How do Economic Crises Affect Regional Human Development?An Investigation of the 2008 Global Crisis

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Abstract
In this study, we examine the impact of the 2008 Global Crisis on the Human Development Index (i.e. HDI) values of 149 countries. Over the 1980 to 2013 period, there has been a gradual and consistent improvement in the index values for the overall sample. However, our results show that this improvement has slowed down sharply after the 2008 crisis. This slowing down differs from region to region. For Latin American and the Caribbean countries, the East Asia and the Pacific countries, and Sub-Saharan Africa countries, the slowdown started in 2008. For European and Central Asian countries, the slowdown started in 2011. For Arab States and South Asian countries, the slowdown is not statistically significant. Interestingly, the Sub-Saharan Africa countries have been more resilient compared to some of the other regions.
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1. Introduction
Most of the previous studies (i.e. Ranis and Stewart (2001), Ranis and Stewart (2005), and Suri et al. (2011)) show that there is a bi-directional causality between economic growth and human development: Economic growth supports human development vice versa. A few other studies (i.e. Shahbaz, Aamir, and Alam (2009)) show that in certain regions or cities, there is a one-way causality: human development causes economic growth, but not the other way around.

Several other studies have extended this research to include the level of development as an interacting variable. Block et al. (2004), Bloem, Semba, and Kraemer (2010), Breisinger et al. (2011) examine how economic crises affect poor versus wealthier populations. They find that "poor" populations are more vulnerable to an economic crisis when compared to well-to-do populations.

In this study, we examine the impact of the 2008 Global Crisis on the Human Development Index (i.e. HDI) values of 149 countries. We make two main contributions. Our first contribution is examining the improvement in the human development scores of six regions around the globe over the 1980 to 2013 period. By looking at the human development trend in each region, we can state when (or during which periods) each region has improved more. Future studies that deal with specific regions or countries may use these findings as a base.

Second, we examine the impact of the 2008 Global Crisis on each region's human development scores. Our tests will show us whether all of the regions are affected or not. We will also see which regions are affected more negatively due to this recent crisis. Policymakers may interpret these results for each region and then take precautions, especially in the regions where there is a bigger impact.

Any future research on the topic should consider the findings in this study. For example, if human development efforts in Brazil is examined, for example, the researcher should consider how Latin America as a region performs during economic crises. In other words, if we find significant differences in regional human development scores here, then future studies have to control for this regional effect.

The paper proceeds as follows: Section 2 reviews the previous literature. Section 3 shows the empirical results. Finally, Section 4 concludes.

2. Literature Review

Ranis and Stewart (2001), Ranis and Stewart (2005), and Suri et al. (2011)) show that there is a bi-directional causality between economic growth and human development: Economic growth supports human development vice versa. Ranis and Stewart (2001) looks at the link between economic growth and human development in Latin American countries. The authors show that the initial improvement in level of development determines the future human development trend in a country. According to Ranis and Stewart (2005), governments need to support both economic growth and human development because there is a two-way causality.

Shahbaz, Aamir, and Alam (2009) focus on Pakistan. They examine the causality between economic growth and human resource development. They find that while in some of the cities, there is a two-way causality, in others, economic growth does not cause human resource development. Suri et al. (2011) show evidence of a two-way causality between economic growth and human development. The authors recommend governments to focus on human development because of the fact that human development affects economic growth.

There are several papers that examine the impact of economic crises on human health. All of these studies show that the crises have a negative impact on human health. Block et al. (2004) focus on Indonesia. They show that that there was a significant drop in children's weight and their blood hemoglobin levels after the 1997/1998 crisis.

Bloem, Semba, and Kraemer (2010) argue that governments are making a mistake by emphasizing consumption of calorie-rich but nutrient-poor food. According to the authors, this leads to a decline in dietary quality as well as quantity. This policy also leads to

micronutrient malnutrition. Breisinger et al. (2011) examine Yemen. They show that the slowing economy in that country after the 2008 crisis has compounded the poverty effects of the food crisis.

