A RECONSIDERATION OF THE GEOGRAPHY OF ECONOMIC DEVELOPMENT IN CENTRAL ASIA

ORTA ASYA'DA EKONOMİK KALKINMA DİNAMİKLERİNİN YENİDEN GÖZDEN GEÇİRİLMESİ

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ABSTRACT

Economic development, once viewed as a synonymous concept with economic growth, is now widely recognized as connoting societal progress. While such notions as progress and quality of life may be difficult to quantify, one empirical measure of development has received ample attention in both the academic literature and popular press. Since the early 1990s the United Nations has released its annual Human Development Index (HDI), which provides a quantitative measure of development using state-level income (output), health, and education data. If intra-regional variations in economic development within Central Asia are of concern, however, the HDI seems inadequate. A revised, region-specific economic development index is constructed here, adding to the existing HDI variables the measures of corruption, income inequality, infant mortality, and undernourishment. Applying this new index to Central Asia reveals some change in the results of the HDI, while still exposing stark variations in intra-regional economic development levels. As there may be more intra-regional variation in levels of economic development than uncovered by the HDI, the widely discussed economic integration efforts within Central Asia are expected to face significant obstacles.

Key Words: *Central Asia, economic development, empirical measurement, corruption, income inequality, infant mortality.*

ÖZET

Bir zamanlar ekonomik büyüme ile eş anlamlı bir kavram olarak görülen ekonomik kalkınma, günümüzde geniş anlamda toplumsal gelişmeyi ifade etmektedir. İlerleme ve yaşam kalitesi gibi kavramların sayısal değerlerle ölçülmesi zor olabilirken kalkınma kavramının ampirik olarak ele alınması hem akademik literatürde hem de popüler basında geniş ilgi görmektedir. 1990'lardan itibaren, Birleşmiş Milletler, devlet düzeyinde gelir (üretim), sağlık ve eğitim gibi verileri kullanarak kalkınmanın nicel ölçümünü sağlayan yıllık İnsani Gelişme Endeksini yayınlamaya başladı (HDI). Bununla birlikte, Orta Asya'da bölge içi ekonomik kalkınma dikkate alındığında ise İnsani Kalkınma Endeksi yetersiz kalmaktadır. Bu çalışmada, mevcut haliyle İnsani Gelişme Endeksi değişkenlerine yolsuzluk, gelir eşitsizliği, bebek ölüm oranları ve yetersiz beslenme ölçütleri de eklenerek bölge temelli yeni bir ekonomik kalkınma endeksi geliştirilmiştir. Bu yeni endeksin Orta Asya'ya uygulanması ile İnsani Gelişme Endeksi'nin ortaya koymuş olduğu sonuçlardan farklı olarak bazı değişiklikler ortaya çıkmaktadır. Ekonomik kalkınma seviyelerinde İnsani Kalkınma Endeksi'nin ortaya koyduğundan daha fazla bölge içi farklılıklar olabileceği için çokça tartışılan ekonomik entegrasyon girişimlerinin ciddi engellerle karşılaşması öngörülmektedir.

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Introduction

The breakup of the Soviet Union in 1991 propelled 15 newly independent states into the existing global political and economic arena. Nearly two decades later, these states exhibit variations in development levels, as well as differences in influence (however defined) within the globalized new world order. While treating the former Soviet Union as a monolithic entity has contemporary merit, a recognition and analysis of the regional constituencies of former Soviet space (the Baltic States, the Caucasus, or Central Asia for example) illuminate important regional distinctions. Central Asia, defined here as the former Soviet republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, is indeed a region facing a number of contemporary challenges. While proximity to Afghanistan and significant oil and natural gas reserves seem to have recently brought the region into the Western consciousness, environmental degradation, privatization, political reform, disparities in well-being, and a current discourse on regionalism remain pressing issues. How the region deals with these challenges will, of course, impact its future. In the current era of globalization's interconnectedness of regions and states, the response to these issues will also have an unmistakable global impact.

Given this contextual background and the region's resurgent geopolitical importance, this paper sets out to address the geography[1] of economic development within Central Asia. The concept of economic development is treated here as a multi-dimensional snapshot of overall levels of citizens' well-being within the region. A geographical treatment, particular attention will be paid to the intra-regional variation in development levels as expressed by the dimensions of income, health, education, and government. Academic literature[2] and empirical evidence[3] suggest that significant disparities in economic development continue to afflict the region. Using the United Nations' Human Development Index (HDI) as a departure point, a revised development index is presented, featuring a modified set of variables and a slightly revamped weighting scheme. In addition to the income, health, and education variables reflected in the HDI, additional measures of income inequality, health, and corruption are used to create a new economic development index sensitive to a number of particular development challenges faced by Central Asia. This region-specific index is expected to yield a more accurate representation of state-level economic development within the region. While index values are calculated for 128 of the world's states, particular emphasis is paid to

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[1] The geography of economic development, in this context, refers to the spatial manifestation of intra-regional variations in levels of economic development.

[2] See Anders Åslund, "Sizing up the Central Asian Economies", *Journal of International Affairs*, Vol. 36, No. 4, 2003, pp. 75-87 for intra-regional development disparities.

[3] See, for example United Nations Development Program, *Human Development Report* 2006: *Beyond Scarcity: Power, Poverty, and the Global Water Crisis*, (New York: UNDP, 2006) and its HDI results for the Central Asian states.

Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The results presented here reaffirm the significant regional disparities with respect to development levels within Central Asia. Such disparities, therefore, may prove problematic for the success of future regional integration efforts.

Economic Development

As this paper seeks to empirically re-asses the current state of development in Central Asia, it seems prudent to explore the meaning of the term *economic development*. Somewhat surprisingly, this term, as known today, has only fairly recently gained wide exposure in the academic literature. Economic *development* and economic *growth* were largely viewed as synonymous terms in the years following the Second World War.[4] Even earlier colonial-era references to economic development referred simply to the exploitation of a colonial possession's natural resources. By the 1960s, most attempts at measuring economic development focused solely on *per capita* income and output (GNP or GDP) *per capita*.[5] Those states with the highest income or output were assumed to have the highest levels of economic development, and those with low income were assumed to have the lowest levels of economic development. By the early 1970s, Dudley Seers strongly questioned the confusion between economic growth and development and proposed that a measurement of economic development be a measure of decreases in poverty, unemployment, and inequality. He offered a much broader definition of development, calling the main goal of economic development "the realization of the potential of human personality."[6] Yes as recent as the late 1970s, significant confusion and overlap existed between the concepts of economic development and economic growth.[7]

Today, of course, the notion of economic development extends well beyond a state's economic growth rate or a population's average income. What confusion may exist seems to be based on the choice of term to use, be it economic development, development, socio-economic development, or human development. Regardless of the term used, the concept denotes progress or improvement in the quality of life of a state's population.[8] As Timothy Fik defines it, economic development refers to "positive changes and progress in the human condition through economic means".[9]

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[4] For an articulation of this, see H.W. Arndt, "Economic Development: A Semantic History", *Economic Development and Cultural Change*, Vol. 29, No. 3, 1981, p. 457-466.

