DEBT DEPENDENCY, DEBT RELIEF, AND MACROECONOMIC POLICIES:

HOW DOES THE STRUCTURE OF EXTERNAL AND DOMESTIC DEBT

AFFECT THE WELL BEING OF A COUNTRY'S CITIZENRY?

A Dissertation

by

JACKIE R. BURNS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2004

Major Subject: Sociology

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Approved as to style and content by:

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ABSTRACT

Debt Dependency, Debt Relief, and Macroeconomic Policies: How Does the Structure

of External and Domestic Debt Affect the Well Being of a Country's Citizenry?

(December 2004)

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The research expands the scope of the World System and Dependency theories that emphasize the deleterious effects of the extent of external debt held by multilateral institutions (Chase-Dunn, 1975; Sell and Kunitz, 1986-87; Meldrum, 1987; Harsch, 1989; Bradshaw and Huang, 1991; Bradshaw et al., 1993) *and* the structure of capital formation (Chase-Dunn 1975;Bornschier, Chase-Dunn, and Rubinson 1978; Bornschier and Chase-Dunn,1985; Timberlake and Kentor, 1983; Bradshaw, 1987; Walton and Ragin, 1990; Dixon and Boswell, 1996; Firebaugh, 1996) on the growth and development of Third World Countries. This research primarily examines the relationship between external debt held by multilateral development institutions and central government debt. A major barrier to social and economic development in developing countries is malnutrition and the inability of individuals to maintain a healthy standard of living and be economically and socially productive. The major findings on the direct and indirect effect of external debt and the solvency of a domestic economy on the health and nutritional status of women and children were: External debt as measured

as a percent of GDP did produce slight but statistically significant direct effects on under-five infant mortality. Central government debt as measured as a percent of GDP demonstrated a direct effect only with under-five mortality and it was modest at best. Gross domestic investment measured as a percent of GDP also exhibited a weak direct effect on under-five infant mortality and percent total immunized. As expected, external debt did demonstrate a substantial and statistically significant direct effect on central government debt. The results of the path analysis reveal that external debt consistently produced an indirect effect, operating through central government debt, on measures of under-five mortality, percent children immunized, and children wasting and stunting. However, the magnitude fluctuates considerably and their statistical significance drops to below acceptable levels on childhood immunizations and the nutritional measures.

DEDICATION

To my mother Patsy J. Hefner-Burns for her unconditional love.

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I wish to express my great appreciation of the unwavering support I have received from my family, friends, and church community. Many thanks also go to my advisor and chair of my dissertation committee, Dr. Wm. Alex McIntosh, Professor, Department of Sociology/Rural Sociology. You have transformed many lives with your quiet resolve and generous portions of long suffering. It has been a privilege working with you and coming to know you over the years. The accomplishment of something of this magnitude could not have been possible without the faculty and administrative staff at Texas A&M University. My warmest and most humble regard goes to Dr. Kenneth Kiser, Professor, Department of Sociology, Oklahoma State University. Thank you for carrying me across the finish line.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

CHAPTER I

INTRODUCTION

The globalization of capital and the emerging global economy has as McMichael (1996: 25-26) notes, "…embedded national economies [and] dissolved the sovereignty of the nation state." The global financial system operates under a logical integrity that maximizes profits for shareholders at the expense of the social welfare of a country's citizens (1996:35-40). As human suffering and deprivation continue to escalate on an global level there is "…an urgency to reallocate expenditures" to the social sectors and establish viable infrastructures that attend to basic human needs (Daesking & Powell, 1999).

The effect of capital globalization on health has been a major concern for dependency theorists and it has recently become a major concern for the World Bank and development economists in general (World Bank, 1996). Brenner (1996:214) asserts that "It is widely recognized that the performance of the economy has a profound impact on a nation's health." He further states that an individual's socio-economic status is almost entirely dependent on national economic performance and is one of the more powerful epidemiological risk factors. Differential socioeconomic status is linked to deteriorating health conditions of individuals due to its effects on access to opportunity structures that result in fluctuations in standard of living conditions.

This thesis follows the style of *American Sociological Review*.

This is supported by a number of studies: Brenner (1996) and his analysis of population health and its links to production and consumption patterns; Daly, et al. (1998) and the association between inequitable distribution and systematic under investment in human, physical, health and social infrastructure; Waldman (1992), and Wennemo (1993) demonstrate the negative effects of income inequality and poverty on infant mortality. Jenkins and Scanlan (2001) further note that, "Economic growth may improve aggregate food supply, but because of unequal control of economic resources the poor remain disadvantaged." A major barrier to social and economic development is malnutrition and the inability of individuals to maintain a healthy standard of living and be economically and socially productive.

In summary, the performance of a nation's economy within the global economy and the distribution of resources have direct effects on the well-being of its citizens. A major concern for development economists today is the persistent unresponsiveness of a developing country's economy to intervention programs aimed to improve economic performance and standards of living that promote healthy lifestyles.

In spite of two decades of debt relief, poverty and income inequality continues to escalate in many developing countries. Conventional wisdom would expect debt relief to encourage asset accumulation and spur economic growth that would in turn improve the social and economic circumstances of the poor. Indeed, conventional measures of external debt dependency have demonstrated a decline in the percent debt service being paid to exports and gross domestic product (GDP). However, the mystery of escalating poverty becomes demystified when researchers turn their attention to the structure of

domestic debt in conjunction with a nation's external debt and how the two are intertwined. A closer examination of the domestic debt and external debt stock reveal the extent and consequence of an insolvent nation. As domestic debt and the net present value of external debt stock has increased over the past decade, poverty and income inequality have also increased.

In the interim, the International Monetary Fund and The World Bank have become increasingly aware of the need to recognize that the debt crisis of less developed countries (LDCs) is fundamentally a problem of solvency and not liquidity of cash reserves. They now concur that the Balance of Payment (BoP) accounting methods and the standard indicators of debt dependency ratios are no longer sufficient in understanding development and dependency issues. Solvency issues of a nation necessitate a higher level of specificity in the monitoring of fiscal and monetary policies, as compared to the Balance of Payments (BoP) approach. This higher level of specificity includes measures of domestic assets, domestic debt, and net present value of both external and domestic debt stock (*External Debt Statistics: Guide for Compilers and Users*, World Bank, 2001a).

This dissertation follows the link of production and consumption patterns to population health. Given the dire circumstances of the humanitarian situation in developing countries, it is imperative that social science continue to explore and discover economic and political factors that are either causing problems to escalate or discover factors that will cause a decrease in the escalation of problems.

The Research Problem

The purpose of this research is to extend the field of inquiry of dependency theorists to include measures of domestic debt – as measured by central government debt, domestic assets- as measured by gross domestic investment and Easterly's (1999) measure of net present value of debt correcting for loan concessionality. These measures will be used in conjunction with already established measures of economic growth – as measured by annual growth of gross domestic product (GDP), external debt dependency– as measured by present value of debt as a percent of exports of goods and services, and their effects on the health and nutritional status of children. The following hypotheses are derived in an attempt to capture both the World Bank's increasing concern for domestic solvency and Easterly's (1999) proposed negative influence of debt relief as measured by net present value of debt stock (also controlling for concessionality) on the structure of a nation's domestic economy, as measured by central government debt and gross domestic investment. Domestic debt, or central government debt, will be examined in addition to the conventional measures of domestic assets, or gross domestic investment, in order to more fully examine a nation's economic ability to initiate and maintain physical and human capital investments, which in turn, promote the physical well being of a country's citizenry.

Loan concessionality refers to the restructuring of debt with a reduction in the present value of the debt service. Concessionality level is defined as, "A net present value calculation, measured at the time the loan is extended, that compares the outstanding nominal debt value of a debt and the future debt service payments

discounted at an interest rate applicable to the currency of transaction, expressed as a percentage of the nominal value of debt" (*Supplement to External Debt Statistics: Guide for Compilers and Users*, World Bank, 2001b:493). Beginning in October of 1988, concessional restructuring terms have been granted to low-income countries that reduce the present value of eligible debt. Since 1988 there have been four revisions to the amount of eligible debt that can be reduced with the final revision culminating in June 1999, which increases the present value of debt (NPV) reduction up to 90 percent (Supplement to External Debt Statistics: Guide for Compilers and Users, 2001b:494).

This research extends previous research in several specific ways. First, the analysis will utilize Easterly's (1999) indicator of external debt-relief - net present value of debt controlling for loan concessionality - and test it's effect on basic health and nutrition indicators. This will move debt dependency research forward by including an examination of the effects of external debt relief intervention on the development of physical and human capital investments. Second, the utilization of a nation's domestic economy, specifically gross domestic investment and central government debt, will test the effects of domestic solvency on indicators of basic health and nutrition indicators. Third, by including traditional economic growth and dependency measures such as GDP per capita, external debt as a percent of GDP and/or exports of goods and services, the research encourages a comparison of debt-relief related variables to the more conventional external debt dependency measures. Fourth, by extending the field of inquiry into higher levels of economic specificity of a nation's domestic economy, the relative importance of liquidity and external debt may be subsumed under the increasing

significance of solvency and domestic debt. This will bring World System and

Dependency theory research more in line with the current research agenda of the

International Monetary Fund and the World Bank.

CHAPTER II

LITERATURE REVIEW

During the 1970's, developing countries aggressively began to expand their market economies beyond domestic borders. Corporations mobilized and hence globalized their capital resources through strategies such as vertical integration of transnational corporations (mergers and acquisitions) and strategies of direct foreign investment in developing countries. One of the underlying assumptions of capital globalization is that developing countries that engage in international trade and finance will follow the same trajectory of growth and development as experienced by the now "developed" nations. It is assumed that the infusion of capital via direct foreign investment and trade contributes to the development of income producing economies, expedites technological transfers, increases the efficiency of production facilities, and improves the standard of living (Firebaugh, 1992; Bauer and Yamey, 1957; Rostow, 1960).

Unfortunately, growth and development in less developed countries (LDCs) has never fully materialized. Most development theorists operated under the assumption of perfect competition and failed to consider a developed country's hegemonic control of global resources. By the late 1970's, LDCs sounded the alarm that the absence of perfect competition in a global economy was not only true but also untenable. In less than a decade, many LDCs had accrued unsustainable levels of debt and were unable to service them. These debts were accrued primarily from trade deficits and the need to borrow heavily from other governments, private lenders, or export credit agencies (ECAs) (Daesking & Powell, 1999:2). The 1980's debt crisis demonstrated that LDC

economies were not growing in proportion to the debts they were accruing in international trade.

Globalization and Economic Dependence

The World System and Dependency perspectives proved the most logical paradigm to approach the causal relationship between globalization, economic dependency and the social welfare of societal members. The position of the nation-state in a global hierarchy assumes that nation-states are interdependent and economic development and distribution of wealth is contingent upon their interdependencies. Differential access and utilization of resources in the exchanges made between nation-states would ultimately affect access and utilization of resources within a nation-state. Building upon the logic of development theory, the World Systems and Dependency theorists began to utilized the direct foreign investment and dependency measures to demonstrate how developed or core countries engage countries that are less developed into economic and political relationships that ultimately retarded their economic development.

Research findings on the negative effects of globalization on a developing domestic economy generally support evidence that foreign ownership of capital investment was not as productive as domestic capital investment due to issues such as profit repatriation, declining reinvestment, and weakened public revenues (Dixon and Boswell, 1996:543). In fact, dependency ties have historically emerged from a peripheral country's ties to transnational corporations (Walton and Ragin (1990:879). Peripheral countries are linked to the world economy through a system of transnational exchanges that concentrates capital among the small local elite allied to international capital that stunts

local industry and perpetuates global inequality, unemployment and underemployment (Bornschier, Chase-Dunn and Rubinson 1978; Chase-Dunn 1975; Bornschier, Ballmer-Cao and Thanh-Huyen, 1978).

Dixon and Boswell (1996:545) assert that, "At the heart of capital dependency research [is] that the source of capital investment matters". Firebaugh (1992:106-7) provides substantial evidence that foreign capital is substantially less productive than domestic investment in terms of tax avoidance, diminished local entrepreneurship, inappropriate technology, less profit reinvestment, and less linkage to domestic business (as cited in Dixon and Boswell, 1996:545). Samir Amin (1974, 1976) argues that dependency of foreign capital investments causes structural distortions or *disarticulation* of the domestic economy. Disarticulation is characterized by weak or missing internal links between economic sectors with varying levels of development and productivity. The research of Evans and Timberlake (1980) builds on Amin's theory of disarticulation and demonstrates how dependency of foreign capital promotes income inequality by encouraging the disproportionate growth of capital-intensive industry in urban areas and ultimately widening the gap between dual sector economies, or between capital and non-capital intensive sectors of the economy.

