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JOURNAL OF ECONOMICS AND ECONOMIC EDUCATION RESEARCH

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LETTER FROM THE EDITOR

We are extremely pleased to present this issue of the *Journal of Economics and Economic Education Research*, an official publication of the Allied Academies' Academy of Economics and Economic Education Research, dedicated to the study, research and dissemination of information pertinent to the improvement of methodologies and effective teaching in the discipline of economics with a special emphasis on the process of economic education. The editorial board is composed primarily of directors of councils and centers for economic education affiliated with the National Council on Economic Education. This journal attempts to bridge the gap between the theoretical discipline of economics and the applied excellence relative to the teaching arts.

The Editorial Board considers two types of manuscripts for publication. First is empirical research related to the discipline of economics. The other is research oriented toward effective teaching methods and technologies in economics designed for grades kindergarten through twelve. These manuscripts are blind reviewed by the Editorial Board members with only the top programs in each category selected for publication, with an acceptance rate of less than 25%.

We are inviting papers for future editions of the *Journal for Economics and Economic Education Research* and encourage you to submit your manuscripts according to the guidelines found on the Allied Academies webpage at www.alliedacademies.org.

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ECONOMICS EDUCATION ARTICLES

DETERMINANTS OF ALUMNI GIVING RATES

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ABSTRACT

This manuscript examines the determinants of alumni giving rates. The data set is derived from U.S. News & World Report and comprises 196 educational institutions. The combination of decreased state funding for education and increasing costs of education has increased the need to find alternative sources of funds. Alumni donations provide the funds needed along with the signal that alumni are proud of their alma mater. Regression results indicate that the primary determinants of alumni giving rates are institutional acceptance rate, amount of average student debt, percent of students receiving Pell Grants, cost of room and board, value of the institution's endowment, public versus private institutions, percent of full-time students, and percent of female students.

INTRODUCTION

Fundraising efforts at colleges and universities continue to be a top priority for administrators in a higher education environment universally characterized by declining government support as a percentage of total funding. There has been a shift in prioritizing elementary and secondary education over higher education. Higher education is less than one-third of state spending on elementary and secondary education, which comprises 35.1% of total state expenditures (National Association of State Budget Officers, 2007).

A simple search of employment opportunities at a level of college president or dean reveals fundraising ability as an important expectation of the job at most institutions. In order to meet strategic goals, universities compete for top students, faculty and research grants. However, the goals and initiatives are expensive and directly dependent upon accessing funding from donors (Mann, 2007). It becomes a catch-22 for institutions. Donors prefer to give to successful programs but universities need the funds initially to create the successes. Plus, many programs

and research projects require several years before fruition, creating a lag effect between donation and success. Furthermore, institutions must continually find new programs that spark the interest of donors.

Higher education's significant and growing dependence upon donations from alumni clearly distinguishes it from other industries. Frequently, a dollar donated by alumni is critically important to an institution because it provides the funding for the margin of success for initiatives that separate one institution from another (Leslie & Ramey, 1988).

Recent reports indicate that the alumni contributions share of expenditures have climbed to over thirty percent. Donations are somewhat distinct from other higher education revenue sources because many times they are based on lagged rather than contemporaneous institutional features, administrative choices, and student body characteristics (Ficano & Cunningham, 2001). Major alumni donors are typically near or in retirement age and remember the university of their youth not necessarily the current characteristics of the institution.

The purpose of this research is to empirically analyze the determinants of alumni giving rates with a focus on financial, institutional, and demographic variables. This paper is divided into four sections. First, a brief survey of the related literature is discussed. The second section provides the model specification and variable discussion. This is followed by an empirical evaluation of the determinants of alumni giving rates for 196 educational institutions employing data from the 2005-06 academic year. The final section offers concluding remarks.

SURVEY OF THE LITERATURE

Scholarly interest on alumni giving to colleges and universities continues to grow. With greater demands on state budgets for health care, prisons, and transportation, education has had to fight for funding and seek an ever increasing amount of alumni-generated donations to make up the difference. Higher education is only 11.5% of general revenue expenditures by state legislatures. This is down from 14.9% in 1990 (National Association of State Budget Officers, 2006).

Even states with relatively stable state budgets, support of higher education is increasing slower than expected. Expenditures for Medicare are the most frequently cited reason for not increasing higher education funding (Walters, 2006). State governments find themselves increasing responsible for the aging population including expenses associated with short hospital stays and minor operations which used to be covered by families or insurance. Furthermore, under the pressure of

elections, states choose transportation initiatives and increases in law enforcement for any additional discretionary funds. Higher education is one of the last items funded and one of the first items cut. Moreover, state funding is biased towards construction projects such as new buildings and renovations for standards compliance and not the day-to-day operations of the university (National Association of State Budget Officers, 2007).

A contributing factor to the shift in responsibility back to universities is that universities can raise tuition and fees (National Association of State Budget Officers, 2007). Higher education is viewed as an investment in human capital. Historically, society was willing to contribute significantly to the investment because society gained from the increase in the education and skill level of the labor force. States are increasingly viewing higher education as an individual investment in human capital and not as a public good. Thus, individuals who choose to be educated beyond the primary and secondary level are finding themselves increasingly responsible for the costs of education. Evidence of this change in perception is evidence by the growing number of states that view support of student loan programs as the major part of their higher education initiatives (National Association of State Budget Officers, 2006).

At one time, alumni donations were used for the marginal student who needed scholarships to attend the university or for student organizations to support their travel and activities. Today, donations are an integral part of the budget of a university and necessary for the day-to-day operations.

Over the past two decades, researchers have tested a wide array of variables to identify the most important factors predicting alumni giving rates to alma maters. Mann (2007) categorizes the reasons why donors give and finds that alumni give in order to receive a benefit. The benefit can be altruistic in nature but alumni expect something in return. The return ranges from the good feeling that is associated with helping others to tax benefits. Weerts & Ronca (2007) find that the most giving alumni were not necessarily the best or most engaged students but instead have developed a sense of commitment and responsibility to the institution over many years of involvement. These findings show that it is important for universities to recognize the transaction aspect of donations and make sure that they provide the desired return.

The majority of empirical research in the area of alumni giving suffers from limited model development or a lack of relevance in the quickly changing environment of higher education. Using secondary analysis of 2002 data compiled from *U.S. News and World Report*, Gunsalus (2005) finds sufficient explanatory

power in some basic institutional variables including the importance of development activities. Harrison, Mitchell, and Peterson (1995) discover that having an NCAA division I athletic program, whether a school is public or private, and the size of the school's endowment have no significant effect on alumni giving while investment in development personnel, participation in fraternities and sororities, and bequests are important alumni giving determinants. These findings are interesting because many schools put major emphasis on athletics as a tie to alumni donors and view athletics above other school activities.

Okunade and Beri (1997) find the marginal probability of giving to be significantly related to time since graduation, major area of degree, willingness to recommend the university to others, family ties to alma mater, the number of other voluntary donors known, and the availability of matching gifts. Michael (2005) describes the importance of endowment with respect to national ranking and alumni giving rates. These results support the theory that donors prefer to back an already successful institution. Donors are willing to give if others have already given and if they are proud of their alma mater's reputation.

Christou and Haliassos (2006) plus Baum and O'Malley (2003) explore the role of debt in higher education financing and conclude that the increased use of debt has resulted in too much of the financial burden being shifted to students. These results imply that students who accumulated debt may not feel any obligation to assist those students who follow them; instead, expecting future students to amass debt.

Wunnava and Lauze (2001) find that male alumni members, alumni who are close to retirement and the existence of alumni chapters enhance alumni giving rates. Ficano and Cunningham (2001) offer one of the more extensive modern studies. They conclude an institution's academic reputation, the measured scholastic aptitude of the student population, its faculty-student ratio, its function and structure, and the vocational choices of graduates significantly impact alumni giving. These studies imply that alumni who have been successful are more likely to give funds but only if they feel connected to the institution and believe that the institution needs the funds.

Overall, the current literature has focused much more on the psychology of giving instead of who gives. Despite the expansion of research into alumni giving there is still a need for quantitative research to explore the impact of rapidly changing trends such as rising student debt, increasing tuition and fees, and the dramatic expansion of women and minority enrollments.

DATA AND MODEL

The primary source of cross-sectional data employed in this study is the *U.S. News & World Report's* website (usnews.com). The subscription component of the website not only offers traditional information on several colleges but has recently added student debt information for almost 200 colleges and universities.

The general model in this study used to evaluate the determinants of alumni giving rates is comprised of a total of thirteen independent variables from three general categories: four financial variables, five institutional variables, and four demographic variables. The explicit empirical model employed to investigate the determinants of average student debt is specified below as:

$$ALUMGIV_i = B_0 + B_1AVDEBT_i + B_2PPGRANTS_i + B_3TUITIONFEES_i + B_4ROOMBOARD_i + B_5SIZE_i + B_6PUBLIC_i + B_7ENDOWMENT_i + B_8LARGECLASS_i + B_9ACCEPT_i + B_{10}FULLTIME_i + B_{11}FEMALE_i + B_{12}AFAMERICAN_i + B_{13}HISPANIC_i + u_{i,}$$

where ALUMGIV is the percent of alumni giving to the institution, AVDEBT is average student debt for an undergraduate after graduation at an institution of higher education, PPGRANTS is the percent of students receiving Pell Grants, TUITIONFEES is the 2005-06 rate of institutional tuition and fees, ROOMBOARD is the 2005-06 estimated room and board expense at an institution, SIZE is the total number of undergraduate students at the institution, PUBLIC is a categorical variable separating public and private institutions, ENDOWMENT is the size of the endowment at an institution, LARGECLASS is the percent of classes offered with more than fifty students, ACCEPT is the institution acceptance rate, FULLTIME is the percent of students attending school full-time, FEMALE is the percent of female students at the institution, AFAMERICAN is the percent of African-American students at the institution, and HISPANIC is the percent of Hispanic students at the institution.

Several alternative model specifications were considered including control variables for student/faculty ratio, institutional ranking, categorical variables for various regions of the country, and freshman retention. Inclusion of these variables into the model affected the standard errors of the coefficients but not the value of the remaining coefficients or they suffer from excessive multicollinearity with variables included in the model. For these reasons they are not included in the final model.

Table 1: Summary Statistics: Alumni Giving Rates (2005-2006)
n = 196

Variable	Mean	Maximum	Minimum	Standard Dev.
ALUMNIGIV	17	61	3	10.1
AVDEBT	18,367	31,723	4,030	4,709
PPGRANTS	23	57	1	9.9
TUITIONFEES	13,845	34,030	2,955	10,833
ROOMBOARD	7,625	12,554	4,155	1,866
SIZE	13,726	37,509	896	8,585
PUBLIC	0.63	1	0	0.48
ENDOWMENT	811,930,000	22,587,305,000	463,000	222,000,000
LARGECLASS	11.4	29	0	6.3
ACCEPT	63.54	99	10	21.24
FULLTIME	87.2	100	44	10.1
FEMALE	51.8	74	19	9.3
AFAMERICAN	8.6	84	0	9.9
HISPANIC	6.4	75	0	8.2

Descriptive statistics for the model variables are presented in Table 1. Princeton University has the highest alumni giving rate at sixty-one percent, while Nova Southeastern University and Tennessee State University have the lowest alumni giving rate at three percent.

A discussion of the independent variables and their expected impact on alumni giving is in order. The four financial variables are AVDEBT, PPGRANTS, TUITIONFEES, and ROOMBOARD. One of the unique components of this study is the exploration of the impact of student debt on alumni giving rates. Average debt is expected to have a negative impact on alumni giving rates because large debt should limit the ability to give. Monks (2003) reveals that alumni who gave less to their alma mater had loan debt, which limited capacity to give. Average student debt for the data set is $18,367 with a standard deviation of $4,709. Twenty-one

institutions have an averaged student debt level above $25,000 including University of Miami, Idaho State University, Duke University, Wake Forest University, University of Notre Dame, Rensselaer University, George Washington University, and Iowa State University. Five institutions have an average student debt level below $10,000. The five represent a diverse grouping of institutions as follows: Princeton University, Harvard University, University of Texas El Paso, University of Hawaii at Manoa, and California Institute of Technology.

Pell Grants are need-based federal grants that had been the starting point for low-income students to attend college. In 1985-86, the maximum Pell Grant would have covered 25% to 30% of the tuition and room and board at an average public institution. By 2004-05, the maximum Pell Grant covers less than 15% (College Board: Trends in Higher Education, 2005). PPGRANTS is expected to have a negative impact on alumni giving as an institution with a large student population receiving Pell Grants is also likely to encompass a student body that faces financial constraints that limit the ability to give to the institution. These individuals may give first to other family members. Idaho State University leads the way with fifty-seven percent of students receiving Pell Grants versus only one percent receiving Pell Grants at Princeton University.

The direct financial cost of education via tuition & fees (TUITIONFEES) and room & board (ROOMBOARD) should have a negative impact on giving rates, holding other factors constant. George Washington University has the data set distinction of having the highest tuition and fees at $34,030 per year versus the low of $2,955 per year at the University of Florida. Room and board expenses reach a high of $12,554 per year at the University of California at Berkley versus a low of $4,155 at Louisiana Tech University. One weakness of the model is that it does not explicitly take into account the level of scholarship support that each institution provides because the information is not readily accessible. Posted tuition and fees are generally not what students pay.

The five institutional variables are SIZE, PUBLIC, ENDOWMENT, LARGECLASS, and ACCEPT. SIZE is anticipated to have a positive impact on alumni giving as large institutions often have high profile athletic teams that help facilitate a long-run relationship between the alumni and the institution. The University of Texas at Austin is the largest program in the sample with 37,509 undergraduate students versus California Tech as the smallest institution with only 896 students. PUBLIC is expected to have a negative impact on alumni giving rates as public institutions have traditionally lagged behind private institutions with respect to alumni development activities. The pedigree associated with a private

school education is generally considered to be a rallying point for alumni giving. Sixty-three percent of the institutions in the data set are public institutions.

ENDOWMENT is expected to have a positive impact on alumni giving. People generally prefer to invest in a winner and nothing says success like a large endowment. The largest endowment in the data set is over $22 billion at Harvard University. LARGECLASS and ACCEPT are expected to have a negative impact on alumni giving as large class sizes and a high acceptance rates are not usually associated with the quality required to inspire high rates of alumni giving. The University of California at Davis has the highest percentage of classes fifty or more students at twenty-nine percent. Yale, Harvard, Princeton, Stanford, and Columbia have the lowest acceptance rates, which range from ten to thirteen percent.

The four demographic variables are FULLTIME, FEMALE, AFAMERICAN, and HISPANIC. FULLTIME is expected to have a positive impact on alumni giving as full-time students have a greater probability of engaging in the college experience. Financial burden is a main reason why students drop-out of college as they simply have to go to work (Matz, 2005). Work also forces some students to attend part-time. Of entering freshman, seventy-nine percent of part-time students work while 44.3% of full-time students work (BLS, 2006). In addition, part-time student often work and are not able to fully engage in campus activities resulting in an expected probability of lower rates of giving. Several institutions including Harvard University, Cornell University, California Tech, and Boston College report 100 percent of the undergraduate student body at full-time status versus only forty-four percent at the University of Missouri at St. Louis.

The expected sign on the FEMALE, AFAMERICAN, and HISPANIC are uncertain. There is no inherent reason to believe that one demographic group is more or less likely to give than another demographic group beyond the observation that colleges that cater to minorities have a greater propensity to receive state and federal funds (Fischer, 2006). Nova Southeastern University and Adelphia University have the highest percentage of female students at seventy-four percent. Howard University has the highest percentage of African-American students at eighty-four percent while the University of Texas at El Paso has the highest percentage of Hispanic students at seventy-five percent.

DETERMINANTS OF ALUMNI GIVING RATES

The estimated empirical relationship between the explanatory variables and alumni giving rates is presented in Table 2. Two model specifications are presented.

The first is a linear specification offering results from the full thirteen independent variable model. The second specification employs a reduced model where insignificant variables are eliminated via a stepwise elimination process in order to reduce potential multicollinearity among the numerous independent variables. None of the independent variables have a correlation in absolute value higher than 0.71 (TUITIONFEES and PUBLIC has the highest correlation), suggesting that excessive multicollinearity is not a problem in the analysis. On the other hand, nine paired independent variable correlations have an absolute value above 0.50 implying that the stepwise elimination procedure might lead to more efficient estimates.

Table 2: Determinants of Alumni Giving Rates (2005-2006)

Variable	Full Model Coefficient (t-statistic)	Reduced Model Coefficient (t-statistic)
Intercept	43.977 (5.11)	45.900 (6.01)
AVDEBT	-0.0002 (-1.85)**	-0.0002 (-1.79)**
PPGRANTS	-0.1424 (-2.22)*	-0.1886 (-3.56)*
TUITIONFEES	0.00013 (0.74)	
ROOMBOARD	-0.0010 (-2.95)*	-0.0010 (-3.06)*
SIZE	-9.07 E-05 (-1.12)	
PUBLIC	-3.2813 (-1.22)	-5.6610 (-4.37)*
ENDOWMENT	1.1 E-09 (4.34)*	1.1 E-09 (4.49)*
LARGECLASS	0.0463 (0.42)	
ACCEPT	-0.1570 (-4.91)*	-0.1556 (-5.39)*
FULLTIME	0.1089 1.90)**	0.1244 (2.30)*
FEMALE	-0.1973 (-3.53)*	-0.2322 (-4.47)*
AFAMERICAN	-0.0558 (-0.99)	
HISPANIC	-0.0725 (-1.13)	
R Square	0.6439	0.6358
Adjusted R Square	0.6184	0.6202
F-Value	25.310	40.800

Notes: *p<.05, **p<.10, and n = 196.

The results of the two empirical models are extremely consistent. The full and reduced models both explain approximately sixty-four of the variance in alumni giving rates. Seven of the thirteen independent variables are statistically significant in full model specification, while one additional variable is statistically significant in the reduced model. It should be noted that a semi-log model specification was also estimated but not presented as the results yield equivalent results but with coefficients that are not as applicable as the linear specifications are.

Three of the four financial variables in the model are statistically significant. The results indicate that institutions with a large average debt per student (AVDEBT) have a negative and statistically significant impact on alumni giving rates. Student debt creates a financial burden that constrains ability to make alma mater contributions. King and Frishberg (2001) find that 78% of students underestimated the total cost of their loans and overestimated how much they could pay each month upon graduation. Debt problems would almost certainly limit ability to give. In addition, it is also possible that students that accrue significant college debt feel less of an obligation to provide financial support to their degree granting institution. It is clear that those alumni who accumulated debt understand the importance of education. However, they may feel that the university experience is more of a business transaction and not an opportunity. Plus, these graduates may pride themselves on doing it on their own and expect others to do the same.