[5] As expressed in E.G. Stockwell, "The Measures of Economic Development", *Economic Development and Cultural Change*, Vol. 8, No. 4, 1960, pp. 419-432.

[6] This quote appears in Dudley Seers, "What are we Trying to Measure?", *Journal of Development Studies*, Vol. 8, No. 3, 1972, p. 22.

[7] See Robert. A. Flammang, "Economic Growth and Economic Development: Counterparts or Competitors?", *Economic Development and Cultural Change*, Vol. 28, No. 1, 1979, pp. 47-61.

[8] See United Nations Development Program, *Human Development Report 2006: Beyond Scarcity: Power, Poverty, and the Global Water Crisis*, (New York: UNDP, 2006).

[9] See Timothy J. Fik, *The Geography of Economic Development: Regional Changes, Global Challenges*, (Boston: McGraw Hill Higher Education, 2000), p. 22.

While economic development, by definition, is a dynamic process, a given state's level of economic development can be measured at a given time using empirical data reflecting income, health, education, physical infrastructure, government, or overall quality of life. Measuring development requires decisions on the geographical scale of analysis (from international to intra-state), the variables to measure, the data sources to utilize, and the relative importance of the included variables. Perhaps the most influential and widely disseminated contemporary development measure is the Human Development Index (HDI) published annually by the United Nations. The HDI will be described in more detail in a subsequent section of this paper.

Geography and Economic Development

The academic discipline of geography is concerned, among other things, with such concepts as location, regions, spatial variation, and place characteristics. Economic geographers study the locations, distributions, and interactions among and between economic phenomena. As the world's economic development levels exhibit marked variation between states, within states, between regions, and within regions, geographers have made valuable contributions to the economic development literature.[10] A state's location, of course, can impact its economic development. A landlocked location has historically impeded its involvement in global oceanic trade. A location along a major trading route (the ancient Silk Road network for example) can stimulate trade, economic growth, and economic development. The world's most profitable natural resources occupy highly localized and distinct points in the Earth's crust. If a given state's political boundaries happen, by chance, to bound such a location, revenue (and ideally development) can accrue to the state.

Location aside, geography is also multi-disciplinary in nature, incorporating theories and concepts from economics, demography, and political science to name just three. Economic development itself is a multi-dimensional concept, itself encompassing economic, demographic, and political variables. A shared multi-dimensionality and a concern with regional and locational variations combine to make economic geography an ideal vantage point from which to approach economic development research. Most recently, the World Bank's 2009 World Development Report entitled *Reshaping Economic Geography*[11] forwards the importance of geography in the economic development process. In this

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[10] For an excellent example, see Steven R. Halloway and Kavita Pandit, "The Disparity Between Economic Development and Human Welfare", *The Professional Geographer*, Vol. 44, No. 1, 1992, pp. 57-71. Other examples considering geography's importance to economic development include Paul Krugman, "The Role of Geography in Development", Paper Prepared for the Annual World Bank Conference on Development Economics, April 20-21, 1998, pp. 1-35.; John L. Gallup, Jeffrey D. Sachs, and Andrew D. Mellinger, "Geography and Economic Development", *Working Papers Center for International Development at Harvard University*, CID Working Paper No. 1, 1999, pp. 1-47.; J. Vernon Henderson, Zmarak Shalizi, and Anthony J. Venables, "Geography and Development", *Journal of Economic Geography*, Vol. 1, No. 1, 2001, pp. 81-105.

[11] The World Bank, *World Development Report* 2009: *Reshaping Economic Geography*, (Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank, 2009).

particular context the geographical concepts of density (economic agglomerations), distance (measure of separation between economic centers as well as workers and firms), and division (boundaries that limit movement of labor, capital, or goods) prove paramount to economic development at the local, national, and international scales. With this report, the World Bank brings geography – spatial relationships and place characteristics – to the forefront of policy considerations and recommendations.

Quantifying Development: The Human Development Index

Since 1990, the United Nations Development Program (UNDP) has produced its annual Human Development Report (HDR). In addition to focusing on pressing economic development issues (e.g. access to clean water in 2006, human rights in 2000, and alleviating poverty in 1999), these reports have also included a standardized development measure called the Human Development Index (HDI). The HDI "looks beyond GDP to a broader definition of well-being"[12] to also include measures of health and education. More specifically, the most recent versions of the HDI have incorporated state-level data on life expectancy at birth (in years), adult literacy rate (% age 15 and above), combined primary, secondary, and tertiary gross enrollment ratio (%), and *per capita* GDP (purchasing power parity in $US). For each of the world's states (data permitting), three separate income, health, and education indices are calculated using the above variables. The final HDI value is calculated by averaging these three indices, forming the basis of the final development rankings. Results of the most recent HDI (2007/08 report using 2005 data) show the world's highest development levels in Iceland, Norway, Australia, Canada, and Ireland, and lowest in Sierra Leone, Burkina Faso, Guinea-Bissau, Niger, and Mali.[13]

As with other world regions, HDI results can be used to highlight intra-regional, state level development variations within Central Asia. In addition, comparing HDI results from the 1997 (1994 data) and 2006 (2004 data) reports allows for a cursory comparison of regional development changes during what essentially amounts to the region's first decade of independence (Tables 1a and 1b). As a cautionary note, time series analysis comparing HDI results from different reports is not recommended as computational methods have changed slightly over the decade in question. As a result, index values take on slightly different meanings, although HDI rankings can be compared to illuminate relative improvement or decline in a state's level of development. It should also be noted here that the 1997 HDI (using data from 1994) ranked 175 of the world's states, while the 2006 HDI (using 2004 data) ranked 177 states.

In both 1994 and 2004 Tajikistan is shown to have exhibited the region's lowest development levels, and its world HDI ranking dropped seven places (from 115 to 122). It appears that a nearly three-year drop in life expectancy

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[12] United Nations Development Program, H*uman Development Report* 2006: B*eyond Scarcity*: P*ower, Poverty, and the Global Water Crisis,* (New York: UNDP, 2006).
[13] United Nations Development Program, H*uman Development Report* 2007/2008: F*ighting Climate Change*: H*uman Solidarity in a Divided World,* (New York: UNDP, 2007).