Bornschier and Chase-Dunn (1985) demonstrated that countries with high proportions of capital stocks owned by foreign corporations experienced lower rates of GNP growth. Others have operationalized transnational corporation (TNC) penetration and found it positively associated with growth in income inequality (Bornschier, Ballmer-Cao, and Thanh-Huyên, 1978). Walter and Ragin (1990) and Bradshaw et al.

(1993) findings demonstrate that the greater the form of dependency the slower the economic growth. Bradshaw et al. (1993) utilized several indicators of dependency including IMF debt renegotiations and total external debt as a percent of exports and gross national product. Walter and Ragin (1990) operationalized dependency by constructing an IMF pressure index based on four criteria capturing past IMF debt renegotiations. Wimberley (1990) found that the net level of foreign investment has negative effects on both the economy and the social welfare of individuals. Timberlake and Kentor (1983) have examined the effects of dependency in the form of direct foreign investment and its links to over-urbanization and the widened gaps between capital and non-capital intensive sectors of the economy. Over-urbanization is characterized as structural distortions amassing from a surplus of population in urban areas. This is due primarily from push factors such as the shift to export-oriented agriculture and pull factors such as availability of government resources and income producing jobs. Excessive urbanization is relative to a country's level of economic development. Bradshaw et al., (1993:637) defines overurbanization as "a condition that occurs when countries are not sufficiently developed to employ, house, and generally care for their growing urban population." Walton and Ragin's (1990) findings demonstrate that over urbanization, measured as the residuals of urbanization regressed on GNP per capita (Bradshaw, 1987), is one of the primary causes of Third World protests against austerity programs.

Neoclassical Economic Theory

Neoclassical economists believed that foreign investment provided a means for generating capital for investment in the local economy, arguing that local investors lack both sufficient incentive and capital resources to do so. Evidence supports this view, de Soysa and Oneal's (1999) findings demonstrate how direct foreign investment spurred growth in gross domestic product per capita, was more productive than capital from domestic sources, and stimulated investments from domestic sources. Borensztein, Gregorio, and Lee (1998), and Dunning and Hamdani (1997) found foreign investment increased the rate of investment from domestic sources and provided wider export markets.

Firebaugh (1992) has argued that many dependency studies involve a misinterpretation of the ways in which investments, foreign or otherwise, affect an economy. Firebaugh claims "investments are investments" in that both foreign and domestic investment contribute to overall investments, which contribute to economic growth. He argues that dependency theory studies have relied on measures of current amount of stock of foreign investment rather than flows of foreign investments. Using three different measurements of investment flows Firebaugh (1992) found that an increase in such flows leads to an increase in economic growth. However, Firebaugh's later research findings on investment dependence demonstrate statistically significant reductions in welfare benefits (caloric consumption per capita and infant survival probability) of economic growth. Firebaugh and Beck (1994:647) concludes that, "The

view that imported capital may not be as beneficial as domestic capital is hardly a startling revelation to development scholars".

Debt Dependence and Economic Growth Theory

Researchers have increasingly turned their attention to debt dependency and its consequences for economic development. Debt dependency measures came to be considered a country's primary indicator of their status in the global hierarchy of international trade. World system and dependency theorists have asserted that debt dependency has deleterious effects on countries in the periphery equal to or greater than those caused by trade dependency. Debt dependency takes precedence over commodity trade dependencies when explaining slow economic growth (Bradshaw and Huang, 1991). Chase-Dunn (1975), Pfister (1984), Sell and Kunitz (1986-87), and Bradshaw et al. (1993) found that external debt, operationalized in several ways, creates deleterious consequences such as retarded GNP growth, increased income inequalities, and slowed decline in mortality rates.

A variety of measures of debt dependency have been utilized but the most cited were "percent debt service to GDP and/or exports". The numerator "percentage paid to service their external debts" remained constant while the denominator fluctuated somewhat but also remained an aggregate figure derived from a balance of payments accounting system. These measures were adopted in large part from the World Bank and the International Monetary Fund. The "debt crisis" was, after all, the failure of several countries to service their debt. The World Bank and the International Monetary Fund instigated elaborate macroeconomic interventions to restore net cash flows and

payments to creditors. The primary source of capital revenues for many LDCs continued to be export commodities and capital generated from direct foreign investors. The balance of payment (BoP) accounting method of multilateral institutions typically aggregated capital revenues into gross domestic product figures. Hence, the debt service ratio was the primary measure used in devising strategies to restore net capital flows back to lending agencies (External Debt Statistics: Guide for Compilers and Users, World Bank, 2001a:1-2).

A second important factor to consider when examining increasing external debt is the role of the hegemonic financial institution, the International Monetary Fund (IMF). Hegemonic to the degree that developing countries suffering from chronic shortages of foreign exchange, due to declines in international crop prices, can ill-afford to sever ties with international capital. International creditors adhere to strict monetarist economic theories. The IMF makes loans and evaluates creditworthiness of developing countries. Once a country defaults on their debt service payments they must submit to IMF imposed conditionality or structural adjustments for debt repayment to restore their credit status (Bradshaw and Huang, 1991).

IMF structural adjustments, or austerity measures, typically involve currency devaluation, wage freezes, and reduced government spending on issues such as food subsidies (Meldrum, 1987). Harsch (1989:46) notes that structural adjustment policies that reduce government spending on social welfare programs are particularly harmful to children. Harris (1986) notes that wage freezes cause decreases in the standard of living due to inflation outpacing individual earnings. Devaluation of currency, increased

privatization, and removal of tariffs are encouraged in order save money and encourage

exports (Callaghy, 1984). Bradshaw and Huang (1991) note the June 1990 aftermath of

IMF imposed austerity programs in Zambia when food prices increased dramatically in

the absence of food subsidies. The ensuing civil unrest killed at least 23 people and

incited an unsuccessful coup attempt against the president. Stonich (1991) documents

the effects of these failed policies in Honduras, which experienced the effects of both the

decline in international crop prices and an increase in external debt. During the 1980's,

GNP growth declined, as did wages and standard of living. External debt increased by

169 percent, increasing the percentage of GNP devoted to repayments from 19 to 27

percent. Many Hondurans experienced a decline in wages while others lost sustenance

ability entirely due to capital flight and privatization of public works.

Economic Growth/Dependence, Income Inequality, and Physical Quality of Life

Initially, social scientists sought to understand how and why the globalization of capital

was simultaneously expanding a lesser developed country's (LDC) domestic economy in

terms of gross domestic product per capita but also making them more economically

dependent on bilateral and multilateral financial institutions. Development economists

had regarded phenomenon associated with the social sectors (health, education, and

nutrition) as "residual" effects of more macro economic policies. It was assumed that

social sectors would improve as a natural consequence of an "expanding" economy

(typically measured as gross domestic product per capita). Conversely, the increased

standard of living derived from the expanding economy would in return help sustain and

maintain long-term economic growth. Regardless, the social sector would not come under scrutiny until the classic macroeconomic explanations had been exhausted.

As stated earlier, dependency theorists concluded that macroeconomic policies and the use of foreign capital investment tended to *disarticulate* the economy that then resulted in slower growth and increased inequality from excessive growth in service sector employment. Economic dependencies such as trade inequities, direct foreign investment, and debt dependency, have negative effects on both the growth of economic wealth as well as its distribution (Amin 1974, 1976; Evans and Timberlake 1980; Stokes and Anderson 1990).

Economic disarticulation occurs when an economy adopts a predominately-external market orientation that in turn creates differential productivity within the various sectors of a domestic economy. Export driven sectors are characterized by modern production technology (non-labor intensive) and monopolize access to capital. Undeveloped sectors are characterized by traditional labor-intensive productivity and are unable to develop input markets to the export-oriented sector. The relationship between wage-levels and productivity and the relationship between economic growth and labor force expansion becomes bifurcated resulting in a traditional sector economy and an export oriented, or developed, sector of the economy (Stokes and Anderson, 1990).

Population health is inextricably linked to patterns of consumption and production, the stability of economic growth, and the extent of economic inequality (Brenner, 1996:212). There are two primary mechanisms by which health is related to income inequality. First, inequitable distribution of resources, including income, are more than

likely associated with systemic problems within the state apparatus and include basic institutional under-investment in human capital and social infrastructure. Societal wide under-investment has very real material effects for those individuals who occupy the lower and middle stratum of the class status hierarchy. Second, people's perceptions of their social environment are directly related to their experiences, the deleterious experiences of poverty may also affect the health of an individual (Daly et al., 1998: 319).

Waldman (1992) conducted a cross-national study on the effects of income inequality on infant mortality and found that the greater the disparity in income between the rich and poor adversely affected the mortality rates of the poor. Wennemo (1993) also examined infant mortality rates and the effect of public policy and income inequality in industrialized countries. Her findings indicate that income inequality and poverty rates explained more of the variation in infant mortality rates than economic development.

The research of Floud et al. (1990) demonstrated that improved wages tended to improve diets and lower mortality. However, rapid urbanization and maldistribution of resources would circumvent any further declines in mortality. Contrary to findings that suggest that income distribution and GNP per capita predicted life expectancy (Rodgers, 1976; Flegg, 1982; LeGrand, 1989; Moon, 1991; Firebaugh and Beck, 1994; McIntosh, 2000), Wilkinson's (1996) hypothesis asserts that increases in life expectancy are due to declines in social inequalities and improved access to resources via social networks of integration. Wilkinson (1996) examines the relationship between economic growth and

improved health and notes that the increases in life expectancy level off after $6,000 per

capita is achieved and countries that are relatively poor have achieved high levels of life

expectancy without the concomitant growth in per capita income. The conundrum for

Wilkinson lies in disentangling the phenomenon of social integration to a level that can

be measured and linked to factors that improve health.

Research on income inequality and health in the United States has incorporated

disaggregated levels of income inequality that include state, community, as well as

family income and examine both risk of death and self-assessed health as dependent

variables (Daly et al., 1998; Kawachi et al., 1997; Kennedy et al., 1998). Again, the

general findings support that income inequality has a modest but significant negative

effect on health.

Economic Dependence and Provision of Health Services

Caldwell's (1986:203) central finding is that mortality can be reduced significantly by

basic health service provisions, the establishment of a nutritional floor, family planning,

and educational opportunities for females in particular. Evans (1994) research found

that increased access to public health and medicine lead to mortality decline. Bahr and

Wehrhahn (1993) examine the effects of public health intervention programs such as

building rural clinics, breast-feeding; feeding expectant mothers, child supplemental

foods, and drinking water access. The research findings demonstrate that all contribute

to mortality declines. Arriaga and Davis (1969) study of mortality declines in Latin

American illustrated that there are non-economic factors associated with mortality

declines. In this instance, public and medical health interventions were attributed to

mortality declines. However, it could be argued that public and medical health intervention would not have been possible without the economic resources to make such investments.

Hymer (1972) and Müller (1979) findings show that multinational penetration may impede public health measures by repatriating profits and reducing funds available to the government. Repatriation of profits obstructed a country's ability to apportion public spending through tax initiatives, and required governments to invest in economic infrastructure rather than the public infrastructure. Sell and Kunitz (1986-87), attribute the slow down in mortality decline to reduced public spending because of burgeoning foreign debt and subsequent austerity measures. Wimberley's (1986, 1990, and Wimberley and Bello,1992) findings on increased debt dependency demonstrated a decline of other basic health considerations such as immunizations and prevalence of physicians. Bradshaw et al. (1993) suggest that the negative effects of economic dependency were a possible explanation of health differentials between core and periphery countries. It has long been recognized in development economics that increases in level of debt can spur capital flight and reduce the amount of capital available to invest in improving the health, sanitation, education, and expansion of a consumer economy.

Economic Dependence and Basic Needs Fulfillment

Streeten (1981) argue that economic growth and inequality measures are inadequate in assessing the impact of international development policies on the physical quality of life of a country's citizenry. Streeten (1981) introduced the perspective of a "basic needs"

assessment of development as an alternative approach to the economic growth and reductions-of-inequality perspectives. The health status of a population became associated with a range of indicators that included housing, sanitation, safe water, nutrition, basic education and health (Hicks and Streeten, 1979).