Percent of students receiving Pell Grants (PPGRANTS) and the cost of room and board (ROOMBOARD) both have a negative and significant impact on alumni giving rates. The negative coefficient on the Pell Grant variable is not a complete surprise as the financial support is an indicator of need and signal that a student may not have the financial resources to participate in alumni giving. The significance of the room and board variable appears to imply that the variation in living expense across institutions has a substantial impact on alumni giving. Inexpensive or reasonably priced room and board appears to enhance college experience and augment the willingness of graduates to give to support an institution after graduation. Furthermore, alumni who stay in the area after graduation face a more reasonable cost of living which increases their ability to give. The summary statistics of Table 1 indicate a room and board standard deviation of less than $2,000 with an average room and board annual cost of $7,625.

The TUITIONFEES variable is positive but highly insignificant. The positive but insignificant coefficient on the tuition and fees variable indicates that direct expense does not have an impact on alumni giving. One explanation might be that more expensive institutions might signal a good educational investment that

leads to higher income and institutional satisfaction. A second possible explanation is that financial aid and scholarships confound the impact of variation in tuition and fees on alumni giving rates.

Three of the five institutional variables in the model are statistically significant. The variables PUBLIC and ACCEPT are both negative and statistically significant. The results imply that private institutions significantly outperform public institutions with respect to reaching out to alumni for financial support. Private schools are known for their close-knit campus environment and engagement of students. This engagement extends beyond college as alumni continue to stay active. The negative impact of acceptance rate on alumni giving implies that more selective institutions have a higher probability of garnering financial support from graduates. These two variables also identify schools with a strong reputation. Donors prefer to give to established and successful institutions. The variables ENDOWMENT has a positive and significant impact on alumni giving. Institutions with large endowments such as Harvard and Princeton have a dedicate alumni base that consistently donate back to the institution. The result implies that alumni prefer to give to an institution that other people are also willing to financially support.

The variables SIZE and LARGECLASS are not statistically significant. Large institutions with over 30,000 undergraduate students like the University of Texas, the University of Michigan, and Michigan State University have too many students to develop a significant pattern in alumni giving rates. Large classes can lead to economies of scale associated with the cost of education but this appears to be countered by a lack of attachment to faculty and the institution at a level that would significantly impact alumni giving. University of California at Davis, University of Texas at Austin, Iowa State University, Michigan State University, and Texas Tech University are all institutions with over twenty percent of course offerings featuring a class size of fifty or more students. The institutional variables highlight the trade-offs universities face. Larger classes and more liberal acceptance rates create more students to pay tuition and fees but at a cost of a lack of attachment to the institution. Alumni didn't feel special or unique as students and don't feel that way now as alumni.

Only two of the four demographic variables are statistically significant. The FULLTIME variable is positive as expected. Full-time students have a greater probability of enjoying the college experience and graduating with a positive opinion of the degree granting institution. A review of the data set reveals that many of the institutions with a ninety-eight percent full-time student status or higher also have a high level of alumni giving. The high full-time student status with

higher than average alumni giving rates includes Harvard, Princeton, California Tech, Dartmouth College, Rice University, University of California at San Diego, and Stanford University.

The FEMALE variable is negative and statistically significant. The observation that women are less likely to be donating alumni members is consistent with the finding of Wunnava and Lauze (2001) and appears to imply that women focus their philanthropic efforts on organizations outside of the academic realm. Female givers may want to tangibly feel that they are helping someone and the university either does not provide this return or does not know how to approach female donors. Another possible explanation is that female alumni are fairly new and may not have accumulated the wealth to give. Many married, female alumni may give to the husband's institution, especially if there is more of a connection with his university. The impact of the Hispanic (HISPANIC) and African-American (AFAMERICAN) variables on alumni giving appear to be limited as both variables are negative but highly insignificant.

CONCLUSION

The trend in higher education has long been a decline in federal, state, and local government appropriations as a percentage of total funding. Public and private institutions are relying ever more heavily on financial donations from their alumni as a source of budget enhancement (Wunnava & Lauze, 2001). Employing a multiple regression statistical model, eight statistically significant determinants of alumni giving rates are identified.

One of the more interesting results is the negative and statistically significant impact associated with average student debt. Government decisions that students should bear more of the cost of higher education resulting in rising debt levels appears to have a negative impact on alumni giving. Rising student debt might also diminish the sense of obligation to support an educational institution after graduation. Budgetary issues in the form of need and costs have a negative impact on alumni giving rates. A larger percentage of students receiving core financial support via Pell Grants and relatively high room and board costs have a negative and significant impact on alumni giving rates. These alumni may not have the resources to give or give to family members instead.

Selectivity and reputation have a significant impact on alumni giving rates as large institutional endowments, low acceptance rates, and being a private institution are significant determinants of alumni giving. Full-time students are

more likely to spend recreational time on campus. This study provides evidence that attachment to an institution as a full-time student has a positive impact on alumni giving rates. Women are revealed to have alumni giving rates that are negative and statistically significant but the demographic variables for Hispanic and African-American are not statistically significant determinants of alumni giving rates.

Overall, the results show a need by institutions to instill in current students and alumni a culture of giving. The emphasis on student loans over scholarships decreases a sense of obligation to help the next generation. Furthermore, current alumni may not see the need for giving if loans are readily available and if their own family members must use loans to attend their alma mater. Institutions must find ways to explain to alumni the rising costs of running an institution and the role that they can play in its future success. Because donors prefer to give to existing, successful institutions, universities must address the lagged effect of giving and results along with engaging alumni in campus events. The lack of substantial female donors indicates a growth opportunity for institutions. They must find ways to reach out to female alumni and present tangible ways for females to donate. The future challenge for the universities is to find ways to match alumni with initiatives and provide the impetus for giving to fund those initiatives.

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EFFECT OF PREREQUISITE ON INTRODUCTORY STATISTICS PERFORMANCE

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Ramaswamy Radhakrishnan, Illinois State University

ABSTRACT

Experience in teaching suggests that students' success is greatly affected by the prerequisite courses taken. Statistical Reasoning (introductory statistics) is a required course in most business schools. Students can choose one of several available prerequisites for this course. Some of these courses are more mathematically oriented than others. Therefore, the objective of this research is to observe if one prerequisite is more effective than the others on Statistical Reasoning.

This paper focuses on the students performance in introductory statistics course who took one of two prerequisite courses— i) Data & Chance, and ii) Finite Mathematics. Several parametric and nonparametric tests provide consistent conclusions about the effectiveness of prerequisite course on student's performance in Statistical Reasoning. Specifically, we have found that students who took the Finite Mathematics received significantly better grade in introductory statistics than did students who took Data & Chance. Thus, students with added mathematical orientation do have greater statistical proficiency. Furthermore, the analysis reveals that on average student's course grade is about half a point higher with Finite Mathematics than with Data & Chance.

INTRODUCTION

A continuing challenge for teachers and curriculum researchers is to identify the best possible prerequisite course. When several alternative prerequisite courses exist, identifying the most suitable one has been a source of continuous discussion among the academicians and academic advisors. This paper addresses the issue of prerequisite course that differentiates student performance in an introductory

statistics course, primarily for business and economics students. Several different factors may affect students' performance (Dale & Crawford, 2000) in a course including student's background knowledge. Understanding (Choudhury, Hubata & St. Louis, 1999) and acquiring the basic knowledge is the primary driver of success (Bagamery, Lasik & Nixon, 2005; Sale, Cheek & Hatfield, 1999). Experience in teaching indicates that students' performance (Trine & Schellenger, 1999) is primarily affected by the prerequisite courses taken. The effect of these prerequisite courses on students' performance is important, because of their diverse level of preparedness and backgrounds. Literatures in this area of research offer little guidance, if any, as to which prerequisite is better suited for a specific course. Performance outcome of prerequisites have been measured and tested in various disciplines (Buschena & Watts, 1999; Butler, et. al., 1994; Cadena et. al., 2003). A remarkable discussion on prerequisite courses has been provided by Potolsky, et. al.(2003). Higgins (1999) among others, perceive that statistical reasoning should be considered an important component of an undergraduate program. Discussion on statistical reasoning can be found in Garfield (2002) and DelMas et. al.(1999).

For this study, data were collected from a Mid-Western university. At this University all students are required to complete one of the several middle-core quantitative reasoning courses. These quantitative reasoning courses accomplish several outcomes of twelve different general education objectives set by the university's undergraduate program. A specific quantitative reasoning course, Statistical Reasoning (MQM 100) is required for all business and economics majors. Statistical Reasoning course stresses application of statistical concepts to decision problems facing business organizations. All sections use a common textbook and cover the same basic materials. The course includes descriptive tools, probability concepts, sampling processes, statistical inference, regression, and nonparametric procedures. Any of the inner-core mathematics courses in the program can be used as prerequisite. These inner-core courses include Data & Chance, Finite Mathematics, Dimensions of Mathematical Problem Solving, and Calculus I.

This paper focuses on students' performance in Statistical Reasoning as measured by its final course grade due to the effect of a prerequisite. Specifically, this research addresses the question; does the level of mathematical maturity attained by students from Data & Chance (Math 111) or Finite Mathematics (Math 120) enhance their performance in Statistical Reasoning? Data & Chance includes data representations, curve fitting, interpretation of polls and experiments, central tendency, statistical reasoning, and applications of probability. Finite Mathematics

covers linear functions, matrices, systems of linear equations, sets and counting, probability, statistics, and mathematics of finance.

There is a general perception that students frequently fear courses in statistics. Most likely, the fear may result from the lack of acquaintance of mathematics and its applications as suggested by Kellogg (1939). Toops (1934) in his review argues that mathematics courses should not be a blanket prescription as a prerequisite for statistics courses. Others perceive this argument as a result of non-relevance from the students' point of view, specifically non-specialist students (see, Pollock & Wilson, 1976; Higgins, 1999; Gober & Freeman, 2005; Moore & Roberts, 1989). Therefore, a proper prerequisite course could help alleviate some of these problems. A natural prerequisite course for an introductory statistics course would be an elementary (or basic) statistics course (see Roback, 2003 for similar discussion), such as, Data & Chance. But, on the contrary, anecdotal evidence suggests that students who took Data & Chance are not as well equipped for Statistical Reasoning as those who took Finite Mathematics. Although there are no specific topics covered that are absolutely necessary for Statistical Reasoning, we perceive that students obtain a higher level of "mathematical maturity" from Finite Mathematics than those who takes Data & Chance.

In this study, the authors analyzed the effectiveness of a prerequisite course on student's performance in introductory statistics. They found that students who took the Finite Mathematics received significantly better grades in introductory statistics than did students who took Data & Chance. This finding implies that this type of prerequisite would be more effective in similar courses in which quantitative reasoning is considered necessary.

DATA AND METHODOLOGY

Data were collected from the records of all students enrolled in introductory statistics course during fall 2002, spring 2003, and fall 2003 semesters. Students were grouped by the prerequisite courses completed prior to enrolling in introductory statistics course. All students who took Data & Chance as a prerequisite completed this course at the university. Most students with Finite Mathematics as a prerequisite completed the course at the university. Others transferred their credit for Finite Mathematics from junior colleges or other universities. In our sample, 507 students took Data & Chance as a prerequisite and all from this university. Total of 1509 students had Finite Mathematics as a prerequisite. Among these, 1306 took this from the university and others transferred from other institutions. There

were no recruitment (or selection) attempts to draw students into either of these courses. As there is no indication presented to the student about the prerequisite course, nor there is any control for which students enrolled in which course. For these reasons, it will be assumed that the students are of comparable mathematical abilities when taking a prerequisite course.

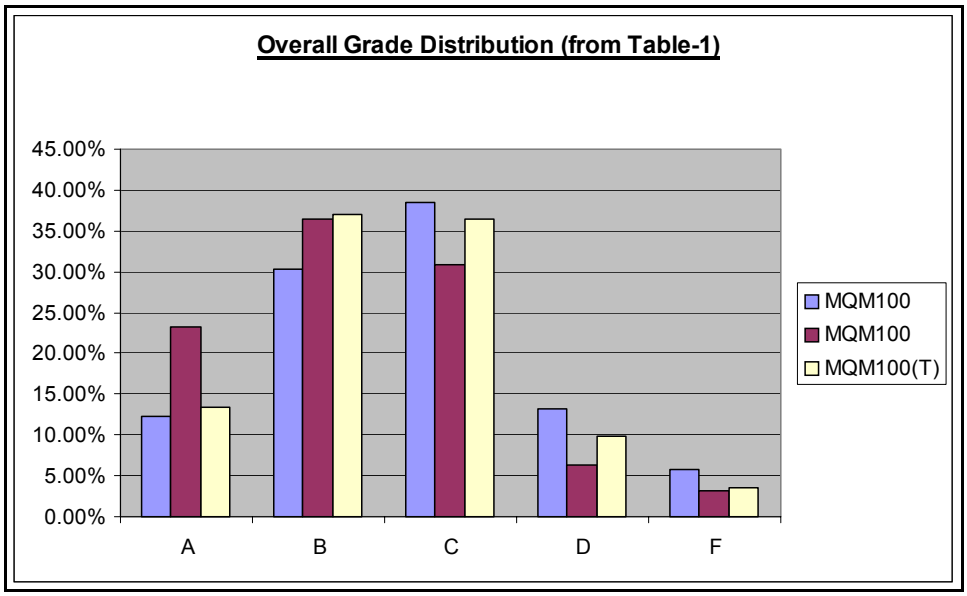
TABLE 1: Grade Distributions (in percentage) by Course and by Semester

Semester	Grade	MAT 111	MQM 100 [MAT 111]*	MAT 120	MQM 100 [MAT 120]*	MAT 120(T)	MQM 100(T) [MAT 120(T)]*
Fall 2002	A	21.62%	12.75%	17.11%	22.15%	15.85%	13.41%
	B	33.78%	30.20%	37.11%	39.47%	29.27%	37.80%
	C	33.11%	32.89%	32.00%	29.17%	51.22%	37.80%
	D	9.46%	15.44%	12.44%	5.26%	3.66%	6.10%
	F	2.03%	8.72%	1.33%	3.95%	0.00%	4.88%
Spring 2003	A	16.77%	12.50%	12.47%	24.32%	7.58%	15.15%
	B	37.72%	31.55%	32.56%	30.63%	45.45%	36.36%
	C	38.32%	36.90%	34.64%	33.33%	42.42%	31.82%
	D	6.59%	14.29%	16.86%	8.56%	4.55%	13.64%
	F	0.60%	4.76%	3.46%	3.15%	0.00%	3.03%
Fall 2003	A	27.13%	11.58%	22.17%	23.15%	22.22%	10.91%
	B	37.23%	29.47%	34.51%	39.16%	35.19%	36.36%
	C	28.72%	44.21%	31.49%	30.30%	37.04%	40.00%
	D	5.85%	10.53%	9.32%	4.93%	5.56%	10.91%
	F	1.06%	4.21%	2.52%	2.46%	0.00%	1.82%
Overall	A	22.07%	12.23%	17.11%	23.20%	14.85%	13.30%
	B	36.38%	30.37%	34.77%	36.37%	36.14%	36.95%
	C	33.20%	38.46%	32.73%	30.93%	44.55%	36.45%
	D	7.16%	13.21%	12.97%	6.28%	4.46%	9.85%
	F	1.19%	5.72%	2.42%	3.22%	0.00%	3.45%

* Introductory Statistics course grades with respective prerequisites; [MAT111]-Data & Chance, [MAT120]-Finite Mathematics, [MAT120 (T)]-Finite Mathematics (transferred).

Performance comparisons are made between these two prerequisite courses (Finite Mathematics and Data & Chance) using introductory statistics course grade. Course grades are classified in the usual manner: A, B, C, D, and F. For the purpose of comparing the average grades of the course in question, the grades assumed the standard quantitative values. An A was weighted at 4 points, a B at 3 points, a C at 2 points, a D at 1 point, and an F at 0. A variety of statistical tests were performed to compare students' performance using course grade in introductory statistics course. Students were grouped into three different groups— 1) Data & Chance, 2) Finite Mathematics at this university, and 3) Finite Mathematics transferred. The Mann-Whitney test (equivalent to the Wilcoxon Rank Sum test) does not make restrictive assumptions about underlying distributions. While two sample *t*-tests require normally distributed populations, the large sample sizes available in this study mitigate this requirement. Versions of the *t*-tests assuming equal population variances and the more conservative unequal variances are reported. In addition, *F*-tests to evaluate the equality of population variances assumption were conducted.

FIGURE 1



1st bar: MQM100 with Data & Chance (at the university).
2nd bar: MQM100 with Finite Mathematics (at the university).
3rd bar: MQM100 with Finite Mathematics (transferred).

EMPIRICAL RESULTS

We present grade distributions in Table 1 and summary statistics in Table 2 for each course by semester and also for all semesters combined (overall). The letter grade distribution in Table 1 reveals that higher percentage of students who took Finite Mathematics at the university received a better grade in introductory statistics course than those who took Data & Chance. As for example, in the fall of 2002, 22.15% of those who took Finite Mathematics at the university received an 'A' in introductory statistics course. In contrast, only 12.75% of those who took Data & Chance received an 'A' in the course. This difference is fairly consistent for all three semesters considered in this study. This difference reverses when we compare them for lower grades, such as C, D or F (see Figure 1). Overall, 18.93% of Data & Chance students received either a 'D' or 'F' in introductory statistics course while only 9.50% of the university's Finite Mathematics students received these low grades. This percentage difference in the higher grade (A & B) for introductory statistics course is roughly equal when we compare Finite Mathematics (transferred) and Data & Chance. As for the lower grades (C,D,F), these percentages for transferred Finite Mathematics are in between the university's Finite Mathematics and Data & Chance. Figure 1 also depicts this information clearly.

In Table 2, we present summary statistics on course grades. We observe that almost half a point difference in average grade points between students with Finite Mathematics at the university and students with Data & Chance. For example, in fall of 2002 those who took Finite Mathematics as a prerequisite received an average grade of 2.706 in introductory statistics course compared to 2.228 for those who had Data & Chance. These results suggest that Finite Mathematics leads to a substantially better grade in introductory statistics course. This improvement is not observed with the transferred Finite Mathematics students. This leads us to test two different hypotheses. First, does it matter which prerequisite is taken for introductory statistics course? Second, does it make any difference if Finite Mathematics is transferred from other institutions or taken at the university? Since, the outcome of prerequisite selection has a substantial payoff, it is important for us to test these hypotheses.

