Volume 5, Number 3 **ISSN 1533-3604**

JOURNAL OF ECONOMICS AND ECONOMIC EDUCATION RESEARCH

An official Journal of the
Academy of Economics and Economic Education
and the Allied Academies

Editor: Larry R. Dale
Arkansas State University

Academy Information
is published on the Allied Academies web page
www.alliedacademies.org

Whitney Press, Inc.

Printed by Whitney Press, Inc.
PO Box 1064, Cullowhee, NC 28723
www.whitneypress.com

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The *Journal of Economics and Economic Education Research* is published by the Allied Academies, Inc., PO Box 2689, 145 Travis Road, Cullowhee, NC 28723, USA, (828) 293-9151, FAX (828) 293-9407. Those interested in subscribing to the *Journal*, advertising in the *Journal*, or otherwise communicating with the *Journal*, should contact info@alliedacademies.org.

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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

ECONOMICS EDUCATION ARTICLES

TEACHING QUALITY, RESEARCH AND TENURE

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ABSTRACT

Our focus is on the interactive effect of scholarship and pedagogical training on teaching quality and the strategic behavior relating to the tenure decision. First we develop an optimal control model in which the department maximizes the discounted benefits to the students net of the cost of improving instruction. The quality of instruction, or benefits to students, is assumed to be a function of the instructor's human capital, which is, in turn, a function of scholarship or research and pedagogical training.

Next we develop a signaling model in which the faculty member may choose a level of human capital investment in order to influence the tenure decision. From the signaling game, we show the conditions for the existence of both pooling and separating equilibria.

INTRODUCTION

Untenured professors have a particularly strong incentive to demonstrate teaching proficiencies and published research. At many universities, such as the majority of state regional schools, the academic tenure decision is based on scholarship and teaching. Untenured professors must balance the significant pressure to have their research published with the expectation to be involved in teaching workshops and other forms of teaching training. Obviously, those who read and write for journals such as this recognize the important links between teaching and research. Unfortunately, on many campuses this interaction is not recognized. In practice, the interaction of teaching and research is mainly ignored and, at the

worst, they are treated as incompatible activities. Much of the literature regarding the improvement of teaching economics has focused in specific techniques or integrated approaches which do not address the role of scholarship. Examples of recent recommendations have included the use of one-minute papers (see Chizmar & Ostrosky, 1998), the integration of technology into classroom teaching and the development of web-based courses (see Simkins, 1999; Vachris, 1999; Chizmar & Walbert, 1999; Stone, 1999).

However, recently the interaction of teaching and scholarship has been investigated in the context of the total quality management framework (see, for example, Chizmar, 1994; Ray, 1996). Paul and Rubin (1984) identify two components of good teaching. The first is classroom presentation, "the ability to communicate with and to motivate students" (p. 143). The second is the content of the course. Here the instructor's responsibility is to ensure that the material is both current and relevant. Actively engaging in research aids the faculty member in making these judgements by exposing him to current ideas and giving him the tools to weed out the weak or irrelevant ones. Extending the argument, one can conclude that improving presentation, while certainly useful, is not enough to guarantee improvement in the quality of student learning. Although Ray (1996), like many other works relating to TQM and teaching, does not explicitly discuss the role of research, if one looks more carefully at the place of the instructor in her model, the importance of research is apparent. The most obvious need for a researching faculty that Ray refers to is in the job of defining the product. This is analogous to what Paul and Rubin (1984) would refer to as controlling the content of the course. A faculty member who is not current cannot adequately ensure that his students are learning accurate, relevant material. Chen and Ferris (1999) argue that research is a desirable activity for professors at teaching universities since research enhances human capital that is necessary to improve the quality of faculty teaching. Research also aids in the instructor's role as a monitor of the quality of certain types of assignments, such as essays, research projects or take-home exams. Since research has intrinsic and spillover benefits

unrelated to teaching, it follows that improving teaching is not the only motive faculty members engage in research.

Our focus is to formally investigate the interactive effects of scholarship and pedagogical training on teaching quality. First we will consider research as a means of improving classroom performance, since the goal of the department is to maximize the discounted benefits to the students net of the cost of improving instruction. The quality of instruction or benefits to students is assumed to be a function of the instructor's human capital, which is, in turn, a function of scholarship or research and pedagogical training. Given this framework, we then derive the optimality conditions for the continuous problem of human capital investment.

In the next model, we consider the strategic behavior that arises in the faculty member's self selection of the relative importance of scholarship and pedagogical training. Within this section, we develop a signaling model in which the faculty member may choose a level of human capital investment in order to influence the tenure decision. For simplicity, we assume that, depending upon his or her abilities and/or taste for work, the faculty member can be either a "high productivity" type or a "low productivity" type, and each type has similar teaching evaluations. The tenure decision is based on a composite score which depends on the instructors' level of research and investment in pedagogical training. From this analysis, we show the conditions for the existence of both pooling and separating equilibria. In the final section, we provide some policy implications and conclusions.

MAINTAINING HUMAN CAPITAL FOR TEACHING

Suppose the goal of the department is to maximize the discounted benefits to the students of quality of instruction net of the cost of improving instruction. In order to achieve this idealistic goal, consider the behavior of the representative faculty member of the department who chooses a combination of two streams of human capital investment, i_1 (research) and i_2 (pedagogical training), to maximize

$$\int_{T_0}^{T_1} e^{-rt}[B(x(t)) - C(i_1, i_2)]dt$$

subject to

$$\dot{x}(t) = i_1 + i_2 + ai_1i_2 - bx, \qquad x(0)=x_0>0,\ i_1 \geq 0 \text{ and } i_2 \geq 0,$$

where B(x(t)) is the benefits to students, x(t) is the instructor's human capital, and $C(i_1, i_2)$ is the department's cost of improving instruction. Note that a dot over a variable indicates a derivative with respect to time. From the state equation, $\dot{x}(t) = i_1 + i_2 + ai_1i_2 - bx$, the faculty member affects his or her human capital by investing in research and/or pedagogical training such as TQM. Depending on the types of institution, i_1 may include publications in refereed journals, publications in proceedings or books, or presentations at meetings. From the perspective of improving teaching, "unsuccessful" research that is not published may provide benefits if it allows the instructor to keep current in the field. Also note that human capital is assumed to decay at a constant proportion, *b*. Paul and Rubin (1984) note that human capital associated with graduate level training in economics decays over time and publications act as a signal of human capital. They provide support for rewarding research at colleges and universities where teaching is the primary mission This decline in human capital may be attributed to memory loss or the loss of relevancy of human capital due to the changes in the field. The positive coefficient, *a*, reflects a complementary interaction term between the two forms of investment. The faculty member's investment in research positively affects his or her investment in teaching skills; similarly, pedagogical training spills over to the instructor's research. If a is zero, investment in pedagogical training and research are independent activities; there are no spillover effects in which research activity improves an instructors teaching or vice versa. This may occur, for example, if the faculty member engages in repetitive research in which he or she publishes multiple papers on the same subject with only nominal changes between papers.

The Hamiltonian associated with the department's goal of maximizing the discounted benefits to the students net of the cost of improving instruction is

$$H=e^{-rt}[B(x)-C(i_1, i_2)] +L(i_1 + i_2 + a\, i_1 i_2 -bx). \quad (1)$$

The necessary first-order conditions are

$$\partial H/\partial i_1 = -e^{-rt}\ \partial C/\partial i_1+L+Lai_2=0, \quad (2)$$
$$\partial H/\partial i_2 = -e^{-rt}\ \partial C/\partial i_2+L+Lai_1=0, \quad (3)$$
$$\partial^2 H/\partial i_1^2= -e^{-rt}\ \partial^2 C/\partial i_1^2 <0, \quad (4)$$
$$\partial^2 H/\partial i_2^2= -e^{-rt}\ \partial^2 C/\partial i_2^2<0, \quad (5)$$

and

$$\partial L/\partial t= -\partial H/\partial x=-e^{-rt}\ \partial B/\partial x +bL. \quad (6)$$

An important policy regarding the allocation of resources originates from equations (2) and (3), since the discounted marginal cost of investment must equal the direct marginal benefits of the investment in research plus the indirect marginal benefits. The standard interpretation of L is the marginal valuation or shadow price of the state variable (see Chiang, 1992; Kamien & Schwartz 1991; Léonard & Van Long 1992). Specifically, equation (2) states that the discounted marginal cost of investment in research, $e^{-rt}\ \partial C/\partial i_1$, must equal the marginal benefits of human capital investment from research, L, plus the indirect spillover benefits from this type of investment, ai_2, as suggested by Paul and Runbin,1984 and Oakley,1997. The interaction between the two forms of investment allows the marginal cost of investment in research to exceed the marginal valuation of human capital due to the investment in research. A similar interpretation for i_2 arises from condition (3). Conditions (4) and (5) are satisfied by assuming an increasing marginal cost of investment for each type of investment.

Subtracting bL from both sides of (6) and multiplying by the integrating factor e^{-bt}, and then integrating yields

$$e^{-bt} L = \int_{T_0}^{T_1} e^{-(r+b)s} \frac{\partial B(x(s))}{\partial x} ds. \quad (7)$$

Multiplying by both sides of (2.7) by $e^{(r+b)t}$ yields

$$e^{rt} \lambda(t) = \int_{T_0}^{T_1} e^{-(r+b)(s-t)} \frac{\partial B(x(s))}{\partial x} ds. \quad (8)$$

From (2), note that $e^{rt} L=(\partial C/\partial i_1)/(1+ai_2)$. Substituting this expression into the left hand side of (8) yields

$$\frac{\partial C}{\partial i_1} = (1 + ai_2) \int_{T_0}^{T_1} e^{-(r+b)(s-t)} \frac{\partial B(x(s))}{\partial x} ds. \quad (9)$$

Equation (8) implies that the optimal path of investment in research requires that the marginal cost of the investment equals the marginal benefit of investment. The marginal benefit of investment from research has two components: the discounted stream of marginal benefits to the students plus an additional fraction of that discounted stream due to the complementary interaction of the two forms of investment. Analogous conditions exist for the optimal investment in pedagogical training.

Authors such as Anderson (1992) and Sykes (1990) have reinforced the perception that teaching and research are incompatible activities. Yet others such as Oakley (1997) argue that there exists a positive relationship between teaching effectiveness and scholarly activities. The preceding model provides a formalization of the positive interaction of teaching and research as discussed by Oakley (1997). Contrary to the "flight from teaching" belief, where research productivity occurs at significant sacrifice in terms of teaching, the solution of the optimal control problem suggests that research gains spillover to teaching in a complementary manner.

Of course, the motives of the individual may be significantly different from the goals of the institution. For analysis of the institution's perspective, see McPherson and Winston (1983) and Carmichael (1988). As is well-

known, the anecdotal evidence suggests that the untenured faculty member is primarily concerned with obtaining tenure, and Hamermesh (1992) argues that a major reason for denying tenure to assistant professors is the lack of publications associated with a slow start. He notes, "Committee work, lecture preparation and advising can quickly fill your schedule." Boyes et al. (1984) find variance in the returns to research depending on the size and rank of the university. Given the reward structure at a university that values both teaching and research, is engaging in pedagogical training incentive compatible? In the next section, we use a signaling model to analyze this issue.

A SIGNALING MODEL

In a signaling framework the faculty member engages in human capital investment, i, in order to receive tenure. Our objective is to analyze a game in which the administrator has incomplete information about the ability or work ethic of the untenured faculty member. This is a variation of Spence's signaling model. Signaling models have been used to address a wide range of problems from transboundary pollution (Chambers & Jensen, 2002) to draft selection in the National Football League (Conlin, 1999). For a brief introduction to a signaling model similar to Spence (1974), see Fudenberg and Tirole (1992) or Osborne and Rubinstein (1994). Harsanyi (1967, 1968a, 1968b,1995) provide a more general introduction to games with incomplete information. Private information exists regarding the ability or work ethic since the faculty member knows his or her type and the administrator is uncertain. We assume that, depending upon these factors, the faculty member can be either a "low talent" or a "high talent" individual. For simplicity, assume that both types receive similar teaching evaluations from students. Note that there is some debate about the use of student evaluations in the tenure decision. Some researchers argue that, while they can accurately measure an instructor's communications skills, students lack the background necessary to judge whether they are being taught accurate, relevant information (see Abrami, Leventhal & Perry, 1982; Naftulin, Ware & Donnelly,1973). Thus it is possible for instructors with varying levels of

investment in human capital (research) to receive similar teaching ratings from students. We model these two types by assuming that there are two possible talent parameters, T^L for the low type and T^H for the high type. Each type chooses a level of human capital investment, i, where the cost of a unit of human capital investment is i/T^f for each faculty member type, f=L or H. For simplicity, we initially assume that each type of human capital investment is equally valued, so that total observed human capital investment is $i=i_1+i_2$. We assume that each type of human capital investment is completely observed. Also note that the signal does not involve the interaction term. Since $T^L < T^H$, it is easier for the high type to obtain higher levels of human capital investment and; therefore, the high type is more likely to receive tenure. Given that the administrator is concerned with providing quality teaching, which is a function of human capital investment, the administrator responds to the higher levels of human capital investment by providing higher tenure evaluation scores, *s*.

To analyze the administrator's problem, assume for the moment that he or she knows the type of the faculty member with certainty. As compared to the environment with uncertainty, this problem is greatly simplified, since the administrator chooses a level of tenure recommendation to maximize the quality of teaching following a simple decision rule. The high types are rewarded with tenure and the low types are denied tenure. Although the faculty member types' are known in this scenario, the faculty members engage in human capital investment since the normal duties of the job and renewal prior to the tenure decision required this activity. For simplicity, suppose there exists a faculty member who is the low type and is only able to obtain a human capital investment level of i^L. In terms of obtaining tenure at this university, this level of investment is almost irrelevant since it contains no signaling value given that the type is known. This is assuming that the human capital investment is not specific to the university in question and, therefore, the human capital investment is a valuable signal for the employment search after tenure is denied. It follows that the faculty member receives a tenure score of s^L and tenure is denied. Similarly, if it is known that the faculty member is a high type and chooses a human capital investment level of i^H in the process of meeting the normal job requirements,

the resulting tenure score is s^H and tenure is granted. In this framework where the administrator knows the faculty type with certainty, the human capital investment is not required as a signal for tenure purposes but is a result of fulfilling normal job requirements.

In the uncertain environment, we assume that the administrator's tenure decision minimizes the quadratic difference between the tenure score, s, and the faculty member's talent, T. The objective function in the form of quadratic difference, such as $(s-T)^2$, is a standard approach in signaling models (for example, see Fudenberg and Tirole, 1992; Osborne and Rubinstein, 1994). The administrator's expectation of the quadratic difference is minimized if E(T)=s. With this objective function and the administrator's belief that the faculty member is the high type, the faculty member receives the high evaluation score, s^H. Conversely, if the administrator believes that the faculty member is the low type, the faculty member receives the low evaluation score, s^L. The prior probabilities are given by p^L for the low type and p^H for the high type.

To signal his or her type, the faculty member chooses the costly activity of human capital investment, with the cost of a unit of human capital investment equal to i/T^f for each faculty member type, f, where f = L or H. As described above, since $T^H>T^L$, it is easier for the high type to reach higher levels of human capital investment and, therefore, positively affect his or her tenure score. Given that human capital investment is costly, we assume each faculty member type's problem is to choose a level of human capital investment, i, to maximize its net benefits, $s- i/T^f$.

The administrator's problem is made more difficult in an environment with uncertainty since the low type may act strategically. In a different light, Siow (1998) provides evidence that research has a signaling role in that it attracts higher ability students. Specifically, the low type may have an incentive to camouflage his or her type if mimicking the high type's behavior is not too costly. If the low type is able to camouflage, this less productive faculty member can return to a utility maximizing lower effort once tenure is granted. Also note that the high type has no incentive to camouflage his or her type since mimicking the low type would reduce his/her probability of obtaining tenure.

We focus our attention on the two common types of equilibria: separating and pooling. First consider the possibility of a separating equilibrium. In a separating equilibrium, the faculty types "separate out" by choosing different levels of human capital investment, so the observed outcome reveals the true faculty type to the administrator. In this equilibrium, the low talent faculty member cannot mimic the higher human capital investment of the high type. In other words, the tenure requirements are too difficult for the less productive faculty member to reach. The natural separating equilibrium is one in which the high and low types use the strategies of the certainty game, i^H and i^L. A necessary condition for a separating equilibrium in which the low type does not imitate the high type is $T^L - (i^L / T^L) \geq T^H - (i^H / T^L)$. Recalling that E(T)=s, this condition states that the low type faculty's net benefits of pursuing the low human capital investment exceeds the net benefits of pursuing the more costly strategy of high capital investment. Alternatively it may be viewed as $(i^H / T^L) - (i^L / T^L) \geq T^H - T^L$ or that the low type's costs of imitating the high type, $(i^H / T^L) - (i^L / T^L)$, exceeds the benefits of imitation, $T^H - T^L$. As stated earlier, the high type has no strategic incentive to imitate the low type. More formally, this condition is $T^H - (i^H / T^H) \geq T^L - (i^L / T^H)$. In other words, the high type's net gains from choosing the high human capital investment is greater than the net benefits from a strategy of low human capital investment. Alternatively, this condition may be expressed as $T^H - T^L \geq (i^H / T^H) - (i^L / T^H)$, which implies the high type's reward to the strategy of $i=i^H$, the acquisition of a favorable tenure review, is greater than the cost of acquiring this score.

To guarantee the existence of this equilibrium, we also need a specification of the administrator's updated or revised beliefs, R(T), which are consistent with separation. A reasonable separating belief for this model is $R(T^L \mid i)=0$ if $i \geq i^H$. Under this belief, any investment equal to or greater than i^H implies the faculty member is not the low type.

Under what conditions does a pooling equilibrium, in which the low type imitates the high type, occur? First, both faculty types must choose the same level of human capital investment. In such an equilibrium, one faculty type imitates the other by choosing the same level of human capital

investment, so the administrator's uncertainty about the faculty type persists and he/she is unable to update his/her prior probabilities.

A necessary condition for a pooling equilibrium in which the low type imitates the high type or $T^H - (i^H / T^L) \geq T^L - (i^L / T^L)$. In such an equilibrium, the low faculty type imitates the high by choosing the same level of human capital investment. The resulting tenure score, WS, is a weighted average based on the probabilities of each type, $WS = p^L T^L + p^H T^H$. In addition to the necessary condition of the low type imitating the high type, the administrator must believe that both types are high types. Suppose the observed outcome of the level of human capital investment for both types is i^H. To guarantee the existence of this equilibrium, we must specify beliefs for the administrator concerning deviations away from i^H. If any deviations away from the high level of human capital investment are made by the low type, mimicking behavior of the low type can be supported by $R(T^L \mid i) = 1$ for any $i \neq i^H$. Under these beliefs, the low type can imitate the high type if and only if it chooses the same level of human capital investment. If the tenure score $WS = p^L T^L + p^H T^H$ is below a threshold tenure score, s^T, that is required for tenure, the pooling equilibrium is not a Nash.

Now consider a situation in which we make a distinction between the two types of human capital investment: research (i_1) and pedagogical training (i_2). Suppose that these two types of investment are not equally costly to the faculty members. As before, in order to receive tenure, a faculty member must engage in a certain overall level of investment, i, but now assume the faculty member must also show some balance between the two types. This is consistent with the common expectation that faculty members exhibit involvement in both research and training related to teaching in order to receive tenure. Given the cost differentials, the lower cost type of investment may represent a higher proportion of total investment. If the pedagogical training is less costly, a faculty member may devote greater time and resources to this activity. However, the external rewards of each type of investment are not equal, in that, the research published in refereed journals is more likely to have a greater market value. This increased importance of one type of investment sends an additional signal to the administrator, in that, he or she now receives information in the form of type of investment as well

as the overall level of investment. A faculty member with a high overall level of investment, but with a high proportion of the lower cost form of investment may be revealing a weakness in the other area. In order to reveal such weaknesses, the administrator may impose specific criteria for each form of investment depending on the goals of the department.