Research on the effects of globalization on Third World economic growth and income inequality was extended in order to capture the dynamics of the relationship between dependence and development (Wimberley, 1990; Wimberley and Bello, 1992). Problematics associated with reliability and validity of data on income inequality was a strong motivator towards the move to a basic needs assessment utilizing social indicators. For example, a study conducted by Firebaugh and Beck (1994) examined the effects of economic growth and dependence on changes in national welfare. National welfare consists of three measures: caloric consumption per person per day, infant survival probability, and life expectancy at age one. The authors state, "these measures are not readily monopolized by the rich"[1] (Firebaugh and Beck 1994:640, citing Hibbs, 1973). Moon and Dixon (1985) first examined the influence of intranational political variables - regime ideology, level of democracy, and state strength – on basic needs provisions and found that as state strength increased (government expenditures as a proportion of GNP) basic needs provision decreased. "This relationship, however, masks an interaction between regime ideology and state strength: strong right-wing regimes tend to depress basic needs provision, whereas strong left-wing states tend to enhance it" (London and Williams, 1990: 567). London and Williams (1990) addressed

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[1] Of course, it is arguable that these indices are indeed direct measures of the degree to which the rich have a monopoly on the distribution of resources.

inherent weakness in the Moon and Dixon (1985) research and added international economic variables in order to examine their relationship with intra-national political factors. They also reexamine the role of ideology and its affects on governmental policies and public spending. Their general findings show "strong support for dependency theory [and] more specifically, [that] international economic and internal political processes are independent processes that affect basic needs provisions" (London and Williams, 1990:579).

In a later study, Moon and Dixon (1992:192-193) reviewed the controversies surrounding the "growth-equity trade-offs" that have been at the center of development policies since the 1970's. The debate over the nature of growth and equity initially concerned itself with the income distribution and the negative effects on long-term economic growth of redistributing income to those below the median income level. Liberal economic theory assumes that, " Nations marked by a better than average provision of basic needs are expected to suffer slower future growth…due to slowed savings rate, redistributive taxation, and the larger role of the state." However, the researcher's findings "show no evidence for the orthodox view that either basic needs fulfillment or improvements in basic needs provision compromise future growth" (Moon and Dixon, 1992:205).

The negative effects of investment dependence on "basic needs fulfillment" have been further documented by Bullock (1986), in the examination of the social progress of less developed countries [unpublished doctoral dissertation cited by Wimberley (1986:76)]; London and Williams (1988), utilized the "indexes" of physical quality of

life (PQLI) and net social progress (INSP) as well as separate measures of physical quality of life[2]. Bradshaw et al. (1993:629) conducted an analysis on the effect of the global debt crisis on children and found that "… imposed austerity measures have directly or indirectly impeded child survival, childhood immunization, economic growth, prevalence of health attendants, adequate nutrition and balanced urbanization."

Composite basic needs indices such as the Physical Quality of Life Index (PLQI) were constructed as indicators to measure the concept of "development as basic needs satisfaction." However, these indices tended to exclude measures of food supply and food consumption (Moon, 1991). When utilized, these indices are used as empirical tests of the proposition that dependent economic relationships promote underdevelopment. Indices of basic needs satisfaction have been promoted as being a more viable measure of development than economic growth or distribution of income. Measures of health, food consumption, and education are, after all, the material foundations of life and are direct measures of what development economists suggest are the benefits of capital globalization. However, by definition, composite indices mask empirically distinct phenomenon for the sake of convenience and suffer from the same weakness, as when economic growth is used as a measure of basic needs satisfaction. Composite indices are simply too broad to capture the various dimensions of social life (Wimberley and Bello, 1992).

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[2] Indices of physical quality of life include population per physician, caloric intake, and welfare expenditures as a proportion of GNP, life expectancy, and infant mortality rates.

Economic Dependence and Food Consumption

Substantive research has been done exploring the relationship between economic dependency and the satisfaction of basic needs by extracting the various components of the indices. One of the more germane measures of human need satisfaction is food production and consumption.

Bullock (1986) initially studied the effects of several forms of trade dependencies on food consumption between 1960 and 1980. None of the findings were statistically significant and Wimberley (1990:408) attributes the lack of significance to the use of investment earnings from a single year and not using Bornschier et al. (1978a) suggestion of total stocks of transnational corporate investment (Wimberley, 1990). London and Williams (1988) examined changes in caloric consumption per capita using a stock-based measure for a single year and the results were statistically significant. However, Wimberley (1990:408) again points to the need to examine food consumption with higher levels of specificity and include calorie and protein consumption for total food sources and vegetable sources.

Dale Wimberley (1990) pursues the correction for the shortcomings of the Bullock (1986) and London and Williams (1988) research and examined the effects of transnational corporate (TNC) penetration (as measured by investment stocks) on calorie and protein consumption for total food sources and vegetable sources and found that countries with maximum TNC penetration consumed 700 calories less and 20 grams of protein less than countries with minimum TNC penetration. In addition, the detrimental

effect increases as the time lag between penetration and per capital consumption of calories and protein increases.

Wimberley and Bello (1992) examine the influence of export dependence on consumption while controlling for economic growth. Again, the findings demonstrate that increased TNC investment dependence has a harmful effect on consumption and that reducing primary export dependence does promote food consumption. Economic growth proved to have minimal influence on the effect between dependence and food consumption. Unfortunately, Wimberley and his colleagues failed to overcome the validity problems associated with aggregate data. Evers and McIntosh (1977) examined the use of Food Aid Organization's (FAO) measures for caloric intake of food as an indicator for the availability of food and found them to be grossly inadequate. In calculating an aggregate figure, FAO determines the amount of food supplies for a given country and then divides that number by the number individuals within the population. Clearly, this will not capture access to food or the ability to purchase the food even if food supplies are geographically accessible.

Sen (1981) has noted that famine has occurred in the shadow of food surpluses. Poppendieck (1986) has addressed the "paradox of want amid plenty" in her book *Bread Line Knee Deep in Wheat*. She documents the plummeting prices of farm commodities and the dramatic increase in surpluses during the Depression. At the same time, individuals across the United States were increasingly suffering from malnutrition due to their loss of purchasing power.

In a more recent study, Jenkins and Scanlan (2001) examined the relationship between food supply, food availability, and child hunger rates over a twenty-year period (1970-1990). In general, the results indicate that the distribution of food for consumption suffers from the same problems as the distribution of income for consumption. "Increased food supply alone is not sufficient to reduce hunger" (Jenkins and Scanlan 2001:737); just as increased gross national product alone is not sufficient to reduce income inequality. Due to the researchers choice of measurement for food supply and hunger their findings demonstrated a classic bifurcation of macro-micro phenomenon. Where food supply - measured as five-year mean calories per capita and grams of protein per capita (based on FAO food balance sheets) became a distinctly macro or aggregate phenomenon when juxtaposed to hunger – measured as the percentage of children of healthy weight – a distinctly micro or household level phenomenon of access to food.

Several mediating factors link a child's physical status to international debt dependencies. Walton and Seddon (1994) research findings demonstrated how macroeconomic restructuring included the reduction or outright elimination of various social welfare programs, including food and transportation subsidies, price increases for imported goods, and price increases of state-controlled commodities. There are only a few studies that link structural adjustment practices and over urbanization and its effect on women and children. In related studies, McGuire & Popkin (1990) and Senauer (1990) indicate that in times of economic distress intra-household allocation of food resources are usually detrimental to women and female children.

During structural adjustment initiatives, households faced increasing prices for necessities such as food, the loss of employment, and declines in real minimum wages. Walton and Ragin (1990) examined how the International Monetary Fund's domestic austerity programs in actuality mandated government spending cuts and wage freezes in order to increase economic efficiency and generate resources to repay debt. The rise in debt has meant an increase in the proportion of national revenues apportioned to debt service, reducing the amount left for domestic development expenditures. In particular, the social service budgets, which often included food subsidies, were cut dramatically (Rau, 1991).

Adaptation took on a number of forms. In some households, the number of jobs held by family members increased, in others cost-cutting measures were taken (Walton and Seddon, 1994). In many a higher proportion of the income had to be expended to purchases essentially the same poorer diet. A decline in economic well being is reflected in an increase in the percent of household income spent on food. A corollary to Engle's law is that the poor spend a larger proportion of their budgets on food than the better off segments of the population (Sanjur, 1982). Increases in such proportions thus indicate a decline in economic fortunes. Such changes are often accompanied by a decline in nutritional status. As Floud et al. (1990) indicate the relationship between nutritional status and income is not simple, but a general decline in broadly measured living standards is associated with poorer nutrition. Children's health programs and nutritional status are directly tied to the distribution of economic gains rather than to actual rates of economic growth. The effects of differential domestic market growth and debt

dependency on the distribution of income within a trade deficit country exhibit its most profound effect on the welfare of children. Caliendo (1979:156), remarking on the relationship between poverty and malnutrition states that, "The basic cause of poverty is that economic growth is not equitably reaching the poor, and that the poor are not making significant contributions to economic growth."

Economic/Debt Dependence and Physical Welfare of Individuals

If the underpinning logic of disarticulated economies holds true then one should see a concomitant effect in the social sector of society. Increases in income inequality, deterioration of health and educational services, and decreased access to basic entitlements such as food, clothing and shelter would all be indicators of the consequences of a disarticulated economy. As noted earlier, Brenner (1996) asserts that economic growth is associated with improved material conditions such as better nutrition, housing, and health care that in turn affect the rate of incidence in malnutrition, acute infectious disease, infant mortality and morbidity, and life expectancy.

There have been several studies that test the significance of economic development, or lack thereof, and more direct measures of health extracted from the physical quality of life indicators. Using the same measure for economic growth – GNP per capita - both Moon (1991)[3] and Firebaugh and Beck (1994) found that infant survival and life expectancy increase as GNP per capita increased. Stokes and Anderson (1990:72) examined the relationship between foreign capital dependency, disarticulation, and social welfare. The general findings were that "holding level of development constant,

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[3] Moon utilized a more elaborate index Physical Quality of Life that includes infant survival and life expectancy.

disarticulation is associated with increases in the crude death rate and the child mortality rate and with decreases in secondary enrollment". The uniqueness of this study is the omission of income distribution in accounting for declines in human welfare. The authors further sate that "income distribution may not be the best index to gauge the effects of economic growth on human welfare [hence] it seems preferable to utilize direct measures of human welfare" (Stokes and Anderson, 1990:65). However, the theory of disarticulation expressly assumes that the net effect of capital dependency is the promotion of income inequality due to a disproportionate growth in the service sector and its concomitant wide income distribution.

Factors that link economic dependency to weakened well being have not always been empirically demonstrated or the findings have been contradictory. Sell and Kunitz (1986-87) found that debt dependency slowed gains in life expectancy, but that rates of increase in debt per capita accelerated gains in life expectancy. Lenski and Nolan (1984) and Nolan and White (1983) examined the effect of a country's position within the world economy and found that those countries within the periphery[4] had higher infant mortality rates and decreased life expectancy. Bullock (1986) found that infant mortality decreased when the level of investment dependence and per capita foreign aid increased. Wimberley (1990) examined infant mortality and life expectancy at one year of age and found that multinational corporate penetration had a significant negative effect.

Bradshaw et al. (1993) examined the effect of economic dependence – both debt and investment, and structural adjustment, as measured by IMF pressure, on the under five-

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[4] Note that income inequality tends to be higher in these countries.

mortality rate, childhood immunizations, access to safe water, low birth weight babies, health attendants, over-urbanization change, and calories per capita. In general, the study found that debt and investment dependencies tend to lessen the amount of food available for consumption, weaken public health efforts, and slow the rate of decline in child mortality. In an earlier study, Bradshaw and Huang (1991) findings show that structural adjustments have slowed economic growth that in turn limits resources for health factors affecting physical quality of life. The underlying argument identifies a weakened economy to weakened well-being of individuals.

