg Schaffer offered a program where the nearby parish would offer a constant price for coffee. The parish would use any profits from unexpectedly high prices to offset losses from unexpectedly low ones. This program is simple by design, but the ability of farmers to know what their crops would earn them in advance was an invaluable tool which allowed them to apportion their spending accordingly. As such, this program greatly helped improve coffee farmers earnings and allowed them to improve their daily lives over time. This type of solution; simple, but effective and meaningful is exactly what AdP works for and incorporates into towns to allow for growth to spur further growth.

Agua del Pueblo's History

A number of foreign and Guatemalan volunteers formed Agua del Pueblo, 'the People's Water,' in 1972 in San Lucas, Tolimán to help three local villages obtain potable water. Agua del Pueblo (AdP) follows a specific methodology while helping a community to ensure maximum impact. First, AdP only responds to 'felt needs'. That is, AdP does not solicit communities for projects. Communities must approach AdP directly. This method ensures that the community is already organized and that a communal demand exists for an improved water system. Reddy (1999) showed evidence that this improves the likelihood of successful collective action. When comparing two similar villages, the economically poorer and more water scarce village was more effective in community action for societal benefit. She declared that, 'these apparent disadvantages seem to be reasons behind, if not necessarily conditions for, the success of collective action' (Reddy 1999:90). Soon after a community contacts AdP, AdP 'barefoot engineers' perform a one-day, preliminary engineering and socio-economic study. AdP discusses the results of this preliminary study with the entire community. The preliminary study includes a number of options as well as preliminary cost estimates. AdP's preliminary cost estimates have consistently been within 10 per cent of final costs. The AdP methodology requires that the community form a 'water committee' to represent and organize the community. The community itself is responsible for a portion of the financial costs of the project, and all of the labour of the project.

In order to facilitate their work, AdP also trains Technicos de Acueductos Rurales (TARs). A TAR is a 'Rural Water Technician;' local residents trained in the supervision, management, planning, design, and construction of rural potable water systems (Clemens et al, 2002).

AdP ensures that the entire community receives adequate training and is fully informed of all expectations such as the cost that they will burden and labour that may be needed (Evans, & Appleton, 1993; Clemens et al, 2002). By involving the community in the decision making process and requiring some financial input, AdP gives the community a full sense of ownership and itself provides merely a supporting role. As Arlosoroff (1987: 37) argued,

> *While many communities may need financial help, relegation of their role to that of recipients without significant participation has often resulted in an inappropriate choice of technology and service level, wrong location of the water point, unnecessarily high cost, inability to keep the scheme operating, and ultimately user rejection.*

Finally, the training ensures that the community will be knowledgeable enough to reap the full benefits of their system and to maintain the system themselves without the need of

significant outside intervention. This method focuses on keeping the communities in control of their projects, which Lockwood (2004) explains will ensure that communities are invested in the project and will work to ensure that it and its benefits are lasting.

Recent literature provides evidence of the benefits of community empowerment for sustainable development and progress. Espinosa and Rivera (1994:14, 28), argue that 'this kind of model and methodology are not only viable but also more successful than traditional models' and that 'active community participation in developing and implementing solutions can lead to a sense of ownership by the community that greatly increases the sustainability of a given activity or enterprise.' Subsequent researchers support and extend the argument (Campos and Zapata, 2013 and Owusu, 2013). Swaminathan (1995) demonstrated that public action involving the community with an organized group such as AdP is *necessary* to help raise standards of living.

Espinosa and Rivera (1994) found that the residents in Guatemala City were able to adapt a health and sanitation program to bring about other benefits such as literacy improvements, preschools, and even a leadership-training program. Campos and Zapata (2013) add that community focused programs often expand into neighbouring locations. Clemens, Karp and Papadakis (2002) described how AdP projects provided such ancillary benefits (Clemens et al, 2002). Fox (1992) found similar results in Mexico in which a small government branch supported local farmers to band together in order to improve their agricultural success. This group further advanced into its own network, 'Lázaro Cárdenas Ejido Union' (UELC) (Lázaro Cárdenas communal farmer Union). The UELC now includes not only farming support, but owns its own fertilizer production facilities and sponsors house development/improvement projects as well. This ULEC even supported the development of another similar, but larger network, the National Union of Autonomous Regional Peasant Organizations (UNORCA).

In AdP's first 30 years, the non-profit organization trained more than 700 public health workers, constructed over 21,000 latrines, and benefited over 100,000 residents (Clemens et al, 2002). AdP's efforts in Guatemala have helped the country enjoy considerably higher rural water supply coverage than countries in similar situations in Latin America. In some Guatemala states, 92 per cent of the residents have access to sustainable drinking water. Some more economically developed countries such as Brazil are as low as 58 per cent (Solanes and Jouravlev, 2006). The rural poor are especially in need of support such as this as they often lack their own voice to work towards development. Having AdP give them the chance to ask for developmental assistance and have them develop their own representatives to support self-development is crucial to the success of the long-term development after the initial project's end (Fox, 1992).

Recent interviews confirmed that local residents recognize the benefits of the AdP methodology. One key is the transparency of non-profits (Elson, O'Callaghan, Walker, 2007; Smith & Richmond, 2007). Resident Felipa Umul Cotuc explained that, 'the community was isolated, but now we are starting to band together. Other committees have attempted and failed projects such as this, but they were formed for their own benefit… This committee does it for the community.' (Personal communication with lead author during interviews, May 2013).

AdP foreign and local staff has supported the rural poor in Guatemala. Kay (1991) provides a theoretical explanation. The author suggests that having one dominant mode of production "leads to the subordination and exploitation of certain economic and social sectors, of certain segments of the population from certain geographical regions, by others" (Kay, 1991:40). This explains why rural Guatemala is in much more need than urbanized Guatemalan areas such as Guatemala City or Antigua. Kay also states that this type of "internal colonialism" is separate

from rural-urban relations and class relations as it is based in discrimination, which cuts across class lines. Guatemala has a turbulent history of this discrimination of the indigenous, a 36 yearlong civil war between the government and primarily rural indigenous. AdP and AdP sponsored committees were at significant risk. The Guatemalan federal government considered rural individuals supporting community empowerment possible rebels. Regretfully, AdP training increased local risk. Due to the economic inequality and the process of "internal colonialism" AdP has focused on supporting the 'poorest of the poor'.

Des Gasper (1996) suggested that culture is an integral part of development and must be considered. Gasper discusses that there are multiple ways to view culture, which can drastically change the outcome of development attempts (Gasper 1996). AdP is not prone to bias towards imposing western beliefs on other societies as AdP has become fully run by Guatemalans themselves.

Specifics of the Case Study

The Sanik-Ya and Chitulul project is a good choice for this case study for a number of reasons. Currently, only one family lives full-time in Sanik-Ya and Chitulul. The people who own property in these areas are living in the neighbouring city of San Lucas Tolimán. San Lucas Tolimán (population 30,956) is the municipality to which Sanik-Ya and Chitulul belong (Instituto Nacional de Estatística, 2013).

The large majority of these people would rather live in their properties in Chitulul and Sanik-Ya, but are unable to do so because there is not currently any water system available. Moving to their larger properties in Sanik-Ya and Chitulul will significantly improve the lives of these families. They own their own land in Sanik-Ya and Chitulul, but many now rent in San Lucas. Families would be able to work their fields more effectively, which is vitally important in an agrarian society such as this. Families also explained during the interviews that their small city-size living areas force them to live in small, cramped homes with as many as eight family members in a home meant for two. The interviews will be discussed in more detail later in the methods section.

Although San Lucas does have a municipal water system, the system does not deliver potable water throughout the day to all residents. The interviewers asked several questions pertaining to the current situation with water. The large majority of the respondents had significant problems with the adequacy of their current water source. The existing water system pumps water from Lake Atitlán, which San Lucas borders, into two tanks before distributing it. Unfortunately, the lake is heavily polluted. Residents will often bathe in the lake and wash clothes using chemical detergents. Another concern is that the rainwater washes all waste from San Lucas into the lake.

Lake Atitlán's situation has deteriorated to a point so low that the Global Nature Fund named it the threatened lake of the year in 2009 (Global Nature Fund, 2013). Many towns border this 130 square kilometre lake and as many as 74 per cent of the people living in these areas are living in poverty. The lake suffers from litter and chemical contaminants and began to show the extent of this contamination in 2008 with a large algal bloom. This bloom covered 75 per cent of the lake at one point. An inlet such as the one that San Lucas Tolimán uses is more affected by the higher concentration and lower flow of the area (Global Nature Fund, 2013).

The municipal system only chlorinates the water; it does not remove all of the pathogens from the water. Interviewees shared numerous complaints about the water system. The

chlorinator on the municipal system tends to cause problems. Some residents complained about contamination and a lack of chlorination in their water. Other residents complained about over chlorination causing skin and stomach irritation. One of the families explained that their water sometimes arrives so highly chlorinated that the vapours generated from boiling were noxious. Other complaints included contamination such as trash or chemical contamination. One interviewee explained that the water would come in so contaminated that it was yellow after large rains. Due to these reasons and more, most residents do not believe that their current source is healthy to drink. Most will either boil it before drinking it or buy bottled water. The Municipality charges 10 Quetzals monthly (approximately $1.30US) for municipal water. With some families making fewer than 200 Quetzals a month, even the monthly payment can be difficult to manage. Bottled water is far too expensive for many Sanik-Ya and Chitulul project participants.

The municipal system does not function adequately for many residents. Some families explained that they have been forced to go as many as 15 days without access to water. During which times they must either buy bottled water for all uses or resort to walking to the lake for their water. Other interviewees mentioned that they only have access after dark until sunrise. This leads to further problems with health. Those without water will go directly to the lake and thus be using completely untreated, polluted water. Another concern according to Tonglet, Isu, Mpese, Dramaix, and Hennart (1992) is that a distance greater than a five-minute walk can lead to less water being used and increased illness. This applies to the majority of San Lucas as people live between approximately five to 20 minutes away from the lake.

Figure 1 illustrates the boundaries of San Lucas Tolimán as well as Chitulul and Sanik-Ya. This figure also provides the location of the intended water system and the current tank, which will serve as the source for Sanik-Ya and Chitulul.

Figure 1: San Lucas, Sanik-Ya, and Chitulul

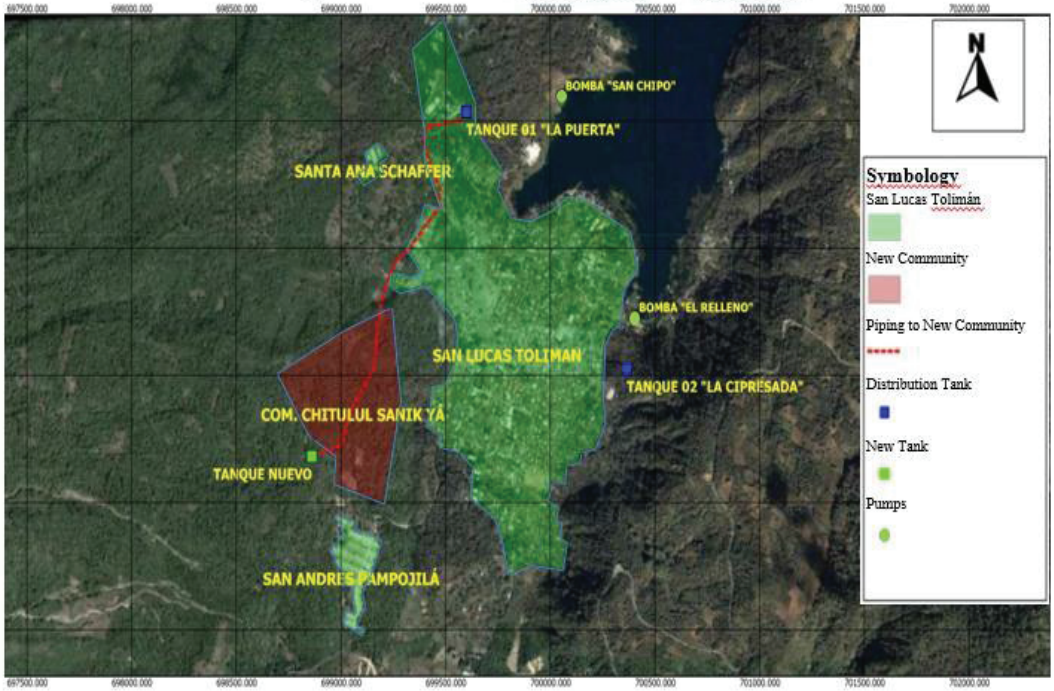

Figure 1 depicts an image of San Lucas, Tolimán with boundary lines for the city and for the planned towns of Sanik-Ya and Chitulul. It also shows a dotted line from the current tank to the planned area of the second tank. Map provided by Francisco Javier Juarez Santizo. The Spanish is translated as below:
1. Bomba "San Chipo" = Secondary San Lucas Municipal pump (San Chipo).
2. Tanque 01 "La Puerta" = Existing municipal tank ("The Door") from which the project will pump.
3. Santa Ana Schaffer = Adjacent community named for Monsignor Gregory Schaffer (RIP).
4. Bomba "El Relleno" = The original still-functioning San Lucas municipal pump.
5. Tanque 02 "La Cispresada" = The original distribution tank for the municipality of San Lucas.
6. Tanque Nuevo = The new tank designed for the Sanik-Ya and Chitulul communities.
7. San Andres Pampojilá = Adjacent town named for the Pampojilá plantation

THE CASE STUDY: THE SANIK-YA AND CHITULUL WATER PROJECT

Ordinarily, AdP helps supply water to existing villages without adequate access to water. In this situation, AdP is providing water to a new area to allow people to begin moving there. According to Victor Racancój, the Chairperson of AdP's Board of Directors, this is likely to become more common as over-crowding in cities is becoming a larger problem (personal communication May 2013). The Sanik-Ya and Chitulul system will use municipal water that is pumped to one of the two distribution tanks. The north tank that the project will use draws water from the cleaner area of Lake Atitlán. The project will install a booster pump at the north tank and connect it to another tank. The new tank will be placed at the highest point of the two communities, near San Andres Pampojilá. From this new tank, the water can flow by gravity to Sanik-Ya and Chitulul.

Unfortunately, this system is more costly per capita than a typical AdP project. Water must be pumped more than four kilometres to a height of more than 90 meters above the existing tank (Simon, 2013).

The new system will provide a significantly more consistent supply. Just this increased consistency can be quite beneficial. According to Esrey, Feachem, and Hughes (1985) increased quantity of water can have a greater impact than water quality improvements. The plan is to install an additional chlorination system to improve the quality of the water as well. This improvement in water could dramatically change the lives of those in San Lucas as the World Bank feels that unsafe water causes about 88 per cent of disease in the developing world (Fogden & Wood, 2009). An often-overlooked concern of illness is not the direct cost of health care, but the indirect cost of lost school or workdays adding a further economic burden (Fogden & Wood, 2009).The total estimated cost solely for water project materials is $100,000. Agua del Pueblo will design and oversee the construction. US university students have collected over $29,000 dollars including a grant from the Duke Endowment. Fundraising for the project is still underway.

The potential beneficiaries are already hard at work. Sanik-Ya and Chitulul have established a Concejo Comunitario de Desarrollo (COCODE) (Community Development Council). The Council has rallied the people towards building a large, improved road connecting Sanik-Ya and Chitulul to San Lucas. The road will not only make the process of building the tank much simpler, but it is also helping the community feel united, see real progress in their work, and improve the situation for many who currently use the road for their profession or to collect firewood. The community is building the road in a sustainable manner. The road is designed to withstand the rainy season by placing a spillways of basalt and granite rock in the road every 10 meters. This stone line is a simple way to minimize erosion. The future residents of Chitulul and Sanik Ya are building the road by hand with solely volunteer labour on Sundays.

Francisco Juarez, the first Vocal of the COCODE and Carlos Simon, AdP's lead engineer, estimate that, once the funds are available, the entire project could likely be finished within three months (F. Juarez and C. Simon, Personal communication, May 10, 2013). An interesting story worth noting is that although Francisco Juarez is the first Vocal, the highest non-officer rank in the COCODE, Mr Juarez does not own nor intend to purchase land in Sanik- Ya or Chitulul. He is helping with the project significantly and doing so only out of his good spirit.

METHODS

Measures

Wealth: The researchers measured the level of wealth using the mean of the weekly wage, monthly wage and a coded value for the profession of the main family breadwinner (Cronbach's alpha of 0.83). The researchers uncovered four categories of professions: Jornaleros, Agriculturalists, Artisans, and Salesmen. Jornalero refers to a generic day labourer without a specific profession. Artisans included professions such as shoemakers, masons, bakers, etc. Salesmen included accountants. The researchers assembled an expert panel from Guatemala to rank the wealth of the four professions. The researchers coded the four categories of profession from one to four from least wealth to most wealth. This value was then averaged with coded values for both the wage made within the past week, and the wage made within an average month for the families interviewed to obtain the measure for wealth.

Location: Before the interviews were conducted, the COCODE separated the families into four separate teams based on their location. The COCODE assigned the teams so that the interviewers would be able to more effectively interview all 40 families. As each team interviewed a different area, the researchers used the team, which interviewed the family to measure location.

Willingness to Support the Project: The researchers and AdP were interested how willing the community was to financially support the project. The researchers measured willingness to support the project in three ways: the family's willingness to support the project in order to obtain a cleaner source of water, to obtain a closer source of water, and to obtain water within 30 feet of their home. The researchers kept these three questions separate.

Problems obtaining water: This was an open-ended question asked to residents and explained by the members of the COCODE who assisted with the interviews. Instead of coding this question based on the problems explained such as inconsistency of the system, contamination, over chlorination, the researchers felt that coding it on a simple yes or no basis should suffice to show correlations between this and other parameters.

Number of people in the house age 15 or younger: This was a question to understand how large average families in the area may be and to understand how more children in a household may affect sanitation, water, or economic situations. Any child under 15 who lived in the home was included as many homes contained more than one family.

Use of rainwater: The interviewers asked if the residents made use of rainwater to any extent. If they answered yes, they were asked a rough approximation of how much they depended on this source. As Guatemala has a seasonal climate with heavy rains during half of the year, and a dry period for the other half it is not possible for one to survive with solely rainwater.

Use of lake water: The interviewers asked families if they made use of any sources of water other than their main source. The main source for all families was the municipal source. The only responses garnered from this question were use of rainwater and direct use of the lake water.

Survey Development and Use

The authors designed the survey based on a previous study of water and economic development (Elmendorf and Buckles, 1980). Survey interviews have the advantage of obtaining contextual data (Brears. 2012). The research team translated the survey into Spanish. Women typically have the largest vested interest in improving the water and sanitation (Elmendorf and Buckles 1980; and WHO/UNICEF 2010). In fact, the one family, which has moved to their property, told the researchers how the man of the house was unsure of the move until his wife pushed the decision and convinced the family to move. In general, women are the most impacted by water related tasks. Thus the researchers had to obtain the majority of the data from women. The first language of the majority of the population is Kaqchikel, the local Mayan language. Typically the older women did not speak Spanish.

Members of the COCODE translated the Spanish survey into Kaqchikel. The research team randomly selected 40 of the 160 families who own property in Sanik-Ya and Chitulul. The research team of ten students, two faculty members and a guest conducted all of the interviews. The COCODE divided the 40 families into four geographic groups to minimize travel time. The lead researcher assigned four research teams, one to each of the four groups.

The process began with students reading a Spanish Institutional Review Board (IRB) approved consent form. The interviewers read the survey questions in Spanish, and the COCODE representatives translated into Kaqchikel. The researchers gave the residents time to respond fully before the committee member would translate the Kaqchikel response into Spanish for the interviewers. The research team recorded all interviews to ensure accurate translations.

The research team contacted Francisco Juarez of the COCODE before the field visit to help prepare the communities for the interviews. Thanks to the COCODE, the residents were fully prepared. In fact, most of the villagers were looking forward to the opportunity to assist the researchers. After selecting the 40 families to interview, the researchers were surprised that families who were not chosen were actually disappointed and wished to talk to the researchers to discuss their situation. The COCODE collected additional detailed information on the professional and family situation of all of the 160 families to supplement the information collected through the survey.