POLICY IMPLICATIONS AND CONCLUSIONS

The interaction between research and teaching quality has been widely recognized and fits well with both the TQM and production function models of teaching. We have shown, using an optimal control model, that a positive interaction term between research and teaching implies that the optimal level of research exceeds the point at which the marginal cost is equal to the marginal direct benefits. While this result may seem intuitively obvious, it is often ignored in practice. Our results suggest that the optimal tenure decision at a teaching university may be based on a criteria that incorporates both pedagogical training and research. In a separate model, we consider the tenure decision as a signaling game in which there exists uncertainty regarding the quality of the faculty member. The administrator's job is complicated by the fact that, under some circumstances, the low quality faculty member may be able to camouflage his or her type and receive tenure. In this case, it may be optimal for the administrator to increase the minimum standard for tenure. If there are different costs associated with different types of human capital investment, the administrator may also choose to impose additional requirements on the type of investment.

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EFFECTS OF CLASSROOM EXPERIMENTS AND INTEGRATION ON STUDENT LEARNING AND SATISFACTION

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ABSTRACT

Student performance and course satisfaction measures are examined to evaluate the effectiveness of an integrated micro- and macro-economics principles course with a strong emphasis on classroom experiments. Student test scores are used to analyze performance for the microeconomics portion of the integrated class, relative to prior traditional microeconomics courses taught by the same instructor. Class evaluations are examined to gauge changes in student satisfaction. Student characteristics are included in the regression model to account for differences in performance due to ability or other factors.

INTRODUCTION

This paper examines the impact on student performance and satisfaction of an integrated micro- and macro-economics principles course, taught with a strong emphasis on classroom experiments and active learning. To explore the possible advantages of the pedagogical use of experimental economics, an experimental integrated micro- and macro-economics course was developed and taught to first-year students at the University. Students completing the course received six semester units of credit (3 units for Principles of Microeconomics and 3 units for Principles of Macroeconomics) and received separate grades for the two courses. The class met for 6 hours per week. Microeconomics was completed during the first half of the fourteen-week semester and macroeconomics was covered during the second

half. The course was designed to include a number of classroom experiments. Economic experiments conducted during the semester, primarily in the microeconomics portion of the class, included a double oral auction, an ultimatum game, a public goods experiment, a production function experiment, a prisoner's dilemma game, and an experiment in international trade and comparative advantage.

Classroom experiments have grown in popularity and are claimed to improve student interest and learning (see Brock, 1991 and Neral and Ray, 1995, for example). The Journal of Economic Education has devoted an entire issue to classroom experiments (JEE, Fall 1993). Several resource books exist to assist instructors who wish to integrate economic experiments into the classroom as a pedagogy tool (Yandell, 2002; Bergstrom & Miller, 2000; Hazlett, 1998; Delemeester & Neral, 1995). Experiments can be time consuming, however, so there is concern that less material will covered in classes with a heavy experimental focus. The 6-unit integrated course was designed to allow more time for experiments without sacrificing the number of chapters covered by eliminating any overlap or review required when micro and macro courses are taught separately. The expected result was improved student learning without loss of content coverage. To test this hypothesis, student test scores and student evaluations are used to analyze performance and satisfaction for the Microeconomics portion of the integrated class, relative to traditional microeconomics courses taught by the same instructor. Student characteristics are included in the regression model to account for differences in performance due to ability or other factors.

BACKGROUND AND DATA

The University requires all entering freshmen to enroll in a preceptorial course in their first semester. Preceptorial courses are specially designated general education courses open only to entering freshmen. The preceptorial program was developed as a vehicle for academic advising. The professor teaches the course but also serves as the student's advisor for the first year, and often for an additional semester or two until the student declares a major. The classes are generally kept small, with enrollment

limited to about eighteen students per course. Incoming students are given brief course descriptions and are asked to submit their preferences before registration. The Dean's office tries to accommodate these preferences when initial schedules are developed.

The experiments-based integrated six-unit course was offered as a preceptorial course, with two sections available. Each section met separately for 85 minutes on Tuesday and Thursday mornings, and both sections met in a combined three hour class on Wednesday afternoons. Most of the classroom experiments in the integrated course were run in the separate smaller classes during the morning sessions. The two classes had enrollments of 16 and 19, for a total enrollment of thirty-five students.

This paper compares test scores and course evaluations from the microeconomics portion of the integrated course to the scores and evaluations of students from a pair of preceptorials taught the prior year by the same instructor. The comparison courses were traditional 3-semester-unit microeconomics principles sections. The only experiments conducted in the earlier classes were a double oral auction and a production function experiment. Total traditional enrollment was 31, with sections of 19 and 12 students.

Students had very similar profiles in each year. Economics is taught within the School of Business Administration at the University, and approximately 88% of the students in each group reported that they intended to major within the School of Business Administration. The course therefore served as a prerequisite for the major in addition to fulfilling a general education requirement. Every student in each course was a first-semester freshman and had been registered in the course because of a listed preference for this preceptorial during summer advising.

The microeconomics portion of the integrated course was structured with the same basic format as the traditional course from the prior year. Course requirements were identical, with a grade determined by performance on five quizzes, a midterm exam, a final exam, and regularly collected homework assignments. The same textbook, chapter sequence and content coverage was maintained. The same final exam was used and the same course evaluations were administered each year.

STUDENT PERFORMANCE

It was hypothesized that the economic experiments and active learning methods in the integrated course led to improved student learning and satisfaction. The combination of microeconomics and macroeconomics in the same semester eliminated the need to revisit the introductory foundation chapters and therefore allowed time for the experiments to be conducted without loss of content coverage. Performance on the microeconomics final exam was used as a measure of student learning. The same final exam was given in the traditional microeconomics classes in the first year and in the integrated course the following year. The final exam score is expected to be higher for the integrated experiments-based course, net of the effects of other relevant variables. For each student, data was gathered on the following variables:

FINALEXAM	the score (out of 100 possible) on the microeconomics final exam
SAT-V	the students' Scholastic Aptitude Test verbal score
SAT-M	the students' SAT mathematics score
HSGPA	the students' high school grade point average as calculated by the University's admissions office
FEMALE	a dummy variable for gender (= 1 if FEMALE; = 0 if male)
EXPERIMENT	a dummy variable to distinguish students in the experiments-based course from students in the earlier traditional course (= 1 if enrolled in the experiments-based course; = 0 for the traditional course)

The HSGPA variable represents the high school GPA as calculated by the University's admissions office. Academic grades were converted using a 4-point scale, but greater weight was given to honors or advanced placement courses. It counts only academic subjects (physical education grades are removed, for example). The total sample size was 66 students, with 31 observations from the first year and 35 from the experiments-based course in the second year. Table 1 summarizes the data.

Table 1: Summary statistics

Variable	Traditional (n = 31)		Experiments-based (n = 35)		Combined (n = 66)	
	Mean (Std. Dev.)	Median (Range)	Mean (Std. Dev.)	Median (Range)	Mean (Std. Dev.)	Median (Range)
Final Exam	70.35 (13.10)	69 (51)	78.00 (11.79)	78 (50)	74.41 (12.91)	76 (57)
SAT - v	526.5 (76.2)	540 (330)	563.1 (71.3)	570 (290)	545.9 (75.37)	550 (380)
SAT - m	559.7 (66.5)	550 (280)	591.1 (69.7)	590 (280)	576.4 (69.54)	570 (340)
HSGPA	3.304 (0.397)	3.20 (1.32)	3.563 (0.522)	3.49 (2.25)	3.441 (0.482)	3.39 (2.25)
FEMALE	0.452		0.514		0.485	

Students in the traditional course received a mean score of 70.35 (out of 100) on the final exam, while the experiments-based students averaged 78.00. The higher-performing students, however, had stronger academic qualifications than in the prior year, averaging 20 points more on the verbal portion of the SAT and 30 points more on the SAT mathematics score. The mean high school GPA was also higher, 3.563 compared to 3.304 for those in the traditional course. To evaluate exam performance net of the effects of academic qualifications we estimated the following regression model, and the regression results are reported in Table 2.:

$$\text{FINALEXAM} = B_0 + B_1\ \text{SAT-V} + B_2\ \text{SAT-M} + B_3\ \text{HSGPA} + B_4\ \text{FEMALE} + B_5\ \text{EXPERIMENT}$$

Consistent with a priori expectations, both of the SAT variables and HSGPA are positively associated with the final exam score, although neither of the SAT variables are significant factors. Females, after accounting for academic qualifications, did worse on the exam, but the result is not significant at the .05 level. A student's high school GPA is the only statistically significant factor in explaining variation in the final exam score, with an approximate 14 point improvement on the exam associated with a 1-point increase in GPA. The coefficient for the EXPERIMENT variable is 3.761, suggesting that the integrated approach and focus on experimental

economics increased student final exam scores by nearly 4 points, all else held constant. Although this positive coefficient is encouraging, it is not significant at the .05 level.

Table 2: Regression results for student performance
(Dependent variable = score on microeconomics final exam)

Variable	Coefficient	T-Statistic	p-value
Constant	18.120	1.29	0.201
SAT-V	0.01034	0.50	0.619
SAT-M	0.00311	0.13	0.897
HSGPA	14.235	3.86	0.000
FEMALE	-4.394	-1.40	0.167
EXPERIMENT	3.761	1.30	0.197
R^2 (adj) = .269	F= 5.79	S = 11.04	n = 66

High correlation between the SAT variables and HSGPA was suspected, but the correlation matrix (shown in Table 3) shows that multicollinearity is not a problem. Alternate models were estimated without the SAT variables a with a single combined SAT score, but the remaining coefficients did not change appreciably in magnitude or significance. Estimating the model in log and semi-log forms did not change the results.

Table 3: Correlation between independent variables

SAT-V	SAT-M	HSGPA	
SAT-M	0.446		
HSGPA	0.262	0.421	
FEMALE	-0.028	0.003	0.450

Although the coefficient for EXPERIMENT is not statistically different from zero in the pooled data, a Chow test can be used with the data, separated by year, to test for more general differences between the two years.

The Chow test F-statistic is 0.67, which is not greater than the critical value F.05,5,60 = 2.37, so the null hypothesis that the slope coefficients are the same in the two samples cannot be rejected.

STUDENT SATISFACTION

To test student satisfaction, student evaluation responses were evaluated. The same standardized assessment form was used each semester. The first twenty-two questions refer to the course and the instructor's performance, and the remaining five questions reflect the student's efforts in the course. A two-sample t-test was performed with the raw evaluation responses from the two years for each question and for groups of questions to test for significant differences. For the first 22 questions, students rated the course and the instructor's contribution to the course with a response in one of six categories (Excellent, Very Good, Good, Fair, Poor, Very Poor) which are quantified using a 5 - 0 numeric scale. The last five questions offered seven options (ranging from Much Higher to Much Lower), which are coded from 7 to 1. Table 4 provides a summary of the mean responses to each question for the two years.

Overall, the student evaluations significantly improved in the experiments-based course. Both the combined items 1-22 and items 1-27 showed an improvement that was significant at the 1% level. For individual questions within the first 22 items, three showed a significant improvement and none were significantly worse. The three significant improvements were for question 4, "The instructor's effectiveness in teaching the subject" (p-value = 0.096); question 10, "Instructor's enhancement of student interest in material" (p-value = 0.0013); and question 14, "Interest level of class session" (p-value = 0.046). These suggest that the experimental focus did improve student interest in the material and teaching effectiveness.

It is interesting to note that lower scores were received in the experiments-based classes on questions 5, 8, and 16: "Course organization," "Instructor's ability to present alternatives," and "Use of class time." Although the reductions were not significant, these three questions may reflect the opportunity costs of using classroom experiments. The student

perception that the course is less organized may be due to the unpredictable nature of classroom experiments, since actual experimental outcomes are uncertain. Experiments also take time to explain, administer, and debrief, so students may see class time being used less intensively than in a lecture-dominated course. More time with experiments also means less time to develop alternatives or present additional examples.

Table 4: Student course evaluation summary

	Traditional		Experiments-Based		Improvement	p-value
	Count	Mean	Count	Mean	(Exper.-Trad.)	(Ho:Diff. = 0)
1. The course as a whole was:	27	4.000	33	4.182	0.182	0.35
2. The course content was:	27	3.926	33	3.848	-0.077	0.68
3. The instructor's contribution to the course was:	27	4.519	32	4.719	0.200	0.25
4. The instructor's effectiveness in teaching the subject was:	27	4.185	33	4.545	0.360	0.096 *
COMBINED ITEMS 1-4:	108	4.157	131	4.321	0.163	0.11
5. Course organization was:	27	4.481	33	4.303	-0.178	0.27
6. Sequential presentation of concept was:	27	4.037	33	4.152	0.114	0.58
7. Explanations by instructor were:	27	4.185	33	4.303	0.118	0.59
8. Instructor's ability to present alternatives was:	27	4.259	33	3.939	-0.320	0.16
9. Instructor's use of examples/illustrations was:	27	4.407	33	4.667	0.259	0.19
10. Instructor's enhancement of student interest in material was:	27	3.333	33	4.182	0.848	0.0013***
11. Student confidence in instructors knowledge was:	27	4.667	33	4.697	0.030	0.83
12. Instructor's enthusiasm was:	26	3.692	33	4.091	0.399	0.15
13. Clarity of course objective was:	27	3.926	33	4.242	0.316	0.29
14. Interest level of class session was:	27	3.148	33	3.636	0.488	0.046 **

Table 4: Student course evaluation summary

	Traditional		Experiments-Based		Improvement	p-value
	Count	Mean	Count	Mean	(Exper.-Trad.)	(Ho:Diff. = 0)
15. Availability of extra help when needed was:	26	4.192	33	4.333	0.141	0.52
16. Use of class time was:	27	4.481	33	4.212	-0.269	0.13
17. Instructor's interest in whether students learned was:	27	3.963	33	4.212	0.249	0.35
18. Amount you learned in this course was:	27	3.963	33	4.242	0.279	0.17
19. Relevance and usefulness of course content were:	27	3.926	33	4.152	0.226	0.34
20. Evaluative and grading techniques (tests, papers, etc.) were:	26	4.000	33	3.788	-0.212	0.39
21. Reasonableness of assigned work was:	26	4.038	33	4.212	0.174	0.43
22. Clarity of student responsibilities and requirements was:	27	4.259	33	4.273	0.013	0.94
COMBINED ITEMS 5-22:	482	4.054	594	4.199	0.145	0.0076***
COMBINED ITEMS 1-22:	590	4.073	725	4.221	0.148	0.0021***
Relative to other college courses you have taken:						
23. Do you expect your grade in this course to be:	27	4.778	33	4.848	0.071	0.81
24. The intellectual challenge presented was:	27	5.556	33	5.455	-0.101	0.62
25. The amount of effort you put in this course was:	27	5.074	33	5.758	0.684	0.020**
26. The amount of effort to succeed in this course was:	27	5.519	33	5.576	0.057	0.83
27. Your involvement in course was:	27	5.519	33	5.818	0.300	0.34
COMBINED ITEMS 23-27:	135	5.290	165	5.490	0.200	0.11
COMBINED ITEMS 1-27:	725	4.301	890	4.456	0.155	0.0024***

* = signif. at 10%
** = signif. at 5%
*** = signif. at 1%

In addition to the questions summarized in Table 4, students have the opportunity to provide handwritten comments on a separate page. Students are prompted on the comment sheet with the following questions:

1.	Do you find this class to be intellectually challenging?
2.	What aspects of this class contributed most to your learning?
3.	What aspects of this class detracted from your learning?
4.	What suggestions do you have for improving this course?

There were 27 comment sheets returned in the traditional course and 33 in the experimental course. Each was examined for evidence that the classroom experiments contributed to student interest or satisfaction. Frequent comments under question 2 were that the class activities, examples, and experiments were interesting and useful. Seven (26%) of traditional course forms contained such comments, compared to 23 (70%) of the experiments-based forms. These proportions are statistically different at the 1% level (p-value = 0.000).

For question 4, seven students in the traditional course (26%) suggested that more interactive learning, student involvement, and experiments would have improved the course. Interestingly, six students in the experiments-based course (18%) made the same comment, even though the experimental focus was much more pronounced that year. No student in either year said that the class activities or experiments detracted from learning or that fewer experiments should be done.

CONCLUSION

The impact of classroom experiments on student learning and satisfaction was examined. Student evaluations show that the experiments were memorable, and thus potentially contributed positively to the students' learning experience. This study also supports the claim that classroom experiments improve overall student satisfaction and interest. The impact on student performance is less dramatic. The key factor explaining performance

on the final exam was found to be the students' high school GPA. After accounting for other factors, students in the experiments-based course scored almost four points higher on the final exam, but the regression coefficient was only statistically significant at the 20% level.

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ECONOMICS ARTICLES

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ARE FOREIGN LOANS GOOD OR BAD CHOLESTEROL IN THE ECONOMIC GROWTH OF HIGHLY INDEBTED POOR COUNTRIES? CORROBORATIVE EVIDENCE

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ABSTRACT

This study investigated the impact of foreign debt on the economic growth of 43 heavily indebted poor countries over ten-year period (1991-2001). The findings of this study revealed that foreign debt has a negative and insignificant impact on the economic growth of the surveyed countries. Although debt cancellation may be less effective in the long term, we still concur with the African proposals for debt cancellations suggested by Greenhill and Blackmore (2002) in the report of Jubilee research at the new economics foundation.

INTRODUCTION

Khor (1999) revealed that about 80 of underdeveloped countries (the majority of them are African and Latin American) fell into a debt trap and under the sway of the World Bank (WB) and the International Monetary Fund (IMF). According to WB (2002), the number of severely indebted countries is 88. Out of these 88 highly indebted countries, the WB and key governments considered 42 countries as Heavily Indebted Poor Countries

(HIPCs). Before we assert that all types of foreign debt are good or bad cholesterol in the economy of the HIPCs, as described by Loungani and Razin (2001), it is appropriate to investigate the impact of foreign loans on the economic growth of these countries. Utilizing data set of 43 HIPCs over a ten-year period (1990-2000), this study has examined the effect of foreign loans on the economic development of these countries. We have added Pakistan to the 42 HIPCs because its external debt is $31.7 billion (more than 53% of its GDP) makes it eligible to be HIPC. In addition, its domestic debt at current exchange rates in a further $30 billion (50% of its GDP) makes its total domestic and external debt exceeds its GDP (Greenhill and Blackmore, 2002).

HISTORICAL BACKGROUND OF HIPCS' DEBT CRISIS

Polliewatch No. 37 (1999) outlined the history of the debt crisis including some recent positive developments, reforms providing quicker and deeper debt relief linking debt relief to poverty reduction, and a clear commitment from rich countries to provide new resources for debt relief.

ORIGINS OF HIPCS' DEBT CRISIS

The seeds of the debt crisis in poor countries were sown in the 1960's when many governments of underdeveloped countries pursued industrialization policies that were heavily dependent on imports. At the same time many countries developed policies that undermined their capacity to pay for these imports (e.g., over taxing farmers) so that production of export crops fell, creating a gap between imports and exports. To fill this gap, they borrowed money from abroad and by the 1970's they were verging on crisis (Khor, 1999).

The crisis deepened during the 1970's with dramatic oil price hikes and associated high interest rates causing a global recession. Heavily indebted poor countries were faced with high oil import bills and falling prices for exports of commodities such as tea, cocoa and copper, with many countries losing half their national income. The problem was compounded

in some countries by creditors lending for political reasons, with cold war western loans provided to friendly dictators such as Mobutu in Zaire and Mengistu in Ethiopia-loans used to buy weapons produced in the west or for unproductive projects with no benefit to the poor (IMF, 2002).

Consequently, poor countries found that they are paying back increased debt whilst earning less, being, for all practical purposes, bankrupt. The growth of the debt crisis meant that most governments had to turn for help to the lenders of last resort (the IMF and the WB) for new loans to meet the finance payments on their original loans and to cover budget and trade deficits. Thus, these two institutions now wield considerable power in many poor countries (Joyner, 1998).