(original data used in the 1997 and 2006 HDRs have been examined to analyze HDI value/rank changes) offset gains in adult literacy and gross enrollment ratio. It seems logical that Tajikistan's civil war, which raged through much of the 1990s, at least partly explains its drop in life expectancy and, hence, its final HDI value and rank. Turkmenistan, the region's development leader in 1994, witnessed a precipitous drop in world HDI rank (from 85 to105), though retained the region's second-highest development score in 2004. A drop in life expectancy by 2.2 years and a comparatively sharp drop (15 percentage points) in gross enrollment ratio appears responsible for this dramatic HDI ranking drop. Kyrgyzstan's HDI ranking dropped slightly, from 107 to 110. This dip is most likely a result of a nearly one-year drop in life expectancy, which (like Tajikistan) offset gains in adult literacy rate and gross enrollment ratio. After Turkmenistan, Uzbekistan experienced Central Asia's second-greatest drop in HDI world ranking (from 100 to 113) between 1994 and 2004. While Uzbekistan's nearly one-year drop in life expectancy may explain some of this decrease, a larger contributing factor may be its poor *per capita* output performance.

Table 1a: Human Development Index (HDI): 1994[14]

HDI Rank		HDI value
1	Canada	0.960
85	Turkmenistan	0.723
93	Kazakhstan	0.709
100	Uzbekistan	0.662
107	Kyrgyzstan	0.635
115	Tajikistan	0.580
175	Sierra Leone	0.176

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[14] United Nations Development Program, *Human Development Report 1997: Human Development to Eradicate Poverty*, (New York: UNDP, 1997).

Table 1b: Human Development Index (HDI): 2004[15]

HDI Rank		HDI value
1	Norway	0.965
79	**Kazakhstan**	**0.774**
105	**Turkmenistan**	**0.724**
110	**Kyrgyzstan**	**0.705**
113	**Uzbekistan**	**0.696**
122	**Tajikistan**	**0.652**
177	**Niger**	**0.311**

According to UNDP data, Uzbekistan suffered a nearly $800 nominal decrease in *per capita* GDP between 1994 and 2004. Central Asia's greatest development gains over the first decade of independence occurred in Kazakhstan, which saw its HDI rank jump 14 places (from 93 to 79). Currently Central Asia's development leader, Kazakhstan also holds the distinction of the only Central Asian republic (CAR) to increase its HDI ranking since independence. Kazakhstan's development gains seem to have been a result of a sharp increase (18 percentage points from 73 to 81) in gross enrollment ratio and a more than doubling (increase of $4,156) of its nominal *per capita* GDP. While Kazakhstan's endowment of petroleum resources (coupled with recent high oil prices) conspired to fuel tremendous economic growth, Kazakhstan has also been a regional leader in economic reform.[16] In addition, economic gains have filtered down into Kazakhstan's population to a much greater degree than within any of Central Asia's other states.[17]

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[15] United Nations Development Program, H*uman Development Report* 2006: B*eyond Scarcity*: P*ower, Poverty, and the Global Water Crisis*, (New York: UNDP, 2006).

[16] See Anders Åslund, "Sizing up the Central Asian Economies", J*ournal of International Affairs*, Vol. 36, No. 2, 2003, pp. 75-87.

[17] See Michael Rywkin, "Stability in Central Asia: Engaging Kazakhstan", A*merican Foreign Policy Interests*, Vol. 27, No. 5, October 2005, pp. 439-449.

Moving beyond the HDI: A Development Index for Central Asia

As specified earlier, a purpose of this paper is to construct a new economic development index that captures some of the salient development challenges faced by the Central Asian region. While the HDI remains the world's prominent quantitative measure of development, it has met with a number of calls for improvement, both in terms of methodology[18] and in choice of included dimensions.[19] This paper seeks to reaffirm the benefits of the HDI – namely a quantitative development measure that is applied across the world's states and which extends the notion of development beyond income or output. As such, the methodological techniques used here to derive a Central Asian revised development index will largely mirror those used by the HDI. The alternate index presented here differs from the HDI in its breadth and inclusion of additional dimensions. In addition to the *per capita* GDP, gross enrollment ratio, adult literacy, and life expectancy variables used in the HDI, this index will expand to include measures of income inequality, undernourishment, infant mortality, and corruption. As rationale for the HDI variables has been addressed elsewhere,[20] the following section will seek to substantiate the inclusion of those variables that differ from the HDI, namely corruption, income inequality, infant mortality, and undernourishment.

Corruption

Government corruption can be generally defined as "the sale of public goods or services for private benefit."[21] The list of publicly provided goods and services is, of course, a lengthy one, though some that appear to be more prone to corruption include police protection and law enforcement, health care, education, and taxation. For individual citizens, corruption can take the form of a payment (bribe) to obtain these 'public' services. Bribes can be paid to doctors for treatment, to school officials for an educational opportunity, to judges for leniency, or to police officers to ward off harassment. Corruption can also impact small businesses, making profitability more difficult in the face of corrupt licensing and permit officials demanding bribes in exchange for allowance to remain in operation. Large corporations may also face corruption taking the form of much larger bribes in exchange for entry into a particular market.

Regardless of its level of operation (individual, small firm, large corporation; low-level bureaucrat, high ranking government official), public sector corruption

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[18] See James E. Foster, Luis F. Lopez-Calva, and Miguel Szekely, "Measuring the Distribution of Human Development: Methodology and an Application to Mexico", *Journal of Human Development and Capabilities*, Vol. 6, No. 1, 2005, pp. 5-29.

[19] See Ambuj D. Sagar and Adil Najam, "The Human Development Index: A Critical Review", *Ecological Economics*, Vol. 25, No. 3, 1998, pp. 249-264.

[20] Rationale for included variables is found in each of the UNDP Human Development Reports. For an early example, see United Nations Development Program, *Human Development Report* 1990, (New York, Oxford University Press, 1990).

[21] See Anders Åslund, "Sizing up the Central Asian Economies", *Journal of International Affairs*, Vol. 36, No. 4, 2003, p. 80.

greatly retards economic development.[22] Some of the impacts of corruption on economic development include a negative impact on private business investment, a negative impact on foreign direct investment (FDI), a negative impact on economic growth, and an increase in public investment – although with diversion from such important sectors as health, education, and infrastructure maintenance.[23] In sum, corruption erodes a given state's wealth.[24]

The negative impacts of corruption particularly afflict Central Asia, as the region has been labeled one of the world's most corrupt.[25] Corruption in Central Asia may involve the payment of bribes to ensure a safe childbirth, to obtain a job, to send children to better schools, or to obtain a familial burial plot.[26] Beyond these areas, regional corruption is perceived to be particularly egregious within law enforcement, including police, judges, tax police, and customs agents.[27] As a market distortion, corruption effectively increases the operating costs of each of the region's afflicted businesses.[28] Given the multitude of negative impacts of corruption on economic development, and the fact that corruption is particularly pervasive in Central Asia, it seems logical to include some measure of corruption into a development index with this region in mind. One such quantitative measure is the Corruption Perceptions Index (CPI), published annually since 1995 by Transparency International, an organization dedicated to the eradication of corruption. The CPI will be discussed in greater detail later with the other data variables used in this paper.