TABLE 2: Summary Statistics by Course and by Semester

Semester	Grade	MAT 111	MQM 100 [MAT 111]*	MAT 120	MQM 100 [MAT 120]*	MAT 120(T)	MQM 100(T) [MAT 120(T)]*
Fall 2002	Average	2.635	2.228	2.562	2.706	2.573	2.487
	Std	0.991	1.127	0.958	0.997	0.801	0.971
	N	148	149	450	456	82	82
Spring 2003	Average	2.634	2.327	2.337	2.644	2.560	2.469
	Std	0.859	1.023	1.010	1.038	0.704	1.011
	N	167	168	433	444	66	66
Fall 2003	Average	2.835	2.336	2.644	2.756	2.740	2.436
	Std	0.930	0.960	1.006	0.946	0.872	0.897
	N	188	190	397	406	54	55
Overall	Average	2.709	2.301	2.511	2.700	2.613	2.467
	Std	0.929	1.031	0.998	0.996	0.791	0.960
	N	503	507	1280	1306	202	203

Note: Maximum grade is 4 and minimum grade is 0, on a four-point scale.
* Introductory Statistics course grades with respective prerequisites; [MAT111]-Data & Chance, [MAT120]-Finite Mathematics, [MAT120 (T)]-Finite Mathematics (transferred).

Thus, both parametric and non-parametric tests on difference between two means (medians for the nonparametric tests) have been performed and reported in Table 3. As expected, both tests reveal that the difference in average grades obtained in introductory statistics course is highly significant when comparing Finite Mathematics (at this university) with Data & Chance (see, Table 3). When Finite Mathematics is transferred from an outside institution, they are only marginally significant at 10% level in the fall of 2002 and not statistically significant in spring or fall of 2003.

The similarity of parametric tests assuming equal and unequal variances is not surprising, since *F*-tests on the equivalence of variances (using sample variances) produced *p*-values ranging from 0.0581 to 0.8804 for individual semesters and at least 0.2380 for all semesters combined. A footnote to Table 3 contains the *p*-values for each semester and the combined semesters for the

university's Finite Mathematics versus Data & Chance and for transferred Finite Mathematics versus Data & Chance.

One atypical result requires an additional comment. Comparing students who transferred Finite Mathematics from other institutions to the Data & Chance students, all three tests have higher *p*-values for individual semesters than for all semesters combined. These more-significant *p*-values for the combined groups result from the increased degrees of freedom obtained when combining all semesters.

These tests lead us to the conclusion that students with added mathematical orientation do possess greater statistical proficiency. Perhaps, this is resulted from the enhanced mathematical maturity due to a specific prerequisite leading to a better understanding of statistical reasoning and hence elevated performance in the introductory statistics course.

TABLE 3-A: *t*-tests for average differences in grades in introductory statistics ($\sigma_1^2 \neq \sigma_2^2$)

	Both prerequisites taken at the university		**Math 120 transfers versus Math 111 at the university**	
Semester	***t-value****	***p-value#***	***t-value ****	***p-value#***
Fall 2002	4.616 (456, 149)	0.0000	1.834 (82, 149)	0.0682
Spring 2003	3.402 (444, 168)	0.0008	0.967 (66, 168)	0.3352
Fall 2003	4.990 (406, 190)	0.0000	0.710 (55, 190)	0.4795
All Semesters	7.456 (1306, 507)	0.0000	2.038 (203, 507)	0.0422

* Positive *t*-values indicate better performance for those taking Math 120; values in parentheses are the number of students who took Math 120 and the number who took Math 111.

\# Assumes the population variances are not equal.

TABLE 3-B: *t*-tests for average differences in grades in introductory statistics ($\sigma_1^2 = \sigma_2^2$)

	Both prerequisites taken at the university		Math 120 transfers versus Math 111 at the university	
Semester	***t-value****	***p-value#***	***t-value ****	***p-value#***
Fall 2002	4.913 (456, 149)	0.0000	1.757 (82, 149)	0.0802
Spring 2003	3.380 (444, 168)	0.0008	0.962 (66, 168)	0.3369
Fall 2003	5.017 (406, 190)	0.0000	0.684 (55, 190)	0.4946
All Semesters	7.572 (1306, 507)	0.0000	1.977 (203, 507)	0.0484

*Positive *t*-value indicates better performance for those taking Math 120; values in parentheses are the number of students who took Math 120 and the number who took Math 111.

Assumes equal population variances; *F*-tests for equivalence of variances produced the following p-values for Fall 2002, Spring 2003, Fall 2003, and All Semesters are 0.0581, 0.8380, 0.7996, and 0.3379 for both prerequisites taken at the university and 0.1397, 0.8804, 0.5681, and 0.2380, for Math 120 transfers and Math 111 from the university.

TABLE 3-C: Mann-Whitney test for equivalence of grade distributions in introductory statistics

	Both prerequisites taken at the university		Math 120 transfers versus Math 111 at the university	
Semester	***W****	***p-value#***	***W****	***p-value#***
Fall 2002	146387.0 (456, 149)	0.0000	10294.0 (82, 149)	0.0934
Spring 2003	142328.0 (444, 168)	0.0009	8189.0 (66, 168)	0.3307
Fall 2003	130717.0 (406, 190)	0.0000	7066.0 (55, 190)	0.4905
All Semesters	1256407.0 (1306, 507)	0.0000	76828.5 (203, 507)	0.0476

* W is the sum of the ranks of the students who took Math 120; values in parentheses are the number of students who took Math 120 and number who took Math 111.

\# p-value of the test adjusted for ties.

CONCLUSION

Findings of this study suggest that prerequisite is an important component in predicting academic performance in introductory statistics course. Our analysis illustrates the importance of selecting a proper prerequisite for introductory statistics course for business and economics majors. This selection matters in two ways. First, the prerequisite course provides students with necessary background knowledge needed to succeed in the subsequent courses, including other business and economics courses. Second, the course needs to have necessary components included, so that, students have better opportunity to improve their mathematical maturity needed for quantitative reasoning. Therefore, to reduce attrition and improve students' performance in introductory statistics course, Data & Chance may not be a suitable prerequisite. Specifically, we have found that students who took the Finite Mathematics received significantly better grades in introductory statistics than did students who took Data & Chance. Thus, students with added mathematical orientation from Finite Mathematics may have greater statistical proficiency. In addition, our analysis reveals that on average student's course grade is about half a point higher with Finite Mathematics than with Data & Chance.

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ECONOMICS ARTICLES

THE KEYNESIAN-MONETARIST CONTROVERSY IN INTERNATIONAL ECONOMICS: DISCRIMINATORY POWER OF LONG-RUN EMPIRICAL TESTS

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ABSTRACT

Two major theories in the area of balance of payments are the Keynesian and monetarist theories. There have been many long-run tests of the monetary approach to the balance of payments and the evidence has been used to support the monetary approach. This paper argues that most of the existing empirical work does not have any discriminatory power. Long-run empirical models can discriminate between a simple Keynesian cross and a monetarist approach, but they cannot discriminate between a monetarist and a standard IS-LM model because the monetary equation is the LM schedule in an IS-LM model. This paper recommends that Keynesian and monetarist views about the transmission mechanism and the homeostatic mechanism are fundamentally different and provide bases for discriminatory tests.

INTRODUCTION

Keynesian and monetarist theories dominate macro-economics in general and balance of payments theories in particular. There have been many long-run tests of the monetary approach to the balance of payments and the evidence has been used to support the monetary approach. This paper argues that most of the existing empirical work does not have any discriminatory power.

Ardalan (2003, 2005a, 2005b) has reviewed three alternative theories of balance of payments adjustments. They are the elasticity and absorption approaches (associated with Keynesian theory), and the monetary approach. In the elasticities and absorption approaches the focus of attention is on the trade balance with unemployed resources. The elasticities approach emphasizes the role of the relative

prices (or exchange rate) in balance of payments adjustments by considering imports and exports as being dependent on relative prices (through the exchange rate). The absorption approach emphasizes the role of income (or expenditure) in balance of payments adjustments by considering the change in expenditure relative to income resulting from a change in exports and/or imports. In the monetary approach, on the other hand, the focus of attention is on the balance of payments (or the money account) with full employment. The monetary approach emphasizes the role of the demand for and supply of money in the economy.

Ardalan (2003, 2005a) has comprehensively reviewed the relevant empirical work dealing with the monetary approach. Empirical work on the monetary approach to the balance of payments can be divided into two different approaches; one tests the theory in long-run equilibrium, the other considers the adjustment mechanism and the channels through which equilibrium is reached. The first approach is based on the reserve flow equation developed by Johnson (1972). Testing was undertaken by Zecher (1976) and others (See Ardalan 2005a). The second approach is based on theoretical work of Prais (1977), with corresponding empirical work undertaken by Rhomberg (1977) and others (See Ardalan 2003).

This paper is based on Ardalan (2003, 2005a, 2005b) and it argues that most of the existing empirical work in the long-run framework has no discriminatory power because Keynesian and monetarist approaches yield similar implications when Keynesian models contain a monetary sector. The standard monetary equation may be used to discriminate between the monetary approach and simple Keynesian multiplier theory, but it cannot discriminate between the monetary approach and the Keynesian IS-LM models because the monetary equation is the LM schedule in an IS-LM model.

The next section explores the existing empirical work on the long-run monetary approach to the balance of payments to see if it can discriminate between the differing views of Keynesian and monetarist economists.

QUESTION OF DISCRIMINATORY POWER

The main goal of this section is to show that existing empirical work on the long-run monetary approach to balance of payments does not discriminate between Keynesian (IS-LM) and monetarist theories of the balance of payments. This is because the evidence is consistent with both Keynesian (IS-LM) and monetarist models, as specified.

Ardalan (2005a) noted that Johnson (1972) proposed a test of the monetary approach to the balance of payments for a small open economy under fixed exchange rates. Ardalan (2005a) also reviewed examples (Aghevli and Khan 1977, Wilford and Wilford 1978, and Zecher 1976) of the numerous applications (see the list of references in both Appendix 1 and Appendix 2) of that idea to various small countries (either developed or under-developed). The major conclusion of this line of research was that the evidence strongly favors the monetary approach over the traditional Keynesian one.

This section argues that Johnson's (1972) equation discriminates between the monetarist theory and a simple Keynesian multiplier theory in which there is no monetary sector. It does not discriminate between the monetarist theory and a Keynesian model with a monetary sector (i.e., IS-LM). In order to show this, the monetarist model of Johnson (1972) and the Keynesian models of Mundell (1963, 1964) (See Dornbusch 2000, Fleming 1962, Frenkel and Razin 1987, Mundell 1963, 1964, Prasch 2001, and Salvatore 2000) are analyzed and compared. First, small-country comparisons are shown, and then two-country comparisons are examined.

SMALL-COUNTRY COMPARISON

In this subsection, for the case of a small country, first the monetarist model of Johnson (1972) is reviewed. Then, the Keynesian Model of Mundell (1963) is analyzed. Finally, the implications of the monetarist and Keynesian models are compared.

Johnson's (1972) Model: The reserve flow equation is associated with Johnson (1972). For a small country with a fixed exchange rate, the equation can be derived by the following system: The demand for money, equation (1), is dependent on the foreign and domestic price level, P, real income, Y, and the nominal interest rate, i. The supply of money, equation (2), is dependent on the magnitude of the money multiplier, m, and the sum of international, R, and domestic, D, assets of the central bank. Equation (3) specifies equilibrium in the money market.

$$M^d = P.L(Y,i) \quad (1)$$
$$M^s = m.(R+D) \quad (2)$$
$$M^d = m.(R+D) \quad (3)$$

In stationary steady state, this model implies that the balance of payments is zero. In order to obtain non-zero reserve flows, the model is reformulated in terms

of steady state "growth." Letting "g" denote the percentage growth rate of a variable, i.e., $g_x = (1/x)(dx/dt)$, equation (3) implies the following equations:

$$g_{Md} = g_m + g_{(R+D)} \quad (4)$$
$$g_{Md} = g_m + [R/(R+D)].g_R + [D/(R+D)].g_D \quad (5)$$

Letting e_x signify elasticity of money demand with respect to x, the demand for money in growth terms is:

$$g_{Md} = g_P + e_Y.g_Y + e_i.g_i \quad (6)$$

Combining equations (5) and (6) with the equilibrium condition yields equations (7) and (8):

$$g_P + e_Y.g_Y + e_i.g_i = g_m + [R/(R+D)].g_R + [D/(R+D)].g_D \quad (7)$$
$$[R/(R+D)].g_R = g_P + e_Y.g_Y + e_i.g_i - g_m - [D/(R+D)].g_D \quad (8)$$

Equation (8) is the reserve flow equation developed by Johnson (1972). It is the foundation for almost all long-run analysis.

Ordinary least squares can be applied to the reserve flow equation if the following conditions hold; there is no sterilization of reserve changes, and real income, prices, and interest rates are exogenous. Given the earlier assumptions, all of these conditions must hold for a small country with a fixed exchange rate. In this model the domestic monetary authorities have no control over any real or nominal variables in the economy except the domestic component, D, of high-powered money, and, through reserve flows, international reserves (Magee 1976).

Aghevli and Khan (1977) point out that in utilizing the reserve flow equation, one can use basically two methods. One method is to estimate the reserve flow equation directly, and then check the signs and values of the estimated coefficients. The other is to estimate a demand for money function and substitute it into the reserve flow equation. Simulated values from this equation then can be compared with actual values to test the tracking ability of the model.

Using the first method, one has to know what signs and magnitudes to expect for the estimates of coefficients. The coefficient for g_Y is e_Y, the income elasticity of demand for money. It should be positive and in the neighborhood of unity. For given interest rates, price levels, money multiplier, and domestic credit, growth in income generates an increased demand for money, and a reserve inflow

just sufficient to result in an increase in the nominal and real money stock. This result conflicts with the simple Keynesian model in which rising income increases imports and presumably generates a reserve outflow. Some authors (see the list of references in both Appendix 1 and Appendix 2) have used a statistically significant positive relation between income, Y, and international reserves holdings of the central bank, R, as evidence favoring a monetarist view over the Keynesian approach.

The coefficient for g_i is the interest elasticity of the demand for money, which is negative. Increases in the interest rate are associated with reserve outflows in this hypothesis. The interest rate is viewed as a proxy for world interest rates, and changes in this interest rate are taken to reflect similar movements in rates around the world. Given foreign price levels, an increase in interest rates reduces the demand for money and generates reserve losses.

The coefficient for g_P is unity because the elasticity of money demand with respect to the price level is unity. Domestic and world prices are assumed to be equal. As a result, price changes have a positive effect on reserve flows. An increase in prices reduces real money balances (increases demand for nominal balances) and, other things being equal, leads to a reserve inflow just sufficient to restore real money balances to their previous level.

The final two variables reflect domestic influences on the money stock, and both variables are responsive to policy actions by the monetary authorities. An increase in either variable tends to increase the stock of money and, other things being equal, should lead to an outflow of reserves sufficient to restore the real money stock to its previous level (Zecher 1976). As a result, the coefficient for g_m must be unity while the coefficient for g_D depends on the relative importance of domestic assets in the central bank's portfolio, i.e., [D/(R+D)].

Mundell's (1963) Model: Mondell's (1963) typical Keynesian small country model is analyzed here. Using the notation from Mundell's (1964) two-country model, the variables in his (1963) small country model can be expressed as follows:

I = investment
I* = autonomous investment
S = saving
BT = balance of trade
M = money supply
L = demand for money
D* = domestic assets of the central bank

R = foreign assets of the central bank

Government spending and taxes are included under "investment" and "saving" (a simplification which entails no significant loss).

The following three equations express the system for a small country:

$$I(i) + I^* - S(Y) + BT(Y) = 0 \quad (9)$$

$$M = L(Y, i) \quad (10)$$

$$M = D^* + R \quad (11)$$

Equation (9) specifies that the flow market for goods and services is in equilibrium. This condition ensures that the current supply of goods and services equals the current demand. Due to unemployed resources, output can change with no change in domestic prices. Like monetarists, Mundell (1963) assumes perfect capital mobility, i.e., domestic and foreign interest rates are equal. Autonomous investment, I*, is a parameter representing an autonomous element in the investment schedule, separated for purposes of analysis. It should be noted that: $dBT/dY<0$, $dS/dY>0$, $dI/di<0$, $I(i) + I^* - S(Y)$ is the balance on capital account, and $BT(Y)$ is the balance on current account. Equation (9), therefore, shows both the equilibrium in the commodity market, i.e., the IS curve, and the balance of payments equilibrium. The demand for money, L, is assumed to depend upon the interest rate and domestic income.

The money stock, described by equation (11), equals the assets of the central bank. Commercial banks are ignored. D* is taken as a policy-determined parameter. In effect, Mundell (1963) assumes the money multiplier is unity.

Equating (10) and (11), the LM curve is obtained:

$$L(Y, i) = D^* + R \quad (12)$$

Expressed in growth terms equation (12) is:

$$e_Y.g_Y + e_i.g_i = [R/(R+D)].g_R + [D/(R+D)].g_D \quad (13)$$

Rearranging terms, yields equation (14):

$$[R/(R+D)].g_R = e_Y.g_Y + e_i.g_i - [D/(R+D)].g_D \quad (14)$$

which, except for the absence of the money multiplier and price level, is the reserve flow equation (8) of Johnson (1972). Note that Mundell's (1963) Keynesian model implies the same positive relationship between income and international reserves. The theories yield similar implications because both require monetary equilibrium. The absence of prices and a money multiplier in Mundell's (1963) model are due to the assumptions of a constant price level and unit money multiplier. Neither assumption is crucial for the Keynesian approach. Prices can change in an IS-LM model and fractional reserve banking is consistent with an IS-LM model.

Comparison: The essential equivalence of equation (8) and (14) implies that the reserve flow equation cannot discriminate between monetarist and Keynesian views of balance of payments adjustment. Both theories imply the same relationships between the variables in the reserve flow equation developed by Johnson (1972). The only substantive difference is what can be taken as exogenous. In the monetarist approach, (real) income is exogenous, while income is endogenous in the Keynesian model.

TWO-COUNTRY COMPARISON

Essentially the same argument applies to a two- or multi-country approach. The reserve flow equation has little discriminatory power.

Johnson's (1972) Model: Johnson's (1972) model considers monetary equilibrium in the world as a whole. The essential change from the small-country version is that the world price level becomes endogenous. It is determined by the world demand for and supply of money. The analysis is simplified by assuming that world interest rates are constant, so that the growth of demand for real balances depends only on the growth of real output. (The growth of demand for nominal money balances also depends, of course, on the rate of change of the price level). This assumption can be justified on the grounds that real rates of return on investment are relatively stable, and that money rates of interest in a longer-run growth context will be equal to real rates of return plus the (actual and expected) rate of world price inflation.