By the late 1980's debt stocks were still rising in poor countries. Unpaid interest and the unpaid portion of loans were simply added to the remainder of loans as arrears. The result was that arrears grew at a massive rate. For instance, between 1990 and 1993 Mozambique could only afford to pay 10% of what it was supposed to pay and the balance, almost $US600 million, was added to its growing debt stock. Eventually, creditors began to take steps to tackle the problem of unpayable debt and developed a series of ad hoc measures, which were supposed to provide a solution. Failure of these schemes to reduce the debts of the poorest countries - such as schemes implemented by the Paris Club, a key group of rich OECD country creditors-made repeated rescheduling of debt repayments necessary (European Network on Debt and Development, 2000).

The problems facing HIPCs indebted to the WB and the IMF were particularly acute. Countries had to repay debts in full or face suspension of assistance programs and a cut- off in aid from other donors. WB would not allow its debt to be rescheduled or written off and the IMF saw debt reduction as a threat to international financial security. Although both institutions denied that their debt represented a real problem, the facts spoke for themselves; debt to the WB and the IMF increased from 20% of the total debt stock of heavily indebted poor countries in 1980 to 50% of total debt stock in 1994 (George, 2001).

STRUCTURAL ADJUSTMENT PROGRAMS

Loans from the IMF and the WB have in many cases worsened poverty and widened inequalities (Joyner ,1998). These loans come with conditions set out under the terms of Structural Adjustment Programmes (SAPs), which most countries have been obliged to adopt. Under the Programmes, governments must agree to reform the management of their economies and to increase their debt servicing, with loan conditions often including reducing the size of government and government spending, currency devaluation and increased openness to foreign investment (IMF, 2001; 2002).

In making the often drastic cuts to public spending required by SAP's, social services are usually the first to suffer through cuts to national education and health budgets, reducing access to these basic services by poor households and exacerbating poverty. The impact of debt often also extends beyond the household. Pressured to earn foreign exchange to service debts, some governments are encouraging large scale extractive projects such as mining and logging, often at the expense of the environment and the rights of local people to control the use of their lands. The problems can also become mutually reinforcing at a global level. For example, with many HIPCs relying on the production of cash crops such as coffee and cocoa for export, too much can be grown, resulting in crops flooding the world market and pushing prices down (Oxfam International, 2002).

THE HIPCs' INITIATIVE

The failure of the ad hoc debt relief measures and the growing problem of debt to the WB and the IMF were eventually recognized, and in 1995 the WB and key governments started to develop what became known as HIPCs' initiative. The HIPCs' initiative marked a decisive break with past approaches to debt when it was adopted in 1996. The initiative had considerable potential by bringing all creditors together within one framework and trying to link debt relief to the actual ability of poor countries

to pay. A total of 41 countries were identified under the initiative, 80% of them are in sub Saharan Africa (IMF Press Release, 2002).

Community Aid Abroad and many other organizations welcomed the HIPCs' initiative in 1996. For the first time, debt relief was to be provided in a systematic manner by all creditors, bringing to an end the process of negotiation through different creditor clubs, the growing problem of multilateral debt to the IMF and World Bank was addressed and HIPCs established the principle that debt relief should be linked to ability to pay, rather than creditor demands (Oxfam International, 2002).

Under the initiative, a range of criteria were developed to define the amount of debt that would need to be cancelled in order to reduce the debts of these countries to sustainable levels. For the majority of HIPCs, the amount of debt relief depends upon their level of exports and is conditional upon each HIPC successfully complying with two SAPs of the IMF over a minimum of six years before being eligible for debt relief (IMF Press Release, 2002; Cohen, 2000).

THE FAILURE OF HIPCs' INITIATIVE

Since its inception in 1996, HIPC's progress had been abysmal. The HIPCs' initiative failed to resolve the debt crisis in the world's poorest countries. The debt relief provided was too limited, and implementation too slow: only two out of the 41 countries (Uganda and Bolivia) started to receive debt relief through HIPCs' initiative, and only other three countries (Guyana, Mozambique and Mali) would receive debt relief in 1999. Even after HIPCs' initiative was established, many countries will still remain with unsustainable debt, underlining the inadequacy of the debt relief provided (WB Report, 2002; Ambrose, 2002).

For example, following HIPCs' relief, Uganda's debt servicing in 1998/99 fell from $US165 million to $US128 million ($37 million relief), but still accounts for 18% of government revenue, absorbing finance that could be used for implementation of its national poverty eradication plan. Meanwhile more than 50% of the population lives below the poverty line. Recent decline in coffee prices have meant that even these small HIPCs'

benefits have been lost, and Uganda's debt remains unsustainable. Bolivia's debt servicing in 1999 would also be reduced from $295 million to $228 million ($67 million relief), but the government is still struggling to maintain education spending, and will probably be forced to undertake further lending from the Inter-America Development Bank (IDB) to assist in this effort. This is in a country where UNICEF estimates 700,000 children are absent from school in order to support family income (Joyner, 1998; Cohen, 2000; Ambrose, 2002).

It is now widely recognized that the HIPC initiative failed for three reasons: (1) It provides too little debt relief. The debt relief provided is not deep enough and does not address the burden of debt servicing on national budgets in HIPCs. Under HIPCs' initiative, sustainable debt servicing absorbs up to 40% of national revenue while millions of their people are denied an education or health care. (2) The initiative came too late. Countries entering HIPC must complete two successive SAPs of IMF for six years before qualifying for debt relief. This eligibility requirement leads to serious delays in providing debt relief through HIPC. (3) The initiative has little if any impact on poverty reduction. There is no link to poverty reduction and the HIPCs' initiative; it has been designed to serve the needs of creditors, rather than the needs of these poor countries. The initiative of HIPCs failed to provide sufficient resources, to address the poverty reduction and human development needs of poor countries, and to provide progress on achieving internationally development targets were agreed upon (Cohen, 2000; Dagdeviren, 2001).

CURRENT STATUS OF THE HIPCs' INITIATIVE

Mobilized by the highly successful Jubilee 2001 campaign, tens of thousands of ordinary citizens protesting third world debt greeted the national leaders of the world's largest economies -the G7-when they met in Cologne city, Germany, to discuss the debt crisis. The issue was how to reform the failed HIPCs' initiative. Presented with a Jubilee 2000 debt relief petition signed by more than 17 million people world wide, G7 leaders were under

significant political pressure to take decisive action (Greenhill and Blackmore, 2002).

At the summit, leaders of the G7 agreed to call for reform of the HIPCs' initiative to provide faster and effective debt relief to more countries, with a stronger link between debt relief and poverty reduction. The G7 leaders announced that they want to ensure that HIPCs pursuing sound policies, and demonstrating a commitment to reform and poverty alleviation should be not crippled by the burden of debt. The agreement also called for an increase in the number of countries eligible for debt relief after three years rather instead of the existing six year time frame. The agreement also called for increasing the amount of debt relief from $12 billion under the current HIPCs' program to up to $50 billion in net present value terms (U.S. State Department, 2002).

The G7 Communique also calls on the IMF to reform its structural adjustment programs, on which HIPC eligibility is based, in order to ensure that HIPC is built on "an enhanced framework for poverty reduction." This breakthrough creates the potential for future debt relief to be linked to poverty reduction for the first time. The G7 agreement calls on the World Bank and the IMF to develop, by October of 2000, specific plans for an enhanced framework for poverty reduction. Community Aid Abroad and Oxfam partners welcome the Cologne agreement as an important step forward - but we are only half way toward achieving a full resolution of the debt crisis. While the G7 agreement would generate $50 billion of debt relief to eligible countries, with significant reductions in debt service payments, it will still leave countries spending more on debt service than on basic health and education. Mozambique, for example, will still be paying $US73 million a year in debt servicing under the proposed G7 reforms, down from current repayments of $US98 million a year under HIPC, but still more than it spends on basic health and education combined (IMF Press Release, 2002; Oxfam International, 2002).

Community Aid Abroad welcomes the G7 commitment to provide deeper relief to countries committed to poverty reduction, particularly the emphasis on channeling resources freed by debt relief into basic social services and the call for the WB to help HIPs' draft and implement poverty

reduction plans. Recently, the WB and IMF approved the disbursal of US$ 20 billion in debt relief for 22 countries (4 in Latin America and 18 Africa) in an initiative for HIPCs (IMF, 2002).

CRITICISM OF THE G7 AGREEMENT

Critics argue that the HIPCs' initiative doesn't go far enough. Much of the debt being forgiven is unrecoverable anyway. The HIPCs' initiative simply lower debt service to the level HIPCs were already paying. The financial pressure felt by HIPCs remains the same, and they are compelled to implement SAPs for three. Another criticism is that debt forgiveness may give rise to many problems, including the problem of moral hazard. If countries that ran up excessive debt levels in the past are able to get the debt forgiven, it will distort incentive to repay the loans in the future. In other words, debt forgiveness would be an unfair solution, especially for those countries repay their debts and those countries that refrained from requesting excessive loan (Ambrose, 2002).

Furthermore, debt relief and debt rescheduling may also impose costs on the HIPCs by constraining their access to international capital markets. Exporters and importers have to finance their transactions with cash rather than commercial credit from international financial institutions. The higher transaction costs incurred in the absence of commercial credit will reduce the total volume of trade. Business in HIPCs will have limited or no access to foreign direct investment. These countries will find that they have limited or no access to external source of finance, either through bilateral lending from governments in the developed countries or through multilateral lending agencies (George, 2001).

THE DEVELOPMENT OF AN AD HOC ECONOMIC MODEL

The neoclassical growth model (Solow, 1956; Denison, 1961) proposed that capital accumulation and technological progress is the engine of economic growth. However, this neoclassical exogenous growth model rejected the impact of another alternative approach for studying economic

growth is to view it as an endogenous growth model (Lucas, 1988; Romer, 1986) of several internal factors

Levine and Renelt (1992) and Harms and Ursprung (2002) asserted that there is no universal model of economic growth accepted by all researchers. We have developed an ad hoc model including basic determinants of economic growth as follows: GDP (gross)= foreign loans + foreign aid + foreign direct investment + human capital + growth rate of labor force + growth rate of population + government spending + openness to international trade + Trade openness indicator + economic freedom + business climate + inflation + political regime + political risk + initial GDP in U.S. $1988.

The initial level of per capita GDP was used to test the neoclassical assumption that the starting level of per capita output has no effect on the steady state economic growth. In the transition to steady state, countries with a lower output per capita are expected to grow faster.

These variables drawn from the literature are by no means exhaustive. We examined the relationship between the independent variables and the dependent variable after controlling for cyclical fluctuations and unusual changes in the GDP of each country. We controlled this factor by creating a sample covering the 10-year period. The average of ten years would eliminate any cyclical fluctuations in the GDPs. Therefore, we have included certain factors that influence economic growth and investigated the impact of foreign loans on economic growth in HIPCs.

RESEARCH METHODS

Research methods include sample, data collection, and measurements of variables. Each component was implemented according to the following procedure.

Sample and Data Collection

Data collection consisted of annual data pertaining to a cross-section of 43 HIPCs from 1991 to 2001 period. The purpose of selecting this period

of time is to include a consistent set of recent data. Required data were collected from various resources including Greenhill and Blackmore , 2002, WB (1991-2001); UN reports from 1991 to 2001; International Monetary Fund (IMF) from1990-2001; UN Development Programmes, 2001 and previous reports; Political Risk Services, 1997and previous issues and Harms, 2000; Freedom House, 2001 and previous issues; Gwatney et al., 2002; Pen World Table 5.6 developed by Summers and Heston (1995), and World Bank's (2002) Global Development Finance report and previous reports.

Measurement of Variables

The dependent variable is the average of the economic growth for the years 1990-2001. To control for country size, we divided the total volume of foreign Loans, foreign direct investment, and foreign aid by the population size of each country. To be sure that the results are not just due to the omission of other determinants of GDP, we introduced a number of control variables that are believed to have a significant effect on GDP.

Control variables included in this study are: foreign aid, foreign direct investment, human capital, growth rate of population, growth rate of labor force, government spending, openness to international trade, economic freedom, inflation, business climate, political regime (political rights and civil liberties), and political risk.

(1) Dependent variable

Economic growth was measured by the average of the natural logs of GDPs of each included country from 1991 to 2001. (WB, 2002; UN, 2002; Gwartney et al, 2002).

(2) Independent variables

Foreign loans were measured by the total foreign loans for ten years (1991-2001) of each 43 HIPCs including Pakistan (WB,

2002; UN, 2002; IMF, 2002; Greenhill and Blackmore, 2002).

(3) Control variables

Foreign aid was measured by the natural log of the average of foreign aid received by each recipient country from 1991 to 2001 (World Bank, 2002; UN, 2002).

Foreign direct investment was measured by the natural log of the average of FDI received by each recipient country from 1991 to 2001 (World Bank, 2002; IMF, 2002).

Human capital was measured by the average of adult literacy rates in each country for 1991, 1995, and 2001 (UN, 2002; UNESCO, 2002).

Growth rate of labor force was measured by the average of the growth rates of the labor force of each country from 1991 to 2001 (UN Development Programme, 2002).

Growth rate of population was measured by the average of growth rates of population in each included country from 1991 to 2001 (UN, 2002; World Development Report, 2002).

Government spending was measured by the average of net spending of defense and education as a percentage of GDP for each government of every country from 1991 to 2001 (UN, 2002).

Openness to international trade (reflects the existence of administrative and barriers to trade) was measured by the average of the ratios of exports plus imports to GDP

population in each country from 1991 to 2001 (World Bank, 2002).

Trade openness indicator (reflects the existence of to tariff protection, restrictions to capital movements, and other distortions) was measured by the average of values of trade openness indicator for 1991-1993 and 1994 -2001 (Gwartney et al, 2002; scale 0-10, where number 10 is the maximal openness).

Economic freedom was measured by index of economic freedom assembled on by Gwartney et al. (2002). The average of values of economic freedom for 1991 and 1995, and 2001 was used because it is not available on annual basis (Scale 0-10, where 10 is the maximum economic freedom).

Business climate (quality of business environment) was measured by the average of corruption of government, the quality of the bureaucracy, and a country's law-and-order tradition each country from 1991 to 2001 (Political Risk Services, 2002 and previous issues; scale 0-18, where 18 is the optimal business climate).

Inflation in LDCs was measured by the average inflation rates in each included country from 1991 and 2001 (IMF, 2002).

Political regime:

a. *Political rights* (people's ability to participate freely in the political process) were measured by the average of Gastil index from 1991 to 2001 (Freedom House, 2002 and previous issues; scale 1-7; represents the maximum political repression).

b. *Civil liberties* (freedom to develop views, institutions, and personal autonomy apart from the state) were measured by the average of Gastil index from 1991 to 2001 (Freedom House, 2002 and previous issues; scale 1-7; represents the maximum civil repression).

No political risk was measured by the average of expropriations, exchange controls, and default on government contracts in each country from 1991 to 2001 (Political Risk Services, 1997 and previous issues and Harms, 2001, Scale 0-30, where 30 minimal risk).

The initial GDP per capita was measured in U.S.1988 dollars for each country from 1991 to 2001 (UN, 2002).

DATA ANALYSES

Regression analysis is an appropriate statistical tool and is widely used by researchers investigating relationships of a behavioral and/or economic nature. Regression estimates the relationship concerning independent variables by explaining the variations in the dependent variables (Pindyck and Rubinfeld, 1998). We utilized the multiple regression technique in order to estimate the relationship between the independent variables and the dependent variable.

Thus the regression model is:

$$y = a + b1x1 + b2x2 + b3x3 \ldots\ldots + b15x15 + e$$

Where:

Y= GDP per capita
X1= Foreign loans (debt)
X2= Foreign aids
X3= Foreign direct investments

X4= Human capital
X5= Gowth rate of labor force
X6= Growth rate of population
X7= Government spending
X8= Openness to international trade
X9= Trade openness indicator
X10= Economic freedom
X11= Business climate
X12= Inflation
X13= Political regime:
a. political rights
b. civil rights
X14= political risk (reverse)
X15= Initial GDP in U.S. 1988 dollars
b1, b2,....,b15= estimated regression coefficients
a = constant
e = error term

However, potential problems such as multicollinearity, hetroscedasticity, autocorrelation, outliers, non-linear relationship, and the goodness-of-fit of the overall regression model are potential issues that may confront the regression model. In addition, the data may lack the assumption of normal distribution. The existence of such problems leads to inaccurate results and misleading conclusions and implications (Pindyck and Rubinfeld, 1998).

FINDING OF THE STUDY

To ensure that the multiple regression model has not been undermined by any potential problem, certain statistical tests have been used to check the existence of any problem. Multicollinearity is not a problem because all variance inflation factors (VIFs) are low. Autocorrelation does not exist because the Durbin-Watson statistic is significant (D.W.= 2.4). The plot of the residuals shows that there is no evidence of heterosedasticity.

Neither the Studentized Deleted Residuals Test identified influential outliers for the dependent variable, nor Diffits and the Cook's Test detected influential outliers for the independent variables. The plotted histogram of data depicted normal distribution of the data. The plot of the dependent variable against each of the independent variables showed a linear relationship between these perspective variables. The results of the multiple regression are presented in Table 1. The significant F (F-value= 8.14; P= .001) confirms a complete goodness-of-fit for the overall regression model.

Data analysis in Table 1 reveals that foreign loans (debts) do not have a direct influence on economic growth. Although this factor has a negative effect, it is not significantly different from zero. This finding supports Mishra, Mody, and Murshid's (2001) the notion casting doubts on the ability of foreign capital inflows (including foreign loans) to stimulate long-run growth in underdeveloped economies.

Even when many underdeveloped countries are in favor of capital inflows, Hausmann and Fernández-Arias (2000) asserted that they view international debt flows (especially of the short-term variety) as bad cholesterol. Schaefer and Schavey (2002) also revealed that the International Financial Institution Advisory Commission (known as the Meltzer Commission) urged underdeveloped countries to stop making loans that later crush their recipients under impossible debt. The commission urged rich countries to give them grants conditional on adopting economic policies likely to bring fiscal success.

This finding also supports those of Bosworth and Collins (1999) who provided evidence on the effect of capital inflows on the economic growth of 58 underdeveloped countries between 1978 and 1995. The sample covered nearly all of Latin America and Asia, as well as many countries in Africa. The authors distinguished among three types of inflows (foreign direct investment, portfolio investment, and international banks loans). The authors found that the impact of loans on the economic growth fell below the other two. Dadush, Dasgupta, and Ratha (2000), Lipsey (2001), and Loungani and Razin (2001) found similar results.

With respect to traditional control variables, foreign aid does not have a direct influence on the economic growth of HIPCs. Although this factor has

a negative effect, it is not significantly different from zero. This finding supports those of previous studies (e.g., Griffin and Enos, 1970; Clad and Stone, 1993; Islam, 1992; Johnson and Schaefe, 1997; Villamil and Asiedu, 2001; and Boone, 2002). This finding supports Johnson and Schaefe (1997) who found that the majority of the long-term recipients of foreign aid over 29 years (1965-1994) had achieved very low levels (1%) of economic growth.