The global debt crisis of the 1980's has continued to escalate since the time of these seminal research efforts. The international financial community initially responded with aggressive intervention into the indebted country's fiscal and monetary management policies. The original domestic austerity programs targeted at macroeconomic structural adjustments were intended to solve what was believed to be a problem of liquidity of a country's cash flow. Originally, debt relief was extended in the form of non-concessional rescheduling of arrears, granting of grace periods, and new lending to reimburse old debts. Daseking and Powell (1999:10-12) have documented that the average paid debt service ratios for heavily indebted poor countries have experienced a steady decline from 30 percent in 1986 to about 17 percent and the debt service paid has remained at about 25-30 percent of the total gross external financing. Unfortunately, these strategies only culminated in yet another wave of debt crisis for many of the same countries during the 1990's. Brooks et al. (1998) document that "… by the early 1990s the debt-to-exports ratio had increased by at least three to four times in many of the

heavily indebted poor countries. The ratios rose because of a large increase in the nominal debt stock. "Given that the share of debt on concessional terms increased over time, the present value of debt-to-exports ratios would not have increased as quickly as the nominal debt-to-exports ratios…" (Brooks et al. 1998:6). They further state "The earlier nonconcessional reschedulings granted by external creditors actually contributed to an increase in the debt stock to the extent that interest payments were capitalized" (Brooks et al. 1998:9). The net present value of future debt service actually rose throughout the twenty-year period despite large net transfers of resources from concessional lenders (Easterly, 1999:6).

In September 1996, the International Monetary Fund formally recognized the scope of failure that the poorest of countries were experiencing and that the payment problems were related to solvency as well as liquidity. The IMF launched the Heavily Indebted Poor Countries (HIPC) Initiative to address social sector issues in conjunction with concessional debt relief programs. The HIPC Initiative mandates that countries seeking relief from the fund submit a Poverty Reduction Strategy Paper in conjunction with the adoption of adjustment and reform programs supported by the IMF and World Bank.

The recognition that many LDCs were insolvent initiated two fundamental changes in the economic development agenda. First, solvency issues of a sovereign necessitate a higher level of specificity in the monitoring of fiscal and monetary policies, as compared to the Balance of Payments (BoP) approach used in monitoring liquidity issues. This higher level of specificity includes measures of domestic assets and debts. Second, the long-standing assumption that the social sector will "take care of itself" could not be

empirically supported. Economies can and do demonstrate growth but that does not necessarily translate into equitable distribution of income, nor investments into physical and human capital. Poverty indicators utilized to determine social sector decay have shown no improvement since the advent of the austerity programs and debt relief. "The humanitarian situation has reached dire proportions … [and] … there is an urgency to reallocate expenditures in favor of the social sectors" (Daesking & Powell, 1999).

Easterly (1999:6) observes, "The necessity of waves of debt relief may suggest something is wrong with the implementation of debt relief. There is the paradox that a large group of countries came to be defined as highly indebted at the end of the two decades of debt relief and increased concessional financing." Easterly's findings show direct and indirect evidence of **asset decumulation** and new borrowing associated with debt relief even after controlling for income and terms of trade between heavily indebted poor countries (HIPC) and developing countries. Asset decumulation may be achieved by several means, by either liquidating assets or by reducing its current account deficit; this in turn may reduce the amount of productive new investments in physical and human capital in an attempt to stabilize its assets to consumption ratio (Easterly, 1999:6).

Easterly's model is in sharp contrast with conventional wisdom that debt relief encourages asset accumulation and that actual debt falls over time with improved terms of debt (1999:16). The model also reflects the awareness that the debt crisis is more than an issue of liquidity it is also an issue of solvency. The Balance of Payment accounting methods and the standard indicators of debt dependency ratios are no longer

sufficient in understanding development and dependency issues. Originally, external debt was assumed to reflect a country's inability to maintain capital flows (liquidity) due to poor performance of their export commodities. Recently, both the World Bank and the International Monetary Fund's research agenda have considered the increasing importance the overall solvency of a domestic economy that includes not only external debt, but also domestic debt and conversely domestic assets.

Krueger (2002) asserts that creditors have a clear interest in not only fiscal, monetary, and exchange rate policies, but also any domestic bank restructuring, domestic payments system, and nature of any exchange controls. She further states that domestic debt needs careful consideration as many nations have a wide range of debts to domestic residents. As international capital markets become increasingly integrated "…the domestic and non-domestic debt has become increasingly blurred" (Krueger, 2002:16-17). Financial crisis of nation states occur during defaults to external creditors as well as its own indebtedness. The domestic banking system and corporate sectors may lose creditor confidence and trigger a depletion of foreign exchange reserves by defaulting on either domestic debt held by residents or external debt (Krueger, 2002:36).

A report issued March 21, 2002 by the International Development Association (IDA) and International Monetary Fund stated, "Domestic debt is becoming an important aspect of fiscal sustainability [and] imprudent domestic borrowing could undermine debt sustainability. However, underdeveloped domestic financial markets seriously limit the role of domestic debt in many other heavily indebted poor countries. The best approach to public debt management should cover all categories of debt

including domestic debt" (External Debt Management in Heavily Indebted Poor Countries, March 21, 2002:2). Conventional debt management policies have typically been guided by ensuring long-term debt sustainability by reducing the level of outstanding debt and keeping new borrowing in line with payment capacity. There is a growing consensus among multilateral institutions that the present process for restructuring debts is more unpredictable and more damaging to the country and its creditors than would be desirable (Krueger, 2002:1).

The basic characteristics of the heavily indebted poor countries are that they have an historic vulnerability to commodity exchange prices, are heavily reliant on multilateral institutions for credit, and are chronic low-income economies. However, there are also many less developed countries that are similar in terms of poverty and human immiseration who are relatively more diversified in their commodity exports, are not heavily reliant on external debt, and enjoy relatively higher–income producing economies.

Given the variability in the degree of external debt between countries and the variability in their status in the world economy (commodity exports and income producing market economies), an explanation for their similarity in the degree of poverty necessarily becomes one concerned with the structure of the domestic economy. Researchers need to examine characteristics of the domestic economy beyond debt dependency ratios. What characteristics of the domestic economy do these countries share that exacerbate efforts to reduce poverty and income inequality? A model needs to be developed that provides empirical measures capturing both the nation-states

engagement in a global economy (external debt liability) as well as an examination of domestic economic activity (domestic debt, domestic assets, and consumption).

Clearly, growth, development, under-development, and poverty are multifaceted phenomena in a global economy. The present study is primarily concerned with the institutional force of the global financial system and it is affect within a state system. This research develops an extension of dependency theory and introduces domestic debt as an additional factor contributing to a nation state's inability to exercise sovereignty that subsequently reduces their capacity to coordinate national economic and social programs (McMichael, 1996).

Theoretical Perspective

The World Systems theorists (Chase-Dunn, 1975; Bornschier and Chase-Dunn, 1985, Wimberley 1990) have made significant contributions to our understanding of the mechanisms by which globalization of capital occurs. However, the scope of the analysis extended primarily to the cross examination of economic development theories and addressed sociodemographic issues indirectly through indicators such as income distribution (Portes and Kincaid, 1989). Debt dependency theorists extended the scope to include external debt, domestic assets and more direct measures of physical quality of life. What has not been examined is the relationship between external debt, debt relief, and the solvency of the domestic economy. Domestic solvency is becoming increasingly salient in efforts to eradicate poverty.

The review of the literature demonstrates an emerging concern by both development economists and debt dependency theorists of the influence global capitalization has on

both internal debt and external debt. Development economists (Easterly, 1999; Krueger, 2002; International Development Association and the International Development Fund, 2002; Brooks et. al, 1998; and Daseking & Powell, 1999) acknowledge that an unsustainable level of external debt are not only an issue of liquidity but also compromises the solvency of the domestic economy. Domestic insolvency weakens a nation states' ability to sustain physical and human capital investments. As Gagliani (1987) states, "If we want to analyze the effects of development, we must consider the changes in (a) (b) and (c) resulting from the development process".

Outcomes of Dependency

Physical Well-Being of Children

Studies that examine the physical well-being of children generally report on under age-five mortality, immunization in first 23 months of life, and anthropometric nutritional measures of children (Caldwell, 1986; Evans, 1994; Bahr and Wehrhahn, 1993, Streeten, 1981).

Under-Five Mortality Rate

The under-five mortality rate provides a robust measure of the health of children and the overall health and well-being of a society. It reflects the probability of a newborn baby dying before reaching age five. In addition to monitoring the number of deaths due to childhood illness, the under-five mortality rate may also reflect other social conditions, such as gender discrimination. For example, if female mortality is higher, as it is in some South Asia countries, it may highlight female unequal access to food and health care (Bulletin of the World Health Organization, 2000, 78(10): 1200-1206).

In 2001, the average under-five mortality rate was 121 deaths per 1,000 live births in low-income countries, 41 in lower-middle-income countries and 27 in upper-middle-income countries. In high-income countries, the rate was less than seven. For 70 percent of the deaths before age five, the cause is a disease or a combination of diseases and malnutrition that would be preventable in a high-income country: acute respiratory infections, diarrhea, measles, and malaria (World Bank, 2004. Millennium Development Report.) Table 1 figures demonstrate a substantial decline in under-five mortality rates since the 1960's, however there continue to be sizable differences across regions.

Table 1. World Bank Millennium Development Report
          Under-Five Mortality Rates, 2004

	Under-Five Mortality Rate		Annual Number of Under-Five Deaths (thousands)
Regional Summaries	1960	2002	2002
Sub-Saharan Africa	262	174	4,610
Middle East and North Africa	250	58	559
South Asia	244	97	3,603
East Asia and Pacific	207	43	1,368
Latin America and Caribbean	153	34	394
CEE/CIS and Baltic States	112	41	218
Industrialized countries	39	7	76
Developing countries	222	90	10,773
Least developed countries	278	158	4,331
World	196	82	10,889

Immunizations

UNICEF (1990) argues that immunization could save five million children a year. The World Health Organization (1989) views immunizations as one of the primary means of

preventing disease and enhancing children's survival. Vaccination is widely recognized

as one of the most powerful and cost- effective public health tools. Often immunization

is a child's first, and sometimes only, contact with the health system. In addition, among

all the other interventions now on offer, immunization is still one of the "best buys" in

health. In addition, immunization can be provided even under difficult circumstances,

such as in areas of conflict or where there are no health centers.

   Still, every year, nearly three million young lives are lost to diseases that could be

prevented by existing vaccines. More than one quarter of the world's children is not

immunized by the time they reach their first birthday. This translates into more than 30

million children each year who grow up without being vaccinated.

Table 2. Percent Children 1-year-of-age Immunized, 2002

| | Children 1-year-of-age Immunizations | | | | | |
Regional Summaries	TB	DPT3	Polio3	Measles	HepB3	Total [a]
Sub-Saharan Africa	73	55	55	58	24	66
Middle East and North Africa	89	86	86	87	70	85
South Asia	80	71	71	67	0	95
East Asia and Pacific	79	78	79	80	23	89
Latin America and Caribbean	95	88	89	91	66	95
CEE/CIS and Baltic States	92	91	92	92	79	73
Industrialized countries	-	95	91	90	77	-
Developing countries	81	73	73	73	26	87
Least developed countries	77	63	63	63	14	54
World	81	75	75	75	30	-

   2004 World Bank Millennium Development Report

   [a] % of routine EPI vaccines financed by government in 2002

Measles alone kills nearly 800,000 children every year. In some countries,

immunization rates are at their lowest in a decade (Carol Bellamy, Executive Director of

the United Nations Children Fund, United Nations Special Session on Children, 2002).

As Table 2 illustrates, coverage is low in sub-Saharan Africa at 66 percent and 54

percent in least developed countries.

Nutritional Status of Children

Nutritional status of children is multifaceted and interacts at several social levels.

Aggregate data on food supply addresses the *potential* of food availability but does not

address distribution access or household and individual consumption. McGuire and

Popkin (1990) and Sanauer (1990) have found intra-household allocation of food is

typically detrimental to women and children. The nutritional well-being of children

reflects household, community, and national investments in family and health and

contributes to a country's development. Nutritional status is a reflection of health as

well as the level of society's development, and malnutrition is one of the most critical

health and development problems facing women and children in developing regions of

the world. Table 3 dramatically illustrates nutritional status differences between

industrialized countries and developing countries.

Table 3. Percent of Under-Five Children Suffering from Malnutrition, 1995-2002

Regional Summaries	Underweight	Severe	Wasting	Stunting
Sub-Saharan Africa	29	8	9	38
Middle East and North Africa	14	4	6	22
South Asia	46	17	15	44
East Asia and Pacific	17	-	-	20
Latin America and Caribbean	8	1	2	16
CEE/CIS and Baltic States	7	1	4	16
Industrialized countries	-	-	-	-
Developing countries	27	10	10	32
Least developed countries	36	10	11	43
World	27	10	10	31

2004 World Bank Millennium Development Report

Note that South Asia reported the highest incidence of children under five suffering from malnutrition (46 percent) compared to Sub-Saharan Africa with 29 percent of children under five suffering from malnutrition.