Suppose the world economy possesses an international reserve money, and the residence of the two countries demand national monies, which are based partly on international reserves and partly on domestic credit. For simplicity, the exchange rate is assumed to be unity. The total money supply for the world economy is the sum of the money supplies of the two countries:

$$M^s_1 = R_1 + D_1 \quad (15)$$
$$M^s_2 = R_2 + D_2 \quad (16)$$
$$M^s_1 + M^s_2 = R_1 + R_2 + D_1 + D_2 \quad (17)$$
$$M^s = R_1 + R_2 + D_1 + D_2 \quad (18)$$

where j = 1, 2 refers to the specified country.

For the world economy, the growth rate of demand for money, assuming the homogeneity postulate, is the growth rate of the sum of the demands for money in the two countries:

$$M^d_1 = P.L_1(Y_1) \quad (19)$$
$$M^d_2 = P.L_2(Y_2) \quad (20)$$
$$M^d_1 + M^d_2 = P.[L_1(Y_1) + L_2(Y_2)] \quad (21)$$
$$M^d = P.[L_1(Y_1) + L_2(Y_2)] \quad (22)$$
$$g_{Md} = g_P + g_{[L1(Y1) + L2(Y2)]} \quad (23)$$
$$g_{Md} = g_P + \{L_1(Y_1)/[L_1(Y_1) + L_2(Y_2)]\}.g_{L1(Y1)} + \{L_2(Y_2)/[L_1(Y_1) + L_2(Y_2)]\}.g_{L2(Y2)} \quad (24)$$
$$g_{Md} = g_P + w_1.e_{Y1}.g_{Y1} + w_2.e_{Y2}.g_{Y2} \quad (25)$$
$$g_{Md} = SUM_{j = 1, 2}\ w_j.e_{yj}.g_{yj} + g_P \quad (26)$$

where w_j is country j's share in the total world stock of money.

The rate of growth of the world money supply is:

$$g_{Ms} = (R_1/M^s).g_{R1} + (R_2/M^s).g_{R2} + (D_1/M^s).g_{D1} + (D_2/M^s).g_{D2} \quad (27)$$
$$g_{Ms} = (M^s_1/M^s).(R_1/M^s_1).g_{R1} + (M^s_2/M^s).(R_2/M^s_2).g_{R2} + (M^s_1/M^s).(D_1/M^s_1).g_{D1} + (M^s_2/M^s).(D_2/M^s_2).g_{D2} \quad (28)$$
$$g_{Ms} = (M^s_1/M^s).(R_1/M^s_1).g_{R1} + (M^s_2/M^s).(R_2/M^s_2).g_{R2} + (M^s_1/M^s).[1 - (R_1/M^s_1)].g_{D1} + (M^s_2/M^s).[1 - (R_2/M^s_2)].g_{D2} \quad (29)$$
$$g_{Ms} = SUM_{j = 1, 2}\ w_j.s_j.g_{Rj} + SUM_{j = 1, 2}\ w_j.(1 - s_j).g_{Dj} \quad (30)$$

where s_j is country j's ratio of international reserve money to its domestic money supply.

Equations (26) and (30) determine the rate of change of world prices, through the requirement that $g_{Md} = g_{Ms}$:

$$g_P = SUM_{j=1,2}\, w_j.s_j.g_{Rj} + SUM_{j=1,2}\, w_j.(1 - s_j).g_{Dj} - SUM_{j=1,2}\, w_j.e_{Yj}.g_{Yj} \quad (31)$$

The growth rate of an individual country's holdings of reserves, g_{R1}, can be obtained in the same way as in equation (8) in the small country case:

$$g_{R1} = (1/s_1).(g_P + e_{Y1}.g_{Y1}) - [(1 - s_1)/s_1].g_{D1} \quad (32)$$

Substituting for g_P from equation (31):

$$g_{R1} = (1/s_1).SUM_{j=1,2}\, w_j.s_j.g_{Rj} + (1/s_1).SUM_{j=1,2}\, w_j.(1 - s_j).g_{Dj} - (1/s_1).SUM_{j=1,2}\, w_j.e_{Yj}.g_{Yj} + (1/s_1).e_{Y1}.g_{Y1} - [(1 - s_1)/s_1].g_{D1} \quad (33)$$

$$g_{R1} = (1/s_1).\{SUM_{j=1,2}\, w_j.s_j.g_{Rj} + (e_{Y1}.g_{Y1} - e^*_Y.g^*_Y) - [(1 - s).g_{D1} - (1 - s)^*g^*_D]\} \quad (34)$$

where the terms with a "*" indicate the average product of stared terms for the world economy.

This expression indicates that a country's reserves grow faster (through a balance of payments surplus) the lower its initial reserve ratio; the faster the growth of total world reserves, the higher its income elasticity of demand for money and its real growth rate relative to other countries, and the lower its international reserve ratio and rate of domestic credit expansion relative to other countries. Again, emphasis is on the direct relationship between income, Y, and international reserves, R.

Mundell's (1964) Model: Mundell's (1964) two-country model is now reviewed. Seven equations can express the system in a world context. They are represented by equations (35) through (41):

$$I_1(i) + I^* - S_1(Y_1) + B(Y_1, Y_2, r) = 0 \quad (35)$$

$$I_2(i) - S_2(Y_2) - B(Y_1, Y_2, r) = 0 \quad (36)$$

$$M_1 = L_1(Y_1, i) \quad (37)$$

$$M_2 = L_2(Y_2, i) \quad (38)$$

$$M_1 = D_1 + R_1 \quad (39)$$

$$M_2 = D_2 + R_2 \quad (40)$$

$$R_1 + R_2 = W \quad (41)$$

where W is the level of world reserves, assumed to be constant. The first two equations specify that the flow market for goods and services in each country is in equilibrium. The exchange rate, r, is defined as the price of a unit of the home currency in terms of foreign currency, with the exchange rate initially equal to one by appropriate choice of units. Equation (36) is analogous to (35), except that it refers to equilibrium in the market for current production in the rest of the world. The balance of trade in equation (36) equals, but opposite in sign, the balance of trade of the home country. Interest rates at home and abroad are assumed to be equal. The next two equations (37 and 38) ensure that the demand for money is equal to the supply of money in each country. Equations (39) and (40) determine the stock of money in the two countries. The last equation fixes the level of reserves in the world. When the exchange rate, r, is fixed, these seven equations determine seven endogenous variables: i, Y_1, Y_2, R_1, R_2, M_1, and M_2.

Comparison: Under fixed exchange rates, monetary equilibrium in Mundell's (1964) Keynesian model requires the same relation between reserves, income, and domestic assets of the central bank as in the monetarist model. Once again, the only substantive difference between the two approaches is their assumptions about real income. In the monetarist model real income is exogenous and in the Keynesian model it is endogenous.

Equations like those developed by Johnson (1972) and used by others can discriminate between monetary and simple Keynesian approaches to balance of payments adjustment. However, they cannot discriminate between the monetary approach and a standard IS-LM model.

The monetary equation may be used as a test to discriminate the monetary approach from Keynesian multiplier theory because the Keynesian multiplier theory implies an inverse relationship between income and international reserves held by the central bank. Imports depend on income, and exports are exogenous. An increase in income increases imports, and, given the level of exports, the balance of trade deteriorates. Since the capital account is not considered, the balance of payments will be the same as balance of trade under fixed exchange rates, and there will be a loss of international reserves. That is to say, an inverse relationship between income and international reserves exists.

The monetary equation, however, cannot discriminate between the monetary approach and a Keynesian IS-LM model. In effect, the monetarist equations are simply LM schedules. The only difference is in what is assumed to be exogenous. In the monetary interpretation, real income is always exogenous and prices and interest rates are exogenous for a small country. In the Keynesian interpretation, real

income is endogenous and prices and interest rates can be endogenous or exogenous (Takayama 1969).

This comparison suggests that homeostasis is a fundamental issue separating monetarist and Keynesian views about balance of payments adjustments. If market forces tending to reestablish equilibrium are strong and effective, the monetarist assumption that income can be treated as exogenous is reasonable. If these forces are weak and there is persistent under-employment, then income becomes endogenous as the positive feedback of multiplier analysis dominates the negative feedback assumed by monetarists (For a discussion of the ideas separating Keynesians and monetarists, see Mayor (1978), Chapter 1, pp. 1-46).

CONCLUSION

Two major theories in the area of balance of payments are the Keynesian and monetarist theories. Most of the existing empirical work on the monetary approach to the balance of payments has very little discriminatory power. Long-run empirical models can discriminate between a simple Keynesian cross and a monetarist approach, but they cannot discriminate between a monetarist and a standard IS-LM model because the monetary equation is the LM schedule in an IS-LM model.

The need still exists to discriminate between Keynesian and monetarist theories of international economics. Most of the extant empirical work does not meet that objective because it cannot discriminate between monetarist and Keynesian IS-LM models.

Keynesian and monetarist views about the transmission mechanism and the homeostatic mechanism are fundamentally different and provide bases for discriminatory tests. On the transmission mechanism (which is a short-run phenomenon), the Keynesian view is that excess money balances spill over into the bond market only. In the monetarist view, excess money balances spill over into the bond and money markets. On the homeostatic mechanism (which is a long-run phenomenon), 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.

APPENDIX 1

Ardalan's (2005a) Appendix 5 provides "… a comprehensive list of references which have estimated either the 'reserve flow equation' or the 'exchange market pressure equation' and have not only discussed signs and values of the coefficients in the context of the monetary approach to balance of payments but also contrasted them with those as expected by the Keynesian approach."
The list of the references is as follows: "Aghevli and Khan (1977), Akhtar, Putnam, and Wilford (1979), Bean (1976), Beladi, Biswas, and Tribedy (1986), Bhatia (1982), Dornbusch (1971), Frenkel, Gylfason, and Helliwell (1980), Kamas (1986), Kenneally and Finn (1985), Lee and Wohar (1991), Looney (1991), McNown and Wallace (1977), Miller (1978), Purviz (1972), Putnam and Wilford (1986), Reid (1973), Taylor, M.P. (1987), Tullio (1979), Wein (1974), Wilford (1977), Wilford and Wilford (1977, 1978), Wilford and Zecher (1979), and Wohar and Lee (1992)."

APPENDIX 2

Ardalan's (2005a) Appendix 6 provides "… a comprehensive list of references which have estimated either the 'reserve flow equation' or the 'exchange market pressure equation' and have not only discussed signs and values of the coefficients in the context of the monetary approach to balance of payments and contrasted them with those as expected by the Keynesian approach but also explicitly decided in favor of one theory or the other." The list of the references is as follows: "Kenneally and Finn (1985), Lee and Wohar (1991), Putnam and Wilford (1986), Taylor, M.P. (1987), Tullio (1979), Wilford (1977), Wilford and Wilford (1977, 1978), Wilford and Zecher (1979), and Wohar and Lee (1992)."

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THE CONSERVATION OF EXTENCIA: A NEW LAW OF CONSERVATION

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To Elena Aleinikov who dedicated 34 years of her life to helping this discovery happen

ABSTRACT

Managing global economic developments with massive deployment of people and material resources requires not only a special kind of thinking (global vision, big picture), but also precise formulas for logistics and, therefore, a solid scientific foundation. To meet these global level calculation needs, Oscar Morgenstern over 50 years ago tried to create a theory of organization (Morgenstern, 1951), while Pobisk Kuznetsov, following the works of La Roche, offered a new branch of economy - physical economy (Kuznetsov, 1980). To help political and economic leaders in managing human and material resources, physical economy has already introduced two new laws of conservation with the measurements in the range of L^6T^{-4} and L^6T^{-6} which have been successfully used for transportation problem solving and long-range construction planning.

This article is a short report on over 23 years of meticulous research and data analysis that finally led to the discovery of the next law of conservation. A new conservation law fills the gap in the Bartini/Kuznetsov system. It deals with the Conservation of Extencia - the term offered for the displacement, or linear extension of power: $Ext = P \cdot S = E \cdot S/t = const$. The range of measurement for Extencia is L^6T^{-5}. A new unit for measuring the Extencia is called Alger (coined from the names of researchers involved in the discovery of the law Aleinikov + Gera = Alger). Time and place of discovery: October 16, 2006, Monterey, California.

This law is applicable to all complex economic systems such as transportation, communication, construction, military operations and certainly must become a foundation for numerous calculations in strategic management.

INTRODUCTION: A SHORT HISTORY OF RESEARCH

Whether it is a case of strategic management, such as deployment of mass military forces to a distant region of the world or just a case of economic development of national transportation system, a scientific approach is a must. Science in a sense is the strategic management of the future. Organizational, technical, monetary, and managerial resources should be neither under delivered nor over delivered because the perspective of losing a war due to the lack of a proverbial nail in the horse shoe of the king's horse (under delivery) may be disastrous, but, on the other hand, the perspective of shooting a mosquito from a cannon (over delivery) may be economically expensive and politically damaging. A scientific approach saves human lives, natural and financial resources, time and prestige.

No surprise that particularly big logistic movements on the strategic economical level, requiring lots of calculations, caused Oscar Morgenstern to offer his Prolegomena to the Theory of Organization (Morgenstern, 1951) and became the starting point for the science of Organization - Organizology (Aleinikov, 2004). Scientific reflection of the world and conservation laws (as the backbone of this scientific reflection) play an exclusive role not only in technology and education, but also in strategic management of the economic resources. As it was mentioned above, Kuznetsov offered a new branch of science - physical economy - to employ science in the issues of economical development.

Note: Kuznetsov and Bartini, both belonging to the group of legendary constructor-generals, were less famous than Tupolev (Tu), Antonov (An), Mikoyan (Mi), and Sukhoy (Su), but they have made enormously powerful scientific discoveries that will shape the future. Two new conservation laws that put their names in the row of Kepler, Newton, and Maxwell are just an example. For more information about Kuznetsov and Bartini, see Wikipedia.

The heuristic and explanatory power of conservation laws is tremendous. After being discovered and formulated (and many times rediscovered or restated - see details at www.humanthermodynamic.com), the conservation laws give mathematicians, experimental physicists, and managers a solid foundation for numerous applications (Cera, Phillipson & Wyman, 1989; Friedrichs & Lax, 1971; Wigner, 1952; Wigner, 1964). They demystify the natural events and make scientists look for the seemingly "missing" mass or energy. For instance, the discovery of the neutrino was based on the fact that some of the total (calculated) energy was "missing," and it led to the theoretical prediction of a little particle later confirmed by experiment.

The list of some of the most well-known conservation laws includes:

- *Law of Equal Areas*: A line joining the sun and any planet sweeps out equal areas during equal intervals of time (Kepler, 1609).
- *Harmonic Law*: The ratio of the squares of the revolutionary periods for two planets is equal to the ratio of the cubes of their semi-major axes (Kepler, 1619).
- *Law of Conservation of Impulse* (Newton, 1686).
- *Law of Conservation of Moment of Impulse* (Laplace, 1800).
- *Law of Conservation of Energy* (Mayer, 1842).
- *Law of Conservation of Power* (Maxwell, 1855).

It would be wise to note here that authors and years of discovery are taken from the work of Pobisk Kuznetsov (Kuznetsov, Kuznetsov & Bolshakov, 2000), but discussions about authorship are never ending. The law of Conservation of Energy is a great illustration. For example, some authors say it was Hermann von Helmholtz who stated the law of Conservation of Energy in the form we know it now (Asimov, 1966). Other authors give the honor of discovery to three people: Mayer, Clausius, and Helmholtz. Third authors consider that the first researcher to state the law was Hess (1840) as opposed to Mayer (1842) (see www.humanthermodynamics.com). Finally, some authors even speculate it was Newton - see the new edition of The *Principia* about this issue dismissed due to the wrong translation in the previous edition (Newton, 1999). For the sake of simplicity, this article mentions only Mayer.

Another contradictory issue is the issue of expression. The conservation laws are expressed in a great variety of ways, both informally and mathematically. For instance, the Law of Conservation of Energy was stated at least 30 times and, in addition to Mayer's statement, "Energy can be neither created nor destroyed," it is expressed in such formulas as:

- $E/m = \text{constant} = c^2$ or better known as $E = mc^2$ (Einstein, 1905)
- $dE = DQ - DW$ (Koltz, 1950)
- $E_{total} = \text{constant}$ (Bent, 1965)
- $[E_{total}]_{Final\ State} = [E_{total}]_{Initial\ State}$ (Bent, 1965)
- $\Delta U = Q + W$ (Schroeder, 2000). For more details see www.humanthermodynamics.com.

On one hand, this variety of formula expressions may be needed for calculations and thus it is justified. On the other hand, it sometimes brings confusion, prohibits one from seeing the whole system of natural laws of conservation, and actually holds back the discovery efforts. No wonder that the search for a proper system of conservation laws and consequently for the proper expression of conservation laws is still ongoing (Serre, 1999-2000).

As a case in point, in 1981, German Smirnov (Smirnov, 1981) in a popular magazine article reported that R.O. di Bartini introduced a simple system of expressing all physical constants and laws of conservation through the concepts of space (L) and time (T). Such interpretation, called the LT system, allowed him to see regularities never seen from the traditional point of view. For example, the above mentioned laws are represented by the following LT measurements:

Table 1. Traditional Conservation Laws in *LT* measurements.

Traditional Law	Expression in the LT system
Law of Equal Areas (Kepler, 1609)	$[L^2T^{-1}]$ = const
Harmonic Law (Kepler, 1619)	$[L^3T^{-2}]$ = const
Law of Conservation of Impulse (Newton, 1686)	$[L^4T^{-3}]$ = const
Law of Conservation of Moment of Impulse (Laplace, 1800)	$[L^5T^{-3}]$ = const
Law of Conservation of Energy (Mayer, 1842)	$[L^5T^{-4}]$ = const
Law of Conservation of Power (Maxwell, 1855)	$[L^5T^{-5}]$ = const

The new way of expression is clearly illustrated by the following. Kepler's Second Law, as shown in the above table, is:

"Sector area" (L^2) divided by "equal period of time" (T) = $L^2/T = L^2T^{-1}$ = const.

Kepler's Third Law, as shown in the above table, actually states that the ratio of the cube of the planet's orbital radius to the square of the orbital period is constant (for any planet):

$$\frac{P_1^2}{P_2^2} = \frac{R_1^3}{R_2^3} \text{ or in a generic form } \frac{R_1^3}{P_1^2} = \frac{R_2^3}{P_2^2} = \frac{L^3}{T^2} = L^3T^{-2} = \text{const}$$

Where

P is period
R is radius

By using this unique *LT* system, Bartini developed a periodic table of conservation laws. Chutko mentioned this in his book about Bartini (Chutko, 1982). Chuyev later stated Bartini's priority by saying that Bartini was the first to use the *LT* system for describing the relationship between physical constants (Chuev, 2004). In other words, Bartini offered something similar to Mendeleyev's Periodic Table of the Elements, but this time for the laws of physics, the most important of which are known as the conservation laws. This is called Bartini's Table (BT).