The researchers input the raw data written in the surveys into an excel spread sheet. Subsequently the researchers reviewed the recordings to ensure accuracy. The researchers then entered the data into a coded system so that it could be run through the Statistical Package for the Social Sciences (SPSS) program. The researchers confirmed normality and established that heteroscedasticity was not a concern. Data were also input into an online geographic information system (GIS), ArcGIS developed by Esri, to determine if there were any variables, which were related to location.

RESULTS

Table 1 identifies the significant correlations between the variables. The most significant correlations were the relationships between location, wealth and water.

Table 1
Descriptive Statistics and Pearson's Correlation Coefficients

	Mean	Std. deviation	Number of responses	1	2	3	4	5	6	7	8
1. Willingness to pay for better water	2.37	1.03	38								
2. Location	2.79	1.15	39	-0.56***							
3. Willingness to pay for closer water	2.61	1.41	38	0.54***	-0.70***						
4. Willingness to pay for water within 30 ft.	3.29	1.11	17	0.34	-0.66**	0.64**					
5. Wealth	4.43	3.14	39	0.00	-0.42*	0.20	0.54*				
6. Problems obtaining water	1.16	0.37	38	0.24	-0.10	0.28	0.16	-0.06			
7. Members of household15 years old or younger	1.30	0.72	27	0.04	-0.29	0.38*	-0.05	-0.01	0.68***		
8. Use of rain water	2.05	1.26	39	0.4*	-0.27	0.13	0.38	0.02	0.11	-0.03	
9. Use of lake water	1.48	0.51	25	-0.40	0.45*	-0.24	0.59	-0.05	0.03	0.06	0.22

*Correlation is significant at the .05 level (two-tailed)
**Correlation is significant at the .01 level (two-tailed)
***Correlation is significant at the .001 level (two-tailed)

Researchers found one statistically significant correlation between the resident's willingness to pay to improve their water situation and their location. This applies to both a resident's willingness to pay for better quality water and closer water. What this is likely showing is that those who live further from the lake are more in need of and thus more willing to pay for improved water systems. Unsurprisingly, the data also show that those who were more willing to pay for better quality water were also more willing to pay for closer water.

Figure 2 is an ArcGIS image, which shows the willingness of each family to financially support the project. Each symbol's size is based on the willingness of the family to financially support the project. Figure 2 overlays this data on a satellite image of San Lucas Tolimán. The figure uses four different symbols for the four different interview teams.

Figure 2 San Lucas Data from ArcGIS online by ESRI

Figure 2 is a map of San Lucas with embedded figures created using ArcGIS. Each of the different symbols corresponds to a different interview group and the size of the symbol corresponds to the willingness of the family to pay for improved facilities. The larger symbols represent families who are more willing to pay.

Another significant correlation is the relationship between the number of children in the family and whether the family has had problems obtaining water. It was found that the more children in the household the less likely it was for the family to report problems obtaining water. This is likely because water collection largely falls on children and women in many areas. Thus more children provide more people getting the water (Elmendorf and Buckles, 1980).

It is probable that this is also why the number of children is correlated to the willingness of the family to pay for water on their property. This would be a way to free up time for the children and women of the home.

The data showed additional correlations between the location and the use of lake water as well as location and wealth. The data points to the idea that there are areas in the community, which are wealthier on average. It would seem that those further on the outskirts of the town were those who were less wealthy. This is not an uncommon finding with other papers in both developed and developing countries showing that wealth is tied to location (De Oliver, 1999; Venables, 2005).

As the centre of cities is commonly the area with most opportunity in terms of employment, living on the outskirts would be less desirable and more difficult, especially in a town so close to the mountainside were the outskirts are at risk for landslides.

The evidence also shows that those who are further from the lake reported a higher use of the lake water directly. This may seem counterintuitive, however since they live further from the lake they are also towards the edge of the municipal water system. As they live further from the lake, this means that they must walk even further to reach their water and are thus left with less time, another factor likely leading to the lower wages in these areas. Although the health information is still being collected, the researchers foresee a similar correlation between location and health (Arrossi, 1996; Esrey, Feachem & Hughes, 1985; Clemens and Douglas, 2012).

The results show a negative correlation between the use of rainwater and the willingness to pay for better water. The idea that those who use rain water are less willing to pay for better quality water would seem to point to the fact that those collecting rain water had already found a way to access fairly clean water and are thus in less need of it.

Finally the willingness to pay for water was significantly correlated to wealth. Those who were better off financially were more willing to pay for water on their property. This supports the results of Reddy (1999), which found that willingness to pay was positively associated with farm size, which can be considered another measure of wealth. Other work from the study by Reddy (1999) showed that some areas had such poor water pressure that they had inconsistent water supplies. This was shown to negatively affect their desire to pay for water in their homes, and actually showed indifference between household connections and stand posts. Water supply for many in San Lucas, especially those with less wealth, was incredibly variable as well with as long as two weeks without water reported. This could be an underlying cause for the correlation between willingness to pay and wealth as the rich having better views on water delivery systems than the poor, causing them to be more willing to pay.

The results of the survey will serve as the baseline of a longitudinal study of the area to obtain quantitative data explaining the benefits of improved water development and community empowerment. Numerous articles discuss the links between water, economics, sanitation, and health, but there are very few which are longitudinal and virtually none, which examine all parameters simultaneously. In previous research it was found that there was 'a direct positive relationship between investments in integrated projects in potable water supply and improved sanitation and economic development' as well as a positive relationship between public health and economic development (Clemens, and Douglas, 2012). It is hoped that this longitudinal study verifies and builds upon these findings, but as this is the initial data, only relative correlations between multiple parameters could be found at the time.

LIMITATIONS OF THE STUDY

One significant limitation was the sample size. Due to time and budgetary constraints, the researchers limited the sample to 40 families. Furthermore the data were all obtained from a single town in a single country. While residents of other areas may be in similar conditions, regionally dependent variables such as climate, geological conditions, etc. may play a significant factor (Nurmi and Uksvarav, 1996; Ward et al, 1999; Clemens, and Douglas, 2012).

Another limitation of the study is the language barriers between the interviewers and the native residents of San Lucas. The research team who performed the interviews did not speak the local Mayan dialect. Miscommunication could have occurred when the committee members translated between Spanish and Kaqchikel. In order to address this concern, the researchers recorded all interviews. The recordings are available from the lead author.

One unexpected limitation surfaced while reviewing the recordings. After reviewing the recordings it appears that some of the questions in the survey and some of the local translators seemed to have lead certain interviewees. Any case where it seemed like the translator may have led the question was thoroughly examined to be sure that the resident decided the answer himself.

The final limitation of this study is the reliance on self-reported information from the residents in an interview process. Much of the information desired was too personal and individual to be obtained in any manner other than a survey. Even occupation can be difficult to find in areas such as this without surveys as many men were 'jornaleros,' men who perform odd

jobs as their main source of income.

FUTURE RESEARCH

The data collected included economic, water, and sanitation information. Researchers from a medical school of a separate University are in the process of interviewing the same 40 residents to collect public health information. This paper presents only the beginnings of a longer-term research project. One short-term goal is to incorporate the health information into the current body of information. This research will also be used as the baseline data for a longitudinal study of the area. Such a study will provide valuable information on the long-term benefits of a water and sanitation project using community empowerment methods in terms of economics and health.

The authors and the COCODE of Sanik-Ya and Chitulul are committed to work with any and all researchers to continue this study. As discussed earlier, while the literature on water heath and economics has been growing, the authors were unable to find one longitudinal peer-reviewed study comparing water, sanitation, economics and health. The authors welcome additional research on this topic. The authors encourage future researchers to obtain the raw data from this research.

CONCLUSION

One purpose of this article is to serve as a basis for a longitudinal study to assess improvements, which are made during and after a water project using community empowerment methods. This article also provides correlations found within the initial data. Analysis of the interview data showed several parameters were related to specific areas of San Lucas Tolimán. Research also showed correlations between a family's willingness to pay to improve their water situation and their economic situation, use of rainwater, and number of children.

Subsequent research and the continuation of the longitudinal study will help to illuminate the complex nature of these parameters. Researchers will be able to further unravel the relationships between NGOs and rural communities. Others will be able to investigate how the interrelationships between many of these parameters can change, strengthen, or weaken over time. It is hoped that both NGOs and philanthropists will be able to use these results to help ensure that their work is even more effective.

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APPENDICES

Survey Used to Collect Information in Guatemala

1. Do you have water in your house right now? _____
2. Why do you not live in your property in Sanik-Ya or Chitulul?

   _____
3. A) Where do you obtain the largest part of your water during the year?

   _____

   B) Do you frequently use other sources during the year?

   _____
4. Do you use the rain for your water?

   _____
5. Do you reuse your water (for example, using the water from cleaning dishes for plants)?

   _____
6. Do you have problems obtaining water from these sources?
   Yes ( ) No ( )
   (If the response is yes, ask for which source and what the problem is)

   _____
7. Do you believe that the water that you drink is healthy for you and your family?
   Yes ( ) No ( )
   Why?

   _____
8. Do you believe that the time and work that you take to get the water is:
   Excessive ( ) Normal ( ) Little ( ) If the response is "Excessive," ask: if you were able to spend less time to obtain water, in what activity would you use this new free time?

_____

a. How much do you pay for your water? _____
b. Is the cost of water: High ( ) Normal ( ) Low ( )
c. How much do you and your family earn in a month? _____
d. And in the last week? _____

9. A) Would you be willing to pay more money to obtain better quality water to drink and other uses? No ( ) Yes ( )
If the response is No, ask why?

_____

If the response is Yes, ask: Little more ( ) Much more ( )
B) Would you be willing to pay more money to obtain a closer source of water for drinking and other uses? No ( ) Yes ( )
If the response is No, ask why?

_____

If the response is Yes, ask: Little more ( ) Much more ( )
C) Would you be willing to pay more money to have water within a distance ofthirty feet from our home? No ( ) Yes ( )
If the response is No, ask why?

_____

If the response is Yes, ask: Little more ( ) Much more ( )

10. Only for those who carry their water
a. Do you talk with other people in your community while getting water?
Yes ( ) Sometimes ( ) No ( )
b. Do you believe that this is good? Yes ( ) No ( ) Why?

_____

11. Do you have an idea of what could be done to help you and the community get a better quality of water?

_____

12. Why do you believe that this has not been done already?

_____

13. What system do you use for the elimination of your necessities?
( ) Latrine ( ) Vault with collection
( ) Bucket night soil collection ( ) Leave it on the ground
( ) Leave it for the animals ( ) Septic tank
( ) Other (specify) _____

14. Can you provide another time that you have worked with others on a project?

_____

15. Do you believe that you can work with other people to improve the system of water and waste disposal?
Yes ( ) Maybe ( ) No ( )
If the response is Yes, or Maybe, ask: With what group or organization would you be able to work with?

_____

In what conditions?
Voluntary work ( ) Work with pay ( ) Exchange work ( )

16. How old are you? _____

17. Profession of the head of the house _____
18. Number of people in the family that are over 15 years old (including the interviewee) _____
19. Number of people in the family that are 15 years or under _____
20. Would you like to add anything to the interview?

_____

Thank you very much for your participation in this interview. I hope to be able to help you in the fight for potable water.

STUDENT SUCCESS IN AN INVESTMENTS COURSE AND THE APPROPRIATE PREREQUISITE COURSE

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ABSTRACT

Business faculty frequently seek to make improvements in curriculum to enhance student learning. Part of enhancing student learning is having the student prepared to undertake a higher level course, rather than being put into a class for which the student does not have the required knowledge and skills. This paper reports the results of a study undertaken by a faculty group in finance seeking to ascertain if a potential prerequisite could enhance student preparation for an Investments course. Selected data were examined on 336 students who previously had completed the Investments course over 11 different semesters. Results of the analysis demonstrated that students who had successfully completed the prerequisite course prior to enrollment in Investments had statistically significant better examination results in the Investments class relative to those students who did not take the proposed prerequisite course or who took it simultaneously with the Investments course.

INTRODUCTION

Student success in any university-level course can be influenced by a multitude of variables. A few such elements are motivation, time devoted to the course, and having the proper background and preparation before taking the class. For most upper level business courses, having the proper background is very important as upper level courses often build on knowledge obtained in lower level courses. This need for the appropriate academic background is the reason why many courses have prerequisites.

As observed by Blaylock and Lacewell (2008) in a related study

> Even a casual glance through the latest AACSB Eligibility Procedures and Standards for Business Accreditation (2003) reveals an increased emphasis on standards related to the assurance of learning. Thus, the design of courses used as prerequisites for the basic finance course as well as the design of finance curriculums in general have taken on an increased level of importance.

The Investments course taught within a business school is an example of a course where students should do well. The class is filled with finance majors and with students taking the course as a voluntary elective, so motivation and interest should be high. Yet not all students are successful in the Investment course. One possible reason could be the lack of adequate preparation and background in finance, because students have not had the appropriate preparatory coursework.

To the extent that business faculty can ascertain which lower level courses prepare students for the upper level courses in their academic programs, the potential for student success should then be enhanced. This study focuses an effort to improve the likelihood of student success in an Investments course by ascertaining the correct prerequisite course.

LITERATURE

The literature related to prerequisite courses in learning goes back many decades (for example, Kellogg, 1939) with faculty members from virtually all disciplines exploring what can be done to enhance the learning process in business schools. Faculty members have long sought to understand what the key driving determinants of student success are. Implicitly if the determinants of success can be found, then instructors should be able to utilize that knowledge to promote student learning. Also understanding what factors enhance student learning would mean that faculty members could avoid wasting time and resources on unproductive activities.

One interesting paper in recent years was the work of Dale and Crawford (2000) who reported the combined results from two different studies that they had conducted in 1991 and 1998. A total of 684 students were included in their two surveys, with fairly similar results from the two groups. Using the final grade in an economics course as the dependent variable, they introduced several independent variables to explain the final course grades. Their independent variables were the gender of the student, days absent from class, hours accumulated towards graduation, age, and the number of additional courses in economics. They also noted that they did have to provide an adjustment for different instructors to make the data consistent. The two variables that proved significant in both of their surveys were class attendance and gender, with hours accumulated also found to be significant in the 1998 study.

Research by Buschena and Watts (2001) explored the significance of prerequisite courses for Intermediate Economics and for several agricultural economics courses for which Intermediate Economics was a prerequisite. They found that having completed the required prerequisite did not a statistically significant difference in student grades in the subsequent courses. They also found grade point average and a high math score on the Scholastic Aptitude Test to be significant in predicting which students would have better grades.

Terry (2002) explored the factors that resulted in higher students grades in the introductory corporate finance course. He found student performance to be related to gender, major, type of exams given, grades in prerequisite courses and grade point averages. However, when the data set was broken into two groups based on the types of exams given, gender and major (other than accounting) ceased to be significant.

Studies by Choudhury, Robinson and Radhakrishnan (2007) and Choudhury and Radhakrishnan (2009) examined the use of prerequisites for statistics classes. These studies focused on what skills or knowledge a student might acquire in prerequisite class rather than demographic factors such as age or gender that appear in many other studies. The primary conclusion from both of these studies was that when students had an option as to which prerequisite they take, the prerequisite taken did have an impact on the student's performance in the later class. They felt that was true because the students who took the more quantitative prerequisites tended to do better in the statistics class they took later.

DATA AND METHODOLOGY

The primary question in our study was whether or not the data would demonstrate that the students who had completed the Intermediate Finance course prior to taking the Investments course, had a greater level of success in the Investments course than those students who took

Intermediate concurrent with or after Investments. Success would be measured for a student by the student's final numeric grade average in the Investments course.

This study was conducted at the University of Houston—Clear Lake (UHCL), a medium size university in Houston, Texas. The only prerequisite for the Investments course at this university had been the introductory course in corporate finance (sometimes called business finance). The faculty in finance considered making a change in the curriculum by making Intermediate Finance as the prerequisite for the Investments course. Intermediate Finance is a more advanced course in corporate finance and has the basic corporate finance course as its prerequisite. It was felt that many students were not adequately prepared for Investments with only the single finance course that appeared in the business school's common body of knowledge courses, and that making Intermediate a prerequisite for Investments would have students better prepared for the latter course.

Our research project examined the performance of 336 students who had completed the Investments course in 18 different sections over 11 different semesters. Students who dropped the course were not included in the analysis. It is certainly possible that many who dropped the Investments course did so because they did not have the academic background necessary to perform well in the Investments class, which would further complement the results of this study. But that possibility remains only speculation as we were not able to retrieve adequate data on those students.

The key variable included in the analysis was whether the Intermediate course—the potential prerequisite course—was completed prior to, concurrent with, or after the Investments course. Some non-finance majors actually never took Intermediate Finance, but for our purposes that was the same as taking Intermediate after Investments. Whether taken later or never, it provided no preparation for Investments. Another potentially important variable reported for each student was the major field of study.

Some studies (for example, Dale and Crawford, 2000) cited in this work had to allow for differences between instructors in the advanced course. However, there was only one instructor for the Investments course at UHCL in the time period of study so no allowance had to be made in this study for different instructors.

Generally speaking student demographic characteristics were not important in this study, in part because the students in the Investments classes were fairly homogenous. UHCL at the time of the study was an upper division university that enrolled only juniors and seniors at the undergraduate level, with students completing their first two academic years at another institution. Since every student was a junior or senior, they were approximately the same age, each student had at least two but now more than three years of college experience behind them, and had about the same number of cumulative university hours.

As observed by Islam, Khan, Wilson and Gooch (2008) when discussing their study

> Research has focused on the role of students in educational outcomes, but the role of academic institutions has not received much attention. This paper focuses on the effectiveness of institutional intervention; it does not address the variables that are controlled by the students.

Like those researchers our focus was not on which of personal characteristics of students might impact student performance. As noted above many studies have attempted to use an array of variables including gender, SAT score, age, and cumulative grade point average, to explain the performance of students in a particular course. In fact we did not have access to data on lower

division grade point averages or SAT scores. But we sought to find a way to enhance the learning experience for all students regardless of SAT score or other individual factors.

Nevertheless gender data were available and were included in the analysis. Gender had been found to be significant in some earlier studies of student success and we sought to see if we would get the same results with these data.

ANALYSIS

While the consideration to add Intermediate Finance as a prerequisite for Investments seemed logical and well-thought out to the faculty, there still remained the question as to whether the curriculum revision strategy could produce the desired results. If as a group the students who have completed the proposed prerequisite outperformed the other students in Investments, then the curriculum change would be justified. If these students had failed to outperform the students who did not take the prerequisite first, then the change would not produce the desired results and the curriculum change should not be pursued.

Table 1 presents a summary of the data from the study. As a group the 336 students had a mean examination score of 73.91 in the Investments course, with a standard deviation of 12.44. To investigate the question of whether Intermediate should be a mandatory prerequisite for Investments, we grouped the students by whether they had completed the potential Intermediate Finance prerequisite prior to taking the Investments course, concurrent with Investments, or after taking Investments. The 180 students that took the prerequisite prior to the Investments course had a mean examination score in Investments of 77.3. On the other hand the 69 students who took the two courses concurrently had a mean examination score of 73.2 in Investments, and those who took the prerequisite after Investments had a mean exam score of 67.4 in the Investments course.

Table 1
SUMMARY OF DATA

	Mean	Standard Deviation	Number
Overall	73.91	12.44	336
Intermediate Finance completed	77.3	11.1	180
Concurrent enrollment in Intermediate Finance	73.2	10.1	69
Intermediate Finance not taken	67.4	14.1	87
Males	75.1	11.4	157
Females	72.8	13.2	179
Accounting	76.0	11.0	26
Finance	73.9	12.2	193
Acct & Finance double major	75.7	10.9	83
Other major	67.9	16.3	34

Students were identified by gender. The population was 46.73 percent males, so there were almost an equal number of both genders present in the study. Males had a mean examination score of 75.1 in the Investments course, and females had a mean exam score of 72.8. As noted in the table the standard deviation of the males' exam scores was marginally smaller than that of the females. As the exam score differences between genders were not the research topic (and, it turns out, not statistically significant) we only note these data and draw no conclusions.