Table 1: Multiple Regression Results Concerning the Impact of Foreign Loans on the Economic Growth of Highly Indebted Poor Countries

Independent Variables	Dependent Variable: Economic Growth		
Variables	Coefficient	T-value	Sig. level
Foreign loans	-.0583	1.02	.57
Foreign aid	-.0648	1.08	.49
Foreign direct investments	.8769	2.64	**.05**
Human capital	.1684	1.72	.10
Growth rate of population	.1264	1.36	.23
Growth rate of labor force	.6825	2.14	**.05**
Government spending	-.0597	-1.24	.29
Openness to international trade	.0224	1.28	.48
Trade openness indicator	.0546	1.22	.42
Economic freedom	.0578	1.08	.54
Business Climate	.0611	1.14	.42
Inflation	-.0648	-2.16	**.05**
Political regime:			
a. political rights	.1074	1.33	.27
b. civil rights	.1062	1.17	.32
No political risk	.1038	1.18	.29
Initial GDP in U.S. $1988	-1.0173	-1.48	.10
R-square= .51; Adjusted R-square= .46; F= 5.27; Significant F= .001			

According to Schaefer and Schavey (2002), foreign aid and all efforts of existing institutions and structures have failed to solve the problem of underdevelopment. For example, the United States has spent more than $500 billion over the last 50 years on foreign assistance, yet standards of living have fallen in many underdeveloped countries during that time. Zambia, for instance, has received more than $1 billion in foreign aid since 1964, yet its per capita income has dropped from $664 then to $338 in 1999 (Schaefer and Schavey, 2002).

Even the United States' Agency for International Development itself admits that only a handful of countries that started receiving assistance in the 1950s and 1960s never graduated from dependent status. Despite massive amounts of international aid, the average annual increase in per capita GNP has declined steadily in underdeveloped countries since the 1960s, with many of the underdeveloped countries heaviest foreign aid recipients actually suffering negative economic growth.

In contrast, FDI has a positive and a significant effect on the economic growth of HIPCs. This finding supports those of recent studies (e.g., Dadush, Dasgupta, and Ratha, 2000; Feldstein, 2000; Lipsey, 2001; and Loungani and Razin, 2001). This finding also supports the assertion of Aitken and Harrison (1999) who demonstrated that FDI increases productivity, which in turn promotes growth. But these authors confirm conditions (e.g., skilled labor force, well-developed structures, etc.) under which productivity benefits accrue. For example, some studies claim that FDI boosted productivity in Malaysia, Taiwan, and the southern provinces of China. In contrast, similar benefits were not found in Morocco, Tunisia, and Uruguay. Moreover, firms with greater research and development in LDCs were able to absorb the FDI benefits.

With respect to traditional control variables for economic growth, human capital (represented by the proxy adult literacy) has a positive and significant effect on economic growth, which suggests a strong positive link between investment in education and economic growth. Education enhances productivity and promotes higher economic growth. This finding supports Borensztein, Gregorio, and Lee (1998) who asserted that FDI is more productive in countries with a better-educated labor force.

There is a negative and significant relationship between the initial level of per capita GDP and the economic growth in HIPCs. This finding contradicts the prediction of the neoclassical theory and supports the results of Barro's (1991) study. The two findings suggest that an increase in the starting per capita real GDP that is accompanied by higher investment in human capital may offset each other and thus the initial GDP becomes unable to stimulate growth in the economy.

Growth rate of labor force has a positive and significant effect on economic growth. According to the neoclassical growth theory, labor force growth should have a positive effect on economic growth rate. Economic growth can be sustained through macroeconomic growth policies that curb inflation, high exchange rate of currency and improper government spending. Thus, the government should initiate economic reforms and must fulfill its commitment to improve the quality of the of the labor force by focusing on the people's education and training programs (Kormendi and Meguire, 1985).

Growth rate of population has a positive and insignificant impact contradicting recent findings on the relationship between fertility and economic growth. It is important to note that bigger families with many children are part of the culture of LDCs. The insignificant coefficient of population growth indicates that either capital accumulation or labor force growth does not keep pace with population growth.

This is why Chaliand (2002) suggests that no study of underdeveloped countries (including HIPCs) could hope to assess its future prospects without taking into account population growth. In 1980, the earth's population was estimated at 4.4 billion, 72 percent of it in underdeveloped countries, and it did reach 6.2 billion at the close of the century, where 80 percent of it in underdeveloped countries. This population explosion in the third world will surely prevent any substantial improvements in their living standards and threaten people in stagnant economies with worsening poverty.

Government spending of HIPCs has negative and insignificant effects on economic growth. When we run the regression without the political freedom variable, government spending variable shows a large negative magnitude on economic growth. One possible reason is that governments lacking freedom feel insecure and spend more resources in order to stabilize

their regimes rather than promoting productivity and hence economic growth.

In terms of openness to international trade and trade openness indicator, each finding reveals that openness to international trade and trade openness indicator has the expected positive effects although they are insignificant. It appears that trade in underdeveloped countries is not integrated with the world economy. Both findings support that of Johnson (1997) who found that most recipients of American foreign aid had the highest barriers to trade in the world. In Johnson's (1997) Index of Economic Freedom survey, 69 of 109 underdeveloped countries receiving capital inflows had high or very high marks for their levels of trade protectionism in the world. Trade restrictions are typically expected to have deleterious effects on economic growth due to the inability to exploit comparative advantages. On the contrary, countries ope to international trade, like Australia, Canada, most of the European Union (EU), Japan, Hong Kong, and New Zealand, had either very low or low levels of protectionism.

The insignificant relationship between economic freedom and GDP suggests that if HIPCs want to achieve growth, they must embrace economic freedom. That is, countries having high economic freedom achieve much higher per capita incomes. Conversely, countries lacking economic freedom do not experience sustained growth no matter how much assistance they receive. According to the economists Roll and Talbott (2002), such countries could not afford to clean their environment or raise labor standards. Lower tariffs, smaller barriers to foreign investment, and limited regulatory burdens account for as much as 80 percent of the difference in per-capita income between rich and poor countries.

Business climate has no significant effect on economic growth. This finding indicates that many HIPCs are not providing a complete and healthy business environment for foreign investors. This means that corruption in some governments, complex bureaucracy, and the lack of law and order are deterring foreign investments. This finding supports that of Harms and Ursprung (2002) who attested that healthy business climate enhances FDI, which in turn boosts economic growth in HIPCs. As we expected, inflation has a negative impact on economic growth. It is safe to conclude that inflation deters FDI from investing in LDCs suffering high inflation. This

finding supports the notion that macroeconomic mismanagement lowers aggregate productivity and deters foreign investors. This finding supports those of Harms and Ursprung (2002).

With respect to the political regime (political rights and civil rights) in HIPCs, free-political HIPCs or partly free HIPCs have a higher growth rate than those who are not free. This result tends to support those of Helliwell (1994) who claimed that mature democracies likely suffer a slow-down in growth because of a slow buildup in the powers of special interest groups whose successful claims for special treatment reduce the growth of the economy as a whole. In contrast, countries without political freedom have very low economic growth. A plausible reason is that when governments (particularly in Africa) are confronted with revolutions and military coups, economic plans are usually disrupted, forcing countries into both vicious circles and backward economic processes.

Finally, political risk is based on the International Country Risk Guide of the likelihood of expropriation, exchange control, and default on host government contracts. The insignificant negative relationship between this variable and growth suggests the existence of this political risk, to certain extent, in a large number of these HIPCs.

CONCLUSIONS

The majority of HIPCs being African or Latin American, fell into a debt trap and under the sway of the IMF and World Bank. Foreign loans could not solve all development problems in HIPCs because much of this debt was contracted by undemocratic governments and used for questionable purposes that did not benefit the majority of citizens. Many poor countries could not keep up with their interest payments, let alone ever hope to pay back the principal on their foreign debts. In light of the glacial pace of the HIPC initiative, and developing economic, political and human crises in HIPC countries, we concur Jubilee Plus is calling for the immediate cancellation of 100% of the debts of 42 countries defined by the World Bank and IMF as having unsustainable debts.

RECOMMENDATIONS

In devising a future policy for foreign loans, a country has to remember the brutal fact that the loans (whether obtained by the public or private sector) have to be repaid, with interest, in the specified time frame, and in the foreign currency denominated. This can be done only if the borrower has invested the foreign loan in a project or activity that yields a net revenue sufficient to service the debt. There should be no open-door policy towards loans in general. It must be allowed in as and when required by national policy.

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THE EFFECTS OF TAXES ON CROSS-BORDER SHOPPING

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ABSTRACT

Although some states and national governments are considering new tax revenue sources, including lotteries and gambling, most continue to rely on adjusting their tax structures to increase tax revenues. The problem facing these states/nations is that as the tax rate increases the tax base shrinks, due to residents shopping in neighboring states or cross-border shopping. States should consider the actions of their competitors when choosing the optimal tax strategy that maximizes tax revenues.

While there is incentive for states to compete for these tax revenues by lowering their tax rates, this potentially reduces the aggregate tax revenues for a nation or a union of nations. Attention should be placed not only on the individual state maximizing revenue tax rates, but also on the unified tax revenue functions of border states.

This paper develops a model, which examines the interdependencies of state tax rates in maximizing the joint revenue function of border governments. This helps address if states should exercise tax competition or compliance? If there is tax compliance, should it be set at the minimum or a weighted-average of the tax rates? Results depend on the elasticity of demand, location of home citizens, and the size of the governmental bodies.

INTRODUCTION

How should a border-free Europe set up their tax structure? Who becomes a tax haven? How should we tax electronic commerce? Should the US and Mexico have tax harmony? Is tax coordination desirable? How can states maximize their revenues? What are the central features of the interaction between national tax systems? These and other questions reflect

the interdependence of government tax policies in an increasingly integrated world.

Although some state and national governments are considering new tax revenue sources, such as lotteries and gambling, most will continue to rely on adjusting their tax structures to increase revenues. States in fiscal competition should consider the actions of their competitors and then choose the optimal strategy to increase tax revenues. However, the problem facing these states in their attempt to raise tax revenues is as the tax rate increases the tax base shrinks, due to residents shopping elsewhere, or cross-border shopping.

Alternatively, a state may try to compete for cross-border shoppers by reducing tax rates. However, this brings about the traditional Prisoner's Dilemma or "race to the bottom". Therefore, the decision of a state to alter tax rates depends on the tax policy of bordering governments.

Despite the interdependencies inherent in state taxation, interstate tax policy coordination has evolved slowly. The Multi-state Tax Compact established in the sixties has produced only limited cooperation according to Stephenson and Hewett (1983). Although the New England Fuel Tax Agreement showed an increased awareness of tax interdependencies, there has been inadequate attention to integrated regional tax policy.

In the United States interstate bootlegging of cigarettes has been a continuous concern to the Advisory Commission on Intergovernmental Relations. According to Keen (1987), in the European Community tax rates are not allowed to vary by more than 2.5 percentage points from the community norm. Even more recently, is the growing concern of how to tax electronic commerce sales.

Stephenson and Hewett (1983) show that state tax revenues are dependent on their own tax rates and the tax rates of surrounding jurisdictions. In their model, the revenue for the state of Iowa is a function of income, population, relative prices, a price index and the tax rates. Using data from Iowa and Missouri from 1950-1979, they show that the own income tax rate elasticity for income tax revenue in both Iowa and Missouri are large, positive, and significant. The same is true for home sales and the fuel tax elasticities. Increases in home motor fuel sales tax rates have a

positive effect on the other states motor fuel revenues. In general, they find that when the home country increases their own sales tax rate the home citizens and citizens of other jurisdictions buy less domestically due to both a reduction in the home citizens purchases and the home citizens cross-border shopping. Not surprising, as the tax rates increased, people bought less and/or shopped elsewhere, making the effect of an increase in a competing state's sales tax rate negative for sales and motor fuel tax revenues for both Iowa and Missouri. The changes in regional sales tax rates have a positive effect on sales tax revenues, which suggests that an increase in the sales tax elsewhere will generate an increase in purchases at home. Crombrugghe and Tulkens (1990) also find that an increase in both countries tax rates will generate an increase in both countries tax revenues, creating a Pareto superior solution. Examining the effects of monopoly power on cross-border shopping, Christiansen (1994) finds that the tax revenue effects depend on the degree of monopoly power. He further suggests that it is domestic and not total demand that is important in formulating tax decisions. Kanbur and Keen (1993) use a reservation price for the demand of a good and find that the relative size of the bordering economy is an important determinant of the optimal tax strategy. Unlike Christiansen (1994) and Hewett and Stephenson (1983), their reservation price for the demand of the good does not allow the elasticity of demand to influence the optimal tax revenue generating tax rates.

MODEL

Building on Kanbur and Keen's model, which points out the importance of the size of bordering countries, I develop a model with a single good that has the same marginal and fixed costs being offered in two neighboring countries. Country h is the population in the home country and H is the population in the neighboring country. A country is considered small if its population is smaller than its neighboring country. Since costs are the same in each country, the only difference in price is due to the different destination or sales tax rates between the two countries, which is represented

by (t) for the home country's tax rate and (T) for the neighboring country's tax rate.

Unlike Kanbur and Keen, who assume the reservation price is the same within the country and different between the two countries, I relax this assumption and allow both the home and neighboring country demands to respond to changes in the price. Therefore, both countries have to consider not only the changes in cross border shoppers associated with changes in tax rates, but also the changes in home country demand.

Since home citizens decide to either shop at home or abroad, their demand becomes a function of the home and neighboring countries tax rates, and the travel cost of crossing the border. These travel costs are equal to the travel cost per mile donated by delta and the distance in miles donated by s or delta times s. Following the assumptions of Kanbur and Keen (1993), I assume that home citizens will only travel across the border if the gain in consumer surplus from traveling is greater than the cost of travel. In other words, citizens will cross-border shop only if the costs of shopping at home are greater than the cost of traveling and buying the good abroad. The consumer surplus from buying the good is assumed to be positive.

In the simple case, with strict border controls, there is no cross border shopping, which allows each country to extract the entire consumer surplus. As seen in Christiansen (1994), this makes the maximizing revenue tax rates equal to one over the home country elasticity of demand and one of the neighboring country elasticity of demand as seen in equation 1.

$$1) \quad t^* = \frac{1}{\left|\varepsilon_{D,\text{home}}\right|} \text{ and } T^* = \frac{1}{\left|\varepsilon_{D,Neighbor}\right|}.$$

This makes the joint revenue function equal to the tax revenue of the home and neighbor country minus the cost of border controls.

If border controls are inexpensive, then the 2 countries can ignore each other in setting their optimal tax rates. However, if border control enforcement is costly or impossible, then borders are open. Without tax

coordination, each country will be in tax competition and try to maximize their own tax revenue, given the other country's tax rate.

TAX COMPETITION

Considering that borders are open among states in the United States and nations among the European Union, each country must consider their bordering states as they set their maximizing revenue tax rate. Let the home country demand by denoted by a lower case v, while the neighboring country demand is denoted by an uppercase V. Then, each country must consider their own domestic demand in maximizing their revenue functions and take as given the tax rate of the border country. The maximizing tax rate becomes:

$$2)\quad \begin{cases} r(t,T) = tv(t,T) - tv(t,T)\left(\dfrac{t-T}{\delta}\right) & \text{if } t > T \\ r(t,T) = tv(t,T) & \text{if } t = T \\ r(t,T) = tv(t,T) + tV(t,T)\left(\dfrac{T-t}{\delta}\right) & \text{if } t < T. \end{cases}$$

If the tax rate of the home country is higher than that of their neighbor, then some domestic citizens will shop abroad. Maximizing tax revenue, the home country's best response is:

$$3)\quad \frac{\partial r}{\partial t} = \left[v(t,T) + t\frac{\partial v}{\partial t} + t\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}\right] - \left[v(t,T)\left(\frac{t-T}{\delta}\right)\right] - t\left[\left(\frac{\partial v}{\partial t} + \frac{\partial v}{\partial T}\frac{\partial T}{\partial t}\right) * \left(\frac{t-T}{\delta}\right) + v(t,T)\left(\frac{1}{\delta} - \frac{1}{\delta}\frac{\partial T}{\partial t}\right)\right] = 0.$$

Dividing both sides by v gives:

$$4)\quad 1 + \varepsilon_{v,t} + \frac{t}{v}\frac{\partial v}{\partial T}\frac{\partial T}{\partial t} - \left(\frac{t-T}{\delta}\right) - \varepsilon_{vt.}\left(\frac{t-T}{\delta}\right) - \frac{\partial v}{\partial T}\frac{\partial T}{\partial t}\frac{t}{v}\left(\frac{t-T}{\delta}\right) - \frac{1}{\delta} + \frac{1}{\delta}\frac{\partial T}{\partial t} = 0$$

From this, several conclusions can be drawn. First, the further the distance citizens leave from the border, the more tax revenues can be extracted by raising tax rates. Second, the larger the size of domestic demand, the greater tax revenues will be with higher tax rates. If the home country has a larger population, it is natural to think that the home country demand will be larger than the neighboring foreign country demand. As suggested by Kanbur and Keen (1993), in general a larger country should impose higher tax rates. However, unlike the results found in Kanbur and Keen, this is only true if consumer demand is not very elastic. The more elastic demand the lower tax revenues are if a country raises their tax rate.

Thus, if the tax rate of the home country is higher than the neighboring state then the tax revenue for the home country becomes dependent not only on the size and location of domestic shoppers, but also their elasticity of demand. If the demand is inelastic or shoppers are not very sensitive to an increase in price, then the home country does not lose many customers by raising their tax rates. It follows that for a large country that an increase in the tax rate should outweigh the reduction in the tax base, allowing for higher tax rates to generate higher tax revenues. However, if the home country is relatively small, then we might expect foreign demand to be greater than domestic demand. This will make an increase in the tax rate generate a large reduction in the tax base, reducing tax revenues.

Unlike that found in Kanbur and Keen (1993), if the demand elasticity is high, then regardless of a country's size, increasing the tax rate could reduce tax revenue by severely reducing home country demand. As Christiansen (1994) suggests it is the home country demand that influences the optimal tax rates.

So, what if the home country has a lower tax rate than their neighbors? If the country is relatively small, then the maximizing tax rate is generated in equation 5 from the first order condition with respect to the small country's tax rate.

$$5)\quad \frac{\partial r}{\partial t}=\left[v(t,T)+t\frac{\partial v}{\partial t}+t\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}\right]+\left[V(t,T)\left(\frac{T-t}{\delta}\right)\right]+t\left[\left(\frac{\partial V}{\partial t}+\frac{\partial V}{\partial T}\frac{\partial T}{\partial t}\right)*\left(\frac{T-t}{\delta}\right)+V(t,T)\left(\frac{1}{\delta}\frac{\partial T}{\partial t}-\frac{1}{\delta}\right)\right]=0$$

Since the country is relatively small, it is now easy to assume that foreign demand is greater than domestic demand. Dividing both sides by v gives:

$$6)\quad 1+\varepsilon_{v,t}+\frac{t}{v}\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}+\frac{V(t,T)}{v(t,T)}\left(\frac{T-t}{\delta}\right)+\frac{t}{v}\left[\left(\frac{T-t}{\delta}\right)\frac{\partial V}{\partial t}+\frac{\partial V}{\partial T}\frac{\partial T}{\partial t}\left(\frac{T-t}{\delta}\right)+V(t,T)\left(\frac{1}{\delta}\frac{\partial T}{\partial t}-\frac{1}{\delta}\right)\right]=0$$

Again the benefits of lowering the home country tax rate depends on the size of cross-border shoppers and the price elasticity of demand. While this is similar to that found by Kanbur and Keen (1993), showing that a small country wants to undercut their neighbors tax rates to increase cross border shopping, it shows the added benefit of lower tax rates due to the increase in domestic demand. Examining cross-border shopping with monopoly power, Christiansen (1994) shows that it is domestic demand and not total demand that is important in developing tax policy. The more elastic domestic demand, the more you can increase tax revenue by lowering the tax rate.