Income Inequality

Income inequality can generally be considered the divide or 'gap' between rich and poor in a given population. Income inequality (or the correlate notions of consumption or wealth inequality) has received much attention recently, in both academic literature[29] and the popular press.[30] Much of this recent attention seems to have been stimulated by a wider debate on globalization, and whether the increasingly integrated world economy has heightened the inequality in global levels of income, development, or overall well-being. Income inequality

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[22] See Omar Azfar, Young Lee, and Anand Swamy, "The Causes and Consequences of Corruption", *Annals of the American Academy of Political and Social Science*, Vol. 573, No. 1, 2001, pp. 42-56.

[23] See Shang-Jin Wei, "Corruption in Economic Development: Beneficial Grease, Minor Annoyance, or Major Obstacle?", *World Bank Policy Research Working Paper*, No. 2048, 1999.

[24] See Transparency International, *Global Corruption Report 2007: Corruption in Judicial Systems*, (Cambridge, Cambridge University Press, 2007).

[25] This sentiment is expressed by both Anders Åslund, 2003; and Zamira Eshenova, "Central Asia: Corruption a Common Feature of Daily Routine", *Radio Free Europe/Radio Liberty*, 17 July 2002, Last accessed July 20, 2009 via (http://www.rferl.org/content/article/1100287.html).

[26] See Zamira Eshanova, "Central Asia: Corruption a Common Feature of Daily Routine", 2002.

[27] See Anders Åslund, "Sizing up the Central Asian Economies", 2003.

[28] See Andrew F. Tully, "Central Asia: Corruption, Lack of Vision Seen as Stunting Economic Growth", *Radio Free Europe/Radio Liberty*, October 10, 2004, last accessed July 19, 2009 via (http://www.rferl.org/content/article/1055210.html).

[29] See Richard G. Wilkinson, "The Impact of Inequality", *Social Research*, Vol. 73, No. 2, 2006, pp. 711-732.

[30] See Michael Abramowitz and Lory Montgomery, "Bush Addresses Income Inequality", *Washington Post*, Thursday, 01 February 2007, p. A04.

can be examined at the global scale investigating average income disparities between the world's independent states, or at the national scale investigating inequality *within* a particular state. Global income inequality as a whole is the sum of these two income inequality components.[31] The global pattern of income inequality within states reveals the greatest disparities in Latin America and sub-Saharan Africa, followed by South and East Asia, and the least inequality found in the regions of northern, and the Eastern Europe.[32]

The relationship between a state's income inequality and its economic growth and development was first investigated by economist Simon Kuznets,[33] who pioneered the 'inverted U' hypothesis, the graphic expression of which became known as the 'Kuznets curve.' In this context, income inequality rises dramatically in the early stages of a state's economic growth, reaches a peak somewhere in the middle stages, and declines with further expansion of output. Empirical evidence from studies investigating the Kuznets hypothesis leads to a range of conclusions in the academic literature. Some sources[34] find that economic development significantly determines a state's level of income inequality, fully supporting the Kuznets hypothesis, while others[35] are unable to support Kuznets, finding little relationship between growth and inequality. In what might be considered a middle position, yet another source examines income inequality in developed countries and finds that the Kuznets pattern holds through the 1960s, but the 1970s brought an increase in inequality, effectively 'uninverting' the Kuznets U.[36]

Regardless of the precise causal relationship between economic development and intra-state income inequality, such inequality has a negative impact on the state's level of development. Higher levels of income inequality can worsen absolute levels of poverty, may adversely affect overall human welfare, and can aggravate political and social tensions.[37] In addition to having lower life expectancies and poorer overall health, societies with higher income inequality also tend to exhibit lower levels of social capital, trust, and higher rates of homicide.[38] The negative impacts of income inequality seem particularly acute in Central Asia. Income inequality remains, by international standards,

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[31] See Brian Goesling, "Changing Income Inequalities Within and Between Nations: New Evidence", *American Sociological Review*, Vol. 66, No. 5, 2001, pp. 745-761.

[32] See Klaus Deininger and Lyn Squire, "Economic Growth and Income Inequality: Reexamining the Links", *Finance and Development*, Vol. 34, No. 1, 1997, pp. 38-41.

[33] See, for example, Simon Kuznets, "Economic Growth and Income Inequality", *The American Economic Review*, Vol. 45, No. 1, 1955, pp. 1-28.

[34] See Erich Weede and Horst Tiefenbach, "Some Recent Explanations of Income Inequality: An Evaluation and Critique", *International Studies Quarterly*, Vol. 25, No. 2, 1981, pp. 255-282.

[35] See Klaus Deininger and Lyn Squire, "Economic Growth and Income Inequality: Reexamining the Links", *Finance and Development*, Vol. 34, No. 1, 1997.

[36] See Rati Ram, "Level of Economic Development and Income Inequality: Evidence from the Postwar Developed World", *Southern Economic Journal*, Vol. 64, No. 2, 1997, pp. 576-583.

[37] See Tomson Ogwang, "The Economic Development and Income Inequality Nexus: Further Evidence on Kuznets' U-curve Hypothesis", *American Journal of Economics and Sociology*, Vol. 54, No. 2, 1995, pp. 217-229.

[38] See Richard G. Wilkinson, "The Impact of Inequality", *Social Research*, Vol. 73, No. 2, 2006, pp. 711-732.

quite high in the region, having increased dramatically since independence.[39] Furthermore, these increases in income inequality have also contributed to higher regional levels of poverty.[40] Recognizing the negative developmental aspects of income inequality, as well as the prevailing income disparities within Central Asia, it would seem appropriate to include a measure of income inequality in this paper's revised economic development index. While a number of quantitative methods and measures exist to reflect a given society's income inequality level, the measure to be incorporated into this research will be the Gini coefficient, described in greater detail in the next section elaborating on data definitions and sources.