Malnutrition plays a role in more than half of all child deaths and is caused by consuming too little food energy to meet the body's needs. Adding to the problem are diets that lack essential nutrients, illnesses that deplete those nutrients, and undernourished mothers who give birth to underweight children (World Bank, The Millennium Development Report, 2004; Demographic and Health Surveys (DHS), 2002). Reinhard (2000) notes, that nutritional status is an outcome of various nutritional, biological, social, and economic deprivations and thus implies more than inadequate energy and nutrient intake. As such, he recommends that nutritional status be used as an indicator for poverty and sustainable development.

Hypotheses

This study tests a number of hypotheses that examine the relationship between domestic solvency – gross domestic investment and central government debt, external debt – both total present value of external debt and net present value controlling for loan concessionality – and the physical well-being of children.

Domestic Economy

The relevance of the domestic economy to the well-being of a nation's citizens is obvious. Public and private enterprise both define and are defined by the expansion of the economy. Expanding market economies contribute to the development of income producing capital markets, increases the efficiency of production facilities, and improves the standard of living (Firebaugh, 1992). Bradshaw and Huang (1991) note that, "in theory national savings partially obviates the need for borrowing from abroad". Conversely, increasing domestic debt, as measured by central government debt, can have deleterious effects by causing capital flight, loss of credit confidence, and sudden depletion of foreign exchange reserves (Bradshaw et. al, 1993). In addition, growing integration of international capital markets has increasingly blurred domestic from non-domestic debt (Krueger, 2002). Lastly, an attempt to reduce domestic account deficits has the potential to reduce the amount of productive new investments in physical and human capital (Easterly, 1999:6).

Hypothesis 1: As central government debt as a percent of GDP increases the physical well-being of children decreases.

Gross Domestic Investment

Gross domestic investment (GDI) is an indicator of the level of domestic capital formation or domestic savings. Development economists view GDI as a major source of capital for productive investment and expected to be positively related to economic growth and to the physical well-being of individuals (London and Williams, 1988). Capital formation may enhance the ability of governments to pay for preventive health measures like sanitation and health care infrastructure (Wimberley, 1990).

Hypothesis 2: As gross domestic investment as a percent of GDP increases the physical well-being of children increases.

Public Health Spending – General Services

Numerous studies have been conducted examining the role of health and public services in the improvement of the physical well-being of individuals. Sell and Kunitz (1986-87) demonstrate a slow down in the decline of mortality due to the reduction in public health spending. Wimberley's (1990) research found health services to be an intervening variable in the explanation in the variation in infant mortality and life expectancy at birth. Caldwell (1986) found the reduction in infant mortality largely attributable to the increase in providing basic health and public services. Hymer (1972) and Muller (1979) also found that reduced public spending has a negative effect on public health measures.

Hypothesis 3: As domestic expenditures on health as a percent of GDP increases the physical well-being of children increases.

Hypothesis 4: As domestic expenditures on general public services as a percent of GDP increases the physical well-being of children increases.

Net Present Value of Debt

Since 1988, there has been a shift in financing for highly indebted poor countries. The International Development Association and other multilateral institutions have replaced private and bilateral nonconcessional sources. In spite of the implicit form of debt relief, it has failed to reduce the debt in net present value terms: "the median debt to export ratio is statistically significantly higher in 1997 than it was in 1979" and "is remarkable that the net present value of future debt service rose throughout the period despite large transfers of resources ($3.4 billion) from concessional lenders…" (Easterly, 1999). Easterly concludes that new borrowing more than kept pace with the amount of debt relief. In a report sponsored by the International Development Association and the World Bank, Daesking and Powell note that, "while debt stocks were clearly rising well beyond sustainable levels, creditors were able to use concessional rescheduling techniques to contain the growth of payments being requested" (1999:10-12).

Unfortunately, the practice of containment lead to the exponential growth of interest that outgrew the principal amount initially borrowed. For example, in 1985 Mozambique held external debt in the amount of $929.6 million. In 2002, the debt now stands at $2 billion even though Mozambique has not borrowed any amount over the period. Burundi's present debt in 1999 is over ten times (1,072 percent) the value of the country's exports of goods and services. Burundi's total debt service accounts for 46 percent of the exports of goods and services (Effah, 2004).

The net present value of debt outstanding measures "the discounted stream of all future debt service payments but which are forgiven as a result of the operation, and thus

captures the concessional element" (Daesking and Powell, 1999; Easterly, 1999). Given the above findings, that debt relief in the form of loan concessionality has not been empirically supported to bring about external debt sustainability one would expect a negative relationship between with physical well-being measures.

Hypothesis 5: As the net present values of debt controlling for loan concessionality increases physical well-being of children decreases.

External Debt Total to Exports and GDP Ratios

Dept dependency research (Chase-Dunn, 1975; Pfister, 1984; Sell and Kunitz, 1986-87; Walton and Ragin, 1990; Bradshaw et. al, 1993) utilizing several measures of debt dependency, including total external debt ratios, findings show deleterious effects of increasing external debt on both domestic expenditures and physical well-being of individuals, especially children.

Total external debt ratios represent the total outstanding debt at the end of the year to the economy's exports of goods and services. Total external debt ratios are often calculated by using gross domestic product as a referent point in place of exports of goods and services. Both indicate potential debt related risks and can be used as a measure of sustainability. Increasing debt ratios indicate that a country's total debt is growing faster than their economy's basic source of income. In the future, a country may have problems meeting its' debt obligations. (The World Bank, *The Gray Book*, 2001c:308-310).

Hypothesis 6: As total external debt ratios increases the physical well-being of children decrease.

CHAPTER III

METHODOLOGY

The data used for this study were derived from two sources. The first source of data

concerns the predictor variables that include macro time series data, government finance

data, and social indicators and fixed factors data. These data are made available to the

public via the internet and are contained in the Global Development Network Growth

Database authored by William Easterly and Mirvat Sewadeh (2001). The sample

includes 263 countries for the years 1960 through 2001. However, there were missing

values in a given year. The data was originally derived from The World Bank Debt

Reporting System; Global Development Finance & World Development Indicators and

used for William Easterly "The Lost Decades: Developing Countries' Stagnation in

Spite of Policy Reform 1980-1998", Journal of Economic Growth 6, no. 2 (2001): 135-

157.

For each of the predictor variables a mean was constructed in order to increase the

sample size sufficiently to be able to run simple linear regression on the maternal and

child health indicators. This was necessary because of multiple missing values across

years. First, the data were examined to determine any outliers by examining SAS

generated scatter plot diagrams and analysis of the mean and standard deviations for

each of the predictor variables for the years 1985 through 1996. Then a mean was

calculated for each of the independent variables using values for each year spanning

from 1985 to 1996. The year 1985 was selected primarily for data availability and the

year 1996 was selected as the benchmark year for the predictor variables as it is the year

the World Bank launched the Heavily Indebted Poor Countries Initiative (HIPCI). This initiative implicitly recognizes the deleterious effects of unsustainable external debt as measured by their own Balance of Payment accounting practices. The computed mean value for each of the predictor variables was then used in the analysis of children's health status.

The second source of data concerns the health and nutritional status of women and children. Cross-sectional data were derived from the Demographic and Health Surveys (DHS). The Demographic and Health Surveys (*DHS+*) program is the third consecutive worldwide project initiated by the U.S. Agency for International Development (USAID) to provide data and analysis on the population, health, and nutrition of women and children in developing countries. The time points selected were based on practical and substantive considerations and reflect the period where international debt and domestic insolvency were reaching culmination. Due to poor representation of countries on the selected dependent variables in any one given point in time, the data were first aggregated by the selection criteria "plus or minus four years" from the year 2000. This greatly increased the sample size of representative countries to include 58 countries using the year 2000 as the benchmark year. However, country representation was not sufficient to allow for the analysis of key domestic solvency predictor variables and their effects on children's health status.

Again, in attempt to increase country representation, the 263 countries were divided into 6 regions identified by the World Bank. Region especially matters when examining maternal and child nutritional measures such as wasting and stunting or for that matter

under-five mortality and childhood immunizations. Individual health and nutritional

status is sensitive to the geographical location in which they live. Place determines

proximity and access to food supplies and health care services regardless if the

government is reporting percent of gross domestic product on health care service.

Certainly, it is best to have actual country specific data when addressing the physical

well-being of individuals; however, the data unfortunately are not available.

A mean was calculated by region for each of the dependent variables. Next, for

countries whose values were missing the regional mean was imputed for each of the

health indicators. The sample size increased from 58 countries to 161 countries. The

sample size did fluctuate between the various health indicators for each of the predictor

variables. However, none fell below N=83, this compares to samples falling below 20

countries when the regional mean was not utilized. Table 4 provides the number of

countries used in the calculation of the mean, the actual mean, and standard deviation for

each region.

Table 4. Descriptive Data on Child and Maternal Health and Nutrition Indicators Calculated Regional Mean

Health and Nutrition Indicators	Region 1			Region 2			Region 3			Region 4			Region 5			Region 6		
	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev
Under Age 5 Mortality	5	71.94	35.54	7	65.23	22.41	11	61.02	28.83	4	68.48	30.78	4	100.1	21.82	27	159.18	43.45
% Total Vacc. 12 -23 Months	5	47.96	15.13	7	29.79	25.89	11	29.5	17.03	4	47.35	32.64	4	29.8	18.17	26	30.49	15.23
Maternal Height<145 cm.	2	9.65	7.28	7	3.17	5.6	9	12.81	11.76	4	3.13	3.72	4	11.48	7.39	25	2.06	1.95
Maternal Body Mass Index	2	23.95	3.9	7	12.59	14.74	9	3.4	2	3	9.37	13.74	4	32.83	18.15	25	13.71	7.68
Maternal % Women Wasting	2	20.95	0.49	7	8.01	11.31	9	2.1	1.08	3	7.53	11.84	4	23.93	14.78	25	9.21	6.29
Height-for-Age Below -2SD	2	38.4	4.53	7	21.6	11.15	11	17.64	11.6	3	22.67	19.26	4	37.55	19	26	32.57	9.17
Weight-for-Height Below -2SD	2	14.15	4.45	7	5.47	4.04	11	2.85	2.31	3	6.27	6.72	4	12.25	7.78	26	10.27	5.3
Weight-for-Age Below -2SD	2	41.8	2.55	7	14.73	14.31	11	10.23	7.32	3	16.3	21.56	4	37.23	22.51	26	28.43	9.84

Region 1 = East Asia and Pacific. Region 2 = Europe and Central Asia. Region 3 = Latin America and Caribbean.
Region 4 = Middle East and North Africa. Region 5 = South Asia. Region 6 = Sub Sahara Africa.

Table 5. Comparison of Imputed Regional Mean for Missing Values for Child and Maternal Health and
    Nutrition Indicators

Health and Nutrition Indicators	Imputed Regional Mean			Original Values		
	N	Mean	Std Dev	N	Mean	Std. Dev.
Under Age 5 Mortality	161	95.58	47.22	58	111.38	57.72
Percent Total Vacc. Age 12 -23 Months	161	34.84	13.18	57	32.88	18.95
Maternal Height <145 cm.	161	6.21	5.5	51	5.23	7.29
Maternal Body Mass Index	161	13.58	9.2	50	13.37	11.8
Maternal Percent of Women Wasting	161	10.02	7.74	50	9.31	9.34
Height-for-Age Below -2SD	161	27.71	9.91	53	28.06	12.95
Height-for-Age Mean Z Score	161	-1.15	0.38	53	-1.16	0.49
Weight-for-Height Below -2SD	161	8.21	4.75	53	8.16	5.84
Weight-for-Height Mean Z Score	161	-0.29	0.42	53	-0.285	0.47
Weight-for-Age Below-2SD	161	23.59	12.95	53	23.33	14.76
Weight-for-Age Mean Z Score	161	-0.97	0.52	53	-0.97	0.59

Table 5 allows for a comparison between the original sample mean and standard

deviation with the imputed mean for countries with missing values. Diagnostic statistics

using scatter plots were conducted to identify outliers that may exaggerate the calculated

mean and standard deviation. Where possible alternative data sources such as UNICEF

(1990, 1991, and 2002) and the World Bank Millennium Report 2004 were used as cross

references to compare computed regional means to country specific data. The computed

means were well within the range of both the original aggregate mean values and

selected cross-reference values.