For this study the students in the Investments class also were divided into four groups based on major field of study. The three most common majors in the data set were Accounting, Finance, and the double major in Accounting and Finance of which there were 26, 193, and 83 students, respectively. The fourth field of study category we simply call Other because there were several different majors represented among those 34 students. None of the other majors were numerous enough to obtain any statistically significant results so those 34 students were simply grouped together. As reported in Table 1 the mean examination score for each group of majors was 76.0 for the Accounting majors, 73.9 for the Finance majors, 75.7 for the double majors, and 67.9 for the Other group. We also note that the standard deviation of examination scores for the Other majors was quite large (relative to the other groups), indicating quite a range of performance in the Investments course.

Table 2 presents the results of the three one-tail t-tests we performed based on when Intermediate was taken by the student. The comparison of course examination grades for those students who had completed Intermediate Finance prior to the Investments course instead of concurrent with it or after the Investments course, did produce the results that we had anticipated.

Table 2
ONE-TAIL T-TESTS
(and p-values)

Intermediate completed versus Concurrent enrollment	2.7878 (0.002860)
Intermediate completed versus not taken	5.7449 (0.000000)
Concurrent enrollment versus not taken	2.9897 (0.001626)
Accounting majors vs Finance majors	0.8995 (0.184691)
A&F double majors vs Finance majors	1.2128 (0.113119)
Other majors vs Finance majors	2.0477 (0.020876)

Those students who took the proposed Intermediate prerequisite prior to taking Investments had a mean Investments examination score of 77.3, while those who took the Intermediate course concurrent with Investments had a mean exam score of 73.2. The difference between the score for the two groups was found to be statistically significant at better than the five percent level. When comparing the examination grades of those students who had taken the proposed prerequisite course prior to the Investments course and those students who had not taken it until later, our results were significant at better than the one percent level. The results of these two t-tests demonstrate that those taking the potential prerequisite prior to Investments, as a group clearly had statistically significant higher grades in the Investments course. These results seem to confirm our theory that a student completing Intermediate prior to Investments had a greater probability of success in the Investments course.

We also compared the mean exam scores of the students who took the prerequisite course concurrent with Investments and the exam scores of those who delayed the proposed prerequisite course until later. The students taking the prerequisite concurrent with Investments had mean exam scores that were higher and the difference was statistically significant at better than the one percent level. This information seems to indicate that even concurrent enrollment with Investments did help the students some, even if not as effective as completing the prerequisite in advance of Investments.

Table 3
STEP--WISE REGRESSION

Step	1	2	3	4
Constant	76.18	75.96	73.08	74.19
Intermediate Finance not taken	-8.8	-10.0	-7.0	-6.6
t-value	-5.94	-6.54	-3.64	-3.44
p-value	0.000	0.000	0.000	0.001
Accounting major		6.9	6.7	6.8
t-value		2.76	2.69	2.75
p-value		0.006	0.008	0.006
Intermediate Finance completed			4.0	4.5
t-value			2.42	2.73
p-value			0.016	0.007
Gender				-2.8
t-value				-2.21
p-value				0.028

Standard Deviation	11.80	11.70	11.60	11.60
R-square	9.56	11.58	13.11	14.37
R-square (adj)	9.28	11.05	12.32	13.33

When comparing the means of the various majors, we only found statistically significant results with one comparison. In the comparison of the mean examination scores of the Finance majors and Other majors, the mean score for Finance majors was higher and statistically significant.

Table 3 presents the results of the step-wise regression. A step-wise regression is performed to observe which variables are most significant in an analysis. The regression found that not taking the prerequisite course in advance was the most significant predictor of a student's grade in the Investments course, and that particular variable was negatively correlated with the student's grade as would be expected. Not having taken the intermediate course generally resulted in a lower grade in the Investments course for the student. As was suggested in Table 1, taking the proposed prerequisite after the course for which it is needed to prepare the student clearly cannot get the student ready for the Investments class.

Interestingly the step-wise regression found the second most significant predictor of grade to be the Accounting major, and that major was positively related to the student's grade. The next two variables to enter the regression equation in the stepwise analysis were having completed intermediate finance and gender. P-values reported in the table indicated that each of these variables were highly significant. Having the prerequisite prior to the course was also found to positively impact the student's grade as would be expected. Gender was found to negatively impact the student's grade. We did not investigate this further as this was not the intent of the study. Certainly the variable gender could be highly correlated with other significant variables (such as being an Other major), which might explain the negative coefficient in the regression equation.

For the final regression equation, the coefficient for not having taken intermediate finance (-6.6) indicates that students lacking this course tend to have a grade in the investments course that is almost 7 points lower than others. It is very clear that students who have not taken intermediate finance prior to taking the investments course are at a distinct disadvantage.

It should be noted that for the final regression equation, the coefficient of determination (r^2) is 14.37%. While the regression equation is highly significant, there is a great deal of variability in the grades that cannot be explained by these variables. Things such as overall GPA and SAT scores might help to explain more of the variability, but this information is not readily available.

CONCLUSION

The purpose of this study was to determine if having the Intermediate Finance course as a prerequisite for the Investments course would result in better student success in the Investments course. As expected students who had completed the Intermediate Finance course performed significantly better in Investments than those who had not completed Intermediate. Therefore, the decision was made to make Intermediate Finance a prerequisite for Investments.

Clearly every effort should be made by the university to make students aware of the proper course sequence and the university should enforce prerequisites when students try to take courses out of order.

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STUDENTS' REVEALED PREFERENCE FOR PEDAGOGICAL FEATURES IN INTRODUCTORY ECONOMICS TEXTBOOKS*

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ABSTRACT

Criteria for textbook selection abound. These criteria include cost, readability, accuracy of content, suitability for intended readers, currency, relevance, pedagogical features, among others. The survey sample consisted of 330 students enrolled in introductory economics courses at a college in Montreal, Canada. In this study, students revealed that important terms collected at the end of each chapter, basic concepts emphasized in the text, and explanations of graphs within the text were extremely important pedagogical devices in principles of economics textbooks. Gender and academic performance affected students' ranking of the pedagogical features. The vast majority of the six textbooks examined, contained most of the pedagogical features identified as being important by students. The results of this study will be helpful in the selection of textbooks for the principles course in economics.

Key words: Economic education, criteria for textbook selection, textbook pedagogical features, textbook authors, textbook publishers

JEL codes: A1, A2, A22

Technological advance has touched every facet of modern society, and teaching and education have not escaped its tentacles. Interactive electronic whiteboards, digital projectors, clickers in the classroom, digital texts, open educational resources (OERs), laptops, tablets, smart phones and other such modern electronic devices are being introduced into the classroom with increasing rapidity. Despite these innovations in teaching and learning tools and devices, a study by Watts and Schaur (2011) revealed that the traditional textbook remains the main tool for teaching the principles course in economics. For the purpose of this discussion, we define a traditional textbook as a printed and bound document used in schools for the formal study of a particular subject.

According to Bargate (2012), "Textbooks are the site where specialist knowledge and skills of the discipline are accumulated, communicated, and debated, and may possibly make or break students' interest in a subject." Other authors also extoll the importance of textbooks. See, for example, Pope (2002); Stevens, Clow, McConkey & Silver (2010); Razek, Hosch & Pearl (1982); Landrum & Hormel (2002); and Issitt (2004). Clearly, the selection of textbooks is an important exercise that should be undertaken with due diligence. Many criteria are used in the textbook selection exercise. For example, Stevens, Clow, McConkey & Tiger (2007) and Elbeck, Williams, Peters & Frankforter (2009) examined currency, while Clow, Parker &

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McConkey (2009) identified content, ancillary materials, length of textbook, and textbook costs as key factors in textbook selection.

Proceeding on the assumption that the traditional textbook will continue to be the main tool used for the teaching of the principles course in economics, at least for the foreseeable future, economics professors, textbook authors, and textbook publishers would benefit tremendously if they knew what pedagogical features the main readers of textbooks (that is, students) thought were important in textbooks. Economics professors would benefit because they would be greatly aided in their selection of textbooks for their principles classes. Textbook authors would benefit because they would be able to include in their textbooks those features that students believe to be most helpful in their study of the subject; and textbook publishers would be greatly aided in their selection of manuscripts to be published on the basis of pedagogical elements.

THE SAMPLE

The sample for this research project consisted of 250 students who were taking the introduction to economics course in the fall and winter semesters of 2011-2012 at Dawson College in Montreal, Canada. It also consisted of 80 students who were taking the introduction to microeconomics course at the same time. Thus, 330 students were surveyed. Of these, 175 were males while 155 were females. The students were also categorized as "passing", "at risk of failing", and "failing".

STUDENTS' REVEALED PREFERENCE

In order to gauge students' preferences for certain pedagogical features in introductory economics textbooks, the author designed a questionnaire consisting of ten questions regarding certain pedagogical features of textbooks. For each feature, the students were asked to rank their preferences for the feature on a Linkert-type scale denoting "Not important", "Somewhat important", "Important", "Very important" or "Extremely important". (The questionnaire is available from the author on request). The textbook features examined were:

1. A preview of what is to be learnt
2. Pre-test of knowledge before reading the chapter
3. Explanations of graphs within the text (as opposed to being set apart in boxes)
4. Basic concepts emphasized (such as highlighted, bold) in the text
5. Definitions and important terms emphasized in the text
6. Review of the material studied
7. Important terms collected and defined at the end of each chapter
8. Challenging review questions
9. Problems and exercises at the end of each chapter

10. Use of economic resources on the internet.

THE RESULTS

A Pre-View of What Is To Be Learnt

When asked about the importance of the existence of a pre-view of what is to be learnt in a chapter, the survey revealed that the vast majority of respondents (85.4%) thought that the feature was either very important or extremely important. Not a single respondent felt that the feature was not important. The details are contained in Table 1 below.

Table 1
A PREVIEW OF WHAT IS TO BE LEARNT

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Somewhat important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Important	48	14.5	32	18.3	16	10.3	31	10.5	11	45.8	6	60.0
Very important	79	23.9	40	22.9	39	25.2	67	22.6	10	41.7	2	20.0
Extremely important	203	61.5	103	58.9	100	64.5	198	66.9	3	12.5	2	20.0
Total	330	100.0	175	100.0	155	100.0	296	100.0	24	100.0	10	100.0*

*Note: Percentages may not add up to 100 because of rounding.

Of the 175 males who answered this question, 32 (or 18.3%) of them agreed that this feature was important. This compares with 16 (or 10.3%) of females who though this feature was important. Nearly 82% of the males claimed that the feature was either very important or extremely important. The comparable figure for females was almost 90%. The table also shows that while 10.5% of the respondents who were passing asserted that a preview of the material to be covered was important, 45.8% of those who were at risk of failing and 60% of those who were failing made a similar assertion. The majority of the students who were passing (66.9%) expressed the view that this textbook feature was extremely important while only 20% of those who were failing agreed with this ranking.

Pre-Test of Students' Knowledge

How important is this pedagogical feature to students? When asked to express their ranking of this feature, 1.5% of the respondents felt that a pretest of their knowledge before reading the chapter was not important while a similar percentage felt it was somewhat important. Exactly 97% of the respondents expressed the view that this feature was important (10.9%), very important (47.6%) or extremely important (38.5%).

Male students and female students seem to rank this feature differently. Two of the 175 male students (1.1%) revealed that a pre-test of students' knowledge was not important. This

compares with 1.9% of female students who admitted that this pedagogical feature was not important. On the other hand, 52% of males and 42.6% of females thought that this feature was very important. None of the students who were passing thought that this feature was not important, while 8.3% of those who were at risk and 30% of those who were failing thought that ir was not important. On the other hand, almost 90% of the passing students declared that this feature was either very important or extremely important. This compares with 66.6% of "at risk" students and 20% of failing students. See Table 2 for details.

Table 2
PRETEST OF STUDENTS' KNOWLEDGE

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	5	1.5	2	1.1	3	1.9	0	0.0	2	8.3	3	30.0
Somewhat important	5	1.5	3	1.7	2	1.3	3	1.0	0	0.0	2	20.0
Important	36	10.9	14	8.0	22	14.2	27	9.1	6	25.0	3	30.0
Very important	157	47.6	91	52.0	66	42.6	151	51.0	5	20.8	1	10.0
Extremely important	127	38.5	65	37.1	62	40.0	115	38.9	11	45.8	1	10.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

Graphs Explained Within Text

Students overwhelmingly favoured graphs to be explained within the text. Graphs explained within the text means that graphs become an integral part of the textual explanation. Table 3 below shows that nearly 99% of the respondents believed that this pedagogical feature was either very important or extremely important. More than 22% of the male respondents gave this feature a "Very important" ranking, while only 11.6% of the female respondents gave a similar ranking. However, the "Extremely important" ranking was given by 77.1% of male respondents compared to 86.5% of female respondents. The data also reveal that all respondents, regardless of academic performance, rated this academic feature highly. As can be seen from the table, less than one percent of the passing students ranked this feature as being important only. The corresponding figures for students who were at risk and those who were failing were one percent and 10 percent respectively. More than 81% of the passing students ranked this textbook feature as "Extremely important", while 87.5% of the students who were at risk and 70% of those who were failing ranked this feature similarly.

Table 3
IN-TEXT EXPLANATIONS OF GRAPHS

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Somewhat important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Important	4	1.2	1	0.6	3	1.9	2	0.7	1	4.2	1	10.0
Very important	57	17.3	39	22.3	18	11.6	53	17.9	2	8.3	2	20.0
Extremely important	269	81.5	135	77.1	134	86.5	241	81.4	21	87.5	7	70.0

Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

Basic Concepts Emphasized In the Text

Not a single respondent felt that emphasizing basic concepts in the text was unimportant. On the contrary, 41 of the 330 respondents thought the feature was very important, while the remaining 289 expressed the opinion that the feature was extremely important. Both male and female respondents agreed that this feature was either very important or extremely important, and there was very little difference between the rankings based on gender. Approximately 12.6% of the males considered this pedagogical feature to be very important, while the comparable figure for the females was 12.3%. Whereas 87.4% of males viewed this feature as being "Extremely important", a comparable 87.7% of females shared this view. This textbook feature received high ranking from passing, at risk, and failing students alike. The "Extremely important" designation was given by 88.2% of the passing participants. The comparable figures for the "at risk" and "failing" participants were 88.3% and 80% respectively. Table 4 summarizes the data.

Table 4
BASIC CONCEPTS EMPHASIZED IN TEXT

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Somewhat important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Very important	41	12.4	22	12.6	19	12.3	35	11.8	4	16.7	2	20.0
Extremely important	289	87.6	153	87.4	136	87.7	261	88.2	20	83.3	8	80.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

Definitions and Important Terms Emphasized In the Text

The responses to this question were not at all surprising. It should be expected that students would appreciate having important terms drawn to their attention. Just how highly they value this feature is shown in Table 5 below.

Table 5
DEFINITIONS AND IMPORTANT TERMS EMPHASIZED IN TEXT

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Somewhat important	3	0.9	0	0.0	3	1.9	0	0.0	2	8.3	1	10.0

Important	27	8.2	14	8.0	13	8.4	17	5.7	5	20.8	5	50.0
Very important	193	58.5	104	59.4	89	57.4	187	63.2	4	16.7	2	20.0
Extremely important	107	32.4	57	32.6	50	32.3	92	31.1	13	54.2	2	20.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

As illustrated in the table, all the respondents attached some degree of importance to this pedagogical feature. More than half the respondents thought that it was very important for definitions and important terms to be emphasized in the text, while more than 32 percent thought the feature was extremely important.

The results reveal that this particular pedagogical feature was popular among both male and female respondents. Exactly 92% of the male respondents declared that this feature was either very important or extremely important. The comparable figure on the female side was 89.7. The three students who said that this feature was only somewhat important were females.

Ten percent of the failing respondents and 8.3% of those at risk admitted that this feature was only somewhat important. More than 63% of the passing students stated that the feature was very important, while 16.7% of those who were at risk agreed with this ranking. The comparable figure for failing students was 20%. See Table 5 for the relevant information.

Review of Material Studied

When asked to rank the importance of this feature in a textbook, the respondents overwhelmingly claimed that it was extremely important. All of the respondents expressed the view that it was either very important or extremely important. The survey revealed that both male and female respondents viewed this pedagogical feature as either very important or extremely important. A higher percentage of female respondents (54.8%) than male respondents (44.6%) expressed the opinion that this feature was very important. For the "Extremely important" ranking, a higher percentage of male respondents (55.4%) than female respondents (45.2%) chose this ranking for this feature.

The passing and at risk respondents ranked the "Extremely important" response higher than they did the "Very important" one. This is in contrast to the failing respondents who ranked the "Very important" response higher than they did the "Extremely important" one. The relevant data are contained in Table 6.

Table 6
REVIEW OF MATERIAL STUDIED

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Somewhat important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Very important	163	48.4	78	44.6	85	54.8	146	49.3	10	41.7	7	70.0
Extremely important	167	50.6	97	55.4	70	45.2	150	50.7	14	58.3	3	30.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

Important Terms Collected and Defined At the End of Each Chapter

None of the respondents viewed this feature as being "not important", "somewhat important" of "important". The vast majority of respondents (90%) thought that it was extremely important to have important terms collected at the end of each chapter. Both male and female respondents shared this view. Exactly 12% of the males ranked this feature as "Very important", while 7.7% of the females gave it the same ranking. Whereas 88% of the male respondents said that this feature was extremely important, 92.2% of the female respondents gave the same ranking as did the males. Whether passing, at risk, or failing, the respondents all ranked the "Extremely important" response the highest. Almost 94% of those who were passing at the time of the survey claimed that they felt that this feature was extremely important. The comparable figures for those who were at risk and those who were failing were 50% and 70% respectively. Table 7 below summarizes the results.

Table 7
IMPORTANT TERMS COLLECTED AND DEFINED AT THE END OF EACH CHAPTER

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Somewhat important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Very important	33	10.0	21	12.0	12	7.7	18	6.1	12	50.0	3	30.0
Extremely important	297	90.0	154	88.0	143	92.2	278	93.9	12	50.0	7	70.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

Challenging Review Questions

The study revealed that students want a textbook to contain review questions that challenge their understanding of the material they have studied. Not a single respondent claimed that this feature was "not important". Two students claimed that this feature was somewhat important while 310 (or 94%) claimed that this feature was either very important or extremely important. The difference in ranking by gender was revealed in respondents' answers to this question. If we consider the "Very important" and "Extremely important" rankings of this pedagogical feature in textbooks, we note that 93.7% of the male respondents declared that this feature was either very important or extremely important. This compares with 94.2% of the female respondents. The results are tabulated below.

One of the two participants who ranked this feature as being somewhat important was at risk while the other was failing. All other respondents gave it a higher ranking. The vast majority of the passing participants (64.5%) viewed this feature as being extremely important, while 16.7% of those who were at risk agreed. The corresponding figure for those who were failing was 30%. The relevant information is presented in Table 8.

Table 8
CHALLENGING REVIEW QUESTIONS

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Somewhat important	2	0.6	1	0.6	1	0.6	0	0.0	1	4.2	1	10.0
Important	18	5.4	10	5.7	8	5.2	12	4.1	4	16.7	2	20.0
Very important	112	34.0	73	41.7	39	25.2	93	31.4	15	62.5	4	40.0
Extremely important	198	60.0	91	52.0	107	69.0	191	64.5	4	16.7	3	30.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

Problems and Exercises

Do students think that problems and exercises are important in a textbook? That was one of the textbook features that respondents were asked to evaluate. The vast majority of students (over 77%) acknowledged that this feature was extremely important, while only 3% thought it was just "important". Both male and female respondents agreed that this feature was important, very important, or extremely important in a textbook. Neither group thought it was not important or that it was only somewhat important. While 26.3% of the male respondents thought that this feature was very important, 12.3% of the female respondents shared their view. Whereas 72.6% of the male respondents were of the opinion that this feature was extremely important, the corresponding figure for the female respondents was 82.5%. Thus, 98.9% of the male respondents felt that this feature was either very important or extremely important. The comparable figure for the female respondents was 94.8%.