Infant Mortality and Undernourishment

Health-related dimensions remain important components of a state's level of economic development. Favorable health conditions can lead to higher rates of economic growth while poor health conditions serve to trap citizens in poverty.[41] Two important measures of health conditions within a particular state are infant mortality and undernourishment. Infant mortality rates generally refer to the number of infant (aged between birth and one year) deaths per one thousand live births. Infant mortality has been shown to be the supreme indirect measure of a given state's level of economic development.[42] While correlating strongly with income, infant mortality is not exaggerated by income extremes, can affect all segments of society, and reducing its occurrence remains a universal goal worldwide.[43]

While infant mortality applies to a specific age cohort within a society, undernourishment applies to an entire population. Undernourishment has often been used in the context of global hunger, although the term 'hunger' as applied to poverty and underdevelopment has been derided as being overly emotional and inaccurate.[44] The constituent components of 'hunger' in this context can generally be said to include both *under*nourishment and *mal*nourishment. Undernourishment applies to a paucity of total calories (caloric intake of food) per day, while malnourishment refers to deprivation of certain essential vitamins and minerals necessary for healthy life.

Put simply, undernourishment resides below some minimum threshold of caloric quantity, while malnourishment applies to caloric quality.

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[39] See World Health Organization, "WHO on Health and Economic Activity", *Population and Development Review*, Vol. 25, No. 2, 1999, pp. 396-401.

[40] See Jane Falkingham, "The End of the Rollercoaster? Growth, Inequality and Poverty in Central Asia and the Caucasus", *Social Policy and Administration*, Vol. 39, No. 4, 2005, pp. 340-360.

[41] See United Nations Development Program, Human Development Report 2005.

[42] See E.G. Stockwell, "The Measurement of Economic Development", *Economic Development and Cultural Change*, Vol. 8, No. 4, 1960, pp. 419-432.

[43] For an excellent geographical examination of infant mortality see William H. Berentsen, "German Infant Mortality 1960-1980", *Geographical Review*, Vol. 77, No. 2, 1987, pp. 157-170.

[44] George Blyn, "Controversial Views on the Geography of Nutrition", *Economic Geography*, Vol. 37, No. 1, 1961, pp. 72-74.

As previously mentioned, the HDI incorporates a lone health-related variable (life expectancy) to measure development. The revised development index presented here will also incorporate life expectancy while also utilizing measures of infant mortality and undernourishment. The main objective in this case is to try to uncover a bit more intra-regional variation along the health dimension within Central Asia. As with corruption and income inequality, specific data definitions for the infant mortality and undernourishment variables will be discussed in the next section.

Data

For calculating a revised economic development index sensitive to the development challenges faced by Central Asia, data were collected along the income, health, education, and governmental quality dimensions for as many of the world's independent states as possible given the availability of data. These data, presented for the five Central Asian republics and summarized for all states (Table 2), were generally the most recent available. In all, a total of eight variables, whose data values are described below, were utilized in calculating this paper's economic development index.

Per capita gross domestic product (pcGDP) refers to a state's total value of goods and services produced within its borders and standardized by dividing by its population. The value of all goods and services produced are in U.S. dollars, standardized using the purchasing power parity (PPP) methodology that values goods at prevailing prices in the U.S.[45] Data values mainly refer to 2007, and were collected for 199 geographic entities. With respect to Central Asia, each of the region's states with the lone exception of Kazakhstan falls well below the world *per capita* GDP median. As previously discussed, Kazakhstan's relative supremacy here can be attributed to its petroleum exports, recent high oil prices, and relatively successful reform efforts. For the remainder of the region, however, per capita output performance is uninspiring. Tajikistan, the region's poorest per capita GDP performer, falls between Senegal and Chad, just 33 ranking spots above Zimbabwe (ranked last in the world, 199, with *per capita* GDP of $200).

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[45] Central Intelligence Agency, *The* CIA W*orld Factbook*, 2009.

Table 2: Data values used in calculating revised development index

	pcGDP[1]	GNI[2]	LEX[3]	IMR[4]	UNR[5]	GER[6]	ALR[7]	CPI[8]
Kazakhstan	11,000	33.9	67.5	26.6	6	94	99.5	2.2
Kyrgyzstan	2,000	30.3	69.1	32.3	4	78	98.7	1.8
Tajikistan	1,600	32.6	65.0	42.3	56	71	99.5	2.0
Turkmenistan	5,300	40.8	67.5	46.9	7	73	98.8	1.8
Uzbekistan	2,400	36.8	71.7	24.2	25	74	99.0	1.8
Max	87,600	74.3	82.7	182.3	75	113	99.8	9.3
Min	200	24.7	32.0	2.3	2.5	22.7	19.0	1.0
Median	7,400	39.1	72.2	21.2	8	73.5	89.9	3.3
N=	199	128	198	198	170	177	175	176

[1]*per capita* GDP ($US) in terms of purchasing power parity. source: CIA, 2009.
[2]Gini coefficient (measure of income inequality) 2006. Source: World Bank, 2007.
[3]Life expectancy at birth (years) 2008. Source: US Census Bureau, 2009.
[4]Infant mortality rate (per 1,000 live births) 2008. Source: US Census Bureau, 2009.
[5]Prevalence of undernourishment (% of population) 2004. Source: World Bank, 2007.
[6]Gross enrollment ratio (%) 2005. Source: UNDP, 2007.
[7]Adult literacy rate (%) 2004. Source: UNDP, 2006.
[8]Corruption perceptions index, 2008.   Source: Transparency International, 2008.

Kyrgyzstan doesn't fare much better in this regard, with a per capita GDP just $400 and 12 ranks greater than Tajikistan. In a similar fashion, Uzbekistan has a per capita GDP just seven ranks (and $400) above Kyrgyzstan. Positioned midway between Kazakhstan and Uzbekistan (Kazakhstan is 34 ranking positions higher and Uzbekistan is 33 raking positions lower), Turkmenistan's per capita GDP places it between China and Bhutan, still well below the global median.

The Gini coefficient (GNI), or Gini index, measures the extent of inequality in a given state's distribution of family income. While theoretically ranging from 0 (perfect equality) to 100 (perfect inequality), global Gini coefficients tend to be highest in sub- Saharan Africa (values in the 50s) and lowest in Scandinavia (values in the 20s).[1] Representing income inequality in 2006, Gini coefficient data were collected for 128 geographic units. For Central Asia, the state of inequality seems positive for the region's economic development. Kyrgyzstan (ranked 20th), Tajikistan (27th), and Kazakhstan (36th) are ranked fairly highly by world standards. Uzbekistan (ranked 56th) occupied six spots above the world median, and even Turkmenistan, deemed having Central Asia's most unequal incomes, is ranked just 10 spots (at 74th) below the world median. These Gini coefficient data, and the resulting world rankings, would seem to be at odds with those who claim that income inequality is an acute problem in Central Asia.[2]

Life expectancy at birth (LEX) refers to the average number of years a newborn is expected to live assuming age-specific mortality rates remain constant into the future, throughout the newborn's life.[3] Life expectancy data are for the year 2008 (both sexes), and were collected for 198 geographic entities. Considering the Central Asian region, life expectancy results are not promising. Each of the region's states falls below the global median value. Central Asia's life expectancy leader (according to these data), Uzbekistan, is ranked 105th (out of 198) globally. The remaining states are ranked at 127 (Kyrgyzstan), 131 (both Kazakhstan and Turkmenistan), and 144 (Tajikistan).