This shows an even stronger incentive for small countries to undercut their neighbors then that found by Crombrugghe and Tulkens (1990) and Kanbur and Keen (1993). This creates an even faster "race to the bottom" with tax competition encouraging tax rates to be too low. When considering the potential tax revenue losses associated with e-commerce sales in states with no sales tax this is especially discerning. While this is in the best interest of tax revenues in a small country, it does reduce tax revenues in the bordering large county, which reduces the interdependent aggregate tax revenues. Any reduction in the joint revenue function is especially important considering that states in the United States and nations in the European Union may want to maximize the nation or Unions tax revenues, especially if there is any revenue-sharing. Assuming that the home country is smaller, the interdependent tax revenue function becomes very dependent upon the elasticity of demand and can be seen in equation 7.

$$7)\quad 2\left[1+\underset{-}{\varepsilon_{v,t}}+\left(\frac{t}{v}\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}\right)\right]+\left[\left(1+\frac{V}{v}\right)*\left(\frac{T-t}{\delta}\right)\right]+\left[\left(\frac{Tt-t^2}{v\delta}\right)*\left(\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}+\frac{\partial V}{\partial T}\frac{\partial T}{\partial t}\right)\right]+\frac{V}{v}\frac{t}{\delta}\left(\frac{\partial T}{\partial t}-1\right)$$

TAX COORDINATION

Similar to a cartel, it may be in the best interest of border states to collude and set higher tax rates in order to maximize joint revenues. For example, Stephenson and Hewett (1983) empirically show that the border states of Iowa and Missouri could increase their tax revenues by increasing their tax rates. While smaller states may first object to such a practice, if there are government transfers or revenue-sharing practices between states or nations, then collusion may be encouraged and sustainable.

There are generally three options to imposing tax coordination. The first option is the common practice of setting a tax maximum. However, there is little need to set a maximum tax rate when both countries have tax rates that are too low and not too high. Setting a maximum tax rate will have no effect on the "race to the bottom" observed under tax competition and thus will generate the same joint revenue functions.

The second of these options is to set a weighted-average of the tax rates. Since both countries impose the same tax rate, there is no price differential or incentive to cross border shop. Equation 8 shows that the home and foreign revenue functions respectfully become:

$$8)\quad r^{*}=tv(t) \qquad and \qquad R^{*}=TV(T).$$

In this case, the tax revenue maximizing tax rate is given respectfully by:

$$9)\quad \frac{\partial r}{\partial t}=v(t)+t\frac{\partial v}{\partial t} \qquad and \qquad \frac{\partial R}{\partial T}=V(T)+T\frac{\partial V}{\partial T}.$$

Dividing both sides by v creates equation 10.

$$10)\quad 1+\varepsilon_{v.t.} \qquad and \qquad 1+\varepsilon_{V.T}.$$

From equation 10 it is clear to see that the joint revenue function depends almost solely on the elasticity of demand. While Crombrugghe and Tulkens (1990) find a Pareto improvement if both countries increase their tax rates, it is unclear what happens if the two countries use a weighted-average of

their tax rates in equation 10. Results of this study are similar to that of Mintz and Tulkens (1986), suggesting that the model is ambiguous. While the large foreign country no longer loses cross border shoppers, they do lose some of the domestic shoppers due to the income effects pricing them out of the market. Equation 11 shows that the revenue effects on the large country are unclear and again dependent upon the elasticity of demand.

$$11)\quad 1+\underset{-}{\varepsilon_{vt.}} \lessgtr 1+\underset{-}{\varepsilon_{v.t.}}+\underset{+}{\frac{t}{v}\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}}-\underset{-}{\left(\frac{t-T}{\delta}\right)}-\underset{+}{\varepsilon_{v.t.}\left(\frac{t-T}{\delta}\right)}-\underset{-}{\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}\frac{t}{v}\left(\frac{t-T}{\delta}\right)}-\underset{-}{\frac{1}{\delta}}+\underset{-}{\frac{\partial T}{\partial t}\frac{1}{\delta}}=0.$$

Regardless, it is quite clear that if the home country is small they will lose tax revenue due to the loss of cross border shoppers and home country demand. In comparing the tax revenues between tax competition and a weighted-average of the tax rates in equation 12 shows:

$$12)\quad 1+\underset{-}{\varepsilon_{v,t}} < 1+\underset{-}{\varepsilon_{v,t}}+\underset{+}{\frac{t}{v}\frac{\partial v}{\partial T}\frac{\partial T}{\partial t}}+\underset{+}{\frac{V(t,T)}{v(t,T)}\left(\frac{T-t}{\delta}\right)}+\underset{+}{\frac{t}{v}\left[\underset{+}{\left(\frac{t-T}{\delta}\right)\frac{\partial V}{\partial t}}+\underset{-}{\frac{\partial V}{\partial T}\frac{\partial T}{\partial t}\left(\frac{t-T}{\delta}\right)}+\underset{+}{V(t,T)\left(\frac{1}{\delta}\frac{\partial T}{\partial t}-\frac{1}{\delta}\right)}\right]}.$$

Tax harmony at any tax rate will cause the small country to lose tax revenues due to the elimination of cross border shopping and the loss of domestic demand. Even if the there are net gains for the large country, it is highly unlikely that they will be substantial enough to offset the losses to the small country, making tax harmony an inferior solution.

MINIMUM TAX RATE

A third option for tax compliance is to impose a tax minimum set in between the two tax rates. While this may eliminate "the race to the bottom", it would not eliminate all cross-border shopping.

It is clear that the large country will benefit from a tax minimum. Since they will not change their own tax rate there will be no change in their

domestic demand and they will not lose as many cross border shoppers due to the increase in the smaller countries tax rate. A big country is a clear winner and would prefer a tax minimum to no tax coordination and most likely to a weighted-average of the tax rates.

Examining the small country shows that while they will lose some of their cross border shoppers and some domestic demand by increasing their tax rates to the minimum, it is preferable to tax harmony at a common rate. This is due to them keeping some of the cross border shopper and not losing as much of their domestic demand. However, since the small country losses some of its cross border shoppers and its domestic demand a minimum tax rate clearly generates less tax revenue than tax competition, creating an inferior solution.

While the small country clearly loses tax revenue, the large country clearly gains tax revenue. The size of their joint revenues depends almost entirely on the elasticity of demand in the small country. Assuming that the elasticity of demand is relatively small due to only a small increase in the tax rate, the damages may be minimal. Thus, while the small country will still set a lower tax rate equal to the tax minimum, they will be less quick in their race to the bottom as they are under no tax coordination. While the small country will experience a loss in their tax revenues, the higher tax revenues of the larger country potentially offset the loss of tax revenue in the small country. A small country may agree to impose a tax minimum to generate an increase in the joint revenue function, especially if there is revenue sharing. This is analogous to a small company in a cartel agreeing to increase price in order to increase the cartels total shared profits.

CONCLUSIONS

In general, results are very similar to that found by Kanbur and Keen, suggesting that a small country maximizes tax revenues by becoming a tax haven. Results also support their finding that a tax minimum is preferential to a tax average of the two country's tax rates. However, unlike Kanbur and Keen, results show that the elasticity of demand plays an important roll in determining the overall tax revenues.

While a large country will greatly benefit from a smaller border country increasing their tax rates, one must consider both the small country's loss in cross border shoppers, but also their loss in domestic demand. If the elasticity of demand were high, then it would not be beneficial for border countries to engage in tax compliance at all, even if they are sharing tax revenues. Like Christiansen (1994), results of this paper emphasis the importance of domestic demand and suggests that countries will be less willing to impose a minimum tax rate than Kanbur and Keen suggest.

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ECONOMIES OF SCALE AND THE PROVISION OF PUBLIC GOODS BY MUNICIPALITIES

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ABSTRACT

This paper adds to the literature that examines economies of scale in the provision of municipal services. Private sector economies exist as average costs decline as output expands. Likewise, economies exist in the provision of public services as average costs decline as the number of recipients of the service increases.

A discussion of declining average costs inevitably involves a discussion of municipal consolidation. Proponents of larger local government believe bigger government is more efficient government. Citizens residing in consolidated cities will enjoy quality city services at a lower cost. In addition, consolidated cities are more effective at long range, comprehensive planning which spurs regional economic development.

This study utilizes a sample of municipalities in Alabama to empirically test for economies (or diseconomies) of scale in the provision of public services. A brief history of municipal consolidation is presented in the next section. Section two contains the theoretical arguments for the creation of mega-municipalities and for numerous, fragmented local governments. In section three, a review of the existing literature is presented. Finally, the last section contains the results of this study and some concluding remarks.

BRIEF HISTORY

Consolidating smaller municipalities into a single metropolitan government offers the promise of efficiency to many observers. By ending the duplication of services in nearby cities and taking advantage of economies of scale, lower-cost public services are possible. Centralized government will be attractive to industry and will result in increased economic development.

The notion that bigger local government is better local government is not new. It traces its origins, according to Andrew Sancton (2000), to debates surrounding the consolidation of local governments in the Philadelphia area in 1844. "Eli K. Price, the state senator from Philadelphia, presented one of the first ever projections of financial savings. He claimed that the elimination of 168 tax collectors from the different jurisdictions would save $100,000 per year" (Sancton 2000:28).

New York City is the product of the consolidation of 15 cities in five separate counties in 1898 (Sancton 2000). Twelve municipalities were merged with Birmingham by the Alabama legislature in 1910. While a metropolitan-wide referendum on the merger passed, a majority in the municipalities being merged were opposed. Sancton (2000:37) points out that since that time, "no solvent American municipality has been forced against its will to lose its incorporated status and join another."

The most recent articulation of the case for consolidation comes from David Rusk, the former mayor of Albuquerque, New Mexico. His book, Cities Without Suburbs has successfully placed "the issue of municipal boundaries back on the American agenda" (Sancton 2000:79).

Nevertheless, the issue is typically unpopular with the voters. "Only 20 percent of referenda on consolidation are approved by the electorate (Harrigan and Vogel 2000). To cite a few examples, mergers were defeated in St. Louis, San Antonio, Sacramento, Portland, Charlotte and Knoxville. In fact, Knoxville voters have defeated consolidation plans on four separate occasions (Lyons and Scheb 1998).

A number of notable mergers and consolidations have taken place. The services provided by Dade County (Miami) were extended in 1957.

Nashville and Davidson County were consolidated in 1962, Jacksonville and Duvall County were consolidated in 1967 and two years later, Indianapolis and Marion County were merged (Sancton 2000:71). More recently, Louisville and Jefferson County were merged in Kentucky.

THEORETICAL ARGUMENTS

"According to the consolidationists, the primary ills of local government stem from fragmentation and the 85,000 governments and over 500,000 officials that dot America's political landscape. For consolidationists, the solution lies in eliminating independent municipalities within a county and replacing them with a single government" (Savitch and Vogel 2000: 162).

Bigger local government could take advantage of economies of scale by producing on a larger scale. In addition, the duplication of supervisors, administrators and local politicians would bring relief to taxpayers.

Competition between numerous local governments is unproductive as well. Expressing such an idea is Carl Goldenberg, who in 1963 reported to the Ontario government the merits of amalgamated metro-government. "With each municipality seeking to improve its tax base independently, they compete for development and redevelopment projects, which are accordingly dealt with on a piecemeal basis and without regard to sound planning in the overall interests of the area" (Goldenberg 1965: 181-82). By clinging to their own parochial interests, resources are wasted and the 'big-picture' ignored.

Consolidation supports growth and economic development "by enhancing the planning capacity of local government. Comprehensive planning on a metropolitan-wide basis under a single authority is viewed as a necessary condition for attaining coordinated development" (Feiock and Carr 1997:166). Firms seeking to locate in an area with a metropolitan government only have to deal with a single entity rather than numerous officials from several jurisdictions.

On the other hand, convincing arguments can be made which suggest that smaller, independent municipalities deliver superior services at lower costs. Howard Husock, Director of Case Studies at the John F. Kennedy

School of Government, Harvard University, argues "that improvement of … cities requires not a single, bigger government but increased numbers of smaller ones". Bigger government, according to Husock, is not more efficient government. The basis for his assertion goes back to the work of Charles Tiebout.

Tiebout, in response to those who argued that no mechanism existed to reveal the preferences of consumers for public goods, showed how competition among numerous local governments could achieve a market-like efficiency. When many local governments exist, people can choose to reside in the one that most closely produces the types of public goods they desire.

Small communities can offer differing packages of services and amenities and we can vote with our feet as to which ones we prefer. Moreover, even when they offer the same sorts of services, they compete as to which can deliver them more efficiently. The town which offers the package of services most like that which you want and delivers at the lowest tax rate will get your vote, in effect. You'll move in. If things change, you may well move out. We know that competition disciplines the private marketplace; so, too, does it discipline the public one (Husock 2001).

Numerous local jurisdictions provide choices for consumers and citizen mobility promotes efficiency. As Tiebout predicted, differing policies among jurisdictions has been shown to significantly influence migration (Reschovsky 1979).

Other local jurisdictions also provide a basis for comparison. Thus, citizens in one municipality can compare the set of services offered and the costs of such services with other municipalities and protest - at the ballot box - if the comparison is unfavorable. Comparison shopping is more difficult with metropolitan governments.

Large consolidated cities are monopoly providers of services and, so the argument goes, suffer from all the inefficiencies inherent with this market structure. "We should no more worry about too many municipalities than we should worry about too many firms involved in the retailing of groceries. Just as different grocery stores provide different levels of selection, quality and price, so too do municipalities. Having one municipality responsible for

providing all the municipal services in a city-region makes as much sense as having one monopoly grocery firm" (Sancton 2000:74).

The question of whether economies exist in the provision of services by municipalities is an empirical one. Before empirical evidence is presented, however, the existing literature regarding this subject will be examined.

LITERATURE REVIEW

Researchers have sought to identify the efficiency gains associated with larger municipalities. Sjoquist (1982) found that numerous small jurisdictions resulted in lower costs of services. Benton and Gamble (1984) examined both expenditures and taxation in pre- and post-merger Jacksonville, Florida and found that both increased after consolidation. Gustely (1977) showed that expenditures for services provided by Metro Miami government rose after consolidation. Another study commissioned by the National Research Council (1999) concluded that rather than a method of reducing costs, consolidation resulted in increased local expenditures. Desbiens (1999) found that diseconomies of scale are present even when jurisdiction with as few as 2000 inhabitants are merged - a result suggesting that extremely small municipalities are the most efficient.

Weicher (1970) examines four subcategories of spending; namely police protection, fire protection, sewers and sanitation and highways. Evidence of economies of scale is only present with fire protection. In another study examining Miami-Dade County, Becker and Dluhy (1998) find no evidence of economies when focusing on aggregate expenditures but when specific services are examined, they find some, limited evidence for lower costs with larger jurisdictions. Fire and rescue services, library services and planning services demonstrated economies of scale while police protection, waste management, recreation services and public works showed "either negligible or marginal economies (or diseconomies) of scale" (1998:85).

A study of the Pittsburg (Allegheny County) area for the U.S. government's Advisory Council on Intergovernmental Relations (ACIR)

found that, despite the fact that "there were more than 100 separate police departments [in Allegheny County], costs … were below the average for other American areas on similar size" (ACIR 1992:78). A separate ACIR study (1988) investigated the St. Louis area. Researchers found evidence of "slight economies of scale … in larger police departments (ACIR 1988: 76). The St. Louis study examined another issue; are larger areas better able to attract industry and jobs. The authors found no relationship between the number of municipalities in a region and the number of jobs created.

The notion that larger local government will eliminate duplication and result in lower administrative costs was explored by Bish (2000). The cost associated with 88 elected officials and their staffs in 13 separate jurisdictions were compared with those of 23 elected officials and their staffs in a merged city of the same population. Bish found that per capita costs were practically identical.

The quality of services provided by large cities and by numerous smaller governmental units has also been examined. Ostrom and Parks (1973) asserted that smaller, unmerged police departments are more trusted by citizens, know more about their communities and respond to the citizen needs more quickly. Likewise, Hoxby (1997) found that students in areas with numerous school districts performed better on math and reading examinations than did students from areas with large unified districts. The costs of providing education were significantly lower with more numerous districts as well.

MODEL AND EMPIRICAL EVIDENCE

The present study tests for economies of scale from a sample of Alabama cities prepared by the Public Affairs Research Council of Alabama (PARCA), a nonprofit research organization housed at Samford University. The sample includes Alabama's 25 largest cities ranging in population from 18,497 in Mountain Brook to 252,997 in Birmingham. The data in the report are derived from city financial reports for fiscal year 1998 (October 1998 through September 1999), and have been adjusted so that the data are comparable from city to city. For example, solid waste collection is included

but sewage treatment facility expenditures and the expenditures associated with operating a landfill are omitted.

Municipal expenditures have been divided into a number of categories; namely, public safety, public works and community development, general governmental and social and cultural activities. Public safety expenditures include police, fire, emergency-911, and civil defense; public works and community development expenditures include streets, sanitation, engineering, parking, transit and community development block grants unless allocated to some other function; general government expenditures encompass the mayor and council, courts, finance and economic development; and social and cultural activities include parks, museums, cemeteries, civic auditoriums, libraries, welfare, senior citizen and youth activities, animal shelters and health services.

Public safety expenditures were the largest of the spending categories in 23 of the 25 cities ranging as a percentage of total operating expenditures from a low of 28% to a high of 46% (PARCA Report 2000:5). In the remaining cities, public works and community development was the largest category.

In addition to the spending data, the PARCA Report also includes information that serves as an explanatory variable in this study, TAXBASE. TAXBASE is the amount of per capita money generated by a 1% sales tax. It captures the ability of cities to raise revenue. Sales taxes accounted for the majority of revenue raised in 1998 in 23 of the 25 cities comprising the sample (PARCA Report 2000:2).

Other independent variables entered into the equation are the 1999 median age of the city's residents, the percentage of the city's population in 1999 with college degrees, 1999 per capita income of the city, 1997 property crime (burglary, larceny-theft, motor vehicle theft, arson) per 100,000 residents, 1997 violent crime (murder, non-negligent manslaughter, forcible rape and assault) per 100,000 residents and the percentage of the city's population that is black, in 1999.

Models utilizing total aggregate expenditures, public safety spending, public works spending, cultural expenditures and general government expenditures as the dependent variables are estimated. The results are

presented in Table 1. Seventy seven percent of the variation in aggregate expenditures is accounted for in the first model. The size of the tax base is significantly related to all of the spending categories (including aggregate spending) with the exception of general government and public works expenditures.

Higher per capita income and the amount of property crime are significantly related with public safety expenditures. As the number of college graduates increases, public safety expenditures decrease significantly.

The behavior of the variables of chief interest, population and population squared, indicate that economies of scale are not present in any of the specifications. No evidence for the proposition that big government is efficient government is found. Instead, the results indicate that diseconomies are present in the provision of public safety services and in aggregate expenditures.

CONCLUSION

This study yields no support for the hypothesis that large government takes advantage of economies of scale and avoids wasteful duplication. In fact, diseconomies exist when examining aggregate spending and in the provision of public safety services. Given the overwhelming evidence supporting numerous jurisdictions, Sancton (2000: 75) asserts, "to be intellectually convincing, consolidationists must now specify exactly what it is they expect consolidation to accomplish and why this objective cannot be achieved by following some other course of action."