Respondents deemed only the "Important", Very important", and "Extremely important" rankings to be relevant. Of the 296 respondents who were passing, only four (1.4%) of them ranked this feature as being important. On the other hand, more than 78% of them thought that this feature was extremely important. For those at risk, 62.5% thought that this feature was extremely important, while 80% of those who were failing shared this view. Table 9 contains the relevant data.

Table 9
PROBLEMS AND EXERCISES

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Somewhat important	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Important	10	3.0	2	1.1	8	5.2	4	1.4	6	25.0	0	0.0
Very important	65	19.7	46	26.3	19	12.3	60	20.2	3	12.5	2	20.0
Extremely important	255	77.3	127	72.6	128	82.5	232	78.4	15	62.5	8	80.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

Economic Resources on the Internet

The internet is replete with resources pertaining to economics. Given the popularity of the internet among students, the author wanted to find out how they would rank the inclusion of economic sites as a feature in a textbook. The survey revealed that only 3.3% of the respondents viewed this feature as "very important", while still fewer (0.9%) thought the feature was "extremely important". On the other hand, 43% of the respondents claimed that this feature was "not important". See Table 10 below for the relevant data.

Table10
ECONOMIC RESOURCES ON THE INTERNET

	All students		Male		Female		Passing		At risk		Failing	
Responses	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Not important	142	43.0	70	40.0	72	46.4	131	44.3	6	25.0	5	50.0
Somewhat important	102	30.9	56	32.0	46	29.7	92	31.1	8	33.3	2	20.0
Important	72	21.8	41	23.4	31	20.0	66	22.3	4	16.7	2	20.0
Very important	11	3.3	6	3.4	5	3.2	6	2.0	4	16.7	1	10.0
Extremely important	3	0.9	2	1.1	1	0.6	1	0.3	2	8.3	0	0.0
Total	**330**	**100.0**	**175**	**100.0**	**155**	**100.0**	**296**	**100.0**	**24**	**100.0**	**10**	**100.0**

The way in which male and female students rank this feature may have implications for teaching economics to them. When asked to rank this feature in economics textbooks, 40% of the male respondents and 46.4% of the female respondents said it was not important. On the other hand, only 1.1% of the male respondents and 0.6% of the female respondents attached extreme importance to this feature.

Economic resources on the internet did not rank highly as an important feature in economics textbooks. This was the case regardless of academic performance. As seen in Table 10 above, over 75% of the passing students ranked this feature either as "Not important" or "Somewhat important". Similar rankings were given by students who were at risk (58.3%) and students who were failing (70%). Further details are presented in Table 10 above.

RANKING OF PEDAGOGICAL FEATURES

Students' responses were used to rank the ten pedagogical textbook features according to "Extremely important" and "Very important". In terms of "Extremely important", the first, second, and third spots were occupied by: "Important terms collected at the end of each chapter", "Basic concepts emphasized in text", and "Explanations of graphs within text" respectively. "Economic resources on the internet" occupied 10th place. In terms of "Very important", the top three spots were occupied by: "Definition of important terms emphasized in the text", "Review of material studied", and "Pretest of knowledge before reading the chapter". "Economic resources on the internet" took 10th place in this ranking also. The results are summarized in Table 11.

Table 11
RANKING OF PEDAGOGICAL TEXTBOOK FEATURES

Pedagogical features	**Extremely important**	**Very Important**
Important terms collected at the end of each chapter	First	Ninth
Basic concepts emphasized in text	Second	Eighth
Explanations of graphs within text	Third	Seventh

Problems and exercises	Fourth	Sixth
Preview of what is to be learnt	Fifth	Fifth
Challenging review questions	Sixth	Fourth
Review of material studied	Seventh	Second
Pretest of knowledge before studying	Eighth	Third
Definition of important terms emphasized in text	Ninth	First
Economic resources on the internet	Tenth	Tenth

TEXTBOOK RANKING

The data generated by this survey allows the ranking of textbooks in terms of pedagogical features. In this study, the "Extremely important" ranking was used as the basis for ranking textbooks. The pedagogical features were weighted as follows: The feature that took the first position was assigned a weight of 10, the feature that took second place was assigned a weight of 9, the feature that took third place was assigned a weight of 8, and so on. The feature that took 10th place was assigned a weight of 1.

The following six textbooks were selected for this study. They are listed in alphabetical order according to authors.

- Economics for Life: Micro (Cohen and Howe), 2010
- Macroeconomics, 12th Canadian Edition (McConnell, Brue, Flynn and Barbiero), 2010
- Economics Today, 5th Canadian Edition (Miller, Abbott, Fefferman, et al), 2012
- Microeconomics, 7th Edition (Parkin and Bade), 2010
- Macroeconomics, 14th Canadian Edition (Ragan), 2014
- Macroeconomics, 6th edition (Sayre and Morris), 2009

The highest possible score is 55. Thus, a textbook that scores a total of 40 points will be assigned a mark/grade of 72.7%. On this basis, two of the textbooks examined received a grade of 92.7% and tied for first place. One received a grade of 90.9% and came in second. Two tied for third place with a grade of 89% and the sixth book placed fourth with a grade of 60%. It should be noted that the Cohen book does not use graphs. See Table 12 for details of the textbook ranking.

Table 12
TEXTBOOK RANKING

Features	C	Mc	Mi	P	R	S
Important terms collected at the end of each chapter	0	10	10	10	10	10
Basic concepts emphasized in text	9	9	9	9	9	9
Explanations of graphs within text	0	8	8	8	8	8
Problems and exercises	7	7	7	7	7	7
Preview of what is to be learnt	6	6	6	6	6	6
Challenging review questions	5	5	5	5	5	5
Review of material studied	4	4	4	4	4	4
Pre-test of knowledge before studying	0	0	0	0	0	0
Definition of important terms emphasized in text	2	0	0	0	2	2
Economic resources on the internet	0	1	0	0	0	0
Total	33	50	49	49	51	51
Grade (%)	60	90.9	89	89	92.7	92.7
Position/Rank	4th	2nd	3rd	3rd	1st	1st

Legend: C = Cohen & Howe; Mc = McConnell et al; Mi = Miller et al; P = Parkin & Bade; S = Sayre & Morris.

CONCLUSION

Textbooks seem to be the main tool used for teaching the principles course in economics; therefore, their selection assumes a great degree of importance. This study focused on pedagogical textbook features that students, the primary users of textbooks, thought were extremely important.

The study revealed that "important terms collected at the end of each chapter", "basic concepts emphasized in the text", and "explanations of graphs within the text" were the top pedagogical features from students' perspective. "Definition of important terms emphasized in the text" and "economic resources on the internet" were not considered to be very important.

The data showed that gender played a role in respondents' ranking of some of the textbook features. In particular, female respondents ranked the "the preview of what is to be learnt" feature higher than did the male respondents. On the other hand, the male respondents ranked the "pre-test of knowledge", the "challenging review questions" and the "problems and exercises" features more highly than did the their female counterpart.

Academic performance exerted some influence on students' ranking of textbook features. In general, the students who were passing the course at the time the survey was conducted ranked the pedagogical features higher than those who were at risk of failing or actually failing. This study also revealed that the vast majority of the textbooks examined contained the features that students thought were extremely important.

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AN EVALUATION OF THE UNEMPLOYMENT RATES OF THE UNITED STATES

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ABSTRACT

Unemployment rates are probably the best indicators of the economic health of a nation, and the U.S. Government releases its monthly rates on the first Friday of each month. Of the six sets of assumptions used, the U-3 assumption has become the official number. This rate peaked at 10% in October, 2010 and has steadily declined to 6.1% as disclosed on July 3, 2014.

The problem with this rate is that it is drastically understated and, bluntly speaking, those who use it know it is understated which is why they use it. It measures the unemployed who are seeking a full-time job but does not measure (1) discouraged workers (giving up after repeatedly failing to find a job), (2) "marginally attached" workers (meaning those not using recent efforts to find a job), or (3) workers seeking part-time work (perhaps because of economic necessity).

If the discouraged workers (not over a year) are added, the 6.1% is increased to 6.5%. If the "marginally attached" are added, the rate is increased to 7.3%, and if the unemployed seeking part-time work are added, the rate is 12.1%, about double the official rate. Then if the long-term discouraged workers are added, the rate is a staggering 23.1% which approaches the burdensome rate of about 25% experienced during the great depression of the 1930s.

But the seriousness of the problem is still not conveyed because still missing are the unemployed who have withdrawn from the labor force (perhaps because of discouragement and/or generous unemployment benefits). Additional methods are used to estimate those who are capable of working, and the percentage of these who are not in the work force but "should be" is 37.2% (described by some as the worst unemployment rate in the history of the country).

As significant as this number is, a more troubling reality is that the nation's official unemployment rate has not come down from 10% to 6.1% because people are finding jobs but because people are pulling out of the labor market. In fact, mathematically, the sole reason this rate has fallen by about 4% since 2010 is because the participation rate in the job market has fallen by 4.5% (from about 67.3% to 62.8%--the smallest participation rate since March, 1978).

Also of great concern is that full-time jobs are disappearing and being replaced by part-time jobs (largely because companies want to avoid paying full-time benefits). For example, in the unemployment report of July 3, 2014, it boasted of 288,000 new jobs in the economy, but further scrutiny reveals that 523,000 full-time jobs were lost in the previous month and 799,000 part-time jobs were added. So mathematically, all new jobs were part time. And finally, all these gloomy indicators are not likely to improve much with a national "shortfall" of 6.9 million jobs and with many major companies now moving headquarters overseas.

INTRODUCTION

The unemployment rates are probably the best indicators of the economic health of a nation, and the official rates released by the U.S. Bureau of Labor Statistics on the first Friday of each month probably receive more attention than any other economic indicators. Even the 11 economic recessions since World War II are compared in terms of these numbers with the "official rate" (known as the U-3 Index) used most in the communications. In the current recession (now in its eighth year), this "official unemployment rate" peaked at 10% in October, 2010 and has since declined to 6.1% in June (announced on July 3, 2014).

Following the July 3rd "Jobs Report" were the usual glowing remarks from a variety of people in both government and industry. For example, a Wall Street Journal article proclaimed that "U.S. employers added jobs at a robust clip in June and the unemployment rate fell, signs of labor-market strength as the economic recovery heads into its sixth year" (House, 1). The article also quoted an economist who enthusiastically stated that the 288,000 new jobs "are just the fireworks the economy needs to brighten up" (House, 1).

While any improvement in the jobs market is appreciated, lurking beneath these glowing headlines are many troubling facts. For example, missing from these numbers are the long-term discouraged workers that continue to increase each month. These people were basically abandoned in the 1990s when new methods were developed to measure unemployment. Also significant is what's behind the proud announcement of 288,000 new jobs. Those looking carefully will notice that 523,000 full-time jobs were lost the previous month while 799,000 part-time jobs were added. In other words, all 288,000 of the new jobs were essentially part-time jobs, and by far the majority of these were lower-level jobs that pay inadequate salaries. Also discouraging is the fact that a significant 2.4 million Americans have completely dropped out of the job market within the last year (Rogers, 2).

THE OFFICIAL GOVERNMENT UNEMPLOYMENT RATES

The problem with the "headline numbers" is that they drastically understate the problems in the labor market and, bluntly speaking, those who use the numbers know they understate the problems which is why they use them. The "official U-3 rate," for example, measures the unemployed who are seeking a full-time job but does not measure (1) discouraged workers (giving up after repeatedly failing to find a job), (2) "marginally attached" workers (meaning those not using recent efforts to find a job), or (3) workers seeking part-time work (perhaps for economic necessity). The significant unemployment definitions used are shown in Exhibit 1.

Exhibit 1

UNEMPLOYMENT CATEGORIES USED BY THE U.S. BUREAU OF LABOR STATISTICS
Seasonally Adjusted Numbers for June, 2014

U-6 Index: 12.1% Total unemployed plus marginally attached to the labor force **plus those seeking part-time work** (NOT long-term discouraged workers.)

U-5 Index: 7.3% Total unemployed plus discouraged workers (not over a year) plus all **others marginally attached** to the labor force (less than a year)

U-4 Index: 6.5% Total unemployed plus **discouraged workers (not over a year).**

U-3 Index: 6.1% (The **official unemployment rate.**) **Unemployed** as a percent of the labor force and **currently seeking "full-time" employment**.

U-2 Index: 3.1% **Job losers and those contemplating temporary jobs.**

U-1 Index: 2.9% **Unemployed 15 weeks or longer** as a percent of the civilian labor force.

Starting with the official U-3 Index, if the discouraged workers (not over a year) are added, the 6.1% is increased to 6.5%. If the "marginally attached" are added, the rate is increased to 7.3%, and if the unemployed seeking part-time work are added, the rate becomes 12.1% which is about double the official rate of 6.1%. But the rates above the official U-3 rate are seldom mentioned. Probably 90% of the time in speeches and newspaper headlines the 6.1% is touted, but seldom the 12.1%. Another characteristic of these numbers is that they generally move in lockstep fashion meaning that if one goes up or down the others do likewise. This can be seen in Exhibit 2 which also gives a visual of what these numbers have been over time.

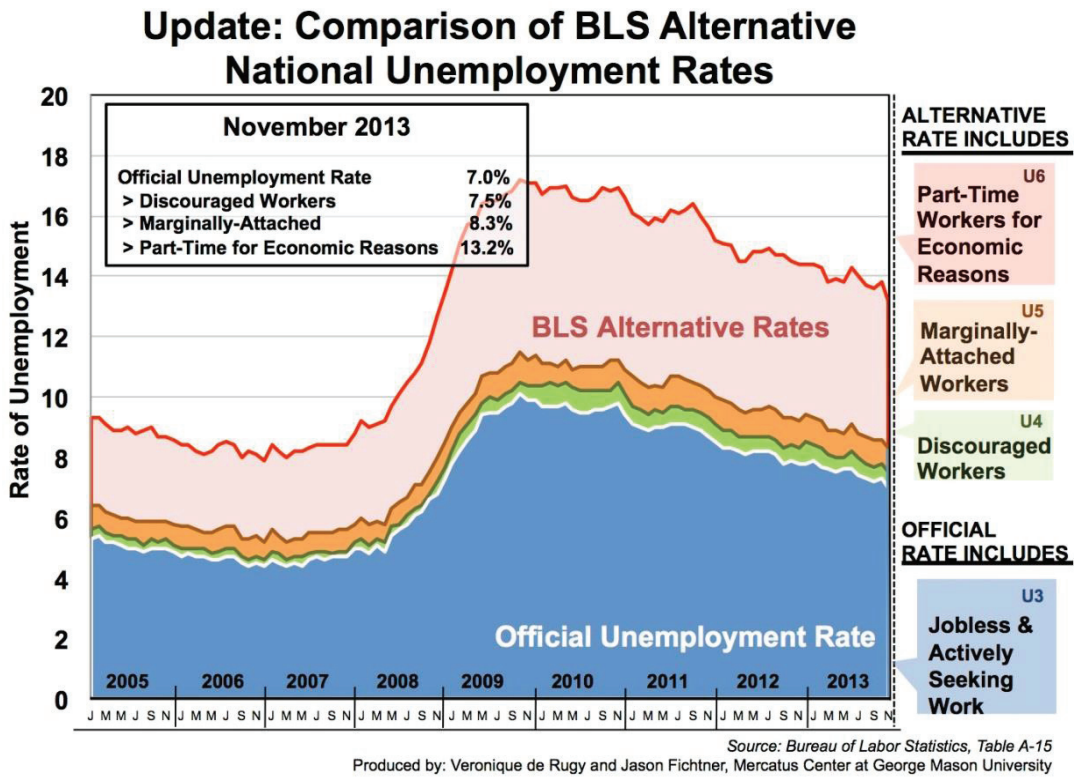
SUPPLEMENTAL (NON-GOVERNMENTAL) UNEMPLOYMENT RATES

Having briefly reviewed the government unemployment definitions and general patterns of change, mention needs to be made of some of the most glaring weaknesses. One such weakness has already been referred to and that is the complete exclusion of the long-term discouraged workers from the data. These are people who simply cannot find jobs for a variety of reasons including inadequate training or skills, perceptions of being too old or young, perhaps social inadequacies, perhaps discrimination, etc. Let's also emphasize that the biggest reason is that millions of jobs have disappeared from the nation's economy (as will be discussed in connection with Exhibit 10). So significantly, this army of unemployed people keeps growing in size (which may be why they are excluded from the data).

These chronically unemployed are, however, included in the "Shadow Government Statistics" (the SGS) that was developed by John Williams, a noted economist (Williams, 1). In essence, the long-term discouraged workers that are excluded from U-6 (see Exhibit 1) are added to U-6 to arrive at the SGS number. In February of this year the SGS Index was 22.9% and is

now at 23.1%. In other words, it continues to grow as opposed to the six unemployment categories used by the government that continue to decline. This can be seen in Exhibit 3 which shows the U-3 Index and U-6 Index in decline and the SGS Index continuing its gradual growth.

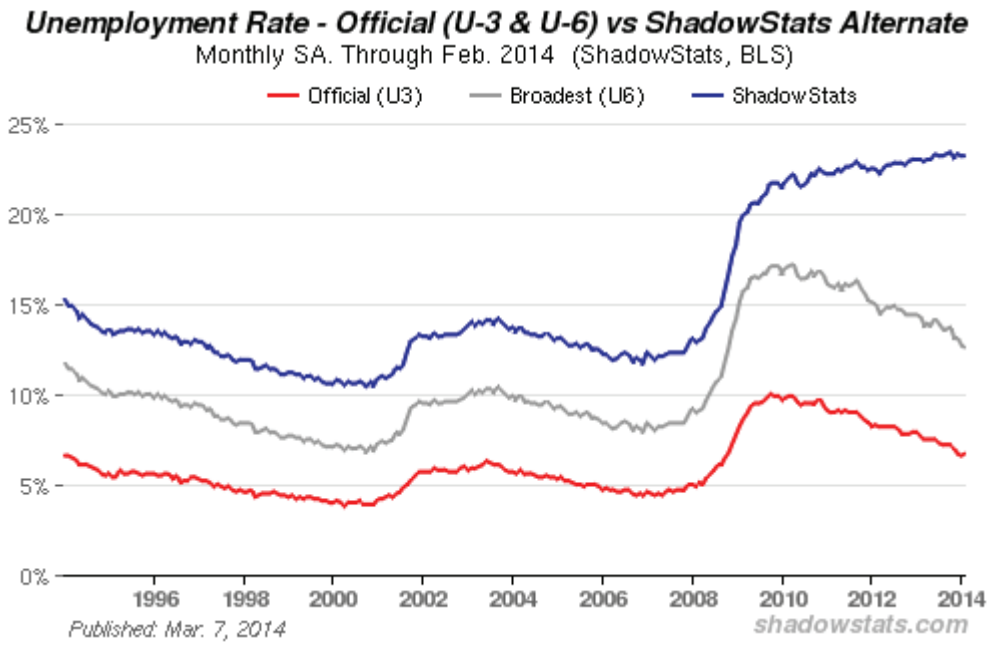
Exhibit 2
A VISUAL SHOWING THE LOCKSTEP NATURE OF THE MOST-USED GOVERNMENT RATES OVER TIME



When this unemployment number of 23.1% is considered, it is no wonder that those in positions of authority hesitate to use it. It is no wonder that those who do the measuring want to exclude these unemployed from the data. With nearly one fourth of the potential workforce of the country without jobs, it is sobering to contemplate. It rivals the approximately 25% unemployment rate that existed during the Great Depression of the 1930s, and who wants to bring the nation to that realization?