Infant mortality rate (IMR) refers to the number of deaths of infants under the age of one year per 1,000 live births.[4] These data values are rates for the year 2008 and were collected for 197 geographic units. In similar fashion to life expectancy, each Central Asian state performs below the global median with respect to infant mortality. As was the case with life expectancy, Uzbekistan is Central Asia's top infant mortality performer, ranked just below the global

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[1]   Ibid.

[2]   See, for instance, Jane Falkingham, "The End of the Rollercoaster? Growth, Inequality and Poverty in Central Asia and the Caucasus", *Social Policy and Administration*, Vol. 39, No. 4, 2005, pp. 340-360. As a cautionary note, the difficulties in quantitatively measuring inequality accurately may result in an incongruity between individual state-level inequality values and the actual existing inequality.

[3]   *United States Census Bureau*, *International Database* (IDB), 2009. Table 010. Infant mortality rates and deaths, and life expectancy at birth, by sex   Last accessed February 15, 2009 via (http://www.census.gov/cgi-bin/ipc/idbagg).

[4]   Ibid.

median and one rank above Honduras. Kazakhstan occupies five rank positions lower, situated between Nicaragua and Syria. A further 14 positions lower is situated Kyrgyzstan, ranked one below India and one above Zimbabwe. Tajikistan occupies seven lower spots, situated between East Timor and Cape Verde, while Turkmenistan, the region's worst infant mortality performer, sits eight spots further between Papua New Guinea and Nepal.

Prevalence of undernourishment (UNR) represents the percentage of a given population considered undernourished, not meeting a minimum daily caloric intake needed for a "healthy life and carrying out a light physical activity."[5]

Undernourishment data refer to the year 2004, and were collected for 170 geographic units.[6] In Central Asia, the prevalence of undernourishment in the population seems to split between two groups of states; Kazakhstan, Kyrgyzstan, and Turkmenistan with undernourished proportions above the global median, and Uzbekistan and Tajikistan with undernourished population proportions well below the world median. In this particular dataset, in fact, Tajikistan (ranked 165 out of 169) has one of the world's most undernourished populations, ranking above only Eritrea, Congo (DRC), Burundi, and Comoros. Uzbekistan, while featuring an undernourished population percentage better than half of Tajikistan's, is ranked just 16 positions (considering numerous ties) higher. Central Asia's lowest proportion of undernourishment is found in Kyrgyzstan, which shares its rank with Algeria, Belarus, Belize, Brunei, Chile, Egypt, Iran, Saudi Arabia, and Syria. Kazakhstan, two percentage points lower than Kyrgyzstan in world rankings, finds itself tied with Albania, Ecuador, Indonesia, Jordan, and Morocco. Turkmenistan, just one percent above the global median, is tied with Azerbaijan, Brazil, Croatia, Grenada, and Slovakia.

Gross Enrollment Ratio (GER) is the combined ratio of total students enrolled in primary, secondary, and tertiary levels of education to total individuals of official school age for the three levels.[7] Expressed in percentage terms and pertaining to enrollment conditions in 2005, GER data were collected for 176 geographic units. With respect to the proportion of school-aged kids actually enrolled in school, the situation in Central Asia is mixed. Kazakhstan, the regional leader, ranks 17th globally, occupying one spot ahead of the United States. For the rest of Central Asia enrollment ratios are significantly lower, although all states cluster within seven percentage points about the global median. Kyrgyzstan and Uzbekistan are just above the enrollment ratio median, while Turkmenistan and Tajikistan are just below.

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[5] This quote comes from the Food and Agriculture Organization of the United Nations, FAOSTAT definition for undernourishment, last accessed March 30, 2009 via (http://faostat.fao.org/site/379/DesktopDefault.aspx?PageID=379). This definition forms the basis of that used by the World Bank.

[6] The source for the undernourishment data is The World Bank, 2007 *World Development Indicators*, (Washington, D.C.: The World Bank, 2007).

[7] Gross Enrollment Ratio data come from the 2007/08 *Human Development Report*, UNDP, 2007.

Adult literacy rate (ALR) refers to the percentage of the population, aged 15 years and older, who can read and write.[8] Literacy data reflect conditions in 2005, and were collected for 172 geographic entities. One of the only development variables, indeed the only used in the revised development index presented here, where each of Central Asia's states show stellar results is with adult literacy. Most of the region's adults appear to have benefited from the Soviet Union's educational system and its explicit goal of universal literacy. This is manifested in this data set, with each Central Asian state positioned near the top of global rankings, particularly Kazakhstan and Tajikistan both tied for 4th in the world. Even the region's state with the lowest rate, Kyrgyzstan, ranks very highly, situated between Albania and Italy.

Corruption Perceptions Index (CPI) data values represent indexed levels of perceived corruption in 2008. The CPI reflects corruption as perceived by those conducting business in the state in question as well as international observers and analysts.[9] Theoretically ranging from one to ten (although actual range is from 1.0 to 9.3), CPI data were collected for 180 geographic units. Empirical evidence, as expressed by this index, suggests that Central Asia is among the world's most corrupt regions. Even the region's state perceived to be least corrupt, Kazakhstan, falls well below the world median and is tied with Timor-Leste for 145th place (out of 180, though multiple ties in rank place Kazakhstan only 11 places from the bottom). Tajikistan ranks 151st (out of 180), and is tied with Papua New Guinea, Laos, Ecuador, and Ivory Coast. Central Asian states perceived to be the most corrupt, Kyrgyzstan, Turkmenistan, and Uzbekistan, are tied with Zimbabwe and Cambodia for 166th place. Given a number of ties at the lower rankings, these states are only six ranks above Somalia (ranked 180 with index value 1.0) – perceived to be the world's most corrupt state in 2008.

Methodology

In general, the indexing methodology implemented by the United Nations in its Human Development Index (HDI) was used to calculate the revised development index for this paper. Following the general formula (**equation 1**), the index value for, say, Turkmenistan adult literacy would be that state's literacy data value minus the minimum literacy value in the data set, divided by the difference between the maximum and minimum data values in the adult literacy dataset.