Brinkman et al. (2010) examine the impact of the 2008 crisis. They show that young children, pregnant and lactating women, and the chronically ill people have been especially affected.

Christian (2010) examines the impact on childhood mortality. The author recommends that, for vulnerable populations, nutritional and health surveillance data are urgently needed to reduce the impact of a crisis on child mortality.

Darnton-Hill and Cogill (2010) show that rising food prices especially affect the poor. They show that this negative effect is more prominent especially in food-importing, resource-limited countries. De Pee et al. (2000) focus on Indonesia. They show that the 1997 economic crisis has caused the country's currency to devalue significantly which in turn resulted in increased food prices. They contend that such a large reduction in purchasing powerin Indonesia has negatively affected nutrition and health. De Pee et al. (2010) argue that the most vulnerable group is the poor. They argue that global economic crisis, commodity price hikes, and climate change have had the worst impact on the poor. They recommend governments to make investments in nutrition.

Fouere et al. (2000) focus on Africa. They investigate the effects of currency devaluation on dietary change and nutritional vulnerability of poor households. Martin-Prével, Yves, et al. (2000) focus on Congo. Thet examine the effects of the January 1994 devaluation of the African Financial Community (CFA) franc on the nutritional situation in Congo. The authors find a decline in the quality of the foods offered to the infants after the devaluation of the currency.

Nikoloski and Ajwad (2013) focus on the effects of the 2009 crisis in Russia. They show that poor households affected by an income shock spent less on health services, compared to households not affected by an income shock. The authors also show that the most vulnerable people altered their health and nutrition behavior. Ruel et al. (2010) contend that "the poorest of the poor are the ones who will be most affected, irrespective of the continent, country, or urban or rural area where they live". Thorne-Lyman et al. (2010) argue that "low dietary diversity during the period prior to major food price increases indicates potential risk for worsening of micronutrient deficiencies and child malnutrition in Bangladesh".

Tiwari and Zaman (2010) estimate the impact of the 2008 crisis on undernourishment. They show that the global crisis may have led to an additional 4.4 percent increase in undernourishment in 2009. Webb and Block (2012) argue that structural transformation in a country supports improved nutrition, especially in rural areas.

West and Mehra (2010) contend that both dietary quality/diversity and adequacy of vitamin A can deteriorate due to economic crises. Wodon and Zaman (2010) contend that the benefits from reducing import tariffs on household staples are likely to accrue largely to the non-poor.

3. Data

The HDI data have been obtained from United Nations Development Programme. The Human Development Index (i.e. HDI) combines three dimensions:

- A long and healthy life: Life expectancy at birth
- Education index: Mean years of schooling and Expected years of schooling
- A decent standard of living: GNI per capita (PPP US$)

The HDI value for each country is computed as follows:

$$HDI = (LEI*EI*II)^{1/3}$$

> where LEI is the Life Expectancy Index, EI is the Education Index, and II is the Income Index.

The values of these three indices are computed as follows:

1) Life Expectancy Index (LEI) = (LE − 20) / (85-20)

> where LE is life expectancy at birth. LEI is 1 when Life expectancy at birth is 85 and 0 when Life expectancy at birth is 20.

2) Education Index (EI) = (MYSI + EYSI) / 2
> where Mean Years of Schooling Index (MYSI) = MYS / 15 (Fifteen is the projected maximum of this indicator for 2025; MYS is mean years of schooling that a person 25 years-of-age or older has had), and Expected Years of Schooling Index (EYSI) = EYS /18 (Eighteen is equivalent to achieving a master's degree in most countries; EYS is expected years of schooling for a 5-year-old child).

3) Income Index (II) = [ln(GNIpc) − ln(100)] / (ln(75,000) − ln(100))]
> II is 1 when GNI per capita is $75,000 and 0 when GNI per capita is $100 (GNIpc is the gross national income at purchasing power parity per capita).

First, we examine the time trend in HDI for several regions including Arab states, East Asia and the Pacific countries, European and Central Asian countries, Latin American and the Caribbean countries, South Asian countries, and Sub-Saharan Africa countries.