But as staggering as it is, it gets worse. There is still a major piece of information that has not been considered and that is the number of people who have withdrawn themselves from the workforce altogether. In other words, the 23.1% include those who would like to have jobs but don't, but there are also many Americans who don't want to have jobs of any kind. It may be that they are "living with Mom and Dad." It may be that they are enjoying unemployment benefits, or it may be that they have other means of survival that are sufficient and don't want the burdens and responsibilities of productive labor.

Exhibit 3
THE SGS (SHADOW GOVERNMENT STATISTIC) ADDED TO THE U-3 AND U-6 INDEXES

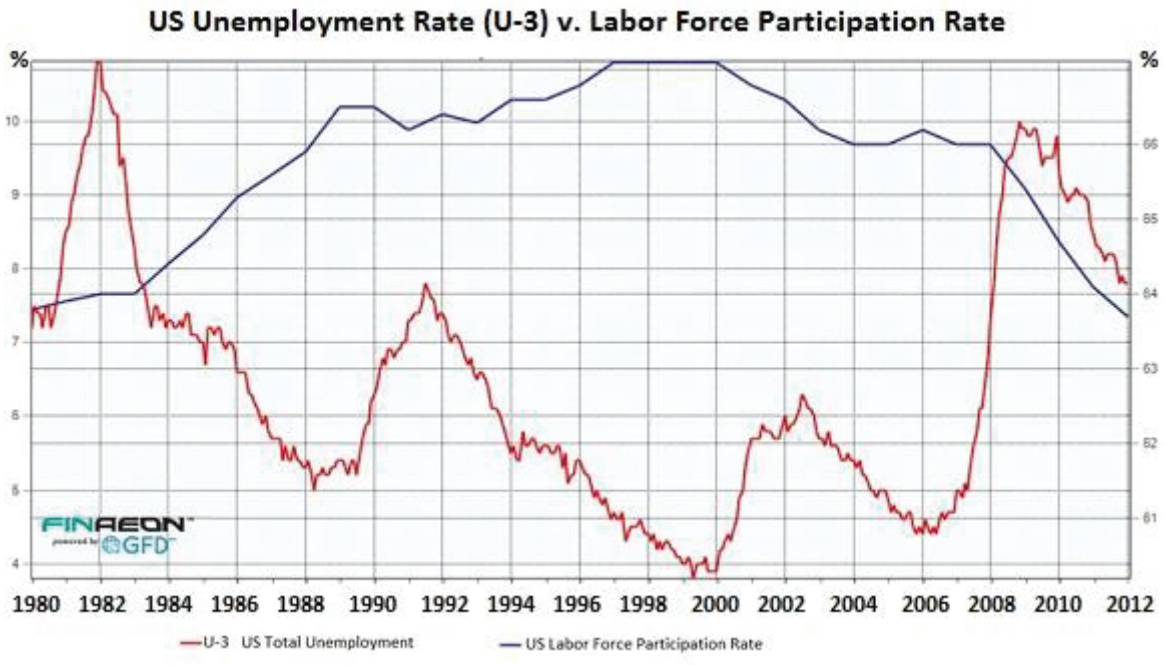


To measure this portion of the population, David John Marotta has developed an index known as the Marotta Index (Weil, 1). To determine this index, methods are used to determine how many people in the United States are able-bodied and capable enough that they "could have, should have, ought to have" jobs, but don't have jobs. This number continues to include those who "don't have jobs and want them" but also includes those who "don't have jobs and don't want them." The index basically takes the SGS Index of 23.1% and adds those who have withdrawn from the labor force, and the resulting number is an eye-popping 37.2% (which some have described as the most serious unemployment situation in our nation's history).

THE PROBLEM WITH LABOR FORCE PARTICIPATION

Returning for the moment to the official government unemployment rate (the U-3 rate), one of the most important observations of this academic paper is that the decline in this rate from 10.0% in October, 2010 to 6.1% in June, 2014 has not happened because more jobs (especially full-time jobs) are being created, but because people are withdrawing from the labor force. In other words, fewer workers competing for scarce jobs means fewer workers will be unemployed. And, for the sake of mathematical emphasis, if everyone withdrew from the labor force, the unemployment rate would be zero.

Exhibit 4
THE EFFECT OF LABOR PARTICIPATION ON THE UNEMPLOYMENT RATE

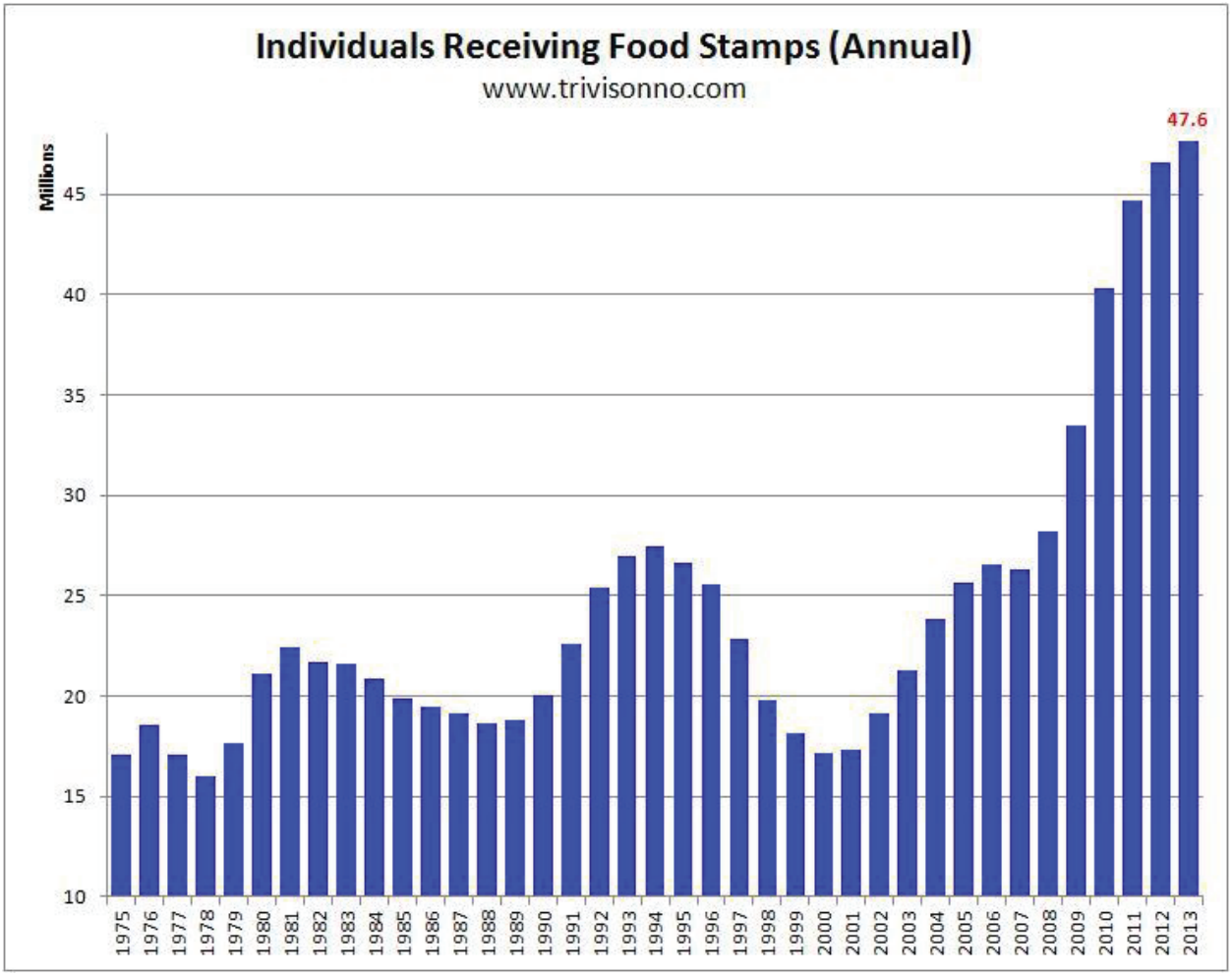


This basic relationship can be clearly seen in Exhibit 4. Notice on the right-hand side of the graph that the decline in the unemployment rate is almost perfectly parallel to the drop in the labor force. It is interesting that the unemployment rate has gone down by about 4% since its peak of 10.0% and the labor participation rate has gone down by about 4.5% since its peak of 67.3%. The more recent participation rate of 62.8% was confirmed again in the July 3rd jobs report and is the lowest participation rate since March, 1978 when there was significant stagflation.

THE EFFECT OF GENEROUS WELFARE PROGRAMS

Perhaps the biggest reason there is such a large number of Americans who "should be working and aren't working" is the fact that those in government (both Federal and state) have intentionally made welfare benefits more generous--even establishing promotional campaigns to sign people up for the benefits. The food stamp program, for example, (known as SNAP or Supplemental Nutrition Assistance Program) has experienced nearly a doubling of participants during the last seven-year recession going from about 27 million to 47.6 million people. This can be seen in Exhibit 5. And while the number of people receiving food stamps has nearly doubled, the amount of assistance received by each person has also increased significantly from about $95 per person in 2007 to $133.07 in 2013. In other words, a family of four would receive about $532.28.

Exhibit 5
AN EXAMPLE OF GOVERNMENT BENEFITS THAT LESSEN THE RESOLVE TO FIND A JOB



Besides the increasing payments for food stamp assistance, a wide variety of other government benefits make it increasingly desirable for many people to prefer living "on the dole." This is not only true of the Federal Government, but many states have welfare benefits that are now greater than the equivalent pre-tax salaries that people could make if they had a job. So "why get a hard job when more can be made with unemployment?" Exhibit 6 shows the annual benefits that a typical unemployed person could receive on a yearly basis in a sampling of 15 states. With such generous benefits, is it a surprise that many potential workers who are healthy and capable and ought to be in the labor force are choosing to shun the job market and live off these programs? While choosing to avoid employment responsibilities, many of them become "professional moochers" with much knowledge of the various ways of acquiring welfare benefits.

Exhibit 6 SAMPLING OF PRE-TAX EQUIVALENT SALARIES THAT WELFARE RECIPIENTS ARE ABLE TO RECEIVE		
1	Hawaii	$60,590
2	District of Columbia	$50,820
3	Massachusetts	$50,540
4	Connecticut	$44,370
5	New York	$43,700
6	New Jersey	$43,450
7	Rhode Island	$43,330
8	Vermont	$42,350
9	New Hampshire	$39,750
10	Maryland	$38,160
11	California	$37,160
12	Oregon	$34,300
13	Wyoming	$32,620
14	Nevada	$29,820
15	Minnesota	$29,350

THE PHENOMENON OF PART-TIME EMPLOYMENT

There are many factors that have a major impact on the unemployment numbers but few have a greater impact than the phenomenon of part-time employment. For example, if someone badly needs full-time employment but happens to have a temporary part-time job, this person is not considered unemployed. Likewise, if a person is unemployed and is merely seeking a part-time job, he or she is not a part of the U-3 category because this number only includes those looking for full-time work. It is only in the category of U-6 that a person needing employment and seeking part-time work is considered unemployed.

To further explore the relationship between part-time work and unemployment, we note the fact that there have been 11 recessions since World War II, and all of them have had an impact on the percentage of people seeking part-time work and those who have actually worked in part-time positions. Exhibit 7 provides some valuable information on these recessions with the first year of each recession shown horizontally near the top of the exhibit. As shown, the first recession began in 1948 and the last of the 11 recessions (the one we are in now) began in 2007.

Exhibit 7 compares these 11 recessions by visually starting them all at the same point and showing the impact that each has had on the unemployment rate with the Y axis showing the percentage of job losses from the peak employment month prior to the recession. The X axis shows the length of time of the recession. As shown at the bottom, the recession that started in 2007 is by far the deepest and lengthiest of the recessions and is still considered unresolved as it passes its 80^{th} month. Overall, it has resulted in the greatest destruction of jobs by far.

Perhaps the reason most frequently given as to why the current recession is deeper and longer-lasting is because of the impact of the Affordable Care Act. This legislation has added such heavy cost burdens to employers that many of them are laying off employees to get to less than 50 employees (the point at which many mandates kick in under the Affordable Care Act).

Likewise, many of them are replacing full-time employees with part-time employees so they don't need to pay other costly employee benefits that full-time employees often receive.

Exhibit 7

PERCENT JOB LOSSES IN POST WORLD WAR II RECESSIONS

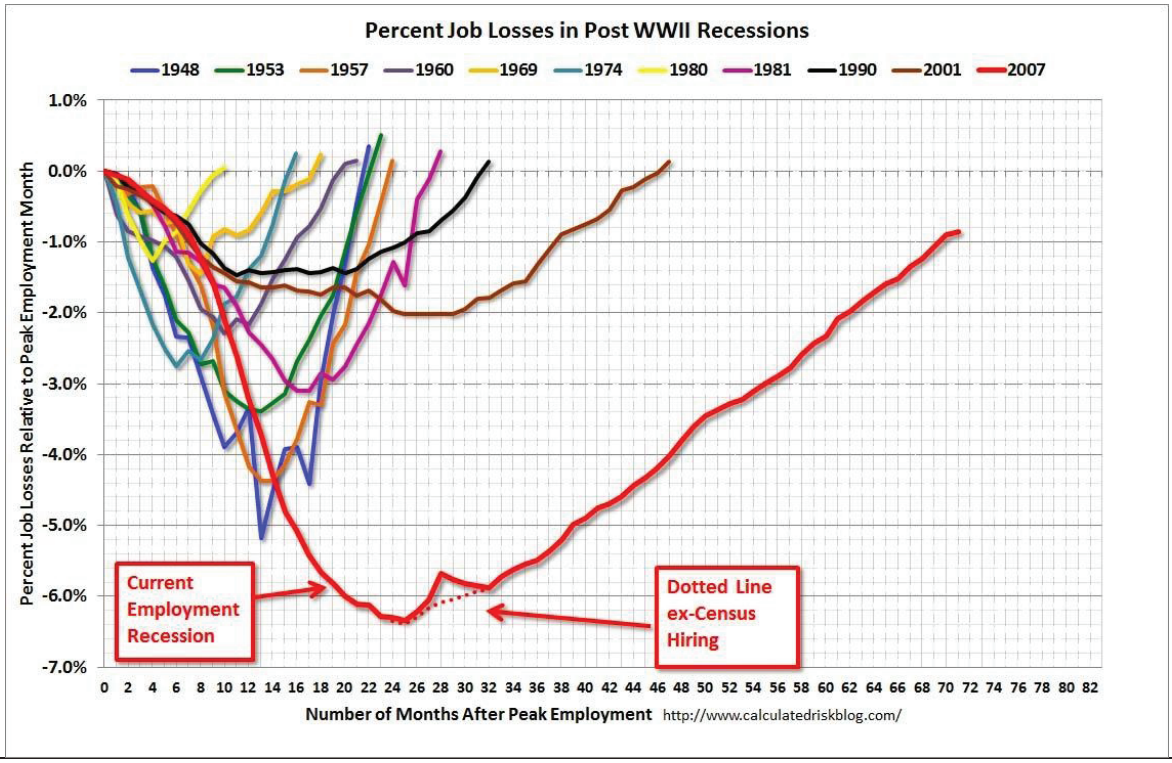
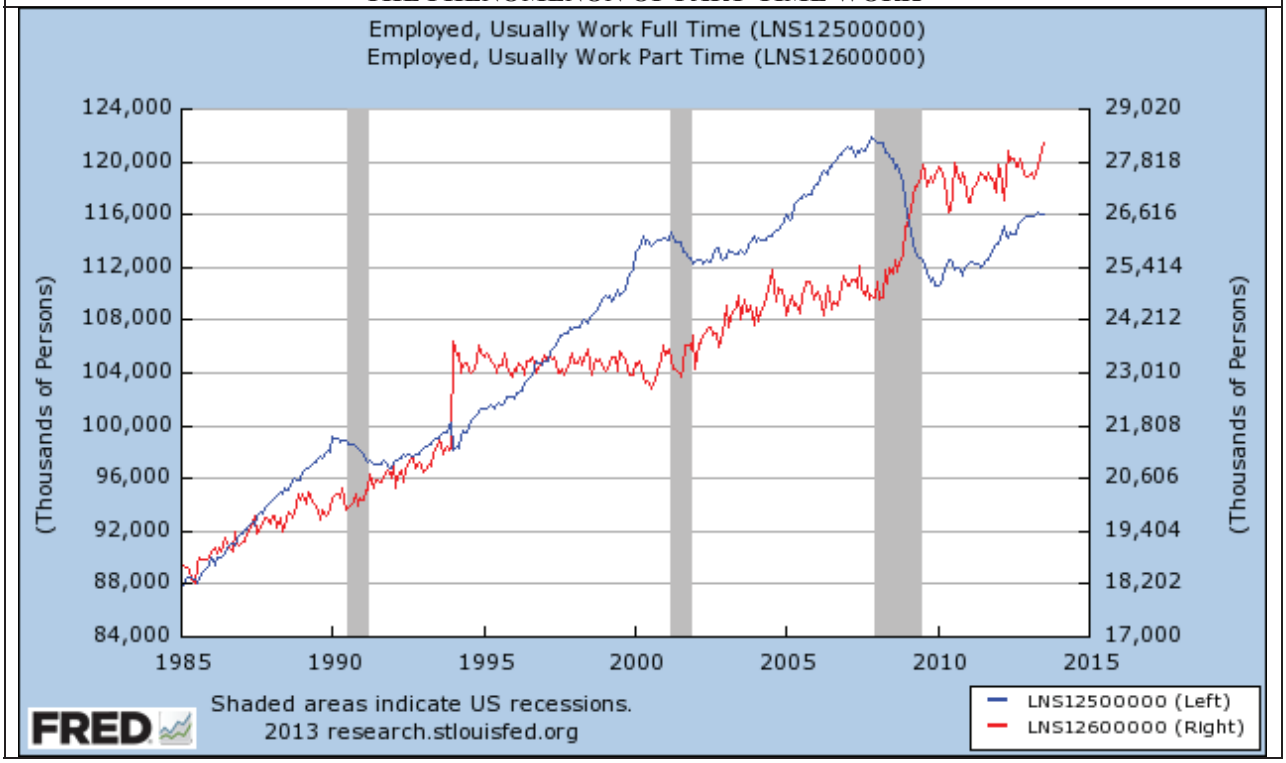


Exhibit 8 shows solid evidence of this phenomenon of replacing full-time workers with part-time workers. As shown in the exhibit, the line that has been more typically at the top represents the number of full-time workers and the one that has usually been at the bottom represents the number of part-time workers in society. Notice near the right hand side that the lines cross over, so the line for part-time workers is now at the top and the line for full-time workers is now at the bottom. Evidence of this phenomenon has already been referred to near the beginning of the paper when mention was made of full-time workers dropping by 523,000 during the month of June while part-time workers increased by 799,000. This pattern not only continues but is actually increasing in strength.

The problem with part-time work is that it results in five disadvantages to the part-time workers. First, these jobs are usually lesser-paying jobs per hour. Second, they obviously provide workers with fewer hours to earn the wages. Third, the part-time workers usually don't receive employee benefits for medical, retirement, etc. Fourth, they frequently consume enough time that it is often hard for part-time workers to effectively seek the full-time jobs that they need. And fifth, having part-time jobs identified sometimes does "resume damage." In other words, listing them (as is frequently mandated) results in a less impressive resume.

Exhibit 8
THE PHENOMENON OF PART-TIME WORK



THE ACTUAL NUMBERS BEHIND THE UNEMPLOYMENT RATES

The primary emphasis so far has been on the unemployment rates and/or percentages. Now let's turn our attention to the actual numbers behind each of the employment and unemployment categories. Referring to Exhibit 9, the first line is the number of people living within the 50 states (not necessarily citizens and not including some citizens who live overseas). This number (318,695,889) is determined by the Bureau of Labor Statistics and other government entities and is locked in after being determined for a given point in time (year).

Subtracted from that number are all the people who are not working and who are not seeking work (as shown from lines 2 through 10). These would include retired people, disabled people, those caring for other people, those being cared for, etc. As opposed to the first line (the population) that doesn't change, these numbers change according to the assumptions made.