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Table 1

	Total Expenditures		Public Safety	Public Works	Cultural Expenditures	General Government
	Model 1	Model 2				
Intercept	-172.2	-292.6	153.7	124.0	-81.1	95.01
	(-0.3)	(-0.58)	(1.07)	(0.77)	(-0.75)	(0.89)
Popu-lation	-0.0065	-0.0065	-0.002	-0.001	-0.0004	0.000038
	(-1.96)*	(-2.37)***	(-2.78)***	(-1.15)	(-0.77)	(0.07)
Pop Squared	0.00000003	0.000000028	0.000000008	0.000000004	0.000000003	0.0000000008
	(2.14)**	(2.58)***	(2.84)***	(1.27)	(1.11)	(0.34)
Tax Base	3.5	3.6	0.87	0.39	0.414	0.186
	(3.54)***	(4.2)***	(3.64)***	(1.53)	(2.42)***	(1.09)
Median Age	10.13	11.42	-2.83	1.37	3.69	-0.31
	(0.66)	(0.79)	(-0.7)	(0.3)	(1.19)	(-0.1)
College Grad	13.82	15.46	-7.04	-5.1	1.15	-1.74
	(1.18)	(1.43)	(-2.32)***	(-1.5)	(0.5)	(-0.77)
Per Capita Income	0.002	0.002	0.011	0.004	-0.0008	0.001
	(0.195)	(0.184)	(3.72)***	(1.14)	(-0.35)	(0.64)
Property Crime	0.04	0.041	0.02			
	(1.53)	(3.16)***	(4.33)***			
Violent Crime	0.036					
	(0.42)					
Percent Black	-2.48					
	(-0.52)					
R^2	0.77	0.76	0.79	0.37	0.42	0.27

t-statistics in parentheses
* 10% level of confidence
** 5% level of confidence
*** 1% level of confidence

HOST COUNTRY INCOME EFFECTS OF FOREIGN DIRECT INVESTMENT: AN ANALYTICAL FRAMEWORK

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ABSTRACT

This paper presents a framework for analyzing income effects of foreign direct investment under different environments and to contrast them with balance-of-payments effects. The results show that it is the institutional environment rather than the distributive share of product value that is responsible for adverse income effects for host countries. The paper shows that "exploitation" or "excessive profits", as is commonly understood, are neither necessary nor sufficient conditions for income effects to be negative as sometimes suspected. On an empirical level, there is a body of evidence that suggests a positive correlation between FDI and economic growth in developing countries. Yet, while much evidence indicates an one-way causality between FDI and growth, meaning FDI contributes to growth as implied in this paper, there are indications that the causality may run both ways. The evidence also appears to suggest that FDI is favorable to growth only if appropriate conditions exist in the host economy, and this includes such factors as adequate absorptive capacity and human capital, and the degree of complementarity between foreign and domestic capital.

INTRODUCTION

For several decades since the 1960's, thanks to its perceived potential to contribute to economic growth and development at home, many developing countries have made considerable efforts to attract foreign direct investment (FDI). Generally, there appears to be a growing acceptance of FDI as a catalyst or contributor to growth, especially in view of the record of

high economic achievements in the countries of East and Southeast Asia. However, the role of FDI in promoting such beneficial goals has not been without controversy. For example, the 60's and 70's saw FDI in a more controversial light, perhaps mainly because of negative assessments of the role of transnational enterprises (TNEs) in developing countries (LDCs). TNEs, of course, are the main international carriers of FDI. A number of scholars viewed the role of TNEs as agents of the industrial advanced economies bent on exploiting cheap labor and resources in the LDC, thus benefit the economy of the "core" (industrial) economies, ordinarily at the expense of the "peripheral" countries (i.e., the LDCs). This view reflects the central thesis of the "dependency" school, which is concerned with the negative political and economic impact of neocolonialism and imperialism on the LDCs (Prebisch, 1959; Frank, 1967). The dependency thesis was among the first to be critical of FDI in the LDCs, but there were other criticisms. For example, one controversial aspect of foreign direct investment (FDI) in less developed countries relates to the unqualified notion that a foreign firm can somehow appropriate more income from a host economy than it helps generate there. Unfortunately, this unqualified contention concerning negative income effects has often been based on the "wrong" reasons such as "exploitation" or "excessive profits". Other sources of confusion concerning income effects of FDI can be traced to the issues of domestic requirement and balance-of-payments (BOP) effects.

It can be shown that under competitive conditions, FDI contributes positively to a host country's national product. The much maligned factors such as foreign "economic exploitation" or "excessive profits" do not by themselves lead to adverse income affects. Rather, the conditions that allow negative income effects to exist have usually been created by recipient countries' policies. Although the theoretical possibility of adverse income effects has been raised in past studies (Reuber, 1973; Bos-Sander-Secchi, 1974), the conditions and mechanism for such an occurrence have never been scrutinized. This paper constructs a simple theoretical frame work for analyzing direct economic impact of FDI on a host country, focusing on the contribution of income to the host economy. A better understanding of such a mechanism is essential because it has important policy implications. The

presence of price distortions-whether inherent or policy-induced-in many developing countries today is a reminder that policy makers may be oblivious to the problems associated with distorted prices. Price distortion is an important issue in this paper; its meaning and implications will be explored more fully at a later stage. Finally, this paper will look at the more recent empirical works to gain a deeper perspective regarding the results of the analytical framework presented in this paper.

LITERATURE REVIEW

The literature critical of FDI in developing countries is voluminous but for the most part appears to have overlooked kind of issues raised in this paper. There is a substantial body of thought-loosely assembled under the broad banner of "dependency" school-that argues that FDI benefits the core industrial economies at the expense of the peripheral underdeveloped countries. The major argument of the dependency thesis is that FDI had tended to freeze the economic structure in the LDCs, creating a lopsided structure the prominent feature of which is localized industrialization in enclaves, where FDI takes place, and complete lack of integration with the rest of host economies. In short, according to the dependency school, in the long run, FDI tends to impede economic growth and development of recipient economies. Although underdeveloped countries lack capital and industrial technology, they are rich in natural resources and inexpensive labor. But while income or wealth is created in the periphery, including Latin America, it does not lead to an accumulation of wealth that would benefit the host economy. On the contrary, this wealth is transferred to and accumulated in the core countries because it is the TNEs rather than the indigenous people that have control over them. Consequently, the core stands to benefit from this structural dichotomy of the host economy because the foreign sector (i.e., the sector associated with FDI) does not benefit the rest of the host country because of lack of integration. Therefore, the argument runs, it is in the interest of the core countries to keep the periphery underdeveloped and dependent on the core.

However, the dependency school has left some major questions unanswered: does the accumulation of wealth in core countries depend on their ability of to appropriate more income from host countries than the income they bring in or help generate there? Does foreign economic "exploitation" as commonly understood lead to adverse income effects? Under what condition can negative income effects come about? These are the kinds of issues that this paper intends to explore. Additionally, while the dependency thesis deals with macro and structural impacts, this paper approaches the income effect issue from a micro perspective.

Singer (1950), in a pioneering work on economic effects of FDI on pre-industrial economies, based his arguments essentially on "price" effects or terms-of-trade effects. He emphasized the mechanism for distribution of income between home and host countries arising from trade between primary commodities and manufactured goods. Singer argued that the benefit of higher productivity in the foreign sector has typically been passed on to core countries in the form of low costs of foodstuff and raw material, while the cost in terms of deterioration in the terms of trade has typically been borne by LDCs. Put differently, an underdeveloped host country sells its products at low prices and pay higher prices for their imports of manufactured goods from the industrial countries. Further, Singer saw the dichotomy between foreign and domestic sectors of the host economy as the most damaging structural effects of FDI.

MacDougall (1960), on the other hand, used marginal productivity theory to analyze income effects and assessed the balance of costs and benefits accruing to the different sectors of the host economy. Fundamentally, MacDougall's work was an income distribution analysis based upon the assumption of perfect competition. According to MacDougall, while the capitalist sector in the host country suffers a loss of income because of decreasing marginal productivity of capital as the capital stock in the host country increases thanks to foreign investment, the labor sector in the host country benefits from higher wages because higher marginal returns to labor there. Since the gain to the labor sector exceeds the loss to the capitalist sector, it follows that FDI yields net positive income effects to the host country. One limitation in MacDougall's analysis is that

it is based on the assumption that FDI takes place in the traditional sectors such as production of primary commodities or basic industrial manufacturing. This assumption can loose its significance as FDI activities began to venture into new sectors that are technology or knowledge-based or into more modern capital-intensive manufacturing. Under these circumstances, decline in capital productivity needs not be a realistic consideration.

In any case, MacDougall's conclusion was based on competitive conditions in the labor and good markets in the host country. It was not until much later that income effects under imperfect conditions were explored (Reuber, 1973; Bos-Sanders-Secchi, 1974; Vaitsos, 1974; Lall and Streeten, 1977; Biersteker, 1978). Although these works raised the possibility, or even likelihood, of adverse income effects, their approach has been basically macro. The work by Bos, Sander, and Secchi (1974) comes closest to addressing adverse income effects from a micro perspective but it does not offer a systematic framework for assessing the problem at hand. The present study seeks to extend their work.

Some recent theoretical works on FDI-Growth relationships have tended to focus on broader welfare implications or effects of FDI on specific variables such as capital formation and private consumption in the recipient country. For instance, using a neoclassical growth model, a study shows that while the impact of capital inflows on growth is inconclusive, the impact on domestic capital stock and consumption is favorable (Chow and Zeng, 2001). Theoretically, FDI is also found to be capable of decrease host country's national welfare because of the effect of transfer of returns of capital to foreign firms (Reis, 2001).

Inability of the orthodox dependency school (Frank, 1967) to explain growth Latin America and other LDCs has led to the emergence of "new dependency" school (Farmer, 1999). The main idea of the new school is that, despite dependency, growth in host countries is possible because the interest of the TNEs is consistent with such growth (Cardoso, 1973). As discussed below, although the empirical studies in the 1980s and 1990s do not find an unambiguous correlation between FDI and economic growth in LDCs, there has been a trend toward a more realistic re-appraisal of the role FDI in LDCs.

This revaluation was prompted by the ever expanding FDI activity in developing countries and the record of high economic achievements in some countries in Latin America and the Pacific area.

THE MODEL

Direct Income Effects

In this standard neoclassical framework, the foreign firm is assumed to be a single-product firm that employs only one factor input such as raw material, procured locally. External and linkage effects will be ruled out so that only first-round, direct income effects will be considered. Further, it is assumed that initially the firm pays no taxes to the host government and receives no subsidies in any form. This firm sells its product and buys its factors under competitive conditions, and the prices of final goods and foreign exchanges reflect true scarcities. It produces output Q, utilizing both foreign factors (assigned subscript f) and domestic factors (without subscript). The production function, assumed to be well-behaved, can be written as

$$Q = f(K_f, M_f, M, L, I), \qquad (1)$$

where K: Capital, M: Management, L: Labor, and I: Material Input. Assuming that the production function displays constant returns to scale and the factors are paid according to their marginal product, then by Euler's theorem, the distributive factor shares are given by

$$Q = k_f + m_f + k + m + l + i \qquad (2)$$

where $k_f = \frac{\delta Q}{\delta K_f} K_f$, $m_f = \frac{\delta Q}{\delta M_f} M_f$, ... $i = \frac{\delta Q}{\delta I} I$

The value added associated with the firm's production can be derived from (2) as

$$q = Q - i = k_f + m_f + m + l \qquad (3)$$

Results under Competitive Environment

The firm's contribution in real terms to the host country's income can first be approximated by B as follows:

$$B = m + l = q - (k_f + m_f). \qquad (4)$$

The derivation of B is based on the conditions that (1) there is no displacement or preemption of indigenous firms, (2) domestic factors have no alternative employment opportunities, and (3) all payments to the foreign factors are not spent or reinvested in the host country. However, to the extent that the domestic factors have an opportunity cost, their income earned in an alternative domestic employment must be deducted from B to yield a correct measure of direct income effects of FDI. Simply stated,

$$b = (m-m') + (l-l') \quad \text{or} \qquad (5)$$

$$b = (q-q') - (k_f + m_f)\,, \qquad (6)$$

where b: real income effects of FDI, and k', m', and l' are, respectively, the alternative earnings (i.e., opportunity cost) of domestic management and labor, and $q' = m' + l'$. Thus, given the rewards to the domestic factors (i.e., m and l), under competitive conditions, income effects of FDI depend crucially on the value of the earnings foregone. Here, three cases can be distinguished. First, if the total opportunity cost q' is zero, the net contribution to the host country's income, b, reaches a maximum. Secondly, if the total opportunity cost is equal to the total payment to the domestic factors, net income effects of FDI are nil. Thirdly, if the total opportunity

cost is less than the domestic factors' earnings but greater than zero, the value of income effects lies between zero and a maximum. Thus, according to this model, as long as domestic factors seek to maximize income under competitive conditions, there is no need to be concerned about negative income effects.

Additionally, if exploitation is defined as underpayment to the domestic factors using their marginal productivity as the basis for compensation, nothing in (5) suggests that exploitation results in negative income effects. To the host economy, the direct benefit of FDI depends solely on the difference between m, l, and m', l', respectively, and while a foreign firm can manipulate such factors as k, m, and l, to its advantage (i.e., to exploit), it normally cannot control the m', and l'. Ordinarily, the opportunity costs of the local factors are a function of the economic conditions prevailing in the host country. Therefore, from the viewpoint of production and generation of income by the foreign firm, the variables m', and l' should be considered as being determined exogenously. The fact that the domestic factors are willing to work for the foreign firm after comparing m with m', and l with l', implies that the real value of the former must be at least as high as the latter. Hence, under competitive conditions, "exploitation" as defined above cannot result in adverse income effects as suspected.

According to the results obtained in equation (5), for the same values of m and l, the smaller the values of m', and l', singly or in combination, the greater the value of b. This means that income benefits to the host economy vary positively with the level of local unemployment. This is because the higher is the level of local unemployment, the lower is the opportunity cost associated with the domestic factors (that is, the lower the value for m' and l'), hence the difference between m and m', and l and l' will be greater. If, as is generally true of many developing countries, the phenomenon of underemployment or disguised unemployment is extensive, income benefits of FDI tend to be underestimated by not taking that phenomenon into account. In short, as long as workers have some choice regarding the type of work and whom they work for, and as long as competition exists in the wage structure, the presence of unemployment cannot cause income effects to be negative. Under these circumstances, more income and more jobs mean

one and the same thing. This result will not be reversed even if the foreign enterprise is a monopsonistic employer. We have already shown that underpayment to the domestic productive factors (e.g., workers) does not alter the outcome indicated in equation (5) because the crucial element is the opportunity cost of these factors and not just how much they are paid by the foreign firm.

Finally, there is the question of determining preemption or displacement effects. In this case, to assess income effects of FDI, one should compare income effects associated with the foreign firm (i.e., b in (6)) with the net income (value added) that would have been generated by the displaced domestic firm. Conceptually, one knows that if the outputs (Q) of the foreign firm and the supposedly displaced domestic firm are identical, real income effects of FDI are definitely negative because there is no transfer of income or profit associated with a domestic firm (i.e.,$k_f = m_f = 0$). Beyond that, however, it is virtually impossible to make a comparison because one would not know the relative size of the foreign compared to the displaced firm or, indeed, whether displacement occurs at all. The argument that FDI, through its displacement effect, may hinder the development of local entrepreneurship in the long run may or may not be a valid one, but this issue is distinct from that of direct income effects examined here. Biersteker (1987) presented an empirical investigation of displacement of indigenous firms and markets by multinational firms in Nigeria. The study found no widespread pattern of displacement of existing Nigerian firms or markets, but preemptive displacement was a more serious matter.

In short, in the absence of price distortions and adverse displacement effects, income effects associated with FDI would be positive even if all the payments to the foreign factors are remitted. However, if a fraction a ($0 < a < 1$) of those earnings is spent on the local economy on taxes or consumption or reinvestment, then real income effects should be adjusted upward as follows:

$$b = (m - m') + (l - l') + \alpha(k_f + m_f) \qquad (7)$$

Results Under Imperfect Conditions

If nominal market prices deviate from true resource costs to society, then clearly the real value of income repatriated by the foreign firm is different from its nominal value. Distorted prices, such as when the exchange rate of the domestic currency is overvalued, may enable a foreign firm to transfer more real income abroad than the net (i.e., value-added) income associated with FDI, resulting in negative income effects for the host country. The proof of that proposition is rather straightforward. Let the foreign currency be e and the domestic currency, p. Then $p = re$, where r is the true, undistorted exchange value of the domestic currency expressed in terms of the foreign currency. In case of overvaluation of the domestic currency, $p = ßre$, where $1 < ß < + \infty$. Assume the foreign earnings T ($T = k_f + m_f$) are repatriated, then the real value of T measured in the foreign currency e is ßreT. Since ßreT > reT by the factor ß, it follows that the foreign firm may be able to appropriate more real income than is generated in the host economy. This, then, is a possible mechanism that makes negative income effects possible. For example, if in the rather extreme case where the income benefits in the absence of distortions $b = (q - q') - T = 0$, then with distortions, $q - q' < ßT$, which means that, by (6), income effects $b < 0$.

So, theoretically, adverse income effects is conceivable in the possible, albeit unlikely, event that a host country has an overvalued domestic currency when it seeks foreign investment. Other things being equal, currency overvaluation tends to discourage FDI, so if a country deliberately sets out to attract FDI, theoretically it should not allow that to happen. However, domestic political or social reason sometimes overwhelm economic rationality, and as a result, some LDCs may have an overvalued exchange rate. Further, we have seen leaders in developing countries subsidize imports by allowing overvaluation to benefit themselves or to keep their constituencies or supporters happy.

In addition to exchange rate distortions, one should also add other kinds of distortions commonly associated with FDI and import-substitution policy. Although these types of distortion have no direct bearing on income

effects of FDI, it is inefficient and had negative welfare effects on society. For example, selective tariffs can be used to keep out the imports that compete with FDI-created products. The incentive to discourage import of final goods is even stronger if the leaders or government in the host country have an investment stake in the FDI as, in the case of joint ventures between a host government and foreign enterprises. In other word, efforts to attract FDI may be accompanied by a policy (e.g., import-substitution) that would have adverse welfare consequences. Since a foreign firm cannot appropriate more than the total income it generates as shown earlier, if net negative income effects result because of price distortions, the part of real foreign income transferred that is in excess of the income generated locally must of necessity comes from somewhere else in the economy and not necessarily from the operation of the foreign firm.

Balance-Of-Payments Effects

While the issue of income effects deals with the difference between the value added by a foreign enterprise and what would have been generated in its absence, BOP effects are concerned with the net balance of credits and debits on the external financial position of a country. The fundamental distinction is that while income effects are concerned with the generation of additional income, BOP effects focus on the generation of additional claims on foreigners, especially in the form of foreign exchange earnings. For a country facing foreign exchange constraints in its growth path, the BOP effects may, therefore, be of greater significance than income effects. The prominent terms in the income effects equation are primarily those that influence the nature of production and, more importantly, distributive shares, whereas in the case of BOP effects, the key variables are those that govern inter-country exchanges of financial claims. Therefore, an accurate assessment of BOP effects has to take into account not only the direct financial consequences of the initial capital investment and subsequent repatriations of foreign incomes but also the indirect financial consequence of activities related to or induced by the initial investment project.

From the viewpoint of income effects, the disposition of the output stemming from FDI -whether destined for domestic consumption or export-does not affect the contribution of FDI to host country's income. But naturally the same cannot be said of BOP effects. In the absence of export of final products and import of intermediate inputs, as a first approximation, BOP effects can be stated in the present context as

$$P = sK_f - \epsilon(rk_f + rm_f) \qquad (8)$$

where P stands for the BOP effects, s, the price of the initial foreign capital K, r, the shadow price of the output share accruing to foreign capital, k_f, and to foreign management, m_f , and $0 < \epsilon < 1$. Here, k_f includes such items as fee and royalty. Assuming that the capital inflow sK_f and the income outflows rk_f and rm_f occur during the same year, the overall BOP effects for that year can be zero, positive, or negative, although the effect on the current account is negative as shown by (8). The effect on the current account may be positive only if the product associated with FDI is exported. Thus when, FDI involves import and export activities, BOP effects must be amended in terms of this model as:

$$P = [(\alpha tQ+\beta tQ) + (sK_f)] - [(\delta tQ) + \epsilon(rk_f+rm_f) + (\lambda tb)] \qquad (9)$$

where t represents the shadow price of output Q, and $0 < \alpha < 1$, $0 < \beta < 1$, $0 < \delta < 1$, $0 < \epsilon < 1$, and $0 < \lambda < 1$. The first two terms, αtQ and βtQ, capture, respectively, the effects of export generation and import savings (i.e., trade effects), expressed as a fraction of the market value of the total output Q. The term δtQ stands for the foreign exchange cost of importing equipment and other inputs, again expressed as a fraction of the value of Q. The last term λtb measures the additional imports induced by the favorable income effects of FDI discussed above, namely b.