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[8] Adult literacy rate data come from *the* 2006 H*uman* D*evelopment* R*eport*, UNDP, 2006.

[9] Corruption Perceptions Index data come from Transparency International, last accessed on January 19, 2009 via (http://www.transparency.org/layout/set/print/news_room/in_focus/2008/cpi 2008). For an in-depth treatment of the CPI's calculation, see Johann G. Lambsdorff, *The Methodology of the Corruption Perceptions Index* 2008, (University of Passau, Transparency International, 2008), pp. 1-13. Last accessed March 28, 2009 via (http://www.transparency.org/policy_research/surveys_indices/cpi).

(1) $\quad$ Index $_i$ = $\dfrac{\text{Actual value}_i - \text{minimum value}}{\text{Maximum value} - \text{minimum value}}$

The formulation above was used to calculate the individual index values for the gross enrollment ratio, adult literacy, and life expectancy data items. In the case of infant mortality, Gini coefficient, and undernourishment, higher data values indicated higher levels of infant mortality, income inequality, and undernourishment in the population. The general indexing method was used for each of these three variables, although yielding highest index values for those states with the highest infant mortality, income inequality, or undernourishment. As all index values ranged between 0 and 1, the simple correction of subtracting these three indices from one resulted in an appropriate transformation.

Corruption perception index data were already in index form, with data values potentially ranging from 0 to 10. Once again, the general indexing calculation was used, yielding a simple movement of the decimal place left one position. The resulting corruption index transformed the original data into the zero to one format used in this paper. Index values for *per capita* GDP were calculated using the same method for such calculation presented in the most recent version of the Human Development Index. The natural logarithm was used for the actual, minimum, and maximum data values for this index only. Variation in world *per capita* GDP is striking, ranging from $200 (Zimbabwe) to $87,600 (Qatar). Using the logged data values in the indexing calculation yields the necessary data compression.

For the final index value calculation, four separate index values were calculated for the health, education, government, and income variables. The health index was the arithmetic mean of the life expectancy, infant mortality, and undernourishment index values. The education index was the arithmetic average of the gross enrollment and adult literacy rate index values. The government index was simply the transformed index value from the Corruption Perception Index. The income index was calculated using the sum of the indices for *per capita* GDP and income inequality, with *per capita* GDP assigned a weight of 9, and income inequality assigned a weight of 1. This particular weighting scheme, while admittedly highly subjective, was chosen to impart a slight (10 percent) inequality adjustment to a state's *per capita* GDP. The final index values for this paper represent the average of the health, education, government, and income indices.

Results and Discussion

Using the above methodology, final index values were calculated for those states with available data values across each of the eight development variables; a total of 128 geographical entities (Appendix A). The general geographical pattern emerging from the results of this economic development

index is fairly consistent with both conventional wisdom and the most recent version of the Human Development Index.

In general the states with the highest development index scores tend to be concentrated in Northern and Western Europe, North America, and the Austral region. Also as expected, states of the sub-Saharan Africa region dominate the lowest index scores. Examining both the results of this paper's revised economic development index and the most recent (2007/08) Human Development Index reveals a somewhat similar view with respect to Central Asian state-level economic development (Table 3). The most recent Human Development Index ranks 177 areas (from 1.Iceland to 177. Sierra Leone) and further distinguishes those entities with High (rank 1-70), Medium (71-155), and Low (156-177) human development.[10] While each Central Asian state falls within the medium human development category, Kazakhstan comes very close (3 ranks and 0.006 in index value) to inclusion within the high human development category. This paper's revised development index also points to Kazakhstan's regional development superiority, with this state easily the region's highest rank (47) and index value (0.656). In addition, both indices show Kazakhstan as the only Central Asian state above the world median rank.

Table 3: Central Asian Comparison of Revised Development Index and 2007/08 HDI [**]

| | Revised development index | | Human Development Index | |
	rank	index value	rank	index value
Kazakhstan	47	.656	73	.794
Turkmenistan	74	.575	109	.713
Kyrgyzstan	79	.563	116	.696
Uzbekistan	82	.546	113	.702
Tajikistan	92	.479	122	.673

[**] Revised development index ranked 128 geographical entities (from 1. Denmark to 128. Angola), while the 2007/08 Human Development Index ranked 177 geographical entities (from 1. Iceland to 177 Sierra Leone).

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[10] The division between high, medium, and low human development is not based on ranking, but rather on index value. Values .800 and above are considered high human development, values from .500 to .800 are considered medium human development, and values below .500 are considered low human development.

In addition to showing Kazakhstan as the regional development leader by far, both the Human Development Index and the revised development index presented here show similar results with respect to the Central Asia's less developed states. Tajikistan is shown in both cases as the region's state with the lowest economic development. In the Human Development Index, Tajikistan occupies rank 122 between Botswana and South Africa, just 34 ranks above the low human development category and 56 ranks above Sierra Leone (ranked last at 177). This paper's revised development index results rank Tajikistan at 92 between Swaziland and Libya, just 36 ranks above Angola (ranked last at 128). In both indices, the remaining three Central Asian states seem to cluster somewhat below the midpoint between Kazakhstan and Tajikistan. In both cases, Turkmenistan occupies the region's second economic development slot (rank 74 in revised development index and rank 109 in human development index). Both indices also feature three ranks separating Kyrgyzstan and Uzbekistan. The HDI ranks Uzbekistan third and Kyrgyzstan fourth regionally, while the revised development index shows the inverse ranking of these two states.

With respect to current state-level economic development within Central Asia, the two development indices described above seem to portray a similar pattern. Upon closer inspection, however, there seems to be a difference between the two indices in their depiction of the geography of economic development within Central Asia. Put differently, there seems to be a slight discrepancy between the two indices in the revealed amount and magnitude of intra-regional disparities in economic development. It seems this paper's revised development index may have uncovered a bit more intra-regional economic development variation than is shown by the Human Development Index. A means of examining such disparities in Central Asia might compare the two indices in terms of the gap between the top-ranked state (Kazakhstan) and the cluster of mid-range states (Turkmenistan, Kyrgyzstan, and Uzbekistan), the gap between the mid-range states and the lowest-ranked state (Tajikistan), the dispersion among the midrange states, and the gap between the top and lowest-ranked states. It should be noted here that this paper's revised development index ranks 128 areas, compared to the 177 ranked by the HDI, so rank differences are proportionally greater in the former than in the latter.