As a further step, by using this Table, Bartini discovered the next conservation law - the Law of Conservation of Mobility characterized by the measurement range of L^6T^{-6}. An example that Bartini used, as Smirnov describes it, was from economics (or physical economy, as Kuznetsov called it). According to Bartini, at a certain point in time, a country has a certain number of excavators (power), and these excavators can be transported to other locations to use their power. Since the country has a well-developed system for transportation, the country does not need to build more excavators - it can transport the available ones to the places where they are needed. For a specific moment of time, when such a transportation system exists, the mobility of this number of excavators remains constant. This constitutes the Law of Conservation of Mobility.

Then, in the same article Smirnov wrote that there was one more law of conservation discovered around 1980 by P. Kuznetsov and R. Obraztsova who offered a new unit of measurement of the form L^6T^{-4}. They called the unit "tran" because they used it for calculating the transportation costs and, therefore, salaries within transportation systems such as railroads earlier miscalculated because of the wrong formulas (Kuznetsov, Kuznetsov & Bolshakov, 2000).

Due to the secrecy of the majority of research materials at that time (Cold War), not much was known about these most recent laws. An interesting fact is that Curt Suplee's book titled *Physics in the 20th century* does not mention conservation laws (Suplee, 1999) as if no laws have been discovered. This corroborates the point of view that finding any information was extremely difficult. Bartini himself

published only two articles (Bartini, 1965, 1966). After Bartini's death in 1974, Kuznetsov was the only person who could shed some light on Bartini's ideas and views. In 2000, Kuznetsov died (Tannenbaum, 2001), and some of his works were published posthumously. Thanks to the Internet, the works became accessible to the broader public (Kuznetsov, Kuznetsov & Bolshakov, 2000). In 2005, Dmitri Rabounski, Editor-in-Chief, *Progress in Physics*, published the translation of the first Bartini's article to English, and this gave the English-speaking world an opportunity to see the depth of Bartini's original ideas (Bartini, 2005).

To the author of this article, who specializes in creativity and innovation, the use of BT - a periodic table - meant that new conservation laws could be predicted and discovered, just as new chemical elements (germanium and scandium) were predicted and then later discovered thanks to Mendeleyev's Table (Hazen & Trefil, 1991; Kedrov, 1987). In 1983, the author began to research the heuristic aspects of BT. In 1985, he made the first report on it to the Soviet Academy of Sciences in Moscow. In one of the 1988 articles, the author described the peculiarities and the unique heuristic aspects of BT and made some predictions for new units, new sciences, and new conservation laws (Aleinikov, 1988). In 1994, the author published his first article in the United States, where he stated that using matrices paved the way to MegaCreativity (Aleinikov, 1994). In 2002, the author introduced Novology, the science of newness (Aleinikov, 2002b), and in the same year he published a book on how to create genius level newness by using the matrix (Aleinikov, 2002a). In 2004, the author offered a broader interpretation of BT and introduced two new sciences that were predicted in 1988: Organizology and Intensiology (Aleinikov, 2004) and then introduced new units for measuring organization (Aleinikov, 2005). Finally, in October 2006, the author concluded his work on the discovery of the next Conservation Law, and, together with Dr. Ralucca Gera (Naval Postgraduate School, Monterey, CA), he reported the results at the Allied Academies International Conference in Reno, NV (Aleinikov & Gera, 2006).

Now is the time to report the discovery of the new conservation law to the public. It is time to fill the gap between the two previously mentioned laws with the measurement ranges of L^6T^{-4} and L^6T^{-6} by introducing the missing link - the law that must have the range of measurement of L^6T^{-5}.

CONCEPTS AND EXAMPLES

Basic Concepts

Power is the rate at which work is done (W/t) or energy is converted (E/t). Work or energy is meaningless until it is applied or delivered. Machines are built to do work on objects. Typical examples are tractors, excavators, mobile cranes, etc. The process of moving (displacing) the power to the place where it can be applied is actually extending the power, or extencia. The equation for extencia is the following: a unit of extencia is equivalent to a unit of power displaced through a unit of distance.

$$Ext = P \cdot S \tag{1}$$

Where

Ext is extencia
P is power
S is the distance, or displacement

In simple terms, the Law of Conservation of Extencia means that the extension of power, or linear displacement of power is constant if conditions do not change. Symbolically, this is:

$$Ext = P \cdot S = \text{const} \tag{2}$$

In the history of science, conservation laws have been traditionally stated for the so-called ideal (invented), or absolute situation. In the case of the Law of Conservation of Energy, the system was perfectly isolated, which certainly does not exist in reality. In the case of Ampere, the law was based upon an equally unrealistic pair of an infinitely small diameter and infinitely long wires in a vacuum.

For the Law of Conservation of Extencia, such an ideal experiment could be described as follows: electric power (when we take electric power as an example) will be carried without any loss for infinitely long distances and times if transported (extended) via a conducting line of infinitely small diameter in conditions of superconductivity (-271^0 K) in a vacuum.

In situations less than ideal, this law implies that two linear extensions of the identical type, length, direction, and technical condition will carry the same

amount of power through the same distance. In other words, the Extencia will be constant under steady conditions.

The formula expression for power is work/time (or energy/time). Now, if the expression for power is W/t or E/t, the expression for Extencia can be rewritten as

$$Ext = W/t \cdot S = E/t \cdot S = \text{const} \quad (3)$$

Where

W is work
E is energy
t is time

Further, since the expression for velocity is displacement/time, the expression for conservation of extencia (3) can be rewritten once more as work · velocity, or energy · velocity:

$$Ext = W \cdot S/t = E \cdot S/t = W \cdot V = E \cdot V = \text{const} \quad (4)$$

Where

V is velocity

This new expression for Extencia actually reveals that Extencia is the velocity (speed, rate) of moving the work, or the velocity (speed, rate) of moving the energy.

Terminology

A long search for an appropriate term for the studied phenomenon finally led to the word *extension*. The Merriam-Webster Collegiate Dictionary traces the word's etymology back to Middle English and Late Latin (*extension-, extensio),* from the Latin *extendere,* and gives eight meanings. The first meaning - "the action of extending: state of being extended"- is exactly what is needed to describe the process of extending, or rather the process of extending the power.

Just as the words *energy* (1599) and *power* (13c) were not coined by Newton or Maxwell (but rather applied by them to Physics and given a certain scientific definition within the terminological system), the word *extension* also has

not been coined by the author. The author's task was to check whether this word could be used as a term for the phenomena under consideration. This test turned out to be negative. The word *extension* was not only widely used but also overused. So there was a necessity to find or coin another term that would satisfy the basic rule for terms - one meaning/one word. The closest possible variant with the minimum change from Latin *extensio* was a variant of *extencia* - never used before and, therefore, open for the application with the new concept.

Now when the phenomenon of extending power, or extension of power, becomes scientifically measurable and testable, the word *extencia* becomes a term in the system of physical terminology, where it is related to the terms *energy*, *power*, and through them to *force*, *impulse*, *moment of impulse*, etc.

Phenomenon Described

The phenomenon of Extencia can be found in all corners of life. The following are examples of this phenomenon.

Mechanical Power

Animal world: A predator may have a powerful beak, teeth, or claws. However, these advantages are useless until the distance is small enough to delivering the power of the strike. The process of running, jumping, flying, stretching, uncoiling, etc., that delivers the power to strike over some distance is an Extencia.

Athletics: A boxer who throws practice punches in the air is demonstrating power but is not applying it. A boxer that takes a step forward toward the opponent to deliver a punch is extending his power or making an Extencia.

Construction: An excavator creating a trench uses power to dig out the soil to a certain depth. This excavator represents the power to move soil. However, after time, the length of the arm and scoop is not enough to reach for new soil, and the excavator moves forward. It actually moves the power to dig. This move is an Extencia.

Military: A stationary machine gun delivers fire power to the enemy lines. However, if the enemy lines are too far away, this fire power is useless. So when a machine gun is installed on an armored personnel vehicle or a tank and this vehicle or tank moves forward, this is an Extencia.

Transportation: All cars, buses, trucks, trains, and planes are the extension of human power. Without this extension (movement of power), millions of people would not be able to work because they would have used their internal energy to cover the distance on foot, thus losing energy and time. Any use of the transportation system is an extension of human power, or Extencia.

Electrical Power

With the electromagnetic radiation (that Maxwell proved to follow the Power Conservation Law), it was clear that, even if the power remained constant within a sphere of any radius around the transmitting antenna, the power received by an individual receiver decreased very quickly with increasing distance. This made it obvious that, if the receiver needed more power, there had to be some device that would carry the power to the place where it would be applied. So instead of non-directional spread (with colossal decrease), a specially designed line was used to channel the power toward the receiver. Electrical lines and systems of electrical circuits became wide-spread in the 20th century. Any electrical line from the power station, whether it be from a generator or from a battery, that carries the power to the consumer is an Extencia. Since Earth conditions are far from ideal, and power from that line is dissipated to the environment, the power company takes every step possible to maintain this line intact, i.e., as straight (short) as possible, insulated, clear from the trees that can short-circuit the line, etc. And, while the line is intact, it maintains the level of conservation (of Extencia) that it was designed to have. Thus, any electrical power extension is the transportation of power, or the displacement of power, and, therefore, it constitutes the case for the Extencia Conservation Law, stating that under the same conditions the linear displacement of power will stay the same.

Information systems

Radio and TV systems, as well as wireless telephone systems, all use Maxwell's Law of Conservation of Power directly, and they rely upon increasingly more powerful transmitters and relay stations to deliver the signals to the consumer. Creating the system of extension lines (radio, telephone, and cable) that delivered electromagnetic signals directly to the consumer was a necessary step. The Law of Conservation of Extencia is applicable to every one of them. If something goes

wrong and the power extension is not operating to the designed level of conservation, the maintenance people will find and fix the problem.

Heat

Heat needs to be transported to the consumers too. Fires and fireplaces are romantic but are highly labor intensive and consume great quantities of natural resources. They also require human attention to add woods and to keep the fire burning. In some big cities, heat delivery is often accomplished through the use of hot water pumped through well-insulated pipes that connect the houses and heat the individual room radiators. In any case, the natural power of fire is often not enough to spread the heat by conduction, convection and radiation, and thus the extension lines are designed to deliver more heat in a more direct manner. The Law of Conservation of Extencia certainly applies to all of them, and two identical lines running from the same source of heat for the same distance in the same conditions will deliver an equal amount of heat per time, which means that they have the same level of conservation.

These examples demonstrate that any process of extending the power in a linear manner is an Extencia.

New Unit

A new unit offered for measuring the Extencia in the SI system is called Alger (pronounced as [′al-ger] with "g" as in *get*, or *gear*) because it was coined from the names of researchers involved in the discovery of the law: Aleinikov + Gera = Alger.

In relation to the other SI units, one Alger equals one Watt through one meter:

$$1\text{Alger} = 1\text{Watt} \cdot 1\text{m}, \tag{5}$$

or in terms of energy, one Alger equals one Joule through one meter per second:

$$1\text{Alger} = 1\text{Joule} \cdot 1\text{m} / 1\text{s}. \tag{6}$$

The Missing Link

To simplify matters, the following table (Table 2) lists the elements needed for the conservation law to be established in the left column, and to the right lists the laws of conservation under discussion. The missing data in the works of other researchers is shown by question marks, and the empty cells represent the missing law with only one known, or rather predicted, item - measurement range = L^6T^{-5}.

Table 2. Latest Laws of Conservation (with gaps)

	Law of Conservation of Energy	Law of Conservation of Power	Law of Conservation of **?**	Law of Conservation of	Law of Conservation of Mobility
Name of discoverer	Mayer	Maxwell	Bartini, Kuznetsov, Obraztsova		Bartini
Year	1742	1855	Around 1980		By 1973
Definition	Energy = transfer of force	Power = rate of energy flow	**?** = propagation of energy		Mobility = rate of **?**
Unit and relations in SI system	Joule = 1N · 1m	Watt = 1J /s = 1N · 1m/1s	Tran = 1J · 1m		**?** = 1W · 1m/1s
Measurement Range	L^5T^{-4}	L^5T^{-5}	L^6T^{-4}	L^6T^{-5}	L^6T^{-6}

The author certainly sees a possibility that the missing data can be found later (it may already exist in the literature that the author does not have access to), but for now, following the heuristic principle, "It is better to rediscover than not to discover at all," the author offers to fill in the gaps.

1 The suggested name for the unit of Mobility is "Bart" to honor Bartini - the discoverer of the law.

2 The suggested name for the phenomenon measured by L^6T^{-4} (and not named by Bartini, Kuznetsov, and Obraztsova) is "Transfer" because it deals with the propagation of energy, transfer of energy, transportation of energy. The unit introduced by these authors already utilizes the root *tran-* obviously related to these words.

Now all the cells of the table can be filled because the new unit, Alger, introduced for measuring the Extencia in (5) and (6), can be used to express the unit of Extencia in Trans and the unit of Mobility in Algers.

(7) 1Alger = 1Tran / 1s

and

(8) 1Bart = 1Alger / 1s

With the additions made (new item are in **bold**), Table 2 becomes Table 3

Table 3. Latest Laws of Conservation (completed)

	Law of Conservation of Energy	Law of Conservation of Power	Law of Conservation of **Transfer**	Law of Conservation of **Extencia**	Law of Conservation of Mobility
Name	Mayer	Maxwell	Bartini, Kuznetsov, Obraztsova	**Aleinikov**	Bartini
Year	1742	1855	Around 1980	**2006**	By 1973
Definition	Energy = transfer of force	Power = rate of energy flow	**Transfer** = propagation of energy	**Extencia = displacement of power = speed of energy transfer**	Mobility = rate of **Extencia**
Unit and relations in SI system	Joule = 1N · 1m	Watt = 1Joule /1s = 1N · 1m/1s	Tran = 1J · 1m	**Alger = 1Watt · 1m = 1Tran / 1s = 1J · 1m/1s**	**Bart** = **1Alger /1s** = 1Watt · 1m/1s
Measurement Range	L^5T^{-4}	L^5T^{-5}	L^6T^{-4}	L^6T^{-5}	L^6T^{-6}

Now you see from Table 2 and Table 3 how the phenomenon of Extencia gets its measurement range.

(9) Ext = L^5T^{-5} (Power) · L (displacement) = L^6T^{-5}

Alternatively, in addition to its definition as displacement of power, Extencia can be described as the rate of Transfer, or the speed of transferring the energy.

(10) $\text{Ext} = L^6T^{-4}(\text{Transfer}) : T\,(\text{time}) = L^6T^{-5}$

Certainly, the Extencia Conservation Law also means that the speed of transferring (moving, propagating) the energy remains constant under the unchanging conditions - an intuitively correct statement.

Furthermore, Mobility now can be described as the rate of Extencia, or the speed that the power is transported in the linear displacement.

(11) $\text{Mob (Mobility)} = L^6T^{-5}\,(\text{Extencia}) : T\,(\text{time}) = L^6T^{-6}$

Now, what was stated in (4) is clearly demonstrated by Table 3 and also is very logical because the term Mobility in its ultimate sense is the number of linear extensions that the observed power system can make. Empirically, this means that the higher the number of extensions, the higher the mobility of the system.

Thus the missing link is filled in its totality: mathematically, physically, logically, and empirically. Consequently, the Law of Conservation of Extencia can be considered discovered.

Time and Place of Discovery

October 16, 2006, Monterey, California.

CONCLUSION

As you see from the examples, Extencia (extending power through a distance) is an everyday phenomenon. An understanding of how to calculate Extencia is a must. All transportation, construction, military, and other complex economic systems need this understanding to function well. So, the Law of Conservation of Extencia is just as necessary as the Laws of Power and Energy Conservation for traditional physics and the Laws of Transfer and Mobility Conservation for physical economy.

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MID-18TH CENTURY ECONOMIC CHANGES: THE RISE OF ADAM SMITH AND THE DECLINE OF THE MERCANTILISTS AND PHYSIOCRATS

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ABSTRACT

The mid-18th century was a time that saw the birth of new economic systems. The mercantile system of the past 250 years was being attacked by new movements in economic thought. One of the chief critics of mercantilism was Adam Smith, and with the publication of his greatest work, Smith drastically changed modern economic theory and created a science out of what was once a philosophy of merchants. Smith was not the first critic of mercantilism. He was preceded by a group of French economic philosophers whose theories had much influence on Smith's work. This paper will explore the rise of mercantilism and its principles, detail the criticisms of Adam Smith toward mercantile doctrine, and discuss the physiocratic doctrine that laid the groundwork for economic change.

INTRODUCTION

This paper will discuss the origins of mercantilism. Through an exploration of the times leading up to mercantilism, a more detailed understanding of mercantile principles will be ascertained. The onset of international commerce laid the groundwork for the mercantile system by creating a new class of merchants who explored the philosophy of economics in an attempt to ensure their own well being. Mercantilists derived much of their doctrine from their strong sense of nationalism. The desire to create a strong state led to the development of the mercantile principle of wealth as existing in the form of specie--gold and silver. The desire to accumulate large amounts of specie led to the development of the balance of trade principle, which would be essential to mercantilistic economic policies. The

mercantile system thus developed from a strong sense of nationalism, which led to a desire for the accumulation of gold and silver, further leading to the balance of trade doctrine, enabling said accumulation.

The paper will also address Smith's comments on mercantile doctrine. In *An Inquiry into the Nature and Causes of the Wealth of Nations*, Smith explores the importance of gold and silver accumulation that is embedded in the tenets of mercantilism. Smith, through his analysis of mercantile arguments in favor of specie accumulation, will ultimately find such arguments in error. By his analysis of mercantile principles, Smith proves to be one of mercantilism's greatest critics. He advocates against specie accumulation and the necessity of a favorable balance of trade to aid in this accumulation, two doctrines that are at the heart of mercantile thought.

The paper will end in a discussion of the physiocratic doctrine that developed in France during the last half of the 18th century. The physiocratic doctrine was vastly different from the principles of mercantilism. The physiocrats placed much emphasis on land as the true creator of wealth. The mercantile principle of wealth existing in the forms of gold and silver was dismissed and more concrete forms of wealth were adopted. The circulation of wealth within a nation was also demonstrated by Quesnay, the undisputed leader of the physiocrats, in his book *Tableau Economique*. This book also explored the productivity of labor and ruled that agriculture was the only productive industry. The physiocrats exhibited strong criticism toward the mercantilistic economic system of the time, especially the system of taxation. The physiocrats further opposed governmental regulation in favor of a *laissez-faire* system of no interference. The physiocratic system is clearly the antithesis of the mercantile system and lays the groundwork for the publication of Smith's book.