The next four lines (from 11 to 14) will change based on which unemployment assumptions are used, and they relate to the four basic unemployment categories of U-3, U-6, SGS, and Marotta that have already been discussed. The next six lines (from line 15 through 20) are a measure of those who are gainfully "employed," but are not a part of the civilian, non-farm labor force. These include self-employed people, government workers, those involved in farming, etc.

Exhibit 9
THE ACTUAL UNEMPLOYMENT NUMBERS
As of August 2014

	Category	U-3 Unemp.	U-6 Unemp.	SGS Calc.	Marotta Index
1	Total U.S. Population (within the 50 states)	318,695,889	318,695,889	318,695,889	318,695,889
2	Less:				
3	Retired people (47,769,898)				
4	Disabled people (11,009,233				
5	Incarcerated people				
6	Students, especially those in college				
7	Those caring for family members, etc.				
8	Those being cared for (children, etc.)				
9	Total: those neither working nor seeking work	92,249,937	83,328,794	68,429,234	47,777,757
10	(Includes long-term discouraged workers)				
11	Should be in the labor force per Marotta Index				270,918,132
12	Should be in the labor force per SGS statistics			250,266,655	
13	Should be in the labor force per U-6 numbers		235,367,095		
14	Should be in the labor force per U-3 numbers	226,445,952			
15	Less:				
16	Self-employed people (8,400,634)				
17	Federal government workers (4,385,896)				
18	State and local government workers (19,698,189)				
19	Those involved in farm labor, etc. (37,484,293)				
20	Total	69,969,012	69,969,012	69,969,012	69,969,012
21	Actual potential civilian, non-farm work force	156,067,994	165,398,083	180,297,643	200,949,120
22	Less:				
23	Percent of Marotta unemployment				37.2%
24	Unemployed per Marotta Index				54,484,747
25	Percent of SGS unemployment			23.1%	
26	Unemployed per SGS Statistics			33,833,270	
27	Percent of U-6 unemployment		12.1%		
28	Unemployed per government U-6 data		18,933,710		
29	Percent of U-3 unemployment	6.1%			
30	Unemployed per government U-3 data	9,603,621			
31	Actual civilian, non-farm workers	146,464,373	146,464,373	146,464,373	146,464,373
32	Full-time workers, 2014	118,399,678	118,399,678	118,399,678	118,399,678
33	Part-time workers, 2014	28,064,695	28,064,695	28,064,695	28,064,695
34	Total workers, 2014	146,464,373	146,464,373	146,464,373	146,464,373
35	Full-time workers, 2008	122,000,000	122,000,000	122,000,000	122,000,000
36	Part-time workers, 2008	24,600,000	24,600,000	24,600,000	24,600,000
37	Total workers, 2008	146,600,000	146,600,000	146,600,000	146,600,000

After subtracting these from the numbers above, the resulting numbers are the potential civilian, non-farm labor force (that the unemployment numbers relate to). These numbers are "backed into" based on the actual civilian, non-farm workers that are determined by government surveys and statistical sampling.

Notice that lines 1, 20, and 31 are the only lines that do not change. Once determined by the government for a given point in time, the numbers remain unchanged. But all other numbers in the 31 lines will change or be "backed into" depending on which unemployment assumptions are used (the four categories of U-3, U-6, SGS, and Marotta in our analyses).

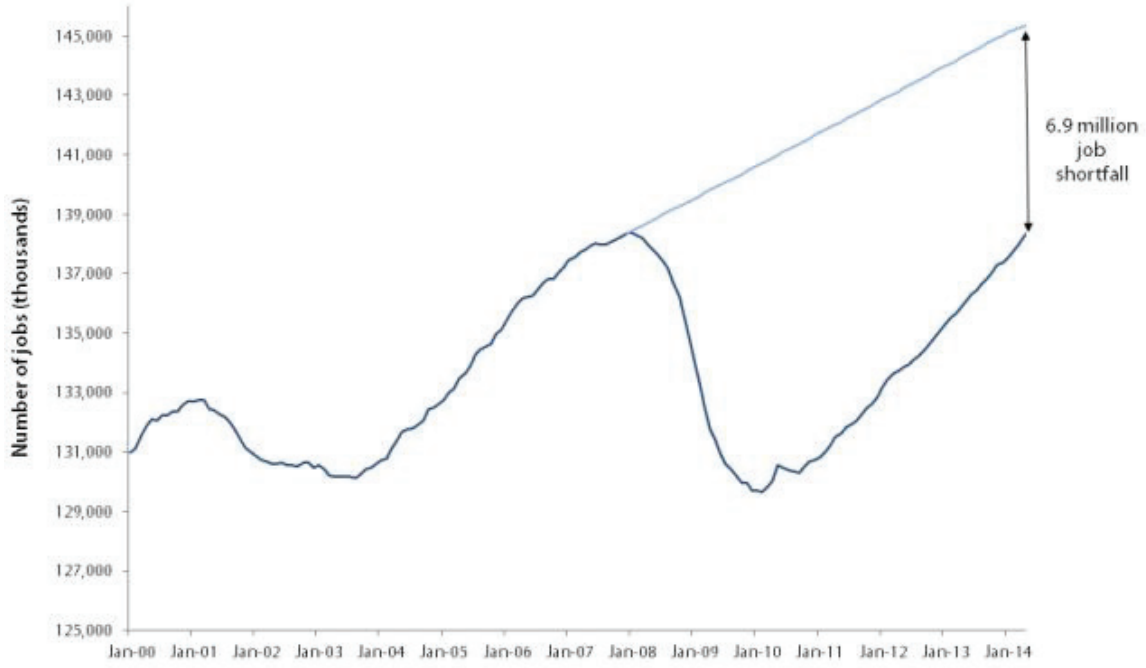
When all is said and done, the lines of Exhibit 9 (other than lines 1, 20, and 31 will be forced up or down depending on (1) what definition of unemployment is used and (2) what assumptions are used as to who is and should be in the labor force. For example, in the first column relating to the U-3 index, the people near the top of the exhibit who are not working and not seeking work are just "left there" on the assumption that they are not and should not be in the labor force (including the long-term discouraged workers that are referred to in line 10).

But the right column that relates to the Marotta Index "thinks" differently of these people and how they are measured. If they are able-bodied and capable of gainful employment, then they should be in the potential civilian, non-farm labor force that is shown in line 21 which is why this unemployment number (line 24) is so large at 54,484,747 or 37.2% of the potential labor force.

Before leaving Exhibit 9, mention needs to be made of the lines at the bottom that show the breakdown of full-time and part-time workers for the years 2008 and 2014. Notice that part-time workers have increased from 24,600,000 in 2008 to 28,064,695 in 2014 (an increase of 3,464,695 or more than 14%). On the other hand, the number of full-time workers has declined from 122,000,000 in 2008 to 118,399,678 in 2014 (a decrease of 3,600,322 or nearly 3%).

Also notice that even though the population of the United States has gone up from 304,660,456 in 2008 to 318,695,889 (an increase of over 14 million people), actually there are slightly fewer people working in 2014 than in 2008 (146,600,000 to 146,464,373). This is obviously one reason that food stamp recipients have gone up from 31,569,623 in 2008 to 45,935,019 in 2014--an increase of over 14 million people (notice the 14 million and 14 million.) It is also the main reason that the number of people living in poverty has gone up from 38,888,551 in 2008 to 47,296,561 in 2014.

Exhibit 10
THE AGGREGATE JOB SHORTFALL IN THE U.S. ECONOMY



Note: The potential labor force is the actual labor force plus the "missing workers". Missing workers calculated here: http://www.epi.org/publication/missing-workers/.
Source: Authors' analysis of Bureau of Labor Statistics' Current Employment Statistics public data series and Current population Survey public data series

THE PROBLEM OF JOB SHORTFALLS

Relating to the problem of more people but not more jobs, Exhibit 10 is a highly significant graph which shows that up until 2008 the nation's economy, at least statistically, was creating or capable of creating enough jobs for everyone (as people entered into the two-way circular flow of producing and consuming). But since 2008, millions of jobs have disappeared because of a mismanagement of the economy. This shortfall has been greater than 10 million jobs and has more recently been shown as a shortfall of 6.9 million jobs (as shown). These millions of lost jobs would have gone a long way in caring for the 14 million additional inhabitants since 2008.

Does the outlook for the future look bright? As long as there is excessive taxation and burdensome regulations, the economy will continue to shrivel as jobs are lost overseas and as corporate headquarters continue to flee to other countries. Exhibit 11, for example, lists a sampling of just a few companies that have moved (or are moving) to other countries to escape the excessive taxes and burdensome regulations.

Exhibit 11 A SAMPLING OF COMPANIES MOVING THEIR HEADQUARTERS TO OTHER COUNTRIES (Wikipedia, 1)
Transocean to Switzerland
Ensco plc to the United Kingdom
Eaton Corporation to Ireland
Actavis to Ireland
Liberty Global to the United Kingdom
Chiquita to Ireland
Applied Materials to the Netherlands
Abbvie to Ireland
Medtronic to Ireland
Walgreens to Switzerland
Mylan to the Netherlands

A SUMMARY OF SIGNIFICANT FACTS

In spite of the fanfare and glowing remarks that are frequently heard about the nation's continuing decline in the official unemployment rate from its peak in October, 2010, there are extremely serious and sobering indicators that are scattered throughout the full scope of employment data. These include the following:

The official unemployment rate (U-3) has not declined from 10% to 6.1% because people are finding jobs but just the opposite. It is because they are NOT finding jobs and are dropping out of the labor force. While the unemployment rate has dropped nearly 4%, those participating in the labor force have declined by 4.5%.

Many unemployed people, including those discouraged in their job pursuits or seeking part-time work, are excluded from the official unemployment rate. When these are added, the unemployment rate nearly doubles from 6.1% to 12.1%.

The army of long-term discouraged workers continues to grow in size but is intentionally omitted from all six of the government unemployment numbers (U-1 through U-6). When these are added, the unemployment rate increases to a sobering 23.1% --close to the rates of the Great Depression of the 1930s.

Many people who are able-bodied and capable of working choose not to have jobs, perhaps preferring to live on generous welfare benefits. When these are added to the list of unemployed, the unemployment rate is increased to a staggering 37.2% which has been described by some as the worst unemployment rate in the history of our nation.

While the population of America has increased by about 14 million people since 2008, there have not been any new jobs created and, in fact, the number of available jobs has declined slightly.

Although the number of total jobs has remained nearly flat, what is usually ignored is the fact that about 3.6 million full-time jobs have been eliminated (many with full benefits) and replaced by about 3.46 million part time jobs (with lower wages and no benefits).

Highly significant is the fact that "During the month of August, the economy added about 659,000 jobs that went to foreign-born Americans (naturalized citizens, green card holders, and illegal immigrants combined). At the same time, it lost about 643,000 jobs that had been held by native-born Americans" (Morris, 4).

Also sobering is the fact that until 2008 the American economy was almost always able to provide enough jobs (at least statistically) for all who wanted jobs. Since 2008, the shortfall has been higher than 10 million jobs and is currently a shortfall of 6.9 million jobs (with most of these jobs going overseas).

Since 1973, productivity growth in the United States has enabled the economy to grow by 275%, but real wages received by employed workers have remained almost completely flat.

Since 2008, real median income in the United States has actually declined slightly from about $28,580 to $28,426.

Since 2000, the population in the United States has increased by 23%, but the number of taxpayers has increased by only 5.6%

In 2000, the burden of a single worker in the United States was taking care of 2.08795 people (the worker burden index), but this has continued to inch upward to 2.1769 in 2014 (meaning that a worker cares for himself or herself and 1.1769 other people).

Before 2008, the poverty rate in the United States had decreased for decades, but since 2008, the number of people living below the poverty line has increased from 38,888,551 to 47,296,561.

CONCLUDING COMMENT

Unless something can be done to reverse the frightening trends that have been described, the middle class of America will continue to be stripped of value and property and driven to the ranks of those living in poverty. Likewise, the great country of America will continue to decline in strength and status among the nations of the earth.

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WHY HOUSEHOLDS BORROW FROM INFORMAL PREDATORY LENDERS: EVIDENCE FROM INDONESIA[1]

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ABSTRACT

We analyze why Indonesian households borrow money from informal predatory lenders. It relies primarily on data from 106 respondents to an in-depth survey. We do find that predatory lending is mostly demand driven, the result of economic insecurity. Lower-income households tend to borrow money frequently and in small amounts from predatory lenders. Natural relationship lending appears to occur even though the lenders charge excessive amounts of interest. Legalizing predatory lending could reduce the cost of borrowing money from such lenders because regulation could set the maximum interest rate. At the same time, however, legalization could create a social problem especially for borrowers by institutionalizing high financing costs.

Keywords: Predatory Lenders, households, economic insecurity, financial institutions, Indonesia
JEL: G21, D14

INTRODUCTION

For years, like in other developing countries, the Indonesian government through the financial authorities[2] has paid more attention on improving access to finance as it is generally considered that finance can promote economic growth[3] (e.g. King and Levine, 1993; Beck et al., 2000; Rajan and Zingales, 2003). Limited access to financing, particularly for the poor as well as for micro, small and medium enterprises, has been a central issue in Indonesia, even though the country's success with microfinance is well known (Karsidi, 2007; Hamada, 2010).[4] Indonesia generally remains "underbanked" (Rosengard and Prasetyantoko 2011).[5] This leads to the existence of predatory lenders and other informal, nonbank sources of loans.[6] Predatory lenders charge high interest rates and require daily or weekly repayment[7]. The concept resembles payday lending that has been regulated in some U.S. states (see for example Stegman and Faris 2003; Stegman 2007; DeYoung and Phillips 2010; Morse 2011). Payday lenders provide short-term consumer credit in low- and moderate-income communities to those having a steady income, mostly from salary, while predatory lenders in Indonesia make loans to those with or without-mostly without-a steady income.

Predatory lending is unregulated in Indonesia. Many individuals provide short-term loans in limited amounts in both rural and urban areas. In fact, many households and microenterprises turn to these predatory lenders despite the oppressive interest charges. The main reason is that it is simpler to obtain a loan from a predatory lender than from a pawnshop or bank. Moreover,

conventional loans may not be possible for some borrowers as banking regulations require that a borrower's income should be more than three times the installment payment.

Basically, there are two business models of predatory lenders[8]. The first model is the unique type of predatory lender which is well-structured business. In this model, there is ultimate chain (owner) which is a big investor usually represented by a non-financial firm. The second layer is a number of regional offices which organize the business in a region (commonly province). A regional office holds the funds, recruits lots of agents, and decides the places to operate. Ultimately, agents are those assigned to distribute loans to individual or micro enterprises debtors. Those agents usually operate in the traditional market and the majority of borrowers are small-scale traders. Borrowers do not need to come to pay installment because the agents would be at the market to collect the installment payment which is usually daily or weekly basis. The second model is the usual business model of predatory lender. Lenders do not have large amount of funds, relatively small, local player and not well-organized business. They get money by borrowing from commercial banks with standard interest rate. They are able to trick banks because they have other business which is legal and they also have collateral. Then, they retail money to individual or household or micro enterprises especially in the areas which are neglected by formal financial institutions with high fees and short-term repayment basis.

The present paper investigates what induces households to borrow from predatory lenders. Previous studies on the supply side (e.g., Stegman and Faris 2003, Bond et al. 2009) support the conclusion that predatory lenders provide loans because of market neglect by the traditional banking sector. Widespread economic insecurity might also create demand, according to previous research (Gallmeyer and Roberts 2009, Bond et al 2009, Nofsinger 2012). This study, using an in-depth survey of 106 borrowers in a province in Indonesia, finds that economic security to be the major determinant of borrowing from predatory lenders. Market neglect by commercial banks and other formal financial institutions exacerbates dependence on predatory lenders. In addition, we also provide a comprehensive understanding on the business models of predatory lenders based on an investigative survey.

The remainder of this paper is organized as follows: Section 2 describes the research method; Section 3 reports on the characteristics of borrowers; the characteristics of predatory lending; and the econometric analysis; and Section 4 summarizes findings and provides policy recommendations.

RESEARCH METHOD

Data

An in-depth survey methodology was used instead of a common-survey methodology. A common-survey questionnaire would have been inappropriate because the respondents belonged to economically distressed families and lacked much education.[9] Originally, 113 respondents meet the criteria for inclusion in this study: (1) they had borrowed money from predatory lenders, and (2) they were willing to disclose information on personal identity, family, and the loans. Seven were eliminated from the final sample because their information was incomplete.

Empirical Model

We use an empirical model to examine the influences of supply and demand on the prevalence of predatory lending, with variables from both influences. The dependent variable was extended beyond the decision to borrow from predatory lenders to include the degree of dependence on such lenders. The function of the empirical model is as follows:

Dependence on predatory lending = f (Loan fees, borrower/household characteristics, availability of formal financial institution,)

- ***Dependence on predatory lending.*** The dependent variable is the degree of reliance on predatory lending. The two measures are (1) frequency of borrowing (FREQ) and (2) amount borrowed (AMOUNT).
- ***Loan fees/interest rate.*** Loan fees/interest rate (INT) measures the price of the loans. It is the charge of the predatory loans, presented here at an annual rate.
- ***Borrower (household) characteristics.*** This measure of economic insecurity incorporates responses on
  - Number of family members (NFAM)
  - Number of family members having job (NFAM_WORK)
  - Household income/number of family members (INCOME_NFAM)
  - Head of household's education (EDUC)
- ***Availability of formal financial institutions.*** This variable reflects supply. Respondents answer questions on
  - Distance to nearest office of financial institution (DISTANCE)
  - Perceived distance to formal financial institution (PERC_DISTANCE)
- ***Proxy data on the availability of formal financial institutions provide a robustness check.*** These figures include
  - Number of bank branches in the sub-district
  - Number of rural banks in the sub-district
  - Number of microfinance providers in the sub-district

RESULTS

Characteristics of Borrowers

The average (standard deviation) age of respondents was 46.57 (8.97). As for education, 41.5 percent had completed elementary school, while 24.5 percent, had not; 17.9 percent had completed junior high school; and 15.1 percent had completed junior high school. Most respondents (59 percent) were small-scale traders at traditional markets. The rest were housewives (14 percent), unskilled laborers (9 percent), farmers (3 percent), and holders of various other jobs (14 percent).

Table 1 provides a deeper look at households. The average (standard deviation) household size was 4.26 (1.64) persons. The mean number of family members holding a job was 2. The maximum (minimum) household income was 7,500,000 (250,000) rupiah, while average income was 1,607,538.

Table 1
CHARACTERISTICS OF HOUSEHOLDS

Characteristics	Average	Standard Deviation	Minimum	Maximum
Number of family members	4.26	1.64	1.00	9.00
Number of family members who are working	2.00	0.84	1.00	5.00
Total income of household (rupiah)	1,607,538	1,121,708	250,000	7,500,000
Total income of household/number of family members(rupiah)	431,922	385,509	70,000	3,000,000

Characteristics of Predatory Lending

Table 2 presents statistics on predatory loans to respondents. The average frequency of borrowing from a predatory lender was 6.69 times a year. The maximum frequency was 72 times a year. The maximum loan was 2,000,000 rupiah, and the minimum amount was 60,000 rupiah. The average loan size was 613,777 rupiah. The maximum interest rate, standardized at an annual rate, was 600 percent. The mean interest rate was 163.5 percent.

Table 2
CHARACTERISTICS OF PREDATORY LOANS

Characteristics	Average	Standard Deviation	Minimum	Maximum
Frequency (in 1 year)	6.686	12.434	1	72
Average borrowed money (rupiah)	613,773.58	466,460.74	60,000	2,000,000
Loan repayment (days)	118.71	120.142	5	820
Interest (annual rate)	163.47%	120.33%	20.00%	600.00%

Empirical Results

The correlation matrix of all variables is presented in Table 3. Table 4 reports the regression results. The Ordinary Least Squares (OLS) method is employed to estimate the model. Columns 1 and 2 present the results with frequency of borrowing from predatory lenders (FREQ) as the dependent variable. Columns 3 and 4 present results for amount borrowed (AMOUNT) as the dependent variable appears in columns 3 and 4 of Table 4.