Dependent Variables

Under-Five Mortality

The under-five mortality rate or the number of children who die before age 5 per 1,000

birth is considered to be the single best indicator of children's well-being (UNICEF,

2002). Other frequently used measures are infant mortality per 1,000 births and child

death rate per 1,000 children (ages 1 to 4). "However, infant mortality underestimates hardship for children because many die between the ages 1 and 5; and child death rate does not standardize by number of births" (Bradshaw et. al, 1993:635). There are numerous studies that have successfully utilized this measure as an indicator of physical well-being: Moon, 1991; Firebaugh and Beck, 1994; Stokes and Anderson, 1990; Bradshaw et al., 1993; Sell and Kunitz, 1986-87.

Immunizations

Immunizations in first year of life by current age represent the percentage of children 12-23 months who had received specific vaccines by the time of the survey (according to the vaccination card or mother's report). All vaccinations include children who are fully vaccinated (i.e. those who have received BCG, measles, and three doses of DPT and polio. Bradshaw et al. (1993) and Wimberley, (1990) have utilized immunizations as an indicator of physical well-being and found that the absence of children immunized have a very strong negative effect on child mortality.

Children Nutritional Status

Anthropometric data (height and weight) allows for objective measurement and evaluation of nutritional status of children. Evaluation permits identification of subgroups of the population that are at increased risk of growth faltering, disease, and impaired mental development, and death.

   This research will utilize two of the three standard indices of physical growth that describe the nutritional status of children. They are height-for-age and weight-for-height. Each of these indices gives different information about growth and body

composition used to assess nutritional status. Height-for-age is a measure of linear growth. A child who is below minus two standard deviations (-2SD) from the median of the reference population in terms of height-for-age is considered short for their age, or *stunted*, a condition that reflects the cumulative effect of chronic malnutrition. Low height-for-age identifies past under nutrition or chronic malnutrition. It cannot measure short-term changes in malnutrition.

Weight-for-height describes current nutritional status. A child who is below minus 2 standard deviations (-2SD) from the median reference population in terms of weight-for-height is considered too thin for their height, or *wasting*, a condition reflecting acute or recent nutritional deficit. Severe wasting is closely linked to mortality risk. Wasting represents failure to receive adequate nutrition in the period immediately preceding the survey and may be the result of a recent illness, or of seasonal variations in the food supply (Mosomi and Owuor, 1998).

Low weight-for-height is useful when exact ages are difficult to determine and is appropriate for examining short-term effects of seasonal changes in food supply or short-term nutritional stress brought about by illness. If a child is below minus three standard deviations (-3SD) from the median in either case, they are considered severely stunted or wasted (Demographic Health Surveys, *Maternal and Child Nutrition Data Measurements*, 2004).

Independent Variables

Central Government Debt as a Percent of GDP

Central government debt as a percent of gross domestic product (GDP) is calculated as the gross debt of the central government with the public and private financial system, the non-financial private sector and the rest of the world. It includes domestic debt (such as debt held by monetary authorities, deposit money banks, non-financial public enterprises, and households) and foreign debt (such as debt to international development institutions and foreign governments). It is the gross amount of government liabilities not reduced by the amount of government claims against others. Because debt is a stock rather than a flow, it is measured at a given date, usually the last date of the fiscal year (World Bank, World Development Indicator Report, 2004).

Gross Domestic Investment as a Percent of GDP

Gross domestic investment measures investments made to the infrastructure of the economy in addition to changes in levels of inventories. Infrastructural investments include but are not limited to "land improvement (fences, ditches, drains, and so on); plant machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings" (World Bank, World Development Indicator Report, 2004).The 2004 World Development Indicator Report has announced it will now report gross domestic investment as "capital formation". The two terms have been used interchangeably. For instance, Wimberley (1990) and London and Williams (1988) found capital formation has a beneficial effect on mortality. The measurement used for

the "rate of physical capital formation" was the mean annual gross domestic investment as a percent of gross domestic product.

Interest Payments as a Percent of GDP

Interest payments are calculated for central government debt only and include, "long-term bonds, long-term loans, and other debt instruments – both domestic and foreign residents" (World Bank, World Development Indicator Report, 2004).

Domestic Expenditures on Health as a Percent of GDP

Domestic expenditures on health include measures for "capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds" (World Bank, World Development Indicator Report, 2004).

Net Present Value of Debt Controlling for Loan Concessionality

Net present value of debt (NPV) controlling for loan concessionality measures "the total debt service to exports of goods and services correcting for concessionality of debt, discounted at the average LIBOR for 1970-1998, in current US dollars" (Easterly, 1999:18).

External Debt Total to Exports and GDP Ratios

Total external debt ratios are defined as "the ratio of total outstanding debt at the end of the year to the economy's exports of goods and services and/or GDP for any one-year" (World Bank, World Development Indicator Report, 2004).

Annual Percent Population Growth

Population growth variables will be included to control for the effects on physical well-being. Rapid population growth and especially high birth rates may inhibit economic growth by increasing level of consumption (relative to future production investments), reduce the per capital stock of resources (health care infrastructure), and indicate closely-spaced births (Wimberley, 1990).

Annual Percent Gross Domestic Product (GDP) Growth

Economic growth variables include aggregate production of goods and services indicated by GDP per capita in constant dollars (international prices, base year 1985). Economic growth may indicate a potential for meeting basic needs, however, Wimberley (1990) notes that rapid rates of economic growth in some countries have resulted in worsening living conditions for large segments of the population.

CHAPTER IV

ANALYSIS

Statistical Tests

Initially a correlation matrix was generated in order to identify multicollinearity issues

among the predictor variables. The results demonstrated that several domestic

expenditures are highly correlated to one another. This is due to the previously

mentioned practice of macroeconomic reporting. Several of the reporting categories

collapse data from subcategories in order to generate broader measures of economic

assets, liabilities, and expenditures. In particular, the measure *Gross Domestic*

Investment includes expenditures for education, health, general public services, and

social security and welfare. It also includes categorical data associated with capital

formation such as domestic savings and a host of physical capital investments. Please

see the above definition of measurement for a more detailed list. Therefore, it is not

surprising to discover high multicollinearity among gross domestic investment, gross

domestic savings, expenditures on health and education, and general public services.

This phenomenon also holds true when examining the association of various reporting

measures on external debt held by a country. Interest payments as a percent GDP,

present value of total debt service, external debt as a percent of GDP, and the net present

value of total debt service controlling for loan concessionality exhibit high levels of

multicollinearity. When running the OLS regressions consideration was given to

predictor variables with known high multicollinearity within the same model. In

addition, SAS was used to produce the following tests to ensure data integrity by

measuring the influence of each observation on the estimates (Belsley, Kuh, and Welsch,

1980). This included the studentized residual, the covariance ratio measuring the change

in the determinant of the covariance matrix of the estimates by deleting the *i*th

observation, identifying observations that are influential in estimating a given parameter,

heteroscedasticity, and Cook's D measuring the change in the parameter estimates

caused by deleting each observation.

Results

Simple Correlations

Table 6 provides zero order correlations between under-five mortality, percent of total

vaccination ages 12-23, maternal body mass index (BMI), and maternal percent of

women *wasting* with the independent variables measuring domestic expenditures and

external debt. Table 7 provides zero order correlations between several measures on

children's wasting, stunting, and underweight with the same independent variables

identified in Table 6. There were several correlations for under-five mortality.

Population growth, gross domestic investment, net present value of debt controlling for

loan concessionality, and external debt as a percent of GDP all generated correlations

with the children's mortality measure.

As expected, population growth is associated with under-five mortality due

primarily to the outpacing of individual demand on a nation's infrastructure in providing

basic public services. Demand on infrastructural services may take several forms: rapid

population growth, infrastructural deterioration due to domestic insolvency, or shortages

in food supplies. At the household level of analysis population growth may affect under-

five mortality due to increases in household size and the inability to provide for additional members.

Gross domestic investment demonstrated a strong correlation with under-five mortality. World System and Dependency theorists maintain that physical and human capital investments at the national level benefit individuals at the community level. Both measures for external debt - net present value (controlling for loan concessionality) and external debt as a percent of GDP were present but the strength of the correlations are moderate at best. The World System and Dependency theorist perspective would expect external debt to have an effect with under-five mortality due to external debt's deleterious effects on domestic capital resources and decreased government spending. Central government debt, total revenue, and expenditures on general public services and health care generated no significant correlations with the health measures. Population growth and annual growth of gross domestic product demonstrate a slight correlation with percent of total vaccinations for children ages 12-23 months. The relation between gross domestic product and percent of total children vaccinated may be attributed to the fact that as gross domestic product increases this generates a higher level of investment capital to be spent on immunization programs. Conversely slow or no growth in gross domestic product may inhibit investment into immunization programs. There were no other predictor variables producing substantial correlations with the vaccination measure.

Table 6. Correlations of Maternal Health Indicators with Economic and Demographic Conditions

Independent Variable	Under Age 5 Mortality		Percent Total Vacc Age 12 -23 Months		Maternal Height <145 cm.		Maternal Body Mass Index		Maternal Percent of Women Wasting	
	Correlation	N	Correlation	N	Correlation	N	Correlation	N	Correlation	N
Controls										
Population Growth Annual %	0.345***	153	0.192**	153	-0.163**	153	0.085	154	0.109	153
GDP Growth Annual %	0.007	146	0.083	146	0.277***	146	0.066	146	0.114	146
Domestic Solvency										
Gross Domestic Investment	-0.280***	141	0.167**	141	0.060	141	0.1	141	0.127	141
Central Government Debt	0.151	89	-0.106	89	-0.056	89	-0.162	89	-0.165	89
Total Revenue % GDP										
(no grants)	0.151	81	-0.029	81	-0.095	81	0.019	81	0.007	81
Health Services % GDP	0.167	72	-0.045	72	-0.111	72	0.018	72	0.004	72
External Debt										
NPV (loan concessionality)	0.311***	133	0.020	133	-0.105	133	-0.042	133	-0.051	133
External Debt % GDP	0.222***	133	0.051	133	-0.084	133	-0.135	133	-0.130	133
Interest Payments % GDP	0.157	77	-0.022	77	-0.097	77	0.023	77	0.012	77

*p<.10   **p<.05   ***p<.01   (one-tailed tests)

The absence of any correlations may be due to implementation of immunization programs by multilateral aid organizations such as UNICEF or the World Bank that in effect transfers the cost reporting outside of government finance. This is an empirical question not included within the scope of the present research.

Table 7. Correlations of Child Health with Various Indicators of Economic and Demographic Conditions

Independent Variable	Height-for-Age Below -2SD		Weight-for-Height Below -2SD		Weight-for-Age Below-2SD	
	Correlation	N	Correlation	N	Correlation	N
Controls						
Population Growth Annual %	0.242***	153	0.266***	153	0.246***	153
GDP Growth Annual %	0.116	146	0.137*	146	0.158*	146
Domestic Solvency						
Gross Domestic Investment	-0.04	141	-0.011	141	0.004	141
Central Government Debt	0.048	89	-0.088	89	-0.03	89
Total Revenue % GDP						
(no grants)	0.074	81	0.07	81	0.062	81
Health Services % GDP	0.076	72	0.07	72	0.062	72
External Debt						
NPV (loan concessionality)	0.136	133	0.046	133	0.091	133
External Debt % GDP	0.051	133	-0.028	133	0.006	133
Interest Payments % GDP	0.083	77	0.07	77	0.069	77

*p<.10   **p<.05   ***p<.01   (one-tailed tests)

Only the two control measures population growth and GDP growth generated modest correlations with the three measures of children's nutritional status: wasting, stunting, and underweight. Measures for maternal nutritional status generated no substantial or significant correlations with the independent variables. This may be due to

the macro economic variables chosen and their inability to demonstrate a *direct* effect on the individual level health and nutrition data.

Regression Analysis

The analysis will include tests for both the direct and indirect effects of the various predictor variables. The rationale for the equations estimated in Table 8 is based partially on the results of the correlations but also on the argument that domestic solvency – as measured by domestic investment and central government debt – has a direct influence on a nation's ability to provide for the basic needs of individuals. As noted previously, domestic debt has also become increasingly linked to levels of external debt (Krueger, 2002). It is expected that both measures of domestic solvency and external debt will have a direct influence on children's health and nutritional status.