THE RISE OF MERCANTILISM

"Mercantilism is the name given to some 250 years of economic literature and practice between 1500 and 1750" (Landreth, 1976). Mercantilism was the result of the developing commercial class, the merchants, and the name "mercantilism" is "derive[d] from the Italian word for merchant" (Canterbery, 2001). As they gained wealth and power, merchants' writings began to develop into the economic system known as mercantilism. "The substantial development of economic thought was due to the leaders of economic activity, the merchants. The theories that evolved were never contained in a body of doctrine such as that of the Canon law. What has made

it possible to speak of mercantilism is the appearance in a number of countries of a set of theories which explained or underlay the practices of statesmen for a considerable time" (Roll, 1974). Niehans (1990) states, however, that "mercantilism was not a system, but rather an unsystematic assortment of arguments, measures, and ideas with wide differences from one country to another." It is true that mercantilism lacks the established doctrine that many other systems have built upon, but there is a set of beliefs and tendencies common to most mercantile writers, such as a strong sense of nationalism and, above all else, the belief in a strong balance of trade. Before addressing the generally accepted principles of the mercantile system, it is necessary to comment on the time in which this system took root.

The era of mercantilism began with the ending of the Dark Ages and the beginning of the Age of Exploration. With the ending of the Dark Ages, society underwent massive changes. The small, self-sufficient manors of the feudal system gave way to the growth of great nations in which large areas of land and a great populace were governed by a centralized state. The end of the Middle Ages also saw the development of international trading. The isolated manor, in which what was consumed was produced within, gave way to the rise of international trade and exploration. A society no longer had to rely on merely what it could make, but it could now draw on other sources of production spanning the globe. The shift from isolated manors to interdependent trading nations was the catalyst for the development of mercantilism and the displacement of the old economic system known as feudalism.

The obsolete system of the Middle Ages "became inadequate in its regulation of production. The revolution in the methods of farming destroyed the basis of feudal economy. It led to rural overpopulation, growing commutation of feudal dues, increased indebtedness of feudal lords and their resort to trade or new methods of farming for the market" (Roll, 1974). As trade began to flourish, the localized manor began to disappear and the market system took root. "Production of goods for the market became more important, and land, labor, and capital began to be bought and sold in markets" (Landreth, 1976). As society began to look outside the manor for resources, the development of foreign commerce put the last nail in the coffin of feudalism. Roll (1974) states, "Another powerful factor is to be found in the maritime discoveries which led to a very great expansion of foreign commerce." With the development of commerce and markets, farmers and producers could go beyond the markets of their own land and into foreign lands that further destroyed the self-reliant system. "In England, for example, where the development of capitalism can be most clearly observed, the growth of commerce

destroyed subsistence farming and caused agriculture to rely increasingly on the market" (Roll, 1974). The onset of foreign commerce brought with it a new sense of foreign competition. The development of nation-states changed the perspectives of rulers from internal concerns to external concerns. Nations began to fight for the resources of far off lands, such as the East Indies and the Americas. It was now a matter of country against country instead of feudal lord against feudal lord. This sense of national competition gave rise to the first defining principle of mercantilism, a strong sense of nationalism.

Nationalism was an essential part of mercantile thought. The mercantilist writers believed heavily in the strengthening of the nation-state. Lionel Robbins (1998) states that mercantilism is "that body of thought which was concerned with nation-building--the transformation of the system of the Middle Ages into the system of national states." The reason for the mercantilists' concern over the strength of their nation was, simply put, self-interest. Merchants needed strong national governments capable of protecting their territories and their goods as they traveled over seas and to far off lands. "National defense was the dominant organizing force of mercantilism, much as local defense had been for feudalism" (Canterbery, 2001). Merchants also wanted the national government to take steps to protect the domestic industries in the world market, and thus protect the interest of the merchants. The merchants strengthened the government and reaped the benefits of such strength. "The building-up of nation-states [was] put in the forefront, and monetary, protectionist, and other economic devices [were] regarded merely as instruments to this end" (Roll, 1974). Trade and production were devices to use to strengthen the nation. "The material resources of the society (the means) were, in general, to be used to promote the enrichment and well-being of the nation-state (the end). The single most important concern of mercantile writers was that the nation's resources be used in such a manner as to make the state as powerful as possible both politically and economically" (Ekelund & Hebert, 1975). As the merchants gained wealth, they also gained power and prestige. Coupled with their proclamation of national interest, this prestige enabled the mercantilists to influence the actions of government. "Those responsible for government accepted mercantilist notions and fashioned their policy accordingly, because they saw in them means of strengthening absolutist states against both rivals abroad and the remnants of medieval particularism at home" (Roll, 1974). The mercantilists, through their desire to ensure a strong state, made economic policy just one more tool in the nation's arsenal. "The ultimate objective of economic policy is the political power of the state, both internal and external. The Austrian Philipp Wilhelm von Hornigk

epitomized this clearly in the title of his tract of 1684: 'Austria above all if she only will.' It is consistent with the down-to-earth objective that the typical mercantilist author was not a speculative philosopher but a cabinet minister, administrator, government advisor, merchant, lobbyist, or adventurer" (Niehans, 1990). In exchange for their loyalty, the wealthy merchants were well rewarded by their political allies. The mercantile governments enacted bills protecting domestic goods from competition abroad, giving domestic monopolists complete control over certain government approved markets. The governments also attempted to strengthen their domestic industries in the foreign markets. "The efforts of the merchants and companies to achieve control over the distant areas with which they traded were seldom sufficient. They had to be supplemented by the exercise of the power of the states, towards the strengthening of which the merchants were contributing in such large measure. The links between the trading interest and the state were thus still further tightened; and the concern of state policy became increasingly concentrated of problems on trade" (Roll, 1974).

In an effort to create a strong national state, the mercantilists developed the principle that the wealth of a nation was contained in the vaults of the king or prince in the form of gold and silver. The mercantilists lived in a world plagued by foreign wars and believed that these wars were funded by the gold and silver of a nation, its specie. Thus in order to develop a strong world power, the accumulation of large amounts of gold and silver was a necessary component. With this specie the nation would be able to fund future wars and maintain its place in the world hierarchy. The mercantilists' obsession with gold and silver became their "basic belief...that it was necessary to accumulate gold and silver through foreign trade in order to foster national wealth and power and therefore a variety of restrictions on imports and subsidies to exports was needed" (Staley, 1989). "For the mercantilist, power consisted of men and money. Men were needed as workers and soldiers; money (in the treasury) was needed to pay for armies and navies, to finance the government, and to pay for extravagant courts" (Niehans, 1990). The mercantilists paid little attention to the goods produced by the nation, except to the extent to which they could be traded for gold or silver. The governments of this era were largely influenced by the mercantilists and developed policies designed to keep large amounts of specie in the country. "An Act of 1339 attempted to compel wool merchants to bring in a certain amount of plate for each sack of wool exported. Richard II, in a reply to a complaint about the shortage of money, included in the Navigation Act of 1381 a prohibition of the export of gold and silver," and "the method generally in use to preserve treasure was still the medieval one of direct

control. Prohibitions of the export of bullion and of the import of luxuries were supplemented by the establishment of the office of the Royal Exchanger" (Roll, 1974). The governmental restriction on the export of specie is congruent with the belief of "the early mercantilists [who] recommended that the export of bullion be strictly prohibited. Later writers suggested that exporting bullion might lead to an improvement in overall trade balances if the bullion was used to purchase raw material for export goods" (Landreth, 1976). This statement establishes a cornerstone of mercantile thought, the belief in a balance of trade. It further ends the belief in the necessity of a complete prohibition on specie exportation; however, the supply of gold and silver within a nation is still essential to mercantile thought.

Mercantilist doctrine, in an attempt to understand the flow of wealth between two trading nations, created the principle that there exists a balance of trade between commercial nations. The balance of trade doctrine has at its root the "assumption that the total wealth of the world was fixed" (Landreth, 1976). If this assumption is true, as the mercantilists believed it to be, then in any transaction where a person gains wealth, it is at the expense of the opposing party. "The mercantilists carried this reasoning over to trade between nations, concluding that any increase in the wealth and economic power of one nation was necessarily at the expense of other nations. Thus the mercantilist emphasized international trade as a means of increasing the wealth and power of a nation and, in particular, focusing on the balance of trade between nations" (Landreth, 1976). The wealth that a nation hoped to gain through a favorable balance of trade was in the form of gold and silver, the payment demanded by the mercantile nations for any trade deficit. Furthermore, nations lacking natural mines from which to gain gold and silver could only obtain these precious substances through trade with other nations (Niehans, 1990).

One of the flaws of the mercantilists relate to their reasoning in regards to the accumulation of specie through a favorable balance of trade. They believed "that a favorable balance of trade--and thus specie accumulation--could continue over long and indefinite periods" (Ekelund & Hebert, 1975). History and practice would prove this assumption wrong, but at the time, the favorable trade balance was a key point of mercantilism to be obtained at all costs. "One's own balance of payments surplus and the deficit of one's rivals thus became the primary objectives of economic policy, to be achieved by all sorts of import restrictions, duties, bounties, subsidies, and regulation" (Niehans, 1990). The tools used by governments to protect their favorable balance of trade were numerous, but their goal was the same, to ensure that no more wealth left the nation than was coming in

and if possible, to allow for the entry of more wealth than was exiting. Mercantilists believed that "[p]rotective duties should be placed on manufactured goods from abroad, while importation of cheap raw material, to be used in manufacturing goods for export, should be encouraged" (Landreth, 1976). Such restrictions were, however, one-sided. By putting duties on the manufactures of foreign competitors, domestic manufactures had a monopoly in the market. Furthermore, if they ensured the importation of cheap raw materials, they also ensured a higher profit margin. The importation of cheap raw materials did not support the raw material industry of the domestic nation, but manufactured goods were held at a higher level of economic importance.

Besides ensuring low costs in the area of raw materials, mercantilists also desired low cost in the form of labor. "The mercantilists advocated low wages in order to give the domestic economy competitive advantages in international trade, and because they believed that wage levels above a subsistence level would result in a reduced labor effort. Higher wages would cause laborers to work fewer hours per year; thus national output would fall. Poverty for the individual, therefore, benefits the nation when the goal of economic activity is defined in terms of national output and not in terms of national consumption" (Landreth, 1976). This passage is yet another example of how mercantilist doctrine supported the interests of the merchants who wrote it and yet contained a sense of patriotism.

SMITH'S CRITICISMS OF THE MERCANTILE SYSTEM

Smith dramatically changed the general economic views of his time with his criticisms of mercantilistic principles. "Smith devoted nearly two hundred pages in his *Wealth of Nations* to a harsh criticism of mercantilistic theory and practice, particularly their equation of the wealth of a nation with the stock of precious metals internally held" (Landreth, 1976). Smith begins his criticism by discussing the value of gold in relation to the mercantile nations. He states that "for some time after the discovery of America, the first inquiry of the Spaniards, when they arrived upon any unknown cost, used to be if there was any gold or silver to be found in the neighborhood?" (Smith, 1999). The Spanish had gold mines within their own borders, unlike England, but they desired to increase their stock of gold through the exploration of the New World. Thus, gold became their primary motivation and blinded them to the other natural resources that other lands offered. Smith further explores gold's role as a measure of value and medium of exchange by comparing the Spanish to the Tartars. Smith states that, "Among the Tartars, as among all other

nations of shepherds, who are generally ignorant of the use of money, cattle are the instruments of commerce and the measures of value. Wealth, therefore, according to them, consisted in cattle, as according to the Spaniards it consisted in gold and silver. Of the two, the Tartar notion, perhaps, was the nearest to the truth" (Smith, 1999). In this statement, Smith downgrades the inflated mercantilist notion that gold is the primary source of wealth. Here Smith gives cattle higher value than gold, perhaps due to the numerous uses of cattle when compared to the primary use of gold as merely a medium of exchange.

The Wealth of Nations also expresses the views of modern mercantilists. Smith paraphrases the beliefs of Locke by writing that "Money...is a steady friend, which, though it may travel about from hand to hand, yet if it can be kept from going out of the country, is not very liable to be wasted and consumed. Gold and silver, therefore, are, according to him, the most solid and substantial part of the movable wealth of a nation, and to multiply those metals ought, he thinks, upon that account, to be the great object of its political economy" (Smith, 1999). In this statement, the national economic policy of a mercantile nation is set, the prevention of the exportation of specie allowing for the accumulation of said specie. "In consequence of these popular notions, all the different nations of Europe have studied, though to little purpose, every possible means of accumulating gold and silver in their respective countries. Spain and Portugal, the proprietors of the principal mines that supply Europe with those metals, have either prohibited their exportation under the severest penalties, or subjected it to a considerable duty. The like prohibition seems anciently to have made a part of the policy most other European nations" (Smith, 1999). The outright prohibition of the exportation of gold and silver is a short-lived method for the accumulation of precious metals.

A new mercantilist principle develops which replaces the prohibition method. The balance of trade principle involves the maintaining of a larger number of exports in comparison to imports, thus creating a favorable balance of trade. The favorable balance of trade results in a trade surplus to be paid in the form of specie. To maintain a favorable balance of trade was the chief economic goal of the mercantilists, but the balance of trade principle was met with the same amount of criticism from Smith as the exportation prohibition. Smith (1999) states that, "The attention of government was turned away from guarding against the exportation of gold and silver to watch over the balance of trade as the only cause which could occasion any augmentation or diminution of those metals. From one fruitless care it was turned away to another much more intricate, much more embarrassing, and just equally fruitless." Smith's criticism, however, is not derived from the

ineffectiveness of the practices in the accumulation of gold and silver. The criticisms have as their source Smith's rejection of the belief that gold and silver are the sources of a nation's wealth. "Upon every account, therefore, the attention of government never was so unnecessarily employed as when directed to watch over the preservation or increase of the quantity of money in any country" (Smith, 1999).

Smith establishes the role of money as a medium of exchange and details the role that it plays in comparison with other goods. "It is not because wealth consists more essentially in money than in goods that the merchant finds it generally more easy to buy goods with money than to buy money with goods; but because money is the known and established instrument of commerce, for which everything is readily given in exchange, but which is not always with equal readiness to be got in exchange for every thing. The greater part of goods, besides, are more perishable than money, and he may frequently sustain a much greater loss by keeping them" (Smith, 1999). Smith also shows the limits of money in comparison to other valuable goods. "Goods can serve many other purposes besides purchasing money, but money can serve no other purpose besides purchasing goods. Money, therefore, necessarily runs after goods, but goods do not always or necessarily run after money. The man who buys does not always mean to sell again, but frequently to use or to consume; whereas he who sells always means to buy again" (Smith, 1999). Money, then, is just a means to an end. It is a tool society must utilize in order to perform commerce more efficiently. Money, however, is not indispensable. Society could function on a barter system, but in a commerce system, a medium of exchange is preferable. The true value of money ultimately lies in what it can be used to obtain. As Smith (1999) states, "It is not for its own sake that men desire money, but for the sake of what they can purchase with it."

Smith attacks the necessity of holding large amounts of gold and silver within a nation's borders. "It should as readily occur that the quantity of gold and silver is in every country limited by the use which there is for those metals; that their use consists in circulation commodities as coin, and in affording a species of household furniture as plate" (Smith, 1999). In this quote, Smith argues that a nation needs only the amount of gold or silver which it can use in its two primary forms, as a coin medium of exchange and as the material for the creation of housewares, and "to attempt to increase the wealth of any country, either by introducing or by detaining in it an unnecessary quantity of gold and silver, is as absurd as it would be to attempt to increase the good cheer of private families by obliging them to keep an unnecessary number of kitchen utensils" (Smith, 1999). The very notion that an abundance of gold and silver is both useless and absurd flies

in the face of mercantile thought; however, mercantile thought is founded on the desire to create a strong nation. The accumulation of gold and silver was seen as a necessary step to ensure a nation's strength through the financing of foreign wars. Smith also attacks this philosophy by arguing, "Fleets and armies are maintained, not with gold and silver, but with consumable goods. The nation which, from the annual produce of its domestic industry, from the annual revenue arising out of its lands, labour, and consumable stock, has wherewithal to purchase those consumable goods in distant countries, can maintain foreign wars there" (Smith, 1999). Smith uses as his example the last war fought by England before the publication of his book to emphasize that gold and silver were not sufficient to finance the massive undertaking that is war, and the "enormous expense of the late war, therefore, must have been chiefly defrayed, not by the exportation of gold and silver, but by that of British commodities of some kind or other" (Smith, 1999). If the accumulation of gold and silver are not the tools with which nations finance war, then "commodities...the annual produce of the land and labour of the country...the ultimate resources which enable us to carry on the war" must be the true source of wealth within a nation (Smith, 1999).

Smith methodically destroys the principles that lie at the heart of mercantile thought. He eliminates the necessity of gold in the maintaining of a strong nation state and the financing of foreign wars. Smith also establishes the commodities of a nation, the goods produced, as the true source of a nation's wealth, eliminating the need for the accumulation of gold and silver. Smith further proves that the mercantile economic practices of prohibiting the exportation of specie and the balance of trade doctrine are both absurd and unnecessary. Smith, through his analysis of mercantile principles, proves to be mercantilism's greatest critic.

PHYSIOCRACY

Physiocracy developed in France during the period of mercantilism but before Smith revolutionized economics with the publication of *The Wealth of Nations*. Landreth (1976) describes physiocracy as "a new but short-lived movement...which had analytical insights into the economy, and significant influence on subsequent economic thought." Unlike many economic schools, "the writings of the physiocratic school express remarkably consistent views on all major points" (Landreth, 1976). The source of the physiocrats' ideological consistency lies in the three unique characteristics of the physiocratic movement: "(1) Physiocracy developed exclusively in France. (2) The ideas of the physiocrats were

presented over a relatively short period of time, from about 1750 to 1780...(3) Physiocracy had an acknowledged intellectual leader, Francois Quesnay" (Landreth, 1976). Quesnay was the primary focal point of the physiocrats. His writings were accepted with little debate, and the writings of others "were mainly designed to convince others of the merit of Quesnay's economics" (Landreth, 1976).