As reported in Table 4, household income/number of family members (INCOME_NFAM) had a negative and significant effect on borrowing frequency. Households having lower incomes per family member tended to borrow from predatory lenders more frequently and in small amounts. Those having higher incomes seemed to borrow less frequently but in bigger amounts.

Results on the effect of interest rates (INT) confirm theory and the general presumption that the higher the interest rate, the lower the amount borrowed (AMOUNT). The interest rate was positively correlated with the frequency of borrowing (FREQ). It is supposed that the

interest rate for small loans is higher than the rate for big loans. This implies that more-frequent borrowers often are charged higher interest rates than are less frequent borrowers.

Distance to nearest office of financial institution (DISTANCE) as well as perceived distance to formal financial institution (PERC_DISTANCE) do not significantly affect frequency of borrowing or the amount borrowed.

Table 3
CORRELATION MATRIX

	FREQ	AMOUNT	INT	NFAM	NFAM_WORK	INCOME_NFAM	EDU	DISTANCE	PERC_DISTANCE
FREQ	1								
AMOUNT	-0.099	1							
INT	0.212	-0.391	1						
NFAM	0.031	-0.176	-0.041	1					
NFAM_WORK	0.160	-0.171	-0.009	0.259	1				
INCOME_NFAM	-0.067	0.214	0.056	-0.512	0.228	1			
EDUC	0.002	-0.007	-0.065	0.120	-0.058	0.089	1		
DISTANCE	-0.013	0.033	-0.089	-0.103	0.156	0.219	-0.135	1	
PERC_DISTANCE	-0.082	-0.036	-0.043	-0.067	0.177	0.191	-0.253	0.775	1

Table 4
REGRESSION RESULTS

Variables	Frequency of Borrowing (FREQ)		Amount Borrowed (LN_AMOUNT)	
	1	2	3	4
Interest (INT)	0.930**	0.903**	-0.359***	-0.358***
	(0.421)	(0.419)	(0.064)	(0.064)
Number of family members (NFAM)	-0.442	-0.429	0.074	0.075
	(0.420)	(0.420)	(0.063)	(0.063)
Number of family members working (NFAM_WORK)	1.522**	1.573**	-0.311***	-0.311***
	(0.721)	(0.719)	(0.108)	(0.108)
Natural log (Household income/number of family) INCOME_NFAM	-1.669*	-1.625*	0.418***	0.415***
	(0.935)	(0.935)	(0.142)	(0.142)
Head of family's education (EDUC)	0.327	0.217	-0.053	-0.054
	(0.508)	(0.521)	(0.076)	(0.079)
Distance to nearest office of financial institution (DISTANCE)	0.061		-0.026	
	(0.632)		(0.095)	
Perceived distance to formal financial institution (PERC_DISTANCE)		-0.823		-0.025
		(1.139)		(0.173)
Constant	20.311*	19.155	8.766***	8.768***
	(12.101)	(12.138)	(1.834)	(1.842)
Method	OLS	OLS	OLS	OLS
Number of sub-districts	12	12	12	12
Number of observations	95	95	97	97
R-squared	0.10	0.10	0.32	0.32

Significance levels: * 10%, ** 5%, and *** 1%

ROBUSTNESS CHECKS[11]

The empirical model underwent some robustness checks. One was to use the actual number of formal financial institutions (commercial banks, rural banks, and microfinance providers), deflated by sub-district population, as a proxy for the availability of formal financial institutions. The results are quite similar to respondents' perception of distance to the nearest formal financial institution.

Also, a vector of dummies in the model controlled for sub-district effects. The results are consistent with those presented in Table 4.

LIMITATIONS

Nevertheless, this empirical estimation has some limitations. The small sample of this study could result a bias in interpretation, because degrees of freedom are lacking. Another limitation comes from not estimating the econometric model using a simultaneous equation technique to overcome endogeneity and simultaneity problems. Finally, incomplete data, especially on the number of formal financial institutions at the sub-district level, might have produced statistically insignificant results.

CONCLUSION AND POLICY IMPLICATIONS

This research investigates factors inducing households to borrow money from predatory lenders. Looking at the descriptive statistics as well as empirical estimation, it seems that economic insecurity is the major determinant of borrowing money from predatory lenders. Lower-income households tend to borrow money frequently and in small amounts from such lenders.

Market neglect by commercial banks as well as other formal financial institutions might very well exacerbate dependence on predatory lending, although this study found no empirical evidence to that effect. Banks and other formal financial institutions are reluctant to make loans to economically distressed households, because these households lack collateral or steady incomes. Also, formal financial institutions tend to be risk averse.

A significant finding of this research is that "natural relationship lending" appears to occur even though the lenders charge excessive amounts of interest. Most of borrowers say that they have personal relationships with the lenders. Borrowers benefit from getting money easily and immediately, providing no collateral, while lenders benefit from high interest rates.

These findings have several policy implications. For instance, governments need to decide how to treat predatory lenders. Legalizing this business could reduce the cost of borrowing money from such lenders because regulation could set the maximum interest rate. At the same time, legalization could create a social problem especially for borrowers by institutionalizing high financing costs.

Greater access to loans from formal financial institutions could reduce dependence on predatory lenders. The government and banking regulators must create incentives for banks to broaden such access.

Most surveyed borrowers are less educated and lack financial literacy. Some respondents also said they do not try to borrow from commercial banks or other formal financial institutions. The respondents explained that they are not confident enough to approach those institutions and perceive themselves as not bankable. It is essential that financial literacy, particularly for the poor, be continuously strengthened.

ENDNOTES

[1]The main part of this research (survey) was funded by the United States Agency for International Development (USAID) through the Support for Economic Analysis Development in Indonesia (SEADI) project. James Hambric (reviewer of the project) and Herry Kameswara (grant manager) offered helpful comments and suggestions. We would also like to express our appreciation for the helpful inputs from the participants at seminar at the Faculty of

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[2]Financial authority bodies in Indonesia consist of Bank Indonesia (the Central Bank) and the newly established Indonesian Financial Services Authority (OJK). The Central Bank is assigned to manage and control the monetary policy, macro prudential policy, and payment system as well as to contribute in improving financial inclusion. On the other hand, the OJK performs as regulatory and supervisory agency for banking, capital markets, and non-bank financial institutions. Before the establishment of OJK, the Central Bank also regulated and supervised banks, while regulation and supervision of capital markets and non-bank financial institutions were under the Ministry of Finance.

[3]Those support the role of finance to economic growth argue that financial intermediary institutions are essential for innovation, economic development and growth due to their services such as mobilizing saving, monitoring managers and facilitating transactions (King and Levine, 1993)

[4]Hamada (2010) cites BRI (Indonesian: *Bank Rakyat Indonesia*), the second-largest Indonesian state-owned bank, as the one of the world's most successful commercializers of microfinance. BRI is supported by a nationwide network of microfinance local units, which enables BRI to release large quantities of loans.

[5]Rosengard and Prasetyantoko (2011) argue that even though commercial banks in Indonesia perform well when measured by profitability and soundness, they fail to broaden access to finance. Moreover, they point out that the introduction of Indonesian banking architecture (API) has strengthened the banking oligopoly, which then exacerbated the ineffective and inefficient banking intermediation function.

[6]In the Indonesian language, such money lenders are usually called *rentenir* or *tengkulak.* In the Javanese language, those lenders are called *bank plecit*.

[7]See appendix for the details of business models of informal predatory lenders in Indonesia.

[8]We are able to portray the business model of predatory lenders by doing an investigative study

[9]In order to further investigate the determinants of the household's dependence on predatory lending and the extent of economic impact of borrowing from predatory lenders, particularly on economically distressed households, five families were interviewed in greater detail to create a complementary case study. These families depended highly on predatory lending, based on the survey. This complementary study made it possible to explore such issues as the purposes of the loans, the methods of repayment (installment), the process to obtain such loans, the effect of the loans on a household's economic situation, and what happened when households could not meet a payment's due date.

[10]Results of robustness checks are not reported, but they are available upon request.

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DEPOSITORS BEHAVIOR UNDER DIFFERENT DEPOSIT INSURANCE COVERAGE: EVIDENCE FROM INDONESIA

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ABSTRACT

This paper investigates the impact of different levels of deposit insurance coverage on market discipline by depositors. It is generally argued that reducing the maximum guarantee would lead to improve depositor discipline. Taking advantage of the detailed quarterly data for Indonesian banks over the 2005-2007 periods, it enables us to disentangle the behaviors of different kinds of depositors, more specifically insured and uninsured depositors, under different deposit insurance coverage. We do find that the deposit insurance system with limited coverage in Indonesia is credibly in which there is no bail-out commitment. It then leads to improve the monitoring efforts of depositors to banks. Moreover, we also find that the value of being state-owned bank increases with reducing the maximum deposit insurance coverage.

Keywords: Deposit Insurance, Market Discipline, Growth of Deposits, Interest on Deposits, State-owned Banks, Indonesia

INTRODUCTION

It is generally argued that depositors can discipline banks by withdrawing their money or requiring a higher interest on deposits. A number of empirical studies provide evidence on the existence of market discipline by depositors, even for insured depositors (Martinez-Peria and Schmukler, 2001) and in a blanket guarantee scheme (Hadad *et al*., 2011). However, little is found on the impact of moving from blanket guarantee scheme to limited guarantee system on depositor discipline. The replacement of the blanket guarantee to limited guarantee could be considered to imply some positive benefits, 1) impose depositors, particularly large (uninsured) depositors, to discipline banks, 2) mitigate bank risk taking behaviors, 3) continue to prevent the banking system stability.

We extend the literature by studying Indonesian banks which are found to be suitable objects for this study as they have experienced a number of different levels of deposit insurance coverage set by the government. After the severe 1997/1998 financial crisis, the Indonesian government introduced a blanket guarantee scheme to restore the confidence in the banking system. Then, following some improvements in the banking system, the Indonesian government replaced the blanket guarantee scheme to a limited guarantee system by establishing the Indonesia Deposit Insurance Corporation to administer a formal deposit insurance system (McLeod, 2005; Hadad et al., 2011; Nys et al., 2015)[1]. Initially, the maximum insured deposits were all deposits (blanket guarantee), then successively reduced to 5 billion Rupiah and 1 billion Rupiah. Beginning March 2007, deposits were guaranteed a maximum savings of 100 million

Rupiah. Because of the financial crisis in 2008, maximum guaranteed deposits were raised to 2 billion Rupiah.

This study focuses on the impact of different levels of deposit insurance coverage on market discipline by depositors. We ask three questions: 1) Do depositors react to the reducing maximum coverage of deposit insurance? 2) Does reducing maximum coverage lead to improve market discipline by depositors? 3) Are state-owned banks more favored by depositors when the maximum coverage was reduced?

This study should contribute to the literature in the following ways. First, given by the nature of data, it enables us to explore the impact of changes in deposit insurance coverage on the depositor behaviors, more specifically we can disentangle the impact of moving from blanket guarantee scheme to limited guarantee for insured and uninsured depositors. Second, by using quarterly data of banks' financial statement, we can capture the more rigorous effect of the level of deposit insurance coverage on market discipline than by using annually data. Third, we include the role of ownership structure as a bank risk factor. We argue that depositors might perceive that state-owned banks are less risky than private banks.

LITERATURE REVIEW

An extensive body of literature has outlined the effectiveness of market discipline by depositors in which depositors punish banks' bad behavior by withdrawing their money or requiring a higher interest rate on deposits. The depositor discipline perspective explains that deposits received by a bank are influenced by the bank riskiness perceived by depositors[2]. It means that bank bad behaviors or risky banks would be punished by depositors by withdrawing their deposits or requiring a higher interest rate. A number of studies have attempted to examine the existence of market discipline by depositors using either cross country analysis, single country analysis or even case study of a bank (Park, 1995; Mondschean and Opiela, 1999; Martinez-Peria and Schmukler, 2001; Davenport and McDill, 2006; Demirguc-Kunt and Huizinga, 2004; Imai, 2006; Murata and Hori, 2006; Davenport and McDill, 2006; Fueda and Konishi, 2007; Onder and Ozyildirim, 2008; Hori *et al*., 2009; Karas *et al*., 2010; Hadad *et al*., 2011). In general, these studies find evidence on the existence of market discipline by depositors, even for insured depositors (Martinez-Peria and Schmukler, 2001) and in a blanket guarantee scheme (Hadad *et al*., 2011).

Some papers have also investigated the contingency effect of deposit insurance scheme on the effectiveness of market discipline. Imai (2006), using the Moody's Bank Deposit Rating to measure bank risk, point out that lifting from blanket guarantee to limited guarantee raised the sensitivity of interest rates on deposits, and that of deposit quantity to default risk. However, this paper also reveals a dark side of the reducing deposit coverage from full guarantee into a certain amount. Too-big-to-fail issue becomes more important in which depositors tend to move from small banks to large banks. Contrary to Imai (2006), Fueda and Konishi (2007), using bank specifics variables as measures of bank risk, document that depositor discipline is most significant during periods of full insurance coverage rather than during limited insurance coverage. Hadad *et al*. (2011) investigate the role of market discipline in Indonesia under different regulations on deposit insurance and capital requirement. They find that market discipline by depositor is weaker during the blanket guarantee scheme then the introduction of limited guarantee system mitigates the role of market discipline. Recently, Nys et al. (2015) stress on the impact of political connections on bank deposits under different insurance system in

the context of Indonesia. They find that the impact of political connections on bank deposits is stronger after the shifting from blanket guarantee to limited guarantee which is called as too-politically important-to-fail issue.

We therefore propose these two following hypotheses:

H1: If the limited guarantee scheme is credibly (there is no bailout commitment), reducing the maximum guarantee improves market discipline by depositors

H2: Reducing the maximum guarantee would lead to a "flight to quality" behavior in which depositors displace their deposits from private banks to state-owned banks.

METHODOLOGY

Data

The IDIC (*LPS*) guarantees deposits for all of conventional and Islamic banks operating in Indonesia both of commercial banks (regional development banks, state-owned banks, foreign-owned banks, joint-venture banks and domestic-private banks) and rural banks. However, in this study, we exclude the Islamic banks and rural banks in our sample because of different system of Islamic banking and different characteristics of rural banks. To test the hypotheses, we employ quarterly data of 106 commercial banks from Q4:2005 – Q2:2007.

Empirical Method

Following the works of Martinez-peria and Schmukler (2001), Murata and Hori (2006) and Hori *et al*. (2009), we examine the deposit demand and supply using a reduced form.

Consider that deposits received by a bank are determined by demand and supply factors, then the equations:

Growth of Deposits = f (Bank Fundamental Factors, Ownership, Insurance Coverage, Bank Fundamental Factors*Insurance Coverage, Ownership*Insurance Coverage, Control Variables)

Interest on Deposits = f (Bank Fundamental Factors, Ownership, Insurance Coverage, Bank Fundamental Factors*Insurance Coverage, Ownership*Insurance Coverage, Control Variables)

Bank Fundamental Factors

According to the study of Nys et al. (2015), we employ a number of bank specific variables as follows:

1. The ratio of non-performing loans to total loans (NPL) as a proxy of credit risk
2. The ratio liquid assets to total assets (LATA) as a measure of liquidity risk
3. Return on assets (ROA) as a proxy of bank profitability
4. Natural logarithm of total assets (LNTA) to measure bank size

However, we use the lag value of those variables as depositors might use the information from the previous period to evaluate the current risk and performance of banks.

Deposit Insurance Coverage

To measure the deposit insurance coverage, we use dummy variables for each period of the different deposit insurance schemes. ALLDEPINS is the period when all deposits were guaranteed (Q4:2005 – Q1:2006), FIVEBILL is the period when the maximum deposit insurance coverage was 5 Billion Rupiah (Q2:2006 – Q3:2006), ONEBILL is the period when the maximum deposit insurance coverage was 1 Billion Rupiah (Q4:2006 – Q1:2007), HUNMILL is the period when maximum deposit insurance coverage was 100 Million Rupiah (Q2:2007).

Bank Ownership

In this study, based on type of ownership, banks are divided into three categories:

1) State-owned Banks (SOB) are banks fully owned or majority owned by central government or regional (province) government.
2) Foreign Banks (FOB) are private commercial banks which are representative (branch office) of parent banks in their home country or commercial banks that were established jointly by one or more commercial banks based in Indonesia and was established by citizens and / or Indonesian legal entity owned by Indonesian citizens, with one or more bank domiciled abroad.
3) Private-Domestic Banks (PDB) are domestic banks owned or majority owned by private or non-government institutions.

We also control for time fixed effects to account for macroeconomic variables which vary overtime but individually invariant. We estimate our empirical model using OLS estimation as the model is a reduced-form.

EMPIRICAL RESULTS

Descriptive Statistics

This table presents the descriptive statistics of variables. GROWTHDEP1 is the growth of deposits < 50 million Rupiah. GROWTHDEP2 is the growth of deposits 50-100 million Rupiah. GROWTHDEP3 is the growth of deposits 100 million – 1 billion Rupiah. GROWTHDEP4 is the growth of deposits 1 – 5 billion Rupiah. GROWTHDEP5 is the growth of deposits > 5 billion Rupiah. INTDEP is the interest rate on deposits. NPL is the ratio of non-performing loans to total loans, LATA is the ratio of liquid assets to total assets. ROA is the ratio of return to total assets, and LNTA is the natural log of total assets.

Table 1

DESCRIPTIVE STATISTICS

	Growthdep1	Growthdep2	Growthdep3	Growthdep4	Growthdep5	Intdep	Npl_1	Lata_1	Roa_1	Lnta_1
Mean	0.032	0.049	0.017	0.027	0.073	0.044	0.041	0.393	0.026	14.891
Median	0.029	0.046	0.026	0.028	0.035	0.034	0.033	0.363	0.023	14.751
Maximum	0.690	0.901	0.962	1.840	10.836	0.311	0.277	0.836	0.182	19.362
Minimum	-0.485	-1.129	-0.858	-2.368	-12.004	0.003	0.000	0.076	-0.072	11.108
Std. Dev.	0.109	0.181	0.215	0.311	1.697	0.030	0.037	0.183	0.023	1.816
Skewness	0.289	-0.196	-0.240	-0.628	-0.088	2.178	2.659	0.494	1.024	0.237
Observations	592	592	592	592	592	592	592	592	592	592

Correlation Matrix

This table presents the correlation matrix of variables. GROWTHDEP1 is the growth of deposits < 50 million Rupiah. GROWTHDEP2 is the growth of deposits 50-100 million Rupiah. GROWTHDEP3 is the growth of deposits 100 million – 1 billion Rupiah. GROWTHDEP4 is the growth of deposits 1 – 5 billion Rupiah. GROWTHDEP5 is the growth of deposits > 5 billion Rupiah. INTDEP is the interest rate on deposits. NPL is the ratio of non-performing loans to total loans, LATA is the ratio of liquid assets to total assets. ROA is the ratio of return to total assets, and LNTA is the natural log of total assets.