Unlike the predictability of (positive) income effects under competitive conditions as suggested by (5) or (6), nothing definite about the overall payments effects can be said even for the short run because the sum of the "capital outflows" in the second part of the equation (9) ([(δtQ) +

$\epsilon(rk_f+rm_f) + (\lambda tb)]$), may or may not exceed the sum of the "capital inflows" in first part $[(\alpha tQ+\beta tQ) + (sK_f)]$. However, in the short run, the effect on the current account may very well be positive if the value of export generation and import substitution exceeds the sum of the repatriated foreign earnings and import of intermediate goods. The same can also be said of the long run, assuming that the value of induced imports λtb remains sufficiently low.

But the concept of the overall BOP effects associated with a given FDI project becomes less meaningful in the long run. This is due to two main reasons. One is that the flows of resource or claims appear on different accounts of the BOP and the other is that these flows have different time dimensions. For example, while the capital inflows associated with the initial investment (sK_f) may be a one-time phenomenon, trade effects (αtQ and βtQ) and profit remittances (rk_f and rm_f) are bound to continue for many years after the initial investment. Further more, except for the long term capital inflow sK_f, which appears on the capital account, the remaining terms in (9) basically impact the current account. Another conceptual problem relates to the treatment of re-invested earnings, which should be considered as new capital inflows yet do not appear as such in BOP statistics. Also, if an FDI causes a displacement or preemption of a domestic business, then one must subtract the BOP effects of the displaced firm from P in (9) above.

In short, income effects and payments effects share one common characteristic, namely that over the years the problem of attribution become more and more intractable because in each case the effects will continue long after the initial act of investment. But while such a spreading over time has a clear impact on BOP effects and their measurement, it has no direct relevance to income effects in the sense that the latter is not so much a function of time as of the economic environment, in which the crucial factor is the presence or absence of appropriate mechanisms for siphoning off more income than was earned by the foreign firm according to its marginal productivity. If there are no continuous infusion of external capital and export of the final product, then in the long run, BOP effects tend to be negative because of the continuous stream of income/profits remissions. This may lie at the root of the confusion regarding negative income effects. But the possibility of long term adverse BOP effects does not imply that income

effects are negative for the same reason that foreign income/profit will continue to be repatriated over the years. While in the long run, the operation of a foreign firm can create a continuous flow of debits without creating an offsetting flow of credits, which would cause unfavorable BOP effects, it apparently cannot create a stream of incomes going to the foreign factor owners without simultaneously creating a stream of incomes going to the domestic factor owners as well.

Further Elaborations

Dropping the linearity or homogeneity assumption about the production function will not fundamentally affect the conclusions reached earlier. This is because while the form of the production function may affect the relationship between output and the distributive shares, it has nothing to do with the institutional environment or transfer mechanisms in the host country. So, neither linearity nor homogeneity has anything to do with the displacement effect or the opportunity cost of the domestic factors.

For example, suppose that the production function is homogeneous of degree n, where
$0 < n < + \infty$, and $n \neq 1$. The effect this would have on the model is on equation (3), which now becomes $q = nQ - i$, while leaving (5) and (6) unchanged. The only implication of changing the linearity assumption is that if the factors are paid by the value of their marginal product, the total product will be under-exhausted ($n < 1$) or over-exhausted ($n > 1$) by all the factor payments. All this means is that the foreign firm may enjoy more or less profit, but that is not the source of negative income effects.

Like any other productive activity, FDI undergoes changes as well as causes changes in the other sectors of the host economies. Basically, secondary effects of FDI can be grouped under two main categories, namely, linkage effects and external effects. The first refers to the vertical creation of supply of inputs to the foreign firm (backward linkage) or demand for the foreign firm's output for use as an input by a domestic firm (forward linkage). These secondary effects are very difficult to measure accurately, but the general principle can be simple. For example, let $\sum e$'s be the sum of all the

benefits (economies) and ∑d's, the sum of the costs (diseconomies) associated with secondary effects (both costs and benefits being measured in terms of output Q), then their difference (∑e's - ∑d's) should be added to or subtracted from equation (5) or (6) to obtain a more accurate measurement of income effects of FDI. How does the size of the intermediate input (i.e., I in equation 1) affect income effects of FDI? The answer depends entirely on whether I represents a (backward) linkage effect or simply a movement of intermediate inputs from one (domestic) sector of the host economy to another (foreign) sector. If I represents the latter, then this is a mere shifting of intermediate inputs within the host economy, and the size of I on income effects of FDI becomes irrelevant. In that case, it does not matter whether I come from domestic suppliers or foreign suppliers. On the other hand, if one drops the no-linkage assumption and let I stand for the net creation of additional intermediate inputs by the foreign firm as is true when linkage effects exist, then it matters whether the intermediate good come from a domestic source or from a foreign source. In the event that domestic suppliers are involved, one should consider the reward to I, namely i, as an addition to the net income effect of FDI. In that case, income effects b given by equation (6) can be restated as

$$b = (q - q') - (k_f + m_f) + i \qquad (10)$$

In the event that no backward linkage effects exist, it does not matter at all whether the intermediate input I is of domestic or foreign origin. If it is of domestic origin, it simply represents a movement from one sector to another within the same economy. But if it is of foreign origin, then, of course, the income associated with I accrues to foreign owners and not domestic owners.

FOREIGN INVESTMENT AND GROWTH: SOME RECENT EVIDENCE

On conceptual ground, we have argued that FDI activities tend to increase host countries' income unless a condition that could cause adverse

effects such as price distortion exists. This means that in cases of an open and well-functioning market economy, where price and exchange rate distortions are negligible, one would expect FDI to contribute to output growth in the host countries. The available empirical record is not always clear-cut on this point, however. While some studies saw a causal positive relationship between FDI and growth, others concluded that such a causality may be unascertainable, or that the positive association between FDI and growth may actually indicate a two-way relationship rather than an one way. For example, a study based on OECD data concluded that FDI has a favorable effect on growth, and the strength of such effect depends on the availability of human capital in the host country (Borensztein, Gregorio, Lee 1998). Similarly, the record of Brazil for the 1960-95 period shows FDI to play a positive role in that country's economic growth (Nader, 1998). By the same token, U.S. direct investment in Brazil during 1953-82 appeared to have a positive impact on Brazilian GDP, private consumption, and public consumption (Bonitsis and Aggarwal, 1990). On the other hand, a more recent study on the role of FDI on Chinese economic growth observed a bidirectional causality between growth, FDI, and exports (Liu, Burridge, and Sinclair 2002). This bilateral causality was also found in the case of Malaysia during 1965-93 (Doraisami and Leng, 1995). Still, an examination of the Indian experience suggests that causality runs more from GDD growth to FDI than the other way around (Chakraborty and Basu, 2002).

On another level, the contribution of FDI to economic growth can also be explained in terms of the higher efficiency of the foreign firm compared with the domestic competitor. This efficiency superiority can be attributed to better management and technology (Harrison, 1994). In that spirit, there is evidence that FDI contributes more to economic growth than domestic investment, provided that the host country has adequate absorptive capacity. This is a conclusion of a study covering 69 developing countries based upon 1980's and 1990's data (Borensztein, Gregorio, Lee 1996). The role of FDI in growth also depends on the degree of complementarity and substitution between FDI and domestic investment (de Mello, 1999). Regarding the dependency thesis, a study of seventy seven countries during

1967-92 found no support for the dependency proposition that links FDI to underdevelopment in LDCs (Farmer, 1999).

CONCLUDING REMARKS

1. In the absence of unfavorable displacement of domestic firms and relevant price distortions, operation of a foreign firm is incapable of contributing negatively to host country's national income as long as the domestic factors employed by the foreign firm have good knowledge of labor market conditions and behave as income maximizers.
2. Thus, the only way a foreign firm can transfer more income than the value added accruing to domestic factors, resulting in negative income effects, is through distortions in the price structure, which enables the foreign firm to siphon off more real output than is indicated by the nominal amount of repatriated income/profit.
3. Underpayment to the domestic factors is capable of reducing income benefits to the host economy but cannot render them negative if (1) domestic factors are income maximizers and aware of alternative job opportunities, and (2) a foreign enterprise does not adversely affect local economic opportunities, and (3) there are no price distortions associated with the FDI operation.
4. Local unemployment conditions are an important factor in determining the income benefits of FDI. Everything being equal, the higher is the level of local unemployment, the greater are the income benefits of FDI.
5. As far as income effects are concerned, it is immaterial whether the intermediate inputs used by the foreign firm come from domestic or foreign source if FDI does not create net addition of intermediate products in the host economy. Contrary to popular perception, high domestic content requirement does not increase income and employment in the host economy if no backward linkage effects exist.

6. There is no meaningful or consistent linkage between real income effects and balance-of-payments effects. Conclusions based on one kind of effects need not be consistent with those based on the other; therefore each type of effects should be considered on its own merits. For example, a country with no BOP problems should concentrate on income and employment effects alone when evaluating a FDI proposal.

Thus, in terms of policy implications, fear of negative income effects under any circumstances is often a misplaced concern. Instead, proper policy concerns should be mainly directed toward reducing or eliminating the conditions or mechanisms that enable the foreign firm to transfer more real income than that which accrues to the domestic factors (net of opportunity costs), leading to adverse income effects. The major mechanism worthy of special attention includes sources of distortion in the price structure relevant to FDI in both the domestic and foreign exchange areas, as well as direct or disguised subsidies. Promotion of a competitive environment is very essential for coping with problems created by severe distortions.

While it is not analyzed in this paper, transfer pricing should be prevented because it provides the means by which the foreign firm can transmit more real income than is apparent on the book. Host country's requirement of domestic content is not an unqualified benefit and should be judged on a case-by-case basis. For instance, to the extent that the use of foreign intermediate inputs denies income that could have accrued to domestic owners and increases foreign incomes that would be remitted, a stricter domestic content requirement is desirable because it will benefit the host economy. Positive measures to increase income benefits should also be contemplated in the area of encouraging reinvested earnings whereby a portion of foreign incomes is re-channeled back to the local income stream. Also, as equations (7) and (9) show, reinvested earnings will strengthen both income effects and balance-of-payments effects.

Finally, although the dependency thesis may imply adverse income effects, this paper does not provide an adequate framework to help evaluate that thesis. This is because it is concerned with a broader issue in which the

major points of attentions are unfavorable structural changes with serious adverse consequences on income distribution and power relationship in host countries, as well as long term economic and political dependency on the capitalist industrial economies. In short, the dependency thesis is more concerned with FDI and development (as opposed to growth) in LDCs, whereas this paper concentrates on FDI and growth.

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DISCRIMINATING BUYERS OF BASEBALL CARDS: DOES RACE AFFECT VALUE?

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ABSTRACT

Since the early days of racial integration in baseball, the issue of fan prejudice has been in question. Evidence of fan reaction to an individual players' race, however, has been nearly impossible to distinguish through such means as game attendance or ticket revenue. Looking at baseball cards, however, allows us to examine evidence based on individual player characteristics, including 'perceived' race. We create an original data set of 2833 player cards. Our findings show strong evidence of racial discrimination, with white player's cards priced an average of $3.25 more than non white players all else being equal.

Our approach to the issue of racial discrimination by sports fans is to make use of the fact that baseball trading cards have moved from the shoebox under the bed to the showpiece of sport collectors. The wide market for these trading cards provides us with a way to look at various players both from the angle of player skill and player race. If collectors are prejudice against non-white players, then cards of players with similar stats but of different races would presumably sell for different amounts.[1]

INTRODUCTION AND BACKGROUND

What had been a childhood hobby, collecting baseball cards that came with sticks of sugary sweet bubble gum, has become big business. Cards that once were purchased to make special noise effects on bikes tires are now investments in 'sports memorabilia.' Some cards can now sell for thousands

of dollars. For example, a 1910 Honus Wagner card recently sold for $640,500 (auction at Christie's in 1996).

Sports cards are seeing a surge of interest from adult collectors in the United States. This growing interest among adults, particularly, is evident from the number of sport card shops. Many retail stores (e.g. K-Mart, WalMart, and Target) reserve considerable space for these cards, and that space is in the front of the store: premium space for retail stores.

Other evidence of this growing industry is found in the number of card magazines. There is Beckett, Tuff Stuff, Sports Memorabilia, and Topps Baseball Cards, just to name a few. Most of these magazines' main function is to supply pricing information about sport cards, information that would not have interested the initial target customer of this market back in the middle of the century (pre-adolescent males). Card collecting is no longer just hobby, now it is a business, an investment for the buyer. Resale value of a particular player's card is paramount in the concern of today's buyer.

As these cards move from the hands of mere aficionados to investors, card buyers must put concerted thought into determining the resale value of these cards. Clearly, the age, condition, and rarity of the card matters, as well as the player's original popularity. Elements in this mix of player characteristics that determines value would include demonstrated player skill (stats) as well as player race.

Issues of racial prejudice are becoming very avant garde in the Economics profession. Furthermore, investigation into the evidence provided by sports on discrimination is hardly new (see Kahn, 1991 for a review, while Jewell, 2002 and others continue this type of work). For example, Rottenberg (1956), a forerunner in sports economics, was among the first to look at the labor market in baseball. Research into the area of discrimination in sports has taken many forms; a myriad of papers have examined various aspects of discrimination from many different sports. Nardinelli and Simon (1990) and, later, Gabriel, Johnson, and Stanton (1995) examined baseball memorabilia (other than trading cards) for evidence of discrimination among collectors. Fort and Gill (2000) examine much of the work done on discrimination revealed in memorabilia markets over the past decades. Other avenues of research have led to the examination of Hall of Fame voting,

promotion to major leagues, and contract/salary issues for evidence of discrimination. The application of economic principles and techniques to other sports in search of racial discrimination continues unabated with such articles as Szymanski (2000) who explores the English professional soccer leagues for evidence of discrimination and Kahn and Sherer (1988) who look into racial discrimination in basketball player salaries.

Fort and Gill (2000) suggest that previous explorations into the market for baseball cards for evidence of racial discrimination are flawed because the racial 'marker' used for the individual players is so often arbitrary (and, incidentally, the arbitrary choice of the researchers in questions, so that some level of bias may inadvertently be introduced). Our study employs a panel approach to the perception of race for individual players, with no input at all from the researchers except in the case of a tie. We note that Fort and Gill, using their continuous measure of race, find evidence of discrimination, just as we do.

Other studies, for instance Tregarthen (1992) and McGarrity, Palmer and Poitras (1999), have also explored the market for baseball cards for evidence of discrimination finding contradictory results. We attribute their discord to the fact that their approaches use a researcher determined measure of race and data set sizes that differ substantially from ours. Tregarthen (1992) looked at only a minute sample of cards, ignoring player attributes other than race. McGarrity, et al, (1999) also looked only at a small number of cards, issued in a single year. We use a very large sample (over 2,000) that incorporates player skill characteristics as well as race. These previous studies also use fairly recently issued cards. By concentrating on cards issued in the 1960's, we are able to ignore fan dedication to 'home teams' or currently winning teams or specific personalities.

OUR DATA AND THE MODEL

Cards prices are from Beckett's Official Price Guide to Baseball Cards. The cards original issue dates are from 1960-1969. As mentioned above, Beckett's pricing is the most frequently used price list for baseball cards. At this time, there was only one major producer of baseball trading

cards: Topps. While they do not traditionally reveal information about production numbers, we were able to contact Mr. Bill O'Connor at Topps. He told us that while no production records still exist from the period in question, he was an employee of the company at that time and remembers what the production runs looked like. Each printed sheet of cards had only one of each player and the sheets were printed in a mass run, thereby implying that each card had identical supply. At the time, however, one of the major (and major-ly destructive) uses of baseball cards was to produce the engine sound on bicycles. As using a well-known player's card was 'cooler' than using an unknown player, there might be fewer of the well-known player's card surviving from that time. Little however can be done about the destructive characteristics of little boys. Therefore, we assume that prices are driven by demand rather than supply characteristics.

Statistics about players' performance are collected from Total Baseball IV. The perceived race of the players will be determined by opinions gathered from at least 3 separate observers, as perceived race is the issue not genetic race. Three individuals independently view each players picture and make a racial identification. In the event of disagreement between observers, we add the opinions of each researcher and then tally the results and use the 'majority rules' decision.

During the 1960's there were 4,838 distinct cards including both pitchers and non-pitchers, counting each year's card for each single player separately. Since different statistics are kept for pitchers versus other players, we had to make a decision about which group to study. A brief consideration of such names as Sandy Koufax, Warren Spahn, Jim Bunning, Whitey Ford or Juan Marichal suggests that these are enduring legends of the game. Therefore, we came to the conclusion that pitchers become so well known as personalities that even 30+ years later collectors may still base value, in part, upon these personalities. We, then, limit ourselves to the non-pitchers (and leave the pitchers as a follow-on project for the future). This leaves us with a data set containing 2,833 distinct cards.

Data on the price of the card (Price), and the player's race (W, a dummy variable where one implies a white player) were collected as described above. Other attributes of the players, included whether the player

has been voted into the hall of fame (HF), or an All Star (AS), or an MVP (MVP) and if the player was in the world series that year (WS). Furthermore, we suspected that there may be some lingering affect from a player being in a large market, so we included a dummy for being on a New York team (NY). We saw no affect from any of the other large markets. In an attempt to capture not only the overall value of the player, but the specific attributes of each year, we used data for both lifetime achievement as well as for the season in question. Therefore, we also include runs batted in (RBI) and lifetime runs batted in (LRBI), home runs (HR) and lifetime home runs (LHR), and batting average (AVE) and lifetime batting average (LAVE). That way players who might have gone had an illustrious career, but may have been suffering from a rough year, may still earn collectors' admiration. Table 1, at the end of the paper, shows a summary of our data.

We used a linear model of these variables to explain card price as follows:

$$PRICE = b_0 + b_1 W + b_2 HF + b_3 NY + b_4 HR + b_5 RBI + b_6 AS + b_7 MVP + b_8 LRBI + b_9 LAVE + b_{10} LHR$$

We expected to find that a Hall of Famer (HF=1), a New Yorker (NY=1) and an All Star (AS=1) to have positive premia over other players. Additionally, we expected the performance variables (HR, LHR, RBI, LRBE, AVE and LAVE) also to boost card value. If the prices of trading cards for shows evidence of racial discrimination, we expect to find a negative coefficient on b_1, the coefficient on the race variable (W=1 if a player is white) to be positive. Results are summarized in Table 2, at the end of the paper.

RESULTS AND CONCLUSIONS

We have demonstrated that the market for trading cards shows significant racial prejudice. Card collectors cards exhibit definite signs that collectors are willing to pay more for the cards of white players than for those of non-white players. The effect of race appears to account for about $2.66 of the average card price of $11.43.

We suggest that we are able to demonstrate such strong evidence of discrimination, where others have usually found either weak or even no evidence is due to the nature of our data. Not only do we have substantially more observations than other studies, but we chose our players from several decades past. The fact that these players are no longer active in the sport means that collectors are not influenced as much by personalities, recent performance, or 'hometown' spirit, as they might be if the players were still in the game.

ENDNOTES

[1] Alternatively, it may not be each individual buyer who is demonstrating prejudice so much as buyers jointly assume that other buyers will display prejudice, thereby affecting price. This is something like England's famous "Page Two Girls" beauty contest where people are asked to pick what other people will think is the most attractive girl. At any rate, the result should be the same in this case: racial discrimination against non-white players should show up as reduced card price, all else equal.