Due to the extremely poor performance of the maternal nutritional status measures they were dropped form the OLS regression model. Also dropped from the models were several of the predictor variables measuring domestic expenditures and revenues that had no significant correlations with the dependent variables and were highly correlated with one another. Lastly, regression models were run without the imputed means for the missing values of the dependent variables and the sample sizes dropped from more than 80 cases to 30-33 cases, depending on the model. Many of the findings from the imputed means analysis were not replicated by this re-analysis. However, in both the under-five mortality and stunting models, gross domestic investment displayed a negative relationship. The greater the domestic investment, the lower the under-five mortality and lower the stunting.

Only the final equations are presented for each of the dependent variables and demonstrate the effect of including all predictor variables within the same model. Separate regressions were run for each of the predictor variables with each of the independent variables and the results are comparable to the final models shown.

Table 8. Multiple Regression of Independent Variables on Measures of Child Health Indicators with Imputed Regional Means

Independent Variable	Dependent Variables			
	U5MR	Immunized	Wasting	Stunted
Population Growth Annual Percent 1985 - 1996	14.60***	1.06	1.03**	1.95
Gross Domestic Investment Percent GDP 1985-1996	-1.85***	0.39**	0.040	0.04
Central Government Debt Percent of GDP 1985-1996	0.34**	-0.05	0.006	0.04
External Debt Percent of GDP 1985 - 1996	-0.14**	0.02	-0.01	-0.02
Constant	104.81	24.35	5.9	22.3
Number of cases	83	83	83	83
Adjusted R^2	0.27	0.08	0.03	0.01

Note: Reported coefficients are Betas

*$p < .10$ **$p < .05$ ***$p < .01$ (one-tailed tests)

For under-five mortality, the *un-standardized* regression coefficients become stronger with increasing significance as each predictor variable was added. The un-standardized regression coefficients between under-five mortality and gross domestic investment, central government debt, and external debt were in the expected direction while their magnitude was slight. Gross domestic investment does, at first blush, appear to be promising as it produces a regression coefficient for under-five mortality (-1.85 p<.002) and immunizations (.032 p<.0112), and are both in the expected direction. According to the World Systems and Dependency theories increases in gross domestic investment should decrease under-five mortality rates and increase percent of the population being immunized. The assumption is that investments in physical and human capital will increase the availability of resources to provide for basic health care needs. However, the magnitudes are slight and gross domestic investment achieved no statistical significance with measures for children's wasting and stunting. Central government debt and external debt achieved statistical significance in explaining variation in under-five mortality but the un-standardized regression coefficients are extremely small (0.34 and -0.14, respectively).

Central government debt was in the expected direction where, as debt increases under-five mortality increases. This assumes that increases in government debt would require additional capital to service the debt and thereby reduce the amount of investment capital available for individual health and nutrition needs. Central government debt may also spur capital flight and thereby reduce the amount of foreign investment and domestic capital formation that is assumed to "trickle down" and

improve the standard of living for individuals. However, the direction of the association between external debt and under-five mortality was not in the expected direction (-0.14 p< 0.04). This may be a statistical artifact and due to multicollinearity with central government debt and gross domestic investment. When external debt is regressed on under-five mortality alone the results are in the expected direction with a standardized regression coefficient is 0.12 P<.010. This indicates that as external debt increases under-five mortality also increases.

World Systems and Dependency theory put forth several arguments to explain the relationship between external debt and under-five mortality. First, increase in the size of the debt service payment diminishes the proportion of gross domestic product reserved for physical and human capital investments. Second, external debt held by bilateral institutions are likely to have concomitant austerity programs attached to them that enforce the reduction in government spending on health and human welfare programs. Third, the structure of debt in terms of currency exchange may be prohibitive to a country managing their debt in a way that is sustainable. Fourth, levels of external debt may have deleterious effects on central government by depleting assets and increasing central government debt (Easterly, 1999).

Central government debt and external debt did not achieve statistical significance in explaining the variation in immunizations or children wasting and stunting. The coefficient with the greatest magnitude was for population growth (14.60 p< .0010); this measure was intended for use as a control and does not fall within the scope of the

World Systems and Dependency theory's explanation for deteriorating health status of children.

For total percent children immunized ages 12-23 months the regression model that contained only population growth and gross domestic investment (not shown in table) produced modest un-standardized regression coefficients (2.36 p<0 .014 and 0.32 <p .01, respectively). When central government debt and external debt were added to the model, only gross domestic investment remained significant with a very weak un-standardized coefficient of 0.39, p< .03.

When the predictor variables were regressed on children wasting and stunted the results continue to decline in magnitude and significance. Population growth was the only independent variable to produce a regression coefficient with statistical significance (1.06 p< .0009). In addition, the statistical significance of the coefficient decreased when gross domestic investment, central government debt and external debt were added to the equation (1.03 p<.0573).

Given the poor performance of the predictor variables on the health indicators, an attempt was made to control for the effects of possible skewness among the nine independent variables by creating a log for each and then re-computing the regression models. Table 7 identifies the original nine independent variables hypothesized to have an effect on children's nutritional status; two of the nine are control variables: population growth and growth in gross domestic product. The results were unremarkable and produced no significant changes. For purposes of this research, the un-logged variables are reported.

Given that a direct relationship with measures of children's health status were less than robust it was determined that path analysis should be conducted to test for indirect effects of external debt, central government debt, and gross domestic investment on under-five mortality, immunizations and measures for children wasting and stunted.

Path Analysis

While the dependency arguments have not received rigorous support thus far, it is possible that dependency has an indirect effect on children's nutritional status working through central government debt. Each of these possibilities is examined in Table 9. First, the direct effect of external debt on central government debt is examined. As expected the *standardized* regression coefficient is substantial and statistically significant at .906 with a p<t value of .0001. Second, external debt and central government debt are regressed on under-five mortality. The results are mixed with an unexpected negative *standardized regression coefficient* measuring the direct effect of external debt on under-five mortality (-0.211). Again, this may be due to external debt being highly correlated with central government debt and technically violates the ordinary least squares (OLS) regression assumptions of uncorrelated independent variables.

However, central government debt did achieve "near" statistical significance and is in the expected direction with a *standardized regression coefficient* of 0.462 and p< 0.081. Multiplying the two standardized regression coefficients produces a measure of 0.419 (See Table 10) indicating the indirect effect of external debt on under-five mortality operating through central government debt. This does support dependency

theory arguments that external debt is detrimental not only in terms of unsustainable debt service payments and possible imposed austerity programs by the IMF, but also adversely affects the solvency of central government by increasing central government debt.

The result of external debt's indirect effect operating through central government debt may be an indication that heavy borrowing from bilateral institutions is not just due to a balance of payment problem (liquidity) but one of basic domestic insolvency. Domestic insolvency may be attributable to a number of issues that are beyond the scope of this research. However, preliminary reporting from the World Bank acknowledges the increasing significance of central government debt. First, Easterly (1999) suggests heavy borrowing and subsequent concessional loan renegotiations may encourage asset decumulation or debt accumulation in order to stabilize its assets to consumption ratio, this is done in order to qualify for future loans and concessional loan renegotiations.

Table 9. Standardized Regression Coefficients Direct Effects of External Debt and Central Government Debt on Children's Health Status

Independent Variable	External Debt % GDP	Under-Five Mortality	Immunization	Wasting	Stunted
External Dept % GDP	-	-0.211	-0.146	-0.238	-0.151
		(0.422)	(0.511)	(0.382)	(0.581)
Central Government Debt % GDP	0.906	0.462	-0.214	0.139	0.189
	(0.0001)***	(0.081)*	(0.103)	(0.199)	(0.193)

Note: Number in parentheses are p<t
*p< .10 **p< .05 ***p< .001

Either way, liquidity or solvency, both reduces the amount of productive new investments in physical and human capital (Easterly, 1999:6).

Second, the distinction between domestic debt and bilateral institutional debt (external debt) has become increasingly blurred. Defaults to external creditors, as indicated by concessional loan restructuring and additional borrowing, may also be indicative of over indebtedness of a country's central government. Both lead to a loss of creditor confidence and potential capital flight thereby undermining a country's ability to invest in physical and human capital (Krueger, 2002:34).

Table 10. Indirect Effects of External Debt on Selected Measures of Children's Health and Nutrition Status

Dependent Variable			
Under Five Child Mortality	0.906	x 0.462	= 0.419
Vaccinations	0.906	x -0.214	= -0.194
Child Wasting	0.906	x 0.139	= 0.126
Child Stunting	0.906	x 0.189	= 0.171

The indirect effects of external debt operating through central government debt were also tested for total percent of immunizations 12-23 months, and measures on children stunting and wasting (results are shown in Table 10). Again, external debt does produce indirect links operating through central government debt to all three measures. Unfortunately, the magnitude and statistical significance drops to below acceptable levels. Regarding immunizations, the calculated indirect measure was -0.194 based on the standardized regression coefficient of -0.214 $Pr< 0.103$ for central government debt

and the standardized regression coefficient of 0.906 for external debt regressed on central government debt. The direct effect of external debt on immunizations was in the expected direction but was not statistically significant (-0.146 p< 0.511).

This same indirect relation holds true for measures of *wasting*, or weight-for-height, which is a measure of a child's current nutritional status. The standardized regression coefficient for the direct effect of external debt on wasting was –0.238 with a p<t 0.382. The standardized regression coefficient of central government 0.139 p< 0.199 and the calculated indirect measure was 0.126.

A measure of nutritional status that reflects chronic under nourishment is height-for-age or *stunted*. The standardized regression coefficient for the direct effect of external debt on stunting was in the expected direction (-0.150) and was not statistically significant (p<0.581). The standardized regression coefficient of central government debt of 0.189 with a p<t of 0.193 and the calculated indirect measure was 0.171. Again the results of central government debt was in is in the expected direction. For both measures of child nutritional status – *wasting* and *stunted* - the statistical significance has peaked past an acceptable range of significance.

The magnitude of external debt's indirect effect on children's health status has diminished substantially on immunizations and the nutritional measures compared to the results of under-five mortality. What is important to note is the consistency in how external debt operates through central government debt, even though the magnitude fluctuates considerably and their statistical significance has reached their upper limits of the more "generous" acceptable range of 0.10. However, the degree to which they

exceed the significance parameters is encouraging. Given a better sample representation and country coverage, the results may increase in their statistical significance.

It should also be noted that a log was created for external debt as a percent of GDP, central government debt as a percent of GDP, and several other independent variables thought to have influence on children's health status or be influenced by external debt. The results did not produce any substantial differences than the use of the un-logged values, the exception being that the negative direction of the external debt on the dependent variables moved toward the expected direction but did not change in level of magnitude or statistical significance.   Several models were tested investigating the possible effects of gross domestic investment, total revenue, interest payments, overall deficit/surplus, and gross domestic savings on children's nutritional status. Several models were also investigating the possible effects of external debt on gross domestic investment, total revenue, interest payments, overall deficit/surplus and gross domestic savings. Several measures of external debt were utilized including Easterly's (1999) net present value of external debt controlling for loan concessionality, and none produced significant results.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

I have attempted to provide an analysis of the macroeconomic factors that affect the health status of women and children in developing countries. The intent of the research was to expand the scope of the World System and Dependency theories that emphasize the deleterious effects of the extent of external debt held by multilateral institutions (Chase-Dunn, 1975; Pfister, 1984; Harris, 1986; Sell and Kunitz, 1986-87; Meldrum, 1987; Harsch, 1989; Bradshaw and Huang, 1991; Bradshaw et. al, 1993) *and* the structure of capital formation (Chase-Dunn 1975;Bornschier, Chase-Dunn, and Rubinson, 1978; Bornschier and Chase-Dunn,1985; Timberlake and Kentor, 1983; Bradshaw, 1987; Walton and Ragin, 1990; Dixon and Boswell, 1996; Firebaugh, 1996) on the growth and development of Third World Countries. The argument set forth in this research primarily examines the relationship between external debt held by multilateral development institutions and central government debt. Central government debt served as one indicator out of several indicators considered to be factors that comprise the over all solvency of the domestic economy. The solvency of a central government or the ability of a state apparatus to serve the basic health and nutrition needs of its population were considered an indicator of the robustness of a nation's economy. The performance of a nation's economy and the distribution of resources have direct effects on the well-being of its citizens. A major barrier to social and economic development in developing countries is malnutrition and the inability of

individuals to maintain a healthy standard of living and be economically and socially productive.