Table 1 lists the countries in each region. In total, there are 149 countries in our sample. Panel A shows the countries that are in the "Arab States" group; Panel B shows the countries that are in the "East Asia and the Pacific Countries" group; Panel C shows the countries that are in the "European and Central Asian Countries" group; Panel D shows the countries that are in the "Latin American and the Caribbean Countries" group; Panel E shows the countries that are in the "South Asian Countries" group; and Panel F shows the countries that are in the "Sub-Saharan Africa Countries" group.

Table 1.
List of the Countries in Each Region

| **Panel A. Arab States (20 countries/territories):** |
| --- |
| Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, State of Palestine, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen |
| **Panel B. East Asia and the Pacific Countries (24 countries):** |
| Cambodia, China, Fiji, Indonesia, Kiribati, Democratic People's Republic of Korea, Lao People's Democratic Republic, Malaysia, Marshall Islands, Federated States of Micronesia, Mongolia, Myanmar, Nauru, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Thailand, Timor-Leste, Tonga, Tuvalu, Vanuatu, Viet Nam |
| **Panel C. European and Central Asian Countries (17 countries):** |
| Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Montenegro, Serbia, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, Uzbekistan |
| **Panel D. Latin American and the Caribbean Countries (33 countries):** |
| Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Plurinational State of Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Bolivarian Republic of Venezuela |
| **Panel E. South Asian Countries (9 countries):** |
| Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan, Sri Lanka |
| **Panel F. Sub-Saharan Africa Countries (46 countries):** |
| Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic Republic of the Congo, Côte d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Swaziland, United Republic of Tanzania, Togo, Uganda, Zambia, Zimbabwe |

4. Empirical Results

The regions' HDI graphs are shown in Figures 1 through 6. From these graphs, we are seeing that, for Latin American and the Caribbean countries, the East Asia and the Pacific countries, and Sub-Saharan Africa countries, the slowdown started in 2008. For European and Central Asian countries, the slowdown started in 2011. For Arab States and South Asian countries, the slowdown is not statistically significant.

Looking at these graphs, we can say that the Sub-Saharan Africa countries have been more resilient than some of the other regions. We can say that these countries' slowdown has been softer compared to at least the European and Central Asian countries, and the Latin American and the Caribbean countries.

One may argue that, since the Sub-Saharan Africa countries had the lowest HDI Index values at the start of the crisis (i.e. the average index value was 0.475), they had more room to grow when compared to the other regions. The closest group with a low HDI Index value at the start of the crisis was the South Asian Countries (i.e. their average index value was 0.56).

Fig. 1. HDI for Arab States over time

Fig. 2. HDI for East Asia and the Pacific Countries over time

Fig. 3. HDI for European and Central Asian Countries

Fig. 4. HDI for Latin American and the Caribbean Countries

Fig. 5. HDI for South Asian Countries

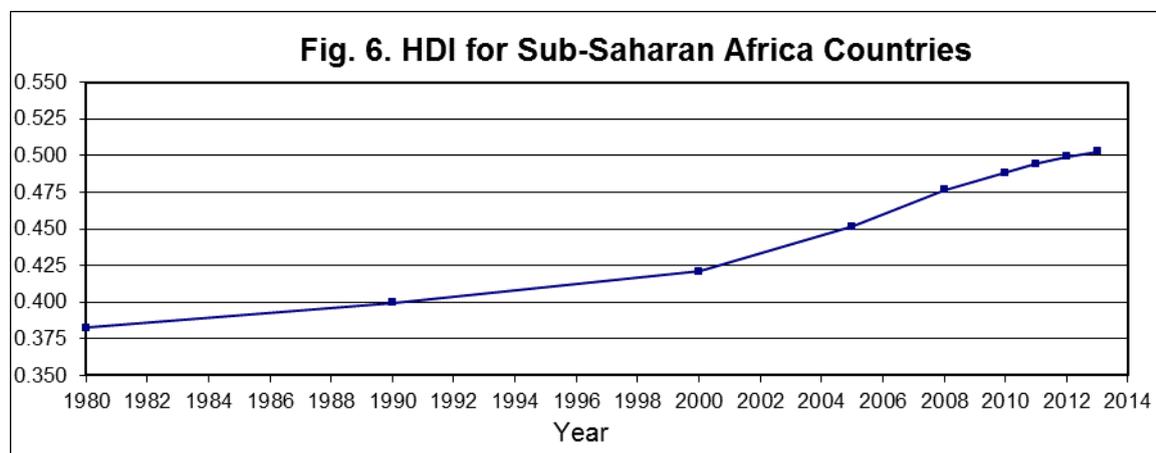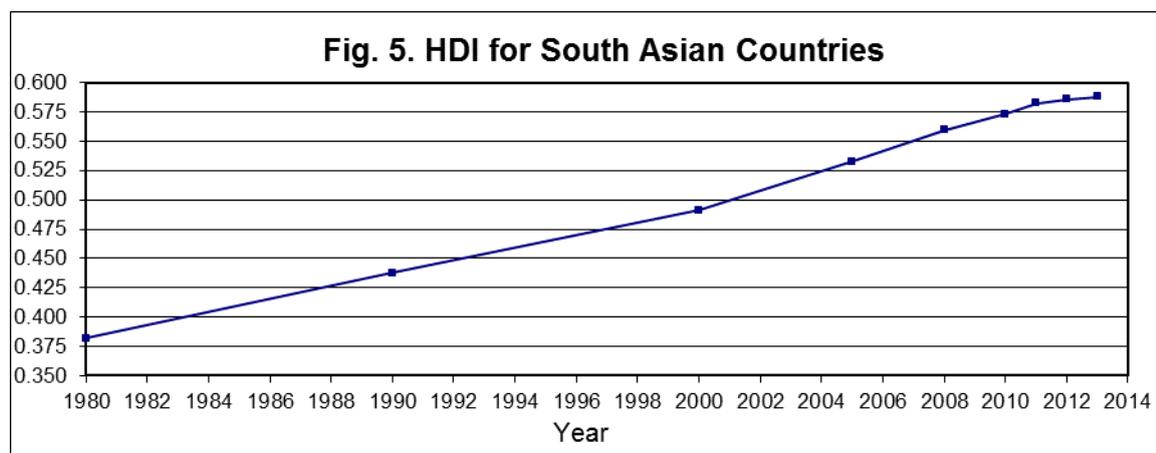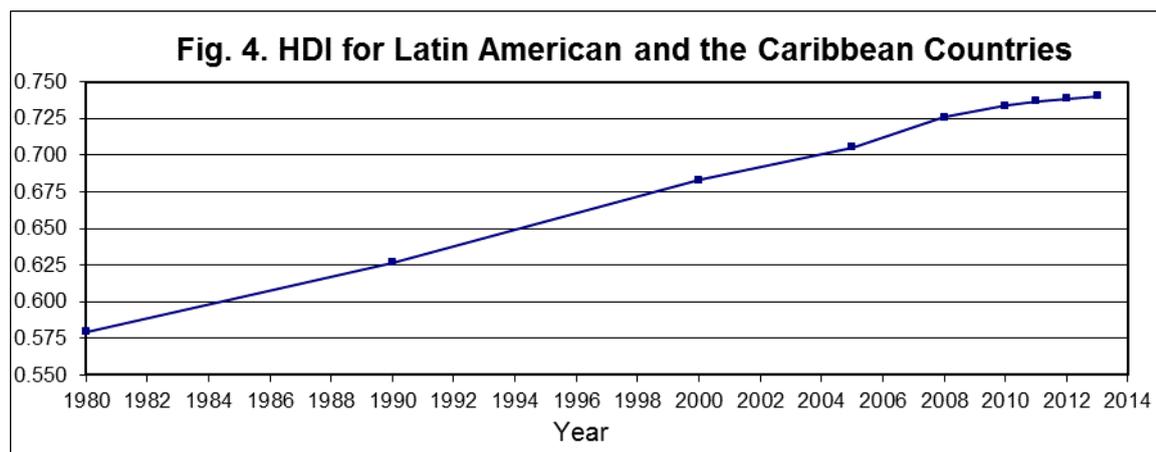Fig. 6. HDI for Sub-Saharan Africa Countries
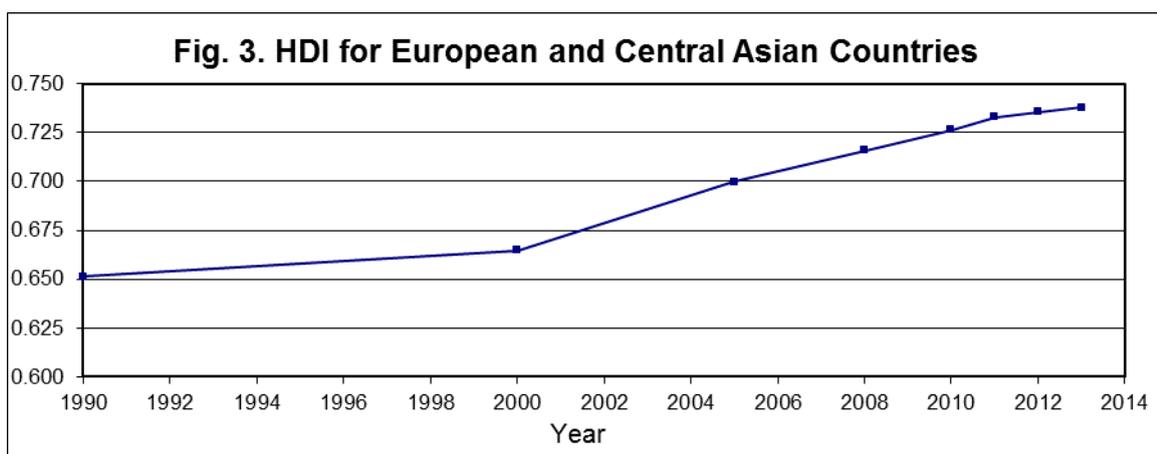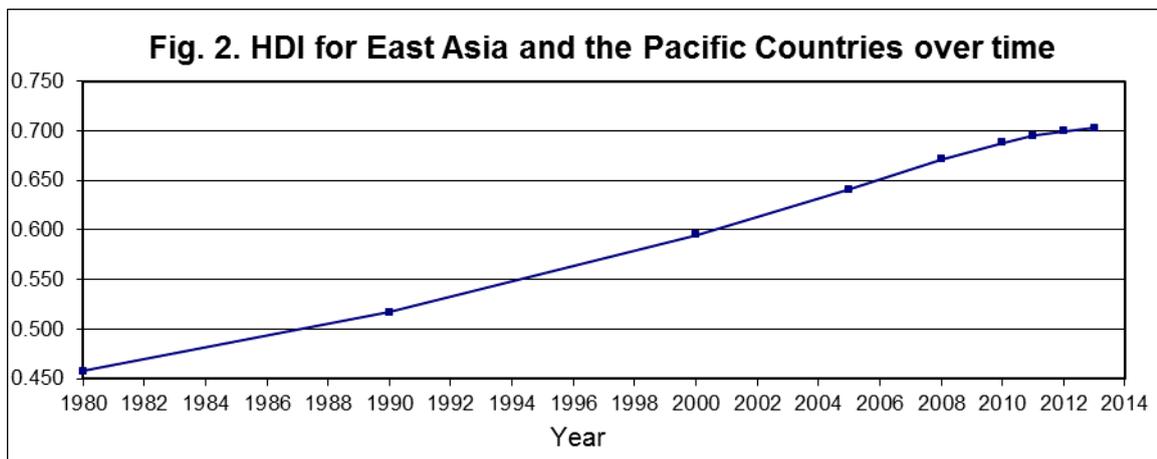