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Table 1: Data Summary: Means (Standard Deviations)	
	Player
Price	11.435
	(32.559)
W (dummy = 1 for White)	.71529
	(.45135)
HF (dummy 1= Hall of Fame)	.07646
	(.26578)
NY (dummy 1= New York)	.10218
	(.30294)
HR (Home Runs)	8.819
	(9.948)
WS (dummy 1= World Series)	.02960
	(.16951)
RBI (Runs Batted In)	38.600
	(30.744)
LAVE (Lifetime Batting Average)	254.00
	(26.09)
LHR (Lifetime Home Runs)	113.38
	(136.33)
LRBI (Lifetime Runs Batted In)	485.41
	(441.44)
AS (dummy 1=All Star)	.13777
	(.34472)
MVP (dummy 1= Most Valuable Player)	.00669
	(.08156)

Table 2: OLS Regression Results Explaining Card Price	
y = Price	Coefficient
	(t stat)
Constant	-26.814
	(-3.97)**
W (dummy = 1 for white)	2.659
	(2.34)**
HF (dummy 1= Hall of Fame)	49.906
	(19.12)**
NY (dummy 1= New York)	9.340
	(5.44)**
HR (Home Runs)	.1353
	(2.30)**
WS (dummy 1 = World Series)	31.089
	(9.78)**
RBI (Runs Batted In)	-.09994
	(-2.44)**
LAVE (Lifetime Batting Average)	.12296
	(4.38)**
LHR (Lifetime Home Runs)	.07471
	(5.62)**
LRBI (Lifetime Runs Batted In)	-.017619
	(-4.06)**
AS (dummy 1=All Star)	3.558
	(1.99)**
MVP (dummy 1= Most Valuable Player)	19.291
	(3.03)**
Adj. R^2	36.3%
F	148.09

THE EURO AND EQUITY MARKETS IN EURO-ZONE COUNTRIES

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ABSTRACT

The relationship between exchange rates and equity prices is an unresolved issue. Proponents of a negative relation between the international value of a domestic currency and the domestic equity prices believe that stronger currency leads to lower exports and thus lower sales, profits, and stock prices for domestic firms. On the other hand, supporters of a positive relation between the international value of a domestic currency and the domestic equity prices argue that a strong domestic currency attracts foreign investors to the domestic equity markets. They further argue that a rising domestic currency leads to expectations of a future rise and therefore increases domestic investment incentives. While both views may be correct in certain time periods, the long term relationships between these two endogenous variables seem to be best described as unstable. In this paper, we hypothesize that both exchange rates and equity prices are endogenous variables, and thus their long-term relationship should be dependent on the predominant exogenous variable that causes movements in these variables. We test our hypothesis by empirically examining the relationship between the international value of the Euro and equity prices in the Euro Zone countries. We find evidence that this relationship is insignificant and unstable. Our findings provide support for the view that assuming a stable and strong relationship between exchange rates and equity prices is misleading.

INTRODUCTION

Although there is a dearth of literature on the relationship between exchange rates and equity prices, the direction and the long-term stability of the relationship remains an unresolved issue. While some studies present

empirical evidence in support of a negative relationship between movements in the international value of a domestic currency and domestic equity prices, others find the evidence of a positive relationship. Proponents of a negative relation believe that stronger domestic currency leads to lower exports and thus lower sales, profits, and stock prices for domestic firms. Supporters of a positive relation argue that a strong domestic currency attracts foreign investors to the domestic equity markets. They further argue that a rising domestic currency leads to expectations of a future rise and therefore increases domestic investment incentives. Empirical Studies by Frennberg (Frennberg, 1994), Choi (Choi, 1995), Ajayi and Mougone (Ajayi & Mougone, 1996), Bahmani-Oskooee and Domac (Bahmani-Oskooee & Domac, 1997), and Wu (Wu, 2000) all present evidence in support of a negative relationship between the value of domestic currency and stock prices. On the other hand, studies by Friberg and Nydahl (Friberg & Nydahl, 1999) and Hau & Rey (Hau & Rey, 2002) are among studies that conclude a positive relationship between these variables. While inferences presented by both groups about the exchange rate/stock prices relationship may be correct in certain time periods, the long term relationship between these two variables seem to be best described as unstable. In this paper, we argue that exchange rates and stock prices are both endogenous variables, and thus their long-term relationship should be dependent on the type of the predominant exogenous variable that would cause changes in these variables. For example, the nominal interest rate may be an exogenous variable, which may play a key role in relating exchange rates to stock prices. Since nominal interest rates are by definition composed of the real interest rate and the expected inflation, the pattern of the relationship between stock prices and exchange rates should depend on whether the disturbance is a real interest rate disturbance or a pure inflationary one. And since over the long run different disturbances may be dominant, one would expect the pattern of the relationship between stock prices and exchange rates to be unstable and insignificant over the long run. This logic was one of the arguments in support of the introduction of the Euro currency. It was argued for example, that adoption of a single currency in Europe would create more stable prices and lower interest rates by eliminating foreign exchange risk between the

EMU countries. It was anticipated that institutions in public and private sectors would reduce dollar-denominated investments and reallocate to Euro-based assets. This reallocation was expected to lead to stronger performance in equity markets in the EMU countries.

This paper provides an empirical analysis of the relationship between the Euro and equity prices in Euro-Zone countries. We test our hypothesis that this relationship is not significant. The contribution of this research to financial and economic analysis is based on evidence reported here contrary to the views that the movements in the international value of the domestic currency and domestic stock prices are strongly correlated.

METHODOLOGY AND EMPIRICAL RESULTS

The theoretical framework of this paper is based on a U.S. study by Farsio, Goodwin, and Willett (Farsio, Goodwin & Willett, 1992), and another international study by Fazel and Farsio (Fazel & Farsio, 1993). Both studies showed that neither a strong positive nor a strong negative relationship between movements in the international value of the domestic currency and domestic equity market had persisted over the 1973-1992 period. These studies also demonstrated that the correlation between movements in the domestic currency and the domestic stock market was likely to be related to the correlation between domestic interest rates and the international value of the domestic currency, and therefore dependent on the predominant cause of movements in nominal interest rates. In the above studies, the patterns of relationships between exchange rates and equity prices were analyzed in light of the real component versus the expected inflation component of nominal interest rates. If for example the dominant exogenous disturbance is a rise (fall) in the real interest rate, one would expect stock prices to fall (rise) since (according to finance theory) there is an inverse relationship between stock prices and the real discount rate. Meanwhile, according to exchange rate theory, a rise (fall) in the real rate of interest would cause an appreciation (depreciation) of the domestic currency since it would induce an increase (decrease) in the demand for the domestic currency. Therefore, under a real

interest rate disturbance, one should expect to find a negative relationship between the value of the domestic currency and domestic stock prices.

On the other hand, if the dominant exogenous disturbance is a rise (fall) in the expected inflation, we should expect a fall (rise) in both stock prices and the domestic currency, and therefore a positive relationship between the domestic currency and equity prices. This is because higher expected inflation would lower real after tax profits, and hence lead to lower stick prices. Meanwhile it is obvious that higher inflation and lower purchasing power would lead to lower international value of the domestic currency. Consequently, the patterns of the exchange rate/ stock prices correlations should be dependent on the predominant cause of changes in nominal interest rates, and therefore unstable over a substantial period of time.

In this paper, we apply the above analysis to the Euro/equity prices in the Euro-Zone countries. Our hypothesis is that the slope of the Euro/equity prices relationship in Euro Zone countries should be insignificant. To perform our empirical analysis, we estimate the following simple regression model:

$$\Delta \text{Ln} S_t = a + b\Delta \text{Ln}\, E_t + U_t \qquad (1)$$

Where:

S_t = Level of stock market index in Euro Zone countries at time t
b = Slope coefficient between stock prices in Euro Zone countries and the Euro
E_t = Level of Euro at time t
a = Intercept
U_t = Error term at time t

The Euro Zone countries include Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, and Greece. Stock prices in Euro Zone countries are measured by the Broad Euro Zone 600 index, which includes the average stock prices for the 600 largest

companies in the 12 countries that compromise the Euro Zone. The value of Euro (Et) is measured by the level of $/Euro. Based on this definition, a rising Et implies an appreciation of the Euro against the Dollar. Daily time series data for the Euro are obtained from www. Fxsolution.com and for Euro Zone stock index are obtained from www. Stoxx.com. Our sample covers January 1, 2002 through August 9, 2002. We selected January 1, 2002, as the starting point of our data since that is the date (the E-day) when Euro Zone countries began trading in the new European cross-border currency of the Euro. On that date, Euro bank notes and coins began circulating in the Euro Zone countries. The ending date for our data is based on unavailability of data beyond August 9, 2002. We divided our sample into two sub-periods: January 1, 1999 through December 31, 2001, and January 1, 2002 through August 9, 2002. The objective was to detect any disparity in the pattern of the relationship before and after the E-day. Based on our hypothesis, we expect the b coefficient to be insignificant across the two sub-periods and over the entire sample period.

Table 1 presents the estimates for the slope coefficient, b, over the three time periods. All OLS estimates are insignificant at the 5% confidence level. Instability in the Euro/equity prices relationship is evident before and after the E-day, as well as for the entire period since the Euro became the single currency in 11 European countries. The right-hand sides of Table 1 present the regression results with the serial correlation corrected. Again, for all periods under study, the relationship seems to be weak and unstable.

Simple regressions across the three time periods were found to reveal an insignificant relationship between the international value of the Euro and equity prices in the Euro Zone countries. As we have described in this paper, this observed insignificant relationship may be due to the existence of two exogenous disturbances; real interest rate disturbance, and inflationary disturbance. While a real interest rate disturbance would cause a negative relationship between the Euro and equity prices, an inflationary disturbance could cause a positive relationship. The existence of both exogenous variables may therefore cause an insignificant correlation between these variables.

CONCLUDING REMARKS

The objective of this study was to examine empirically the relationship between the Euro and equity prices in Euro Zone countries. We found that Euro and equity prices in the Euro zone countries are not correlated. The contribution of this study is that it provides to financial managers and forecasters evidence on the correlation between endogenous variables such as Euro and stock prices in the new era of Euro zone economies. We have provided additional evidence contrary to the perception of a stable correlation between exchange rates and stock prices. Our findings are important for financial decision making, since they support the view that it is a mistake to base the analysis on correlations among endogenous variables such as stock prices and exchange rates without identifying the underlying exogenous disturbances.

Table 1: $\Delta LnS_t = a + b\ \Delta LnE_t$

(Euro Zone Countries)				With AR(1) Correction			
Period	b	DW	N	b	DW	N	ρ
1999, Jan 1-2001, Dec 31	-.15 (-.43)	1.15	1095	-.37 (-.56)	1.80	1094	.23 (1.43)
2002, Jan 1-2002, Aug 9	-.05 (-.63)	1.27	221	-.09 (-.71)	1.94	220	.19 (1.26)
1999, Jan 1-2002, Aug 9	-.14 (-.51)	1.22	1316	-.23 (-.61)	1.88	1315	.27 (1.97)

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GEOGRAPHICAL DIFFERENCES IN POVERTY AND QUALITY-OF-LIFE RATINGS

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ABSTRACT

This paper employs the Spearman's rank correlation and Hotelling-Pabst tests to explore the relationship between poverty and quality-of-life rankings in the United States. The expectation is that the locality with the highest poverty rate would be rated at the bottom of the rankings based on the quality of life indicator. The results of both tests indicate no dependency between the two rankings. The justification for these results is based on the narrow measure of poverty that is currently being used. It is observed that poverty is defined very broadly, while its measurement is quite very restrictive.

INTRODUCTION

In a recent report of the activities of Devonport Action Against Poverty (DAP), a British organization, Van der Gaag (1999) notes the overwhelming clamor by members for respect for people in poverty. They say that poverty "is not about money, though it is what you can do with money." According to Van der Gaag, poverty is about money to the extent that it includes good housing, jobs, healthcare, education, leisure facilities, improved levels of benefit which don't penalize people for working, better transport, and an improved environment. Moreover, there are issues that don't involve money such as, more time, good relationships, privacy, community spirit and respect.

It is normal for workers, corporate executives, public officials to pay attention to ranking of localities across the country based on some traits that measure the quality-of -life. According to Gyourko (1991), a locality's quality of life depends on more than amenities. In an empirical analysis, Gyourko employed a battery of variables to compute the quality-of-life indexes for several localities across the country. These variables include precipitation, cooling degree days, average relative humidity, sunshine, cost-of-living index, hospital beds, property tax rate, population and crime rate. Given the broad coverage of this new measure of quality-of-life index, our objective in this paper is to determine the level of consistency between the quality-of-life and poverty level rankings across localities in the U.S. It is important to know if regional disparities in poverty rates reflect differences in economic well-being as measured by quality-of-life ratings.

POVERTY AND QUALITY-OF-LIFE

In 1974, Chenery et al directed attention of the international organizations to a devastating effect of poverty and need to adopt strategies that would eradicate this social ill from the face of the earth. According to Lipton (1995), the reason for researchers' interest in poverty measurement is to find out how serious this epidemic is for different people and to explore causal link between policy tools and other macroeconomic variables. Stevens (1994), recalls that policymakers generally are interested in the length of time individuals spend below poverty line because of its implications on management of public assistance programs. Triest (1997), notes that poverty rates in the U.S. vary from one region to the other just like the demographic characteristics of the poor. The author wonders why the depth of poverty varies as much as it does across different regions of the country.

Theoretically, the subject matter of poverty is based on the 'basic needs' approach. Fishlow (1995), notes that this approach emphasizes "the importance of separating generalized increases in income from the more significant attainment of the requirements for a permanent reduction of poverty - improvements in health, regular access to nutritional food, more

education, and better and affordable shelter." The arguments used to support this thesis include a fact that many people that are classified poor are not direct producers but part of the dependent population. It is not automatic that an increase in income of individuals is spent on essential services such as better medical care, housing and safe drinking water. Finally, individuals vary in their ability to spend disposable income effectively and wisely.

Based on the foregoing, it is not unlikely for income to increase without any appreciable increase in standard of living. More importantly, Fishlow (1995), notes that the negative correlation between income and poverty does not negate the relevance of public poverty strategies. However, any public policy directed at eliminating poverty should recognize the regional differences in poverty levels. Triest (1997), identifies the factors responsible for the regional differences in poverty rates in the U.S. These include, distribution of potential family earnings, number of weeks the family head was unemployed or whether or not the head of the family is a single woman. Burtless (1996), blames world trade for the inequality in earnings. According to him, even if trade is absolved of blame for trends in unearned income or changes in the composition of households, it is still a source of growing wage inequality.

Powers and Dupuy (1994), note that poverty is an eclectic concept that captures market conditions, demographic characteristics and fiscal policy. The authors, further posit, that it is difficult to accurately measure poverty because of complications created by interregional differences in cost of living and the quality of life. It is no surprise that Gyourko (1991), and Gyourko and Tracy (1991), develop a more comprehensive measure of a locality's quality of life. The value of a locality's quality-of-life (QOL) is defined by Gyourko (1991) as:

$$QOL_j = \sum_{k=1}^{m} FP_k * T_{kj} \qquad (1)$$

where,

$$FP_k = LP_k - WP_k \qquad (2)$$

QOL_j = Quality-of-life index for the jth locality.
FP_k = Full implicit price for trait k.
LP_k = The market price of land.
WP_k = The labor market price.
T_{kj} = The quantity of trait k in locality j.

In order to compute the index for a locality, Gyourko and Tracy use implicit prices by comparing each locality to a hypothetical locality having the average values of all locality traits. The logic is to obtain an index value in dollars, which reflects the premium individuals are willing to pay to live in a given locality relative to the hypothetical benchmark locality. The next logical question to explore is whether a locality with most people in poverty, ranks lowest on the quality-of-life scale.

EMPIRICAL ANALYSIS

As stated earlier, the objective of this paper is to determine the level of consistency between the quality-of-life and poverty level rankings across localities in the U.S. Moreover, it is important to know if geographical disparities in poverty rates are accounted for in the differences in economic well-being as measured by quality-of-life ratings. The data employed in this paper include the quality-of-life ratings for U.S. cities reported by Gyourko and Tracy (1991), 1990 U.S. census data of the number of households in poverty and the respective population numbers for U.S. cities and metropolitan statistical areas (MSA). For each city or MSA, the poverty number, is divided by the population number to obtain the proportion of the population that is in poverty. This proportion represents a rank measure of poverty for the respective city or MSA.

The Spearman's Rho and Hotelling-Pabst test are employed to analyze the data. These tests are the nonparametric equivalent of a test of correlation for matched pairs of data. Consider the following bivariate random sample of size n, (X_1, Y_1), (X_2, Y_2), ..., (X_n, Y_n). Let $R(X_i)$ be the rank of X_i

compared with the other values of X, for i=1,2, ...,n. For example, $R(X_i)$ = 1 if X_i is the smallest number in the series. By the same token, let $R(Y_i)$ be the rank of Y_i for i=1,2,3,....., n. The Spearman's Rho (ρ), is defined as,

$$\rho = \frac{\sum_{i=1}^{n} \{[R(X_i) - \frac{n+1}{2}][R(Y_i) - \frac{n+1}{2}]\}}{\{n(n^2 - 1)/12\}} \tag{3}$$

where,

ρ = Spearman's correlation coefficient
$R(X_i)$ = The rank of variable X_i
$R(Y_i)$ = The rank of variable Y_i
n = Sample size

An equivalent but computationally convenient form is given by:

$$\rho = 1 - \{\frac{6\sum[R(X_i) - R(Y_i)]^2}{n(n^2 - 1)}\} \tag{4}$$

As Conover (1980), notes, the Spearman's rho is insensitive to some types of dependence in the data; thus, a researcher is allowed to be specific as to the nature of the dependence that may be detected. Under this test, the null hypothesis is that variables X_i and Y_i are mutually independent. The alternative hypothesis is that there is a tendency for the smaller values of X to be paired with the larger values of Y, and vice versa. The null hypothesis, is rejected if computed D is less than its selected critical level.

The Hotelling-Pabst test is similar to the Spearman's Rho test. The Hotelling-Pabst T is defined as,

$$T = \sum_{i=1}^{n} [R(X_i) - R(Y_i)]^2 \tag{5}$$

The null hypothesis as stated above will be rejected if T exceeds its 1-quantile. It should be noted that T is large when is small, and vice versa.

The aforementioned tests are applied to the city/MSA poverty and QOL rankings for 113 cities/MSAs selected from Gyourko and Tracy (1991). The null hypothesis tested is that the quality-of-life and poverty index rankings are mutually independent. Consequently, the alternative hypothesis is that there is a tendency for the smaller values of poverty index to be paired with the larger values of QOL index and vice, versa. The calculated Spearman's rho value of 0.022, is compared with the critical value of -0.155, which reflects a 5 percent level of significance. This result indicates that one cannot reject the null hypothesis of independence. By the same token, we obtained a Hotelling-Pabst T value of 235,098, which is compared to a critical value of 277,841.21. Again, this result is indicative of a non-rejection of the null hypothesis at the usual 5 percent level of significance.

CONCLUSION

Many economists and social scientists agree that GNP per capital is a crude and incomplete measure of quality of life but, several public policymakers still rely on this measure (Nussbaum & Sen, 1993). One approach to life is based on a combination of doings and beings, which are collectively referred to as functionings. According to Nussbaum & Sen (1993), these functionings, embrace such matters as being well-nourished and disease-free, self-respect, preserving human dignity and taking part in the life of the community. In a similar pattern of argument, Wingo and Evans (1977), observe that any economic policy directed at improving the quality of life must address health, education, urban economics and the economics of the environment.

The United Nations Development Program (UNDP), defines human poverty as "a denial of choices and opportunities for living a tolerable life." As noted earlier in this paper, poverty goes beyond money or lack of it and its impact varies from one place to another. Powers and Dupuy (1994), attribute poverty differences across geographic regions to demographic, economic, policy and cost-of-living factors. A discussion on poverty

resembles closely that of quality of life to the extent that one thinks poverty is a significant indicator of quality of life.

The approach in this paper has been to explore the level of consistency between geographical rankings of quality of life and poverty in the U.S. In doing this, the authors employed the Spearman's rank correlation and Hotelling-Pabst tests. The expectation is that the locality with the highest level of poverty, would be rated at the bottom of the rankings based on the quality of life indicator. The results of both tests indicate no dependency between the two rankings. The justification for these results, is based on the narrow measure of poverty that is currently being used. It is observed, that poverty is defined very broadly, while its measurement is quite very restrictive. Based on the foregoing, it is imperative for policy-makers to explore amore broadly-based measurement of poverty. This is the only logical effort needed in order to alleviate poverty and thus influence the quality of life of the people.

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