At the heart of physiocratic doctrine lies natural law, serving as the source of many principles. As Knight (1956) explains, the word physiocrat "is practically equivalent to law (or rule) of nature." The source of the physiocrats' obsession with land originates with their leader, Quesnay. At the beginning of his book, *Tableau Economique*, Quesnay (1968) establishes as his first "axiom[:] The earth is the mother of all goods." The physiocrats used their belief in natural law "in the formulation of policy. They held that natural laws governed the operation of the economy and that, while these laws were independent of the will of man, man could objectively discover them as they could the laws of the natural sciences" (Landreth, 1976). Nature serves as the origin for the physiocratic idea of wealth. Unlike the mercantilists, who believed wealth consisted in the forms of gold and silver, "The physiocrats claimed that land--a gift of nature-- was the only real source of wealth because it enabled agriculture to produce a positive net product in excess of its production costs" (Canterbery, 2001). Agriculture was seen as the essential factor of production, and the physiocrats blindly ignored all other forms of production. "The most outstanding fallacy of physiocratic doctrine...was the *exclusive productivity of agriculture*" (Ekelund & Hebert, 1975). In other words, the physiocrats believed agriculture was the only industry capable of producing more than what was put in for the production process. "In the *tableau economique*, which was Quesnay's own name for his visual representation of the circular flow, manufacturing and service industries are considered 'sterile' in the sense that they contribute nothing to the *produit net*, or net product. The net product, in turn, was looked upon as the true source of real wealth" (Ekelund & Hebert, 1975). The net product was the physiocrats' ultimate economic goal. It is simply the surplus created by land. The physiocrats held that land was the only source capable of creating more than what was initially invested in the production process. In their attempts to discover the source of surpluses, "the physiocrats tried to discover the actual form of productive labour. They had no clear idea of the distinction between use-value and exchange-value; and they thought of the surplus entirely in terms of differences between use-values that had been consumed and those that had been produced. The produit net was not a surplus of social wealth in the abstract (exchange-value), but of concrete material wealth of useful goods" (Roll, 1974). In

other words, the net product was the creation of wealth from an initial investment. It was the use of material goods in the creation of more material goods of a larger quantity than what was invested, which could only be done through agriculture. "Labor, according to them, could only produce enough goods to pay the costs of labor, and the same held true for the other factors of production with the exception of land. Production from land, therefore, created surplus that the physiocrats termed net product. Manufacturing and other nonagricultural economic activities were considered to be 'sterile,' because they created no net product" (Landreth, 1976).

In the *Tableau Economique*, Quesnay explores the flow of wealth within a nation by exploring the relationship between the three sectors of society. "The table was a crude representation of the flow of money incomes between the various sectors of the economy and of the creation and annual circulation of the net product throughout the economy. Quesnay's table represents a major methodological advance in the development of economics--a grand attempt to analyze raw reality by means of abstraction" (Landreth, 1976). Quesnay's three sectors of society are "the productive class, the sterile class, and the proprietary class or the landlords, including the government, the army, and the church. There are two industries, namely agriculture, in which the productive class is employed, and manufacturing, which gives employment to the sterile class. The landlords own the land, which they rent to the farmers as agricultural entrepreneurs. The rent income is spent partly for agricultural goods and partly for manufactures" (Niehans, 1990). The creation of the net product lies with the "productive class, consisting of farmer entrepreneurs and hired workers, [who produce] food and raw material, which are partly used inside agriculture, while the remainder is sold to the landlords and to the manufacturing sector" (Niehans, 1990). The selling of food and raw materials to the landlord and manufacturing class has a circular effect because "agriculture buys manufactures and pays rent to the landlords" (Niehans, 1990). The manufacturing sector has no productivity because the food and raw materials that it buys from agriculture are used to create the manufactures that it sells to the agricultural class and the landlords. The manufacturing class only puts out what it received in a modified form. "Land thus appears in this table as the only ultimate resource. Its income, namely rent, is correspondingly the only 'net product' in the sense that it exceeds reproduction costs (which are zero). All other factors earn just enough to reproduce themselves; their earnings represent gross income, not net income. For the economic philosophy of the physiocrats, this doctrine of produit net was of crucial importance" (Niehans, 1990). The physiocrats, however, "didn't deny that other kinds of labour were useful in various ways, but they attached tremendous

importance--analytical importance--to their division between productive and unproductive, or sterile, labour" (Robbins, 1998).

The physiocrats' belief that all wealth originates from the land led them to a unique view of "taxation, the most powerful instrument of state intervention" (Roll, 1974). The physiocrats held that "industry and trade were to be freed from all contributions" (Roll, 1974). The reason for the exemption of industry and trade from taxation was that they created no value. As stated, the net product was created by land and land alone. "They objected particularly to the tax system of the mercantilists and advocated that a single tax be levied on land. Of course, according to their theory, all taxes would ultimately fall on land anyway, but only after causing much friction in the economic system" (Landreth, 1976). To prevent the economic friction caused by taxing industry and trade, "the most efficient method would simply tax the group which ultimately paid the tax. Since taxes can be *paid* only out of the net product, they should be levied against those who *receive* net product. At the same time, the tax rate set should be sufficient to meet the fiscal needs of the state;" however, a high level of taxation was needed due to "the financial demands of external wars and an extravagant court. This burden fell in an arbitrary and capricious manner on those least able to pay, namely, the poor peasant-farmers" (Ekelund & Hebert, 1975).

The natural laws, which were essential to physiocratic doctrine, also influenced the physiocratic view of governmental regulation and led to the development of an essential policy that would be adopted by Smith and future generations. "They believed that the basic motivation for the economic activities of human beings was the desire to maximize gain. Prices were formed in the market by economic activity, and the formation of these prices could be studied, since it was governed by natural laws independent of the will of man...[T]hey concluded that free competition led to the best price and that, if individuals followed their self-interest, society would benefit" (Landreth, 1976). Under such a philosophy, governmental regulation was not only unnecessary but also a burden. According to the physiocrats, governmental regulation, a key mercantilistic principle, was "a major barrier to agricultural development...which restricted both internal and external trade. French mercantilism, or 'Colbertism' (named after French Minister Jean Baptiste Colbert), restricted trade between provinces and created monopoly privileges among manufacturers. The physiocrats reasoned that these restrictions were doubly perverse. They not only tended to artificially divert investment from agriculture to manufacture, but, by changing acquired tastes for manufactures, they also tended to lower the domestic demand for agricultural produce and therefore its

price. The lower prices of farm products in turn prevented capital accumulation in agriculture" (Ekelund & Hebert, 1975). "But the most unfortunate of the many governmental regulations, according to the physiocrats, was the prohibition against the export of French grain. This kept down the price of grain in France, they said, and was therefore an obstacle to agricultural development" (Landreth, 1976). The two forms of governmental regulation had the ultimate result of lowering the price of agriculture, which harmed the farmer. The physiocrats opposed such regulation in favor of a system of non-governmental interference named laissez-faire. "[T]hey concluded that a laissez-faire policy would produce a tremendous growth in French agriculture as the small-scale agriculture of the feudal economy was replaced by the large-scale capitalist agriculture. Thus the wealth and power of the French economy would be increased" (Landreth, 1976). Largely due to their obsession with land and agriculture, the physiocrats gave little value to manufacturing. They believed that "industry created no values; it only transformed them. No regulation of this process of transformation could add anything to the wealth of the community. On the contrary, it was only likely to make production more cumbersome and less economical" (Roll, 1974). The physiocratic system of laissez-faire sought the elimination of "the mercantilist policies regulating domestic and foreign trade" which were seen as "the primary obstacles to economic growth" (Landreth, 1976). By destroying the governmental regulations on trade, the physiocrats believed that the "[r]emoval of these restrictions...would allow capital to flow freely into the agricultural sector and enable the size of the circular flow to grow over time, in accordance with the 'laws of nature'" (Ekelund & Hebert, 1975). The physiocratic policy of laissez-faire would go beyond the boundaries of France. "This idea in the hands of Adam Smith and subsequent economists was of tremendous importance in shaping the ideology of Western civilization" (Landreth, 1976).

CONCLUSION

This paper has illustrated the many economic changes that occurred during the 18th century. Mercantilism, the dominant economic system of the time, was slowly being replaced. It was a system obsessed with the accumulation of gold and silver, which was seen as a necessary component in the building of a strong nation. This nationalism, fueled by the believed necessity of specie stores, led to the prohibition of gold and silver exportation punishable by strict laws. The prohibition was later replaced with regulations to encourage a favorable balance of trade, the next key mercantile doctrine. Whatever the policy, the goal remained the same, the

accumulation of large amounts of gold and silver to be used in times of national defense.

Mercantilism saw its end with the publication of *The Wealth of Nations*. Smith presents in his book a detailed analysis of the mercantile system. Smith examines the mercantile notion of gold and silver as the only sources of wealth and concludes that such a notion is preposterous. Smith further examines the mercantilists' attempts to accumulate large amounts of gold and silver, both by gold and silver prohibition and by the concept of a balance of trade. Smith concludes that these too are preposterous. In his criticisms, Smith irrevocably condemns the mercantile system in favor of a system in which commodities are deemed the true wealth of a nation and are allowed to flow freely within and without.

Smith, however, was not the first to condemn mercantile doctrine. The physiocrats rejected the principles of mercantilism in favor of a nature-based philosophy. The mercantile obsession with gold was revoked and governmental regulation was scorned by the physiocrats. They sought free trade and an elimination of taxes except the tax on land, the key to physiocratic economics. Land was seen as the only source of productivity, and all others were deemed sterile. Manufacturing was included in the unproductive industries because, according to physiocratic principles, it only transformed value and did not create it. The greatest physiocratic contribution to modern economics was the principle of laissez-faire, which encouraged an economic philosophy of no governmental interference. This philosophy would later be adopted by Smith and many Western economists.

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POSSIBILITY OF RUSSIA BECOMING A STRONG ECONOMIC POWER HOUSE

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ABSTRACT

Today practically all socio-political groups and blocs in Russia are debating the country's future along with opportunities of economical growth, but are suggesting very different ways of solving existing problems.

This study will attempt to demonstrate if Russia is capable of becoming a strong economic powerhouse in the near future. After studying various points of view, the most likely result seems to be that Russia indeed does have an encouraging prospect. Russia's natural factors call for future growth and substantial development opening doors so that it may become one of the leading countries. However, the people and the political factors could divert that positive prospective outcome into three very different paths: sliding into a negative direction of past circumstances; maintaining its status quo with slow growth in a positive or a negative direction; or leaping forward into its natural potential of growth and prosperity.

INTRODUCTION

The Russian economy today is still a very close reflection of its USSR predecessor. Even though vast changes in organizational, institutional, and production structures of the economy have taken place, many still consider the last ten years of "reform" wasted and believe that the real reform is yet to begin.[1]

Despite the fact that Russia's macroeconomic performance has been down, a large economic growth has occurred. The "dead hand" of the Soviet economic system stretches out across the economy and continues to slow down the process of economic recovery. Valuable resources serve as strong assets if employed correctly; however, in Russia they are dragged into wasteful activities and structures. According to the calculations of the Soviet Institute of World Economy and

International Relations, Russia uses 1.5 times more materials and 2.1 times more energy per unit of national income than the United States. In his studies, Sowell stated that Russia produces 1.5 to 2 times more the amount of steel and cement compared to U.S.A., but the amount of items derived from them is only 50% of the American level due to inefficient use resources (Sowell, 12). Even though central planning was declined, the regulation functions of the government are still extremely high and do a lot of harm to private entrepreneurship. Besides, the wrong tax system leads to the fact that the only competitive goods in Russia are oil, gas, and other raw materials. The internal market of both food and consumer goods is filled with import because it is more beneficial to import these goods than to produce them.

Still many refuse to look at weaknesses and are focused on the opportunities realizing the potential that lies within the boundaries of Russia. In 2003, new doors are wide opened for people to do businesses. As a result, many new entrepreneurs are fighting to break through the legacy's red tape left by the Soviet system and to destroy the old industrial objects by employing a new business vision, a vision that will change the country's destiny. The key is for everybody to grasp it.[2]

As a result, Russia has yet to achieve a true market-economic system. Due to the fact that almost everything can be bought when it comes to political, economic or social issues, the characteristics of "economic interaction" and techniques used to make future improvements are unique and cannot be likened to a typical healthy functioning economic system. There is a question asked about credibility and dependability of gathered information, performance statistics, and policy impacts.

However, there is an incredible amount of economic activity that leads to success and failure, experimentation and adjustments. This compels Russia's economic system to change and to take a step forward to another dimension of improvements. It is very difficult to predict Russia's future today because of many uncertainties. It is also important to realize that one single step could make a vital change, both in a good or bad direction.

HISTORY BACKGROUND

In the middle of the 80's, the disintegration of Soviet Communist Empire exhausted its supply factors and no longer could exist in the previous form. The situation oil and raw material in the world market became unfavorable for the USSR, as it became an unrestrained race. Ineffective production spent enormous resources. Gorbachev, who took the power, understood the need of reformation and

liberalization of the economy and society. "Perestroika" of the society and a newly accepted law, which was called "about the cooperation", resolved small and average private enterprises. Freedom in words, decision-makings, and press was proclaimed.

Gorbachev and his party desired to renovate socialism maintaining the authority of the Communist Party. The reforms of industry control and agriculture were inconsistent in nature. This was not a transaction to the economic methods but limitation of administration at a certain point. In time of sharpest political war the opposite forces blocked realization of any renovations. Time for the reformation was now lost. Decay of united economic space took place as a result of confrontation of republican organizations. The continuation of chaos and anarchy developed. The Government did not make any cardinal steps; the only step it made was the confiscation of means (freezing accounts in the banks, 5% sales tax, a 50%-70% percent increase in prices, and other aspects). This did not stop the inflation and could result as economic stabilization. By the summer of 1991, the country was in a crucial situation. The break of politics came about to accumulate ripened contradictions.

Putsch in August of 1991 was an unsuccessful attempt to escape from this crucial situation via restoring extreme control methods. Political crisis in 1991 indicated the end of "perestroika". It was used by Russian government to crush and destroy the leading and local structures of CPCU, whose action at that time was slowed down. The property of this party was nationalized, its money means were put to arrest. In December of 1991, leaders of Russia (Yeltsin, Kravchuk, Shushkevich) declared the termination of the union agreement of 1922 and signed an agreement about liquidation of the USSR. Now instead of the USSR the cooperation of independent states was created. This was a union, which status is not determined even today. (Uferova, Trigub).

CURRENT RECOVERY OF THE RUSSIAN ECONOMY

In 2003, the Russian economy is still experiencing a long-standing yet diminishing recovery from the great depression of the 1990's.[3] If there are no new threats coming from external forces, economic recovery in Russia is expected to continue in the future. Further reform created by the government seems to promise even more future growth in the long run. Nevertheless, in order to make this potential come to pass, the new reform has to embrace every aspect of economy and be sharp enough to destroy the "dead hand" of the Soviet Union and to break through the red tape. Only then can Russia's economy be one of a true market.

The financial crisis and default in August of 1998 effected the country's GDP as well as lowered foreign investors' trust in Russia's potential repeatedly. Still, the numbers show that Russia's GDP in 2002 surpassed 1995's GPD by 3%. This relatively low increase, only 2/3 of 1990 levels, reflects the change in transition from communism to democracy. The fact that the increase is low shows that Russia is still in the process of this transition and many more changes need to be made. The long awaited recovery has been achieved by 'favorable economic conditions'. Some analysts believe these changes occurred because Russia's economic level has hit its bottom. Perestroika in 1990, the contraction of industrial activity with a pace that almost resembled one of a 1919-1921 Civil War collapse[4], and the financial crisis and devaluation in 1998 are the events that have contributed to changes in the direction of Russia's development.

New and profitable opportunities have been created by a dramatic rise in international energy and resource prices. Russian industrial and resource capacities, which in the past were unable to make any profit or to even cover basic operating costs, now became viable.

Some of the conditions that have aided to economic recovery can be divided into the following categories (McKinsey, 2001):

1. A four-time devaluation of the ruble significantly reduced domestic costs (especially labor).
2. The competitiveness of Russian industry was improved by price controls over energy, utility, and transportation input costs.
3. An increase in prices in 2001 regarding international basic goods and services, especially oil, increased significance and value of Russian exports.(McKinsey, 2001).

Payments arrears are now stable at less than 23% of GDP, "barter" is now used in less than 25% of industrial transactions (down from 50-70% in 1997-8), and business prospects were up more than 25% in 2002 (2). Enhanced tax collections, higher excises on oil and other exports, improved conditions for business operations, and many new opened doors have made it possible for a budget to have a surplus, 4% of GDP. In 2003, Russia rejected new IMF loans even though its current financial position would enable the country to acquire more debt[5].

Partial credit for this recovery must also be given to president Putin and to the relevant political stability under his reign. After all the events described previously, Russia would be in even worse condition than where it is today if it was

not for this stability. A decade ago, businesses were reluctant to even plan for the future. The changes made by Putin have helped the country's development through businesses' prosperity. A crucial difference is seen in the efficiency of business enterprises in 2003 compared to the beginning of 1990s, which proves the point that only in a free-market economy efficiency and effectiveness are achieved. According to statistics, however, over 35% of businesses still remain unprofitable, which demonstrates a necessity in further restructuring of many businesses[6]. More profitable businesses have also aided to more tax collections and improved budget implementation.

There is, nevertheless, one big problem with taxes. There is no true system for collection of tax revenues. Not only is the government unable to control the accuracy of amounts paid by businesses, but also entrepreneurs would not be in business today if they were to pay all of the amounts. Different layers of the tax system make it unreasonable to be in business since they would come out with a profit close to "zero" after paying all of the income tax. Accountants have to change numbers on the financial statements (illegally) in order to avoid a 100% taxation. This in itself creates two other problems. First, investors cannot trust the numbers they see and are unable to make completely informed decisions when making investments. Second, people know that they can avoid following all of the government regulations since there is no sound system to verify that the policies are being implemented. Consequently, if the government were to finally come up with a good policy, there would be many difficulties in its' implementation. This is also why economic recovery is going under a very slow pace.

RESTRUCTURING

The period of collapse of the Soviet economic system had some positive characteristics. Numerous unprofitable activities and obsolete capital stock have ceased from existence. Many resources were freed to allow economic growth instead of letting valuable resources drag the economy down. The soviet inefficient and unproductive activities were forced to come to an end during the extended depression of the 1990s. Engineering, agricultural, and processing activities were minimized allowing new resource sectors to take place and to increase output and employment. Financial and consumer services could serve an example with the importance of consumer service being practically insignificant during the Soviet era. This reallocation of resources increased labor efficiency compared to 1994 when a large percentage of it was wasted. The nation as a whole benefited from these

changes because low productivity was forced to leave the market while better and more efficient products entered into competition between one another, thus revolutionizing and transforming the markets[7].

Notwithstanding enhanced distribution of workforce and other activities, only a slight "strategic" reorganization has taken place in several production activities that continue to exist in Russia as a legacy left from the Soviet predecessor. Still some improvements in efficiency can be seen. Many more economic developments could be anticipated through reorganization of technology, market relations, factor use, and management practices and structures[8.] Privatization did not have a lot of impact on productivity and restructuring. When analyzing economic developments of Russia, it is difficult to distinguish between the changes that occurred because of restructuring and the changes that occurred because of Russia's transition to democracy.

Several acquisitions have taken place with rich resource and energy companies investing their money in other companies, therefore restructuring other industrial operations, instead of investing in their own businesses. Alfa Group moved into telecoms, Interros added a naval shipyard to its core nickel-mining interests; Severstal is buying automotive, engine and locomotive factories; Siberian Aluminum purchased Gorky Automotive; and Russian Aluminum consolidated the majority of the remaining aluminum industry.[9] These serve as examples of the wide-spread popularity of consolidations, especially in the oil industry.