In order to test the proposed increasing relevance of domestic debt on the social and economic development of a country I utilized two aggregate data sets. For measures of external debt and domestic solvency of a country, I utilized the Global Development Network Growth Database (William Easterly and Mirvat Sewadeh, 2001). The data set contained numerous measures on the structure of the domestic economy including central government debt, domestic investment, external debt, and expenditures on health and general public services for 263 countries for the years 1985 through 1996. Due to multiple missing values for each year of reported data, a mean was constructed for across years 1985 through 1996 for purposes of analysis. For measures of maternal and child health and nutrition I utilized data from the Demographic and Health Surveys data sets for 161 countries for the period 1997 through 2002. Due to multiple missing values across countries, a regional mean was constructed and imputed where there were missing values.

Major Findings

The major findings on the direct and indirect effect of external debt and the solvency of a domestic economy on the health and nutritional status of women and children are briefly discussed below:

1. External Debt as measured as a percent of GDP did produce slight but statistically significant direct effects on under-five infant mortality. But it did

not demonstrate direct effects on percent total immunized ages 12-23 months, percent children *wasting* and or *stunted*.

2. Central government debt as measured as a percent of GDP demonstrated a direct effect only with under-five mortality and it was modest at best.

3. Gross domestic investment measured as a percent of GDP also exhibited a weak direct effect on under-five infant mortality and percent total immunized. But it failed to generate any significance on the other measures for maternal and child health and nutritional status.

4. As expected, external debt did demonstrate a substantial and statistically significant direct effect on central government debt.

5. The results of the path analysis reveal that external debt consistently produced an indirect effect, operating through central government debt, on measures of under-five mortality, percent children immunized, and children wasting and stunting. However, the magnitude fluctuates considerably and their statistical significance drops to below acceptable levels on childhood immunizations and the nutritional measures.

6. What is important to note is the consistency in how external debt operates through central government debt, even though the magnitude and statistical significance fluctuate considerably. The degree to which they exceed the statistical significance is encouraging. Given a better sample representation and country coverage, the results may increase the magnitude and significance of the findings.

Discussion

Aggregate Data

Throughout the analysis the effect of the independent variables on children's nutritional outcomes were disappointing and at times in unexpected directions. This may be partly due to two reasons. First, the high degree of multicollinearity between the independent variables prohibited the use of multiple indicators simultaneously. This was somewhat compensated for in the use of the path analysis approach but there remained unexpected directions in the association of external debt and the dependent variables. This may be attributed to the technical violation of the OLS regression assumptions of independent variable not be correlated to one another.

To illustrate, measures for gross domestic investment and central government debt will be examined. Gross domestic investment includes outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include the construction of roads, railways, and include schools, offices, hospitals, private residential dwellings and commercial and industrial buildings. The category also includes land improvements such as fences, ditches and drains, plant machinery, and equipment purchases. Central government debt includes debt with public and private financial system, the non-financial private sector and the rest of the world. It includes domestic debt such as debt held by monetary authorities, deposit money banks, non-financial public enterprises, and households, and foreign debt, such as debt to international development institutions and foreign governments. The non-specificity of debts and expenditures may indeed be relevant. McIntosh and Thomas (2004) have

found that public health expenditures are not significantly related to the incidence of HIV in countries. Similarly, public health expenditures are not associated with the smoking rate of males and females across countries. Instead, bans on tobacco advertising are significant (McIntosh and Hoque, 2004).

Future research should attempt to disaggregate the reporting categories to specific line expenditures that are germane to the research problem. For instance, central government debt includes debt held by international development institutions and foreign government as well as deposit money banks, etc. Just as the source of capital can determine the level of productive investment (Dixon and Boswell, 1996), it is quite possible that different debt instruments vary in the degree of productive returns in investment. This is an empirical question that does not fall within the scope of the present research.

Second, establishing the linkage between aggregate level data and individual measures of well-being has been historically problematic to social science researchers. This is exemplified when analyzing the effects of domestic expenditures such as health and general public services. The failure to demonstrate significant results may be attributed to the fact that aggregate level data on the domestic economy is categorical and does not necessarily reflect actual distribution of resources within the country. Allocating five percent of domestic expenditures to health, general public services, and education do not necessarily translate into increased resources for women and children concerning access to health care, education on child and maternal health, or food supplies. The methodological problem is our not being able to capture adequately

distribution of and access to resources that have the potential to improve the quality of life for individuals.

There are two substantive areas of inquiry that illustrate this methodological point further. First, in the field of food security and nutritional status individuals, Evers and McIntosh (1977) question the utility of using Food Aid Organization's data on caloric intake of individuals. In calculating an aggregate figure, the amount of food supplies for a country is divided by the number individuals within the population. Clearly, this will not capture access to food or the ability to purchase the food even if food supplies are geographically accessible. At present there are no data available on people's actual food expenditures in terms of how much they spend and the amount/type of food they are able to obtain. This would give a better indicator of access to food and would allow us to test the hypothesis about the effects of debt and development on life chances (nutritional quality of food purchased). Having these data would help us answer some important questions. But even if we had food purchase data, we would still not know how the food was being distributed within the household. We do know from a number of studies that birth order and birth spacing significantly affect how much food particular children in a household receive. We also know there are gender differences in access to food within households. It would be important to determine whether low income exacerbates this, and if the income-access to food relationship is strengthened by the impact of debt.

Sen (1981) has noted that famine has occurred in the shadow of food surpluses. Poppendieck (1986) has addressed the "paradox of want amid plenty" during the Depression when farm commodity prices plummeted and huge surpluses increased

dramatically. At the same time, individuals across the United States were increasingly

suffering from malnutrition due to their loss of purchasing power.

Jenkins and Scanlan (2001) have recently revisited the debate over food supply and

food consumption. Food supply does not necessarily translate into consumption due to

unequal control of economic resources among the poor and disadvantaged. The United

Nations Development Programme (UNDP) defines *food security* as including not only

food supply but also physical and economic access (Jenkins and Scanlon, 2001:719).

Reinhard (2000:2) addresses these same issues noting that, "malnutrition arises from

various nutritional, biological, social, and economic deprivations, and thus implies more

than adequate energy and food intake. Malnutrition is the outcome of various factors in

a broad development context." It has been hypothesized that external debt leads to a

decline of services to the less well-to-do. If would be useful if data were available on

service availability (e.g., subsidized food; health care) over time so that the impact of

both external and central government debt on service availability could be determined.

Research investigating income distribution and income inequality also help to

understand the methodological issues involved with linking macro level phenomenon to

micro level experiences. Economic and physical access to not only food but to other

basic human welfare resources has lead social scientists to examine the intermediary role

of income and how it functions to enfranchise individuals by providing purchasing

power. At a micro level of analysis, this makes perfect sense, however measuring

personal income and income inequality is quite another matter. In countries where

income economies are less than stable computing an individual's income becomes

problematic. Gagliani (1987:313) notes that, "…all empirical studies [on income distribution] suffer from the inadequacy of historical data, as well as from unresolved problems in definition, methodology and measurement." However, gross national product (GNP) per capita, has been found to be highly related to mortality, but the relationship is curvilinear and is strongest between the lowest levels of income up to around $6,000 GNP per capita. After that, the regression line begins to flatten out. See the World Bank (1994) annual report, which, in 1994 emphasized health and economics. Wilkinson (1996) also notes the same curvilinear pattern and identifies the same $6,000 GNP per capita as a benchmark value in his research examining the relationship between economic growth and improved health.

There are a number of researchers who have tried to demonstrate that it is income inequality rather than economic growth that affects health and mortality (McIntosh, 2000; Wilkinson, 1996). Some have found evidence that indeed income inequality is the more important of the two. An interesting research questions is: does central government debt increase income inequality; if so, does it have a greater impact on health than external debt?

The above discussion is meant as a heuristic device to help the reader understand the methodological conundrum in demonstrating direct and/or indirect effects of macro economic phenomenon to individual outcomes. Measurements of macro level data are by definition aggregated into reporting categories. Measuring the effect of reported expenditures on health are analogous to measures of food supply, or caloric intake per capita to explain the variation in hunger. Reported health expenditures on health reflect

the *potential* for productive investments but do not measure actual distribution or utilization by individuals. This combined with the fact that the sample population drawn to measure malnutrition are less than representative, to say nothing of coverage across countries, obviates the ability of researchers to drawn conclusive findings.

Initially this research sought to include measures of maternal health as measured by percent of females whose height was under 145cm – a measure for stunting and reflects chronic malnutrition. Unfortunately, the sample drawn by Demographic and Health Surveys (DHS) is severely limited and only includes those women who have carried a pregnancy to term and visited a health facility within the last year. Excluded is an entire sub-population of women who are not pregnant, nor are they likely to become pregnant due to severe malnutrition. The effect of the selection criteria dramatically reduces the sample representation and reduces the probability of finding significant relationships between aggregate level data and individual outcomes. The robustness of the outcomes of under-five mortality is largely attributed to the national reporting system of deaths in *most* countries and the use of statistical extrapolations in projecting current rates based on prior years reported. As evident in this research, in order to increase the number of cases sufficient to run OLS regression analysis regional means were calculated and imputed into countries whose values were missing data.

As noted above, data on food availability to families and to individuals is generally not available for many countries, making comparative, multivariate studies impossible. Data availability on stunting and wasting are also less available than we would like. The sample sizes in the regression models using these variables tends to be low. Obviously it

would be desirable to have such data across a larger sample. Furthermore, the lack of

such data is associated with the strength of the country's economy. Low income

countries are less likely to have the resources to collect the data on children's heights

and weights. An interesting research question is whether countries that produce less data

are countries that are more likely carrying significant debt, both external and internal.

Finally, stunting and wasting are caused primarily by low-calorie diets; but these two

conditions are not the only forms of malnutrition. There are also deficiencies of vitamin

A, the B-vitamins, iron, iodine, and so on. These deficiency diseases impact millions of

children and adults (or so it is estimated), but actual figures across a great number of

countries is lacking. Again this would appear to the result of lack of sufficient resources.

Conclusion

Overall, the results of this study suggest that external debt continues to exhibit both

direct and indirect effects on under-five infant mortality. This supports conventional

World Systems and Dependency theorists' findings that the prevalence and degree of

external debt matters in terms of size of debt service payment to GDP, the potential

intervention of austerity programs by the IMF, and its negative effects on domestic

assets.

The results also indicate that central government debt holds potential explanatory

power to illuminate how the presence of external debt operates indirectly through central

government debt. Just as "the source of capital investment matters" (Dixon and

Boswell, 1996) the source of central government debt may matter. Various debt

instruments – external bilateral development institutions, public and private financial,

and non-financial private sector- may vary in their ability to promote a productive return on investment for physical and human capital.

Historically, sources of capital investment and the degree of their productivity have been measured as foreign direct investment (stocks and flows), domestic investment, and the structure of external debt in terms of currency exchange rates. It has been argued that domestic debt has become increasingly important in evaluating the sustainability of external debt and that external debt may have deleterious effects on the solvency of the central government (Krueger, 2002; Brooks et al., 2002; Easterly, 1999).

Domestic debt, as measured by central government debt, is comprised of both external debt held by multilateral development institutions and debt held by public and private financial systems, and the non-financial private sector. We can only assume that the line between domestic debt and external debt has become increasingly blurred because the World Bank (2004b) and international development institutions report external debt as both an independent categorical measure and as a subcategory within the broader measure of central government debt.

If social science researchers are to address the role of the domestic economy in eradicating poverty and improving the well-being of its citizens, then they must take the initiative and seek information that is germane to the effective restoration of the individual to their community. This requires that aggregate economic country level data be disaggregated to line item assets, liabilities, and expenditures and evaluated within the context of individual outcomes – such as health and nutritional measures. The 21st century and the technological revolution have brought with it many advantages including

increased transparency of government finance reporting and electronic databases. I can only assume that if data have been aggregated then they can be disaggregated and made available to social science researchers.

Another important issue that needs to be addressed in future research is the role of income inequality and the purchasing power of individuals to access resources that will directly affect their health and well being. Due to the limitations of the data utilized in this research, these influences could not be addressed. Based on the findings of past research it is expected that variation in individual incomes will contribute to explaining the variation in health and nutritional outcomes in conjunction with availability of resources.

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