Table 2
CORRELATION MATRIX

	Growthdep1	Growthdep2	Growthdep3	Growthdep4	Growthdep5	Intdep	Npl_1	Lata_1	Roa_1	Lnta_1
Growthdep1	1									
Growthdep2	0.443	1								
Growthdep3	0.398	0.555	1							
Growthdep4	0.179	0.236	0.293	1						
Growthdep5	-0.040	-0.090	0.003	-0.217	1					
Intdep	0.081	0.084	0.162	-0.007	-0.049	1				
Npl_1	-0.072	-0.034	-0.038	-0.055	-0.035	0.068	1			
Lata_1	0.004	-0.055	0.025	0.038	0.026	-0.279	-0.016	1		
Roa_1	0.093	-0.030	0.070	0.154	-0.013	-0.143	-0.144	0.215	1	
LNTA_1	0.005	-0.060	-0.012	0.019	-0.038	-0.113	0.134	0.169	0.142	1

Regression Results

Table 3 exhibits the regression results of all samples. The dependent variables are growth of deposits (divided into five categories) and implicit interest rate on deposits. Our measure of bank risk which is the ratio of non-performing loans to total loans (NPL) is positively associated with interest on deposits. Moreover, the NPL is also found to have negative impact on growth of some categories of deposits. It confirms our argument; when banks become riskier, depositors punish those banks by requiring a higher rate on their deposits or withdrawing their money. The results of our second proxy of bank fundamental variable which is the ratio of liquid assets to total assets (LATA) as a measure of bank liquidity also reveal that more liquid banks charge a lower interest on deposits than that of less liquid banks. However, we do not find evidence on the growth of deposits. More profitable banks can attract more deposits than less profitable banks. However, our results do not confirm that profitable banks have lower interest on deposits. Our regression results, however, do not document evidence that bank size (LNTA) is considered by depositors as a monitoring tool. As expected, state-owned banks charge a lower interest rate on deposits as they may be perceived less risky by depositors. Similarly, interest rate on deposits is also lower for foreign banks than that of domestic banks.

To test our first hypothesis on the credibility of deposit insurance system in place in which reducing the maximum guarantee improves market discipline by depositors, we create interaction variables between bank fundamental variables (NPL, LATA, ROA and LNTA) and dummy variables representing the maximum deposit insurance coverage. Table 4, 5, 6, and 7 provide regression results for the interactions between bank fundamental variables and ALLINS (the period when all deposits were guaranteed), FIVEBILL (the period when the maximum deposit insurance coverage was 5 Billion Rupiah), ONEBILL (the period when the maximum deposit insurance coverage was 1 Billion Rupiah), and HUNMILL (the period when maximum deposit insurance coverage was 100 Million Rupiah), respectively. Table 4, 5, 6, and 7 also exhibit the interaction variables between state-owned banks (SOB) and dummy variables representing the maximum coverage of deposit insurance to test our second hypothesis.

Basically, our results on the interactions between bank fundamental variables and deposit insurance coverage confirm our hypothesis that depositors, particularly large depositors, pay more attention on their deposits after the regulators reduce the maximum coverage of deposit insurance. It can address the issue of credibility of deposit insurance. In a credible deposit insurance system, there is no bail-out commitment which means banks can fail (Nys et al., 2015). It is then supposed that in such a credible system, depositors will discipline banks. Our findings also confirm the second hypothesis in which reducing the maximum guarantee lead to a "flight to quality" behavior. Depositors displace their deposits from private banks to state-owned banks because they perceive that state-owned banks are less risky. Depositors believe that these banks will be rescued by the government when they encounter financial distress.

Table 3
REGRESSIONS RESULTS (WITHOUT DUMMY MAXIMUM COVERAGE AND INTERACTION VARIABLES)

This table presents the results of panel least squares with time-fixed effect. The dependent variables are the deposit growth which is divided into five categories, and the interest rate on deposits. NPL is the ratio of non-performing loans to total loans, LATA is the ratio of liquid assets to total assets. ROA is the ratio of return to total assets, and LNTA is the natural log of total assets. SOB is the dummy variable for state-owned banks. FOB is the dummy variable for foreign banks. *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	DEPENDENT VARIABLE: DEPOSIT GROWTH					Dep variable: Interest on Deposit
	< 50 million	**50 - 100 million**	**100 million - 1 billion**	**1 - 5 billion**	**> 5 billion**	
Constant	0.049**	0.133*	0.022	-0.003	0.658	0.072***
	(0.025)	(0.077)	(0.105)	(0.074)	(0.699)	(0.008)
NPL (-1)	-0.236	-0.168*	-0.242	-0.271*	-1.550	0.040*
	(0.220)	(0.103)	(0.192)	(0.148)	(2.297)	(0.022)
LATA (-1)	-0.021	-0.049	0.033	-0.046	0.157	-0.030***
	(0.038)	(0.048)	(0.069)	(0.117)	(0.386)	(0.009)
ROA (-1)	0.237**	-0.127	0.359	1.847***	-1.642	-0.036
	(0.099)	(0.307)	(0.334)	(0.437)	(1.005)	(0.071)
LNTA (-1)	-0.001	-0.003	-0.001	0.0001	-0.039	-0.0005
	(0.003)	(0.007)	(0.009)	(0.004)	(0.040)	(0.0004)
SOB	0.021	0.0008	-0.007	0.040	0.116	-0.016***
	(0.025)	(0.070)	(0.103)	(0.074)	(0.162)	(0.002)
FOB	0.016	-0.007	0.015	-0.019	0.067	-0.008***
	(0.016)	(0.019)	(0.014)	(0.023)	(0.107)	(0.002)
Number of Banks	106	106	106	106	106	106
Observations	602	598	603	602	603	697
Time-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.08	0.05	0.18	0.11	0.02	0.40

Table 4
REGRESSIONS RESULTS (ALL DEPOSITS ARE INSURED)

This table presents the results of panel least squares. The dependent variable is the deposit growth which is divided into five categories. ALL_INS is the dummy variable for the period when all deposits were guaranteed. NPL is the ratio of non-performing loans to total loans, LATA is the ratio of liquid assets to total assets. ROA is the ratio of return to total assets, and LNTA is the natural log of total assets. SOB is the dummy variable for state-owned banks. FOB is the dummy variable for foreign banks. NPL(-1)*ALL_INS, LATA(-1)*ALL_INS, ROA(-1)*ALL_INS, LNTA(-1)*ALL_INS, SOB(-1)*ALL_INS are the interactions between ALL_INS and NPL, LATA, ROA, LNTA and SOB, respectively. ∗, ∗∗ and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	DEPENDENT VARIABLE: DEPOSIT GROWTH				
	< 50 million	**50 - 100 million**	**100 million - 1 billion**	**1 - 5 billion**	**> 5 billion**
Constant	0.077***	0.216***	0.146	0.019	1.119
	(0.108)	(0.077)	(0.124)	(0.121)	(0.739)
ALL_INS	-0.139***	-0.415***	-0.505***	-0.096	-3.085***
	(0.031)	(0.069)	(0.123)	(0.135)	(0.777)
NPL (-1)	0.013	-0.134	-0.166	-0.138	-2.103
	(0.086)	(0.138)	(0.266)	(0.206)	(2.554)
LATA (-1)	-0.007	-0.043	0.014	-0.022	0.178
	(0.032)	(0.051)	(0.080)	(0.137)	(0.404)
ROA (-1)	0.304**	0.062	0.734	1.810***	-2.518**
	(0.150)	(0.310)	(0.500)	(0.534)	(1.204)
LNTA (-1)	-0.003	-0.009*	-0.009	-0.001	-0.063
	(0.003)	(0.005)	(0.007)	(0.004)	(0.039)
SOB	0.037	0.041*	0.059**	0.064	0.009
	(0.029)	(0.075)	(0.107)	(0.090)	(0.154)
FOB	0.016	-0.009	0.010	-0.024	0.062
	(0.017)	(0.020)	(0.016)	(0.023)	(0.099)
NPL(-1)*ALL_INS	-1.139***	-0.085	0.205	-0.178	2.931
	(0.080)	(0.105)	(0.249)	(0.200)	(2.364)
LATA(-1)*ALL_INS	-0.178***	-0.231***	-0.304***	-0.387***	0.407
	(0.032)	(0.052)	(0.080)	(0.138)	(0.408)
ROA(-1)*ALL_INS	-0.207	-1.113***	-1.157**	1.751***	7.529***
	(0.139)	(0.265)	(0.531)	(1.825)	(1.667)
LNTA(-1)*ALL_INS	0.016***	0.035***	0.041***	0.010*	0.150***
	(0.002)	(0.004)	(0.007)	(0.005)	(0.042)
SOB*ALL_INS	-0.080***	-0.213***	-0.321***	-0.127	0.519***
	(0.026)	(0.069)	(0.106)	(0.097)	(0.149)
Number of Banks	106	106	106	106	106
Observations	602	598	603	602	603
R^2	0.085	0.096	0.146	0.051	0.018

Table 5
REGRESSIONS RESULTS (MAXIMUM COVERAGE IS FIVE BILLION RUPIAH)

This table presents the results of panel least squares. The dependent variable is the deposit growth which is divided into five categories. FIVEBILL is the dummy variable for the period when the maximum deposit insurance was five billion Rupiah. NPL is the ratio of non-performing loans to total loans, LATA is the ratio of liquid assets to total assets. ROA is the ratio of return to total assets, and LNTA is the natural log of total assets. SOB is the dummy variable for state-owned banks. FOB is the dummy variable for foreign banks. NPL(-1)*FIVEBILL, LATA(-1)*FIVEBILL, ROA(-1)*FIVEBILL, LNTA(-1)*FIVEBILL, SOB(-1)*FIVEBILL are the interactions between FIVEBILL and NPL, LATA, ROA, LNTA and SOB, respectively. *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	DEPENDENT VARIABLE: DEPOSIT GROWTH				
	< 50 million	**50 - 100 million**	**100 million - 1 billion**	**1 - 5 billion**	**> 5 billion**
Constant	0.027	0.100	-0.139	0.045	-0.0435
	(0.048)	(0.128)	(0.160)	(0.089)	(0.995)
FIVEBILL	0.059	0.069	0.448**	-0.146	1.978**
	(0.071)	(0.162)	(0.185)	(0.232)	(1.103)
NPL (-1)	-0.337	-0.083	-0.014	-0.276	-1.99
	(0.350)	(0.123)	(0.208)	(0.332)	(2.768)
LATA (-1)	-0.010	-0.106**	0.043	-0.146**	0.549
	(0.039)	(0.044)	(0.114)	(0.072)	(0.447)
ROA (-1)	0.226	-0.579	0.835	2.275***	-0.619
	(0.157)	(0.353)	(0.541)	(0.741)	(1.630)
LNTA (-1)	0.0003	0.0005	0.007	-0.001	-0.002
	(0.003)	(0.010)	(0.012)	(0.005)	(0.050)
SOB	0.0004	-0.020	-0.073**	0.011	0.010
	(0.031)	(0.100)	(0.141)	(0.092)	(0.201)
FOB	0.015	-0.008	0.011	-0.023	0.066
	(0.017)	(0.019)	(0.016)	(0.023)	(0.102)
NPL(-1)*FIVEBILL	0.268	-0.304***	-0.439**	0.008	1.510
	(0.329)	(0.116)	(0.220)	(0.332)	(4.100)
LATA(-1)*FIVEBILL	-0.039	0.182***	-0.034	0.266	-0.839*
	(0.085)	(0.045)	(0.114)	(0.286)	(0.489)
ROA(-1)*FIVEBILL	0.047	0.916**	-1.065*	-0.862	-3.377
	(0.163)	(0.367)	(0.607)	(0.753)	(2.451)
LNTA(-1)*FIVEBILL	-0.003	-0.009	-0.024**	0.005	-0.111**
	(0.007)	(0.011)	(0.014)	(0.009)	(0.057)
SOB*FIVEBILL	0.062**	0.060	0.195	0.082	0.250
	(0.034)	(0.100)	(0.142)	(0.166)	(0.218)
Number of Banks	106	106	106	106	106
Observations	602	598	603	602	603
R^2	0.041	0.036	0.075	0.043	0.009

Table 6
REGRESSIONS RESULTS (MAXIMUM COVERAGE IS ONE BILLION RUPIAH)

This table presents the results of panel least squares. The dependent variable is the deposit growth which is divided into five categories. ONEBILL is the dummy variable for the period when the maximum deposit insurance was one billion Rupiah. NPL is the ratio of non-performing loans to total loans, LATA is the ratio of liquid assets to total assets. ROA is the ratio of return to total assets, and LNTA is the natural log of total assets. SOB is the dummy variable for state-owned banks. FOB is the dummy variable for foreign banks. NPL(-1)*ONEBILL, LATA(-1)*ONEBILL, ROA(-1)*ONEBILL, LNTA(-1)*ONEBILL, SOB(-1)*ONEBILL are the interactions between ONEBILL and NPL, LATA, ROA, LNTA and SOB, respectively. *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	DEPENDENT VARIABLE: DEPOSIT GROWTH				
	< 50 million	**50 - 100 million**	**100 million - 1 billion**	**1 - 5 billion**	**> 5 billion**
Constant	0.034	0.079	-0.019	-0.072	0.318
	(0.050)	(0.116)	0.187)	(0.108)	(0.877)
ONEBILL	0.027	0.138	0.124	0.188	0.930
	(0.068)	(0.196)	(0.306)	(0.235)	(1.775)
NPL (-1)	-0.400	-0.134***	-0.272**	-0.491***	-1.963
	(0.269)	(0.065)	(0.128)	(0.184)	(2.521)
LATA (-1)	-0.045	-0.027	0.037	0.017	0.305
	(0.046)	(0.057)	(0.035)	(0.158)	(0.374)
ROA (-1)	0.299**	0.192	0.465	1.569***	-1.152
	(0.151)	(0.326)	(0.479)	(0.584)	(1.847)
LNTA (-1)	0.001	-0.006	0.001	0.004	-0.027
	(0.004)	(0.008)	(0.011)	(0.003)	(0.045)
SOB	0.015	-0.023	-0.031	0.042	0.223
	(0.022)	(0.049)	(0.090)	(0.066)	(0.150)
FOB	0.015	-0.011	0.007	-0.024	0.070
	(0.016)	(0.019)	(0.015)	(0.023)	(0.104)
NPL(-1)*ONEBILL	0.569**	0.330***	0.453	0.741***	0.955
	(0.261)	(0.099)	(0.411)	(0.189)	(4.514)
LATA(-1)*ONEBILL	0.073	-0.059	-0.047	-0.215	-0.239
	(0.047)	(0.076)	(0.148)	(0.160)	(0.923)
ROA(-1)*ONEBILL	-0.075	-0.756**	0.333	1.350**	-2.034
	(0.151)	(0.293)	(0.601)	(0.647)	(2.873)
LNTA(-1)*ONEBILL	-0.005	-0.007	-0.010	-0.012	-0.032
	(0.005)	(0.015)	(0.021)	(0.011)	(0.095)
SOB*ONEBILL	-0.033	0.067	0.068	-0.008	-0.357
	(0.062)	(0.186)	(0.277)	(0.214)	(0.342)
Number of Banks	106	106	106	106	106
Observations	602	598	603	602	603
R^2	0.031	0.014	0.010	0.035	0.012

Table 7
REGRESSIONS RESULTS

This table presents the results of panel least squares. The dependent variable is the deposit growth which is divided into five categories. HUNMILL is the dummy variable for the period when the maximum deposit insurance was one hundred million Rupiah. NPL is the ratio of non-performing loans to total loans, LATA is the ratio of liquid assets to total assets. ROA is the ratio of return to total assets, and LNTA is the natural log of total assets. SOB is the dummy variable for state-owned banks. FOB is the dummy variable for foreign banks. NPL(-1)*HUNMILL, LATA(-1)*HUNMILL, ROA(-1)*HUNMILL, LNTA(-1)*HUNMILL, SOB(-1)*HUNMILL are the interactions between HUNMILL and NPL, LATA, ROA, LNTA and SOB, respectively. *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	DEPENDENT VARIABLE: DEPOSIT GROWTH				
	< 50 million	**50 - 100 million**	**100 million - 1 billion**	**1 - 5 billion**	**> 5 billion**
Constant	0.048	0.099	0.060	-0.021	0.919
	(0.040)	(0.108)	(0.162)	(0.105)	(0.842)
HUNMILL	0.007	0.210*	-0.229	0.118	-1.819**
	(0.040)	(0.107)	(0.160)	(0.115)	(0.866)
NPL (-1)	-0.186	-0.154	-0.073	-0.073	-0.467
	(0.250)	(0.130)	(0.256)	(0.150)	(2.102)
LATA (-1)	-0.037	-0.002	0.001	-0.086	0.025
	(0.038)	(0.008)	(0.101)	(0.142)	(0.317)
ROA (-1)	0.333**	-0.129	0.254	2.394***	-2.936**
	(0.130)	(0.348)	(0.392)	(0.441)	(1.140)
LNTA (-1)	-0.0006	-0.002	-0.003	0.0003	-0.052
	(0.003)	(0.008)	(0.011)	(0.004)	(0.044)
SOB	0.013	-0.009	-0.008	0.032	0.149
	(0.029)	(0.084)	(0.124)	(0.086)	(0.174)
FOB	0.013	-0.010	0.004	-0.024	0.051
	(0.017)	(0.019)	(0.014)	(0.023)	(0.100)
NPL(-1)*HUNMILL	-0.094	0.123	-0.154	-1.187***	-10.264***
	(0.234)	(0.108)	(0.249)	(0.144)	(2.003)
LATA(-1)*HUNMILL	0.068*	-0.167***	0.175*	0.088	1.425***
	(0.037)	(0.052)	(0.101)	(0.144)	(0.325)
ROA(-1)*HUNMILL	0.061	0.571**	2.840***	-2.805***	5.640***
	(0.144)	(0.309)	(0.358)	(0.500)	(1.599)
LNTA(-1)*HUNMILL	-0.002	-0.010	0.005	0.001	0.091**
	(0.003)	(0.008)	(0.010)	(0.004)	(0.046)
SOB*HUNMILL	0.044	0.049	-0.029	0.049	-0.363**
	(0.028)	(0.081)	(0.122)	(0.094)	(0.157)
NUMBER OF BANKS	106	106	106	106	106
OBSERVATIONS	602	598	603	602	603
R^2	0.026	0.012	0.019	0.039	0.016

Robustness Checks

We do some robustness checks to ensure that our results are consistent and robust. First, instead of including time-fixed effect in the model, we control for some macroeconomics variables which are inflation and cycle GDP per capita following the work of Nys et al. (2015). In the growth of deposits equation, we include two macroeconomic variables which are inflation, as a measure of price, and cycle GDP per capita to represent the economic activity. In the interest on deposits, we control by interest rate on one month Treasury bill and a measure of industry concentration which is the Herfindahl-Hirschman Index (HHI). Our results remain unchanged. Second, we exclude dummy variables for state-owned banks and foreign banks to enable us estimate the empirical model using individual fixed-effect. With regard to our bank risk variables, the results are consistent.

CONCLUSION

We investigate the impact of different levels of deposit insurance coverage on market discipline by depositors. Taking advantage of the detailed quarterly data for Indonesian banks over the 2005 – 2007 periods, it enables us to disentangle the behaviors of different kinds of depositors, more specifically insured and uninsured depositors, under different deposit insurance coverage.

Our empirical results show that the implementation of deposit insurance with limited coverage in Indonesia, to some extent, has improved the monitoring efforts of depositors. Depositors monitor bank in which they will punish bank bad behaviors. Moreover, our findings are in line with the work of Nys et al. (2015). We find that being state-owned banks becomes more important after the implementation of limited guarantee. Even though depositors believe that banks can fail, they still consider that state-owned banks are less likely to fail as they perceive that the government will prevent them from failure.

Consistent with the findings of Hadad et al. (2011), market discipline by depositors in Indonesia is more pronounced for interest rate on deposit than growth of deposits. Depositors discipline banks by requiring higher interest rate on deposits for riskier strategies.

END NOTES

[1]The existence of deposit insurance scheme in Indonesia was confirmed by Act No. 24 of 2004 concerning the Indonesian Deposit Insurance Corporation (LPS), an agency which is assigned to conduct banking deposit guarantee (Nys et al., 2015). In the Act, it is explained that the functions of Deposit Insurance Corporation (IDIC/ LPS) are to guarantee deposits and to actively participate in maintaining the stability of the banking system in accordance with its authority. The LPS guarantee deposits for all of conventional and islamic banks operating in Indonesia, both commercial banks (regional development banks, state-owned banks, foreign-owned banks, joint-venture banks and domestic-private banks) and rural banks. The LPS has the authority to set and to collect insurance premiums from banks.

[2]Market discipline is defined as a situation in which stockholders, depositors, or creditors face costs that increase as banks undertake risks, and then they take action on the basis of these costs (Martinez-Peria and Schmukler, 2001; Nys et al., 2015).

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