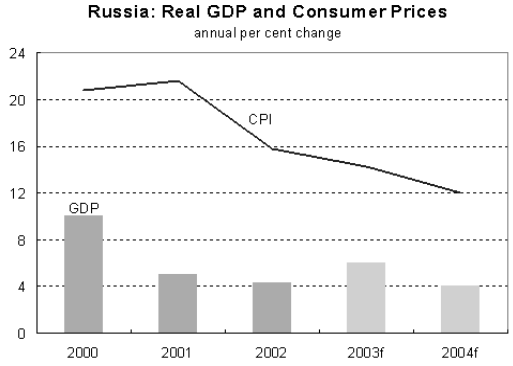
If the crisis of 1998 has truly started the beginning of new, improved, free-market economic system, then this new economic activity and growth should be expected to continue especially now that 2002-2003 external opportunities promise to aid in this development. It is up to the Russian government to use these opportunities to overcome weaknesses that are hidden in so many aspects of economy. Even after the price of oil falls below $18/barrel and as the ruble continues to complete its reappreciation against the dollar, economic recovery is expected to take place. It is believed that if Russia's economy maintains its growth under these unstable circumstances, then positive results of these readjustments will be revealed soon after 2003.

Russia's transition to the market system of the economic relations generates many problems that came through this transition, one of them involve concerns about investments. Without creating an interest for a potential investor to invest money in domestic economy, it is impossible to solve the problems that come into existence when new economic relationships are developed. Although relationship may seem indirect, trust in the future success of the country by Russia's own people

is essential for success in production development, increase of people's welfare, and for the rebirth of the authority of Russia on the world arena. There is not one country that can develop its economy without foreign investments; even the USA could not afford this. This should be of a special concern for a country, whose internal investments are extremely small. After all, it is not a secret that people from the C.I.S., and Russia do not put their own money in the national economy. On consideration of safety, they prefer to put money into foreign banks.

PERFORMANCE TRENDS[10]

Although there was a global economic slowdown, 2002 macroeconomic results in Russia remained generally strong. Russia recorded a fourth successive year of relatively strong GDP growth with GDP growth rates of 4.3 % in 2002, 5 % in 2001, and a record of 10 %I n 2000. This is also a third consecutive year of fiscal surplus for Russia. In its latest Article IV Consultation, the IMF notes that the "Russian economy has continued to benefit from the impact of earlier reforms, although temporary factors - in particular, strong world energy prices and the post-crisis real depreciation of the ruble - have also played an important role in growth performance".



There was a remarkable economic growth in the first part of 2003 from January to June. Russia's real GDP growth reached 7.2% compared to 3.9% growth in the first part of 2002. Such an impressive growth is due to a large increase in oil prices (as the World Bank has estimated, 50% of this 7.2% increase can be accounted by oil prices). To a certain extent, the reason for the change in prices is

a result of the war in Iraq. In the first part of 2003, Russia's inflation rate remained above targeted estimations of 10 to 12% for the year of 2003 with the average of around 14 %. Increases in pay and rapid money growth can account for this increase in inflation rates.

In February 2003, British petroleum, known as BP, made known its intention to invest close to $6.75 billion to establish a new Russian oil company in partnership with Alfa Group and Access-Renova. This deal will create the third in size oil firm in Russia. More than that, this investment represents the largest foreign investment since 1991 when the Soviet Union collapsed. Many western countries turned to Russia because of its oil supply. Khordovskiy, the CEO of Yukos, the largest oil company in Russia, has been discussing the possibilities of selling close to 40% of Yukos's stake to Exxon Mobile and Chevron Texaco. The monetary amount of this investment can reach as much as $20 billion dollars. Very recently, however, several unfavorable incidents took place that have "freezed" 44% of Youkos's shares. Khordovskiy is arrested and accused of participating in fraudulent activities and tax evasions. He denies the responsibility for these actions. Russian people as well as foreign investors are afraid that this is Putin's way of leading the country toward authoritarianism. Whether this is true or not, time will show, but it sure does not aid to an increase in investors' confidence. A BP spokesman in London reiterated "we are in Russia for long-term…and are not going to respond to day-to-day activities". (WSJ Oct 31,03) Additional eight to ten projects are planned for the nearest future.

In May of 2003, President Vladimir Putin introduced a policy with the objective to double the country's GPD in the next ten years. Some economic analysts believe that Russia will need to maintain close to 8% GDP growth rate every year in order to achieve this goal.

OUTLOOK

Referring to the table below, as a result of Russia's strong economic performance in the first half of 2003, real GDP growth is expected to be around 6% in 2003, and to go down to 4% in 2004 because of an anticipation that there will be a decrease in oil prices. (Economist Intelligence Unit, August 2003). Russia's growth in the short-run is highly dependent on the fuel sector, which is believed to be the source through which improvements will be established.

Russia's financial position is forecasted to continue operating in a surplus over the medium term although a decrease in oil prices is expected. The country's

dependence on international products and services will continue to be a cause of risk, with investment spending and export and budget revenue closely related to the prices of oil.

	2000	2001	2002	2003(f)	2004 (f)
Real GDP (% change)	10.0	5.0	4.3	6.0	4.0
Consumer prices (% change)	20.8	21.6	15.8	14.3	12.0
Goods&Services Exports(US$ bn)	114.6	112.7	120.2	134.4	127.7
Goods and Services Imports (US$ bn)	61.1	73.0	83.1	97.2	105.9
Current Account balance as % GDP	18	11.3	9.5	8	3.9
(f) forecasted					

PROSPECTS FOR FUTURE DEVELOPMENT

The prospects for future development today are probably the most encouraging since 1991. As noted by U.S. Secretaries Paul O'Niell and Don Evans during their visit to Russia, the Russian government "appears committed to developing investment and investor friendly institutions and environments by stressing structural reform and political stability". Optimistically, this will interest foreign resources and business proficiencies and will help in transforming and rebuilding infrastructure. It is essential that restructuring in production activities and economic interactions take place. In the long-run, Russia needs to develop a "modern, high technology and consumer oriented economy, in place of the crumbling, old-industry-oriented remains of the Soviet economic system". The specific reform plan was summarized in the Gref Program and in Putin's address to the legislature on April 3rd[11] .

PUTIN/GREF PROGRAM

Putin/Gref Program resembles and seems to be a continuation of reforms started by Gaidar and Chubais in 1992-1995. It has created both opposition and agreement in the eyes of people. This reform openly addresses numerous institutional as well as structural problems described earlier in the paper. The reform also focuses on reevaluating roles, powers, and responsibilities of the government

and beginning to create new and improved budgetary and tax reforms. The Federal Council has been restructured limiting the direct influence of regional governors. Also, seven new regional districts have been created to organize and control federal organs' actions and to ensure implementation of federal laws. Additionally, many steps were taken to suppress the oligarchs. Several criminal cases have been opened against people who opposed to what the government wanted people to believe. Those who made known their disagreements through mass media were treated severely with an example of NTV channel and Gusinsky being taken over[12]. Even though Russia claims democracy, the true democratic system is far from being achieved. Russia's government makes people believe that they have all the rights granted by democracy when in all actuality people do not even have the freedom to speak their opinion openly especially if what they have to say is against the government. There is no direct law that would not allow such freedom, but indirectly actions are taken against these people that force them to quit.

Other aspects of the reform program have been moving at a relatively slow pace[13]. A negotiation land code regarding the rules of land and property sales, was finally passed by the Duma's second reading. While agricultural land sales still have to be approved by local/regional forces, full title of property ownership is finally given to foreigners. Numerous other reforms have been created with several aiding to provide benefits through the states' resources to the "needy" people. The definition of "needy" is very undefined, and for that reason many of the "needy" have not been shown deserved attention. A number of suggestions have been made regarding the unemployment, price controls for houses, and a pension reform. These reforms together with a new market-oriented labor code have led to opposition simply because both households and regional government did not have the means to make these reforms come into existence. Policy implementation is often very expensive, and it is important that before passing a certain law and believing in its ability to achieve desired effects, every factor, including affordability, has to be analyzed. These laws also have taken away state financial support to industry for social purposes and moved responsibility of social obligation from industry to local governments. Consequently, these laws are still under the process of coming to pass and are obstructed by the political procedures. Many banking reforms have been created, but it seems that most of them are focused more on profitability of several monopolies rather than encouraging competition, effectiveness, and efficiency. A consumer is the one that is always hurt from such conditions, in this case the consumer being the Russian population.

Certain changes in regulations of small businesses have been made making it more favorable for existence of small businesses. Regulatory burden has been reduced as well as the number of licensing, registration, and regulatory requirements. Gref reforms have considered this to be one of the main concerns for 2003-2004, thus making another step to destroy what was left by the Soviet Union policies.

ALTERNATIVE PROGRAMS

Perhaps to protect himself in the case of an economic recession, President Vladimir Putin has designed a number of alternative programs, which differ in nature from those of the Gref Reform under Kasyanov's legislative program. One of them is Ishaev's Report of November 22, 2000 prepared by the Academy of science and other opposition reformers under the governor of Khabarovsk Victor Ishaev[14]. While it is understood that both reforms should be complementing one another, the alternative programs contradict Gref's reform in various aspects. A substantial mobilization of resources directed by the state and government involving investments made through a "Russian Development Bank" has been proposed. The problem is the it would involve more government decisions rather than people's decisions and there would be an increased control of financial intermediation.

Another reform is also being developed by V. Soltaganov[15] and his group of the Security Council. The reform has an interesting name - a "State Strategy for National Economic Security". The main objective of the program is to improve and renovate military activities and those related to them. The goal is to increase dependence on self-reliance and to reduce future dependence on international countries. It is essential that a country with a strong economy has a sound military system, but until recently Russia has not been very involved in developing the current military situation.

Several other programs proposed by Kasyanov closely resemble those of Perestroika in 1990. The only difference is that this time everything had to be done "right". It is understood, however, from the previous discussions that not one of these programs can aid in the process of economic development of a modern market. The government needs to analyze mistakes made in the past and learn from them instead of continuing to go back and make the same decisions knowing it has not worked in the past.

Many aspects of the economy need to be controlled by the government, but there are some that need to be left alone for the market to do its own thing. The

"invisible hand" discussed by Adam Smith needs to be allowed to operate in Russia's markets. The market prices lead to the prosperity in the society as well as the nation as a whole. Business people drawn by their own interest are directed by the "invisible hand" to reach the goals which they did not even plan to obtain such as the prosperity of the economics in the country. Only than will there be efficiency that is so vital for long-awaited changes. The question asked by many is why is that the numerous government decisions and reforms continue to be based on what has failed to work in the past. How many times does Russia's economy need to crash for this mistake to never be repeated again?

HISTORICAL EVENTS THAT WILL INFLUENCE THE FUTURE

After Yeltsin became the president of the Russian Federation, those democrats that came with him began the process of privatization of enterprises. As discussed previously in the paper, this privatization was ineffective. No laws have been passed to control the accuracy of privatization that would describe what was deemed to be right or wrong by the government. Privatization is quite a big event and it was a big mistake to let it do its own thing. Without doubt, all of the officials and those residing beside the authorities wanted to become either presidents or co-owners of large enterprises through using the office positions held. The conduction process of privatization was unregulated and unsupported by legal regulations. For this reason, in a very short time those who had influence and power became owners of the largest plants, companies, and enterprises. The Russian system cannot be called free, most likely it can be defined as oligarchic. People who had the closest connection to the government had superior businesses. The ruling gave permissions and quotes for exporting oil and material raw, the contracts for supply or delivery of goods, taxes and custom privileges, which enriched both owners and entrepreneurs. Oligarchic groups of entrepreneurs, who were close to the government or ruling sector, the most powerful of which became so called the "family" of Yeltsin. This was the first time for such an event to occur in the post-communism period. Oil industries were one of the most luscious "slices of the pie". A person who owned an oil company could become a millionaire in almost no time, which is exactly what happened.

The number of oligarchs grows substantially while more and more Russians are becoming poorer every day at an extremely rapid pace. Russia knows the names of its oligarchs: Berezovskiy, Abramovich, Khordovskiy, Potanin, Gusinskiy, and many more. Not one from this list has acquired their capital by honest and

wearisome work. Why is it that after so many years the questions are raised about Khordovskiy's activities in his oil company, Yukos? The problem is that Khordovskiy started having political ambitions and plans to become Russia's president in the future. Khordovskiy is the richest man in Russia and he has the potential of being elected. He has the necessary amount of capital to make this happen. No authority that is leading the game will allow squashing itself. Several most recent interviews given by Khordovskiy to people in other countries demonstrated the seriousness of his ambitions and intentions to replace Putin. It was time Vladimir Putin took some action against Khordovskiy to protect himself as the situation continued to get out of his control and became dangerous in the eyes of the leader.

At the same time, an inspection of Yukos takes place by the tax collectors. It did not take long to find infringements. The problem is that legal, tax-related, and other fraud can be found in a company of any other oligarch. In this case, everybody has to be examined. This shows that laws and regulations in Russia are for those who are "selected". They apply to some (usually those the government does not like), but others are perfectly fine doing the same thing. Such a selective process in determining who is to obey the regulations and who is not prevails only in non-democratic countries. Will there be deprivatization that will lead to another increase in welfare of today's officials? Who is next after Khordovskiy? Abramovich? Potanin? Revision of privatization results and redistribution threatens the country with big economic shocks even with a possibility of a civil war. Therefore, president Putin is more interested in resolving these issues peacefully… the elections are coming soon.

SUMMARY AND CONCLUSION

In the middle of 2003, the Russian economy truly stands on a threshold. There is a potential for a transition to a market economy to take place and be finished, which will lead to continued growth and economic development. Yet still there is a danger that Russia may choose a "third path" where political restrictions will bind private initiative and take away opportunities of future market improvements. This will take the country back to where it was and even to a worse condition. The "third route" could lead Russia into another economic depression and status quo and leave a country far behind the world leading countries. The only difference is that future recovery from this "path" will be much more difficult than what Russia has seen.

The outcomes of globalization can allow Russia to achieve its objectives. Russia has the potential of being one of the leading players in the world economy. Many countries do not have the necessary resources, but are still going forward. How much further could Russia go if it were to employ everything necessary? If most of the resources are found within its boundaries, how much longer will Russia continue to allow them to be wasted?

Renaissance and economic development of the country are only possible with further liberalization of the economy, easing of bureaucratic and tax burden, new foreign investments, involvement into enterprise of small and middle classes of the population. This will allow to fill up the treasury and to create the layer of owners, so-called middle class, which is a support of any democratic country. It is necessary to substantially reduce bureaucratic apparatus and to decrease its control over the entrepreneurs, to make legislation as liberal as possible, and to abolish departmental instructions, which substitute laws, and make everybody, including officials, to obey these laws. Russia needs government officials and business entrepreneurs who would not only look at their own benefits, but also would help Russia to realize its potential. The money that belongs to the Russian people need to be protected and not stolen by those who have the power.

Can Putin and his government be considered the ones to take Russia on the right path? If not, how much longer does Russia have to wait?.. Which path Putin's Russia will take is at this time very much an open question.

ENDNOTES

[1] This feeling has been expressed, for example , by Sergei Karaganov, Deputy Director, Institute of Europe RAN, in an interview published in Trud, 29 June 2003: "In fact, Vladmir Putin has started a structural reform of Russian society which former leaders tried to carry out in the early 1990's. Russia tried to reform its economy and finances but failed and lost ten years."

[2] Some evidence of this is seen in an August 3, 2003, conference in Volgograd, "Business and Power: A Strategy for Interaction," sponsored by local entrepreneurs with support of the Presidential Administration. See JRL, 7 August 2003. Also the entrepreneurial group Russia Club-2015 has been active in pushing to improve the business environment. See Carnegie Endowment "Private Sector Initiative for Russia Meeting Report," V. 3, #14, 3 May 2003, on their web page <www.ceip.org>.

[3] Statistics on most recent performance are derived from the current Russian press, Russian Economic Trends, and the Bank of Finland's Institute for Economies in Transition Russian Economy: The Month in Review, issues through June 2003.

[4] On the dimensions of the collapse, see the EBRD (1999) Chapter 3 and pp. 258-61. The civil war collapse can be seen in the statistics of Chapter 3 of Gregory and Stuart (1998).

[5] Russia has already paid $1 billion of the $2.07 billion due this year, out of a total debt owed to the IMF of $8.8 billion [RFE/RL Newsline, 7 August 2003]. The prior figures are from the Russian Economic Trends monthly update, June 2003, and from the June issue of Russian Economy: The Month in Review of the Bank of Finland.

[6] Russian Economic Trends, July 2003

[7] See Brown and Earle (2003). Aspects of its regional dimension, and constraints on the process, are discussed in Broadman and Recanatini (2003):

[8] This point is eloquently made by the "Report on Russian Economic Performance" of the McKinsey Global Institute (2003). There the particularly destructive role of inherited social and political relations and elite behaviors discussed above is highlighted.

[9] For anecdotal evidence on these trends, see for example Business Week, International Edition, 16 July 2003, "Russia's Big Get Bigger" by P. Starobin, and Financial Times, 25 July 2003, "Consumer Goods Shake Off a Bad Reputation" by R. Cottrell.

[10] All data in this section, unless otherwise noted, are derived from the Economist Intelligence Unit. Actuals and Forecasts, August 2003.

[11] See V. Putin, "Annual Address to the Federal Assembly," on Russian TV, 11am, 3 April 2003, reproduced in JRL #5185, 3 April 2003, for the primary directions being put in 2003. The original Gref Program, published July 15, 2000, is available on the <www.kommersant.ru> web site. The state of the program and current tasks had been elaborated in a press briefing by German Gref, Minister for Economic Development and Trade, on March 2, 2003. See <www.fednews.ru> for that date. The original program was published in July 2000 after receiving support at the G-8 meeting, and is most clearly outlined and analyzed in Nash and Lissovolik (2001).

[12] The most prominent case has been that against Vladimir Gusinsky, resulting in his exile and the destruction of his media empire, concluding with the take over of NTV by Gazprom-media and the assault on Ekho Moskvy in July 2001. The establishment of Federal Media Center, the role of the Communications Ministry, and the use of <strana.ru>, and the FSB requirements on all web access providers for direct access to content, all fit the pattern of attempting to control the "commanding heights" of public information in the interests of security of the state.

[13] The Duma session ending in July 2003 passed 130 new reform bills. The Moscow Times, 16 July 2003.

[14] This is discussed a in A. Nadzharov, "Backing Up?" Novye Izvestia, 9 August 2003.

[15] Its fullest statement is in the May 1997 booklet, RAN, Guidelines of the Programme for Medium Term Social and Economic Development of Russia (Moscow: RAN, 1997).

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