Dispersion, gap, or magnitude of difference can be examined, therefore, in both ranking and proportional separation. Regarding the separation between Central Asian rank one (Kazakhstan) and rank two (Turkmenistan), the HDI results show a 36-rank difference (proportionally 20%) while the revised index shows a 27-rank difference (proportionally 21%). Between regional rank 4 (Kyrgyzstan in the HDI and Uzbekistan in the revised development index) and rank 5 (Tajikistan in both indices), the HDI shows six ranks (3%) of separation, while the revised index shows ten (8%). The gap between regional rank 2 (Turkmenistan) and rank 4 (Kyrgyzstan in HDI and Uzbekistan in revised) is seven ranks (4%) in the HDI and eight ranks (6%) in this paper's revised index. Between Central Asia's top (Kazakhstan) and bottom (Tajikistan) economic development performers, the separation is 49 ranks (just under 28%) in the HDI

results and 45 ranks (35%) in the revised index results. While perhaps not conclusive, it appears that the revised development index, a fuller more nuanced index aimed explicitly at the Central Asian region, seems to have uncovered more intra-regional economic development variation than shown by the most recent Human Development Index. Each of the four aforementioned gaps (between regional rank 1 and 2, between rank 4 and 5, between rank 2 and 4, and between rank 1 and 5) are proportionally wider in the results of the revised development index. While ranking 49 fewer world states, the revised index also shows a greater rank gap (in addition, of course to proportional) between the midrange states and Tajikistan, and a greater rank difference among the midrange states (Turkmenistan, Kyrgyzstan, and Uzbekistan).

Conclusion

An empirical assessment of the geography of economic development within Central Asia has been made using the United Nations Development Program's Human Development Index, as well as a revised development index constructed for this paper using salient variables aimed at Central Asia's own milieu of development challenges. In general, the Central Asian economic development picture exposed by these two indices is similar. Kazakhstan, the region's economic development leader, outpaces a midrange cluster of Turkmenistan, Kyrgyzstan, and Uzbekistan. Tajikistan, falling below this midrange cluster, exhibits Central Asia's lowest economic development. When turning to intra-regional disparities, however, it seems this paper's revised development index may reveal more Central Asian inter-state disparity than is shown with the Human Development Index. If more such disparity exists than has been previously shown, the current efforts aimed at Central Asian regionalism and integration may prove daunting.

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Appendix A: Revised Development Index Final Rankings and Index Values

1.	Denmark	0.92679	36.	Costa Rica	0.71079	71.	Egypt	0.58356
2.	Australia	0.92626	37.	Malaysia	0.70482	72.	Azerbaijan	0.58076
3.	Sweden	0.92170	38.	Bulgaria	0.68740	73.	Indonesia	0.57816
4.	New Zealand	0.92047	39.	Argentina	0.68720	**74.**	**Turkmenistan**	**0.57539**
5.	Finland	0.91618	40.	Romania	0.68426	75.	Philippines	0.57366
6.	Netherlands	0.91108	41.	Jordan	0.68180	76.	Mongolia	0.57099
7.	Canada	0.90910	42.	Trin. and Tobago	0.67600	77.	Paraguay	0.57072
8.	Norway	0.90286	43.	Turkey	0.67143	78.	Bolivia	0.56861
9.	Switzerland	0.89836	44.	Mexico	0.66956	**79.**	**Kyrgzstan**	**0.56382**
10.	Ireland	0.88608	45.	Russia	0.66296	80.	Cuba	0.56180
11.	Austria	0.88374	46.	Belarus	0.66136	81.	Vietnam	0.55572
12.	Germany	0.86823	**47.**	**Kazakhstan**	**0.65631**	**82.**	**Uzbekistan**	**0.54624**
13.	UK	0.86633	48.	Georgia	0.65376	83.	Namibia	0.54460
14.	Belgium	0.86267	49.	Brazil	0.65344	84.	Honduras	0.54459
15.	United States	0.86231	50.	Ukraine	0.65282	85.	Guatemala	0.54067
16.	Japan	0.85687	51.	Tunisia	0.64928	86.	Mauritius	0.53922
17.	France	0.85436	52.	Albania	0.64823	87.	Morocco	0.52500
18.	Spain	0.84293	53.	Botswana	0.64751	88.	Nicaragua	0.52343
19.	Slovenia	0.83496	54.	Bos.-Herzegovina	0.64703	89.	Macedonia	0.52309
20.	Estonia	0.81043	55.	Panama	0.64456	90.	India	0.51446
21.	Israel	0.80765	56.	Colombia	0.63640	91.	Libya	0.49302
22.	Korea, South	0.80615	57.	Peru	0.63571	**92.**	**Tajikistan**	**0.47996**
23.	Portugal	0.80186	58.	Thailand	0.62519	93.	Swaziland	0.47704
24.	Greece	0.79189	59.	South Africa	0.62228	94.	Ghana	0.46426
25.	Italy	0.78678	60.	Jamaica	0.61764	95.	Lesotho	0.44804
26.	Uruguay	0.78354	61.	China	0.61591	96.	Laos	0.43764
27.	Czech Republic	0.77889	62.	Venezuela	0.61002	97.	Cameroon	0.43746
28.	Chile	0.77886	63.	El Salvador	0.60835	98.	Madagascar	0.43667
29.	Hungary	0.76813	64.	Armenia	0.60819	99.	Cambodia	0.43610
30.	Latvia	0.75614	65.	Ecuador	0.60133	100.	Kenya	0.43411
31.	Lithuania	0.75286	66.	Algeria	0.60028	101.	Nigeria	0.43033
32.	Slovakia	0.75246	67.	Iran	0.59574	102.	Mauritania	0.42568
33.	Poland	0.74654	68.	Sri Lanka	0.59125	103.	Uganda	0.42026
34.	Dominica	0.74177	69.	Moldova	0.58645	104.	Nepal	0.41828
35.	Croatia	0.71685	70.	Dom. Republic	0.58500	105.	Yemen	0.41460

106.	Pakistan	0.41301
107.	Benin	0.40147
108.	Tanzania	0.40001
109.	Senegal	0.39907
110.	Bangladesh	0.37929
111.	Cote d'Ivoire	0.37397
112.	Rwanda	0.37351
113.	Malawi	0.37215
114.	Zambia	0.36378
115.	Haiti	0.34034
116.	Gambia, The	0.33652
117.	Burkina Faso	0.33203
118.	Zimbabwe	0.32925
119.	Guinea	0.32056
120.	Ethiopia	0.31340
121.	Mozambique	0.29838
122.	Mali	0.29582
123.	Burundi	0.26094
124.	Central Afr. Rep.	0.26059
125.	Guinea-Bissau	0.25799
126.	Niger	0.25532
127.	Sierra Leone	0.20327
128.	Angola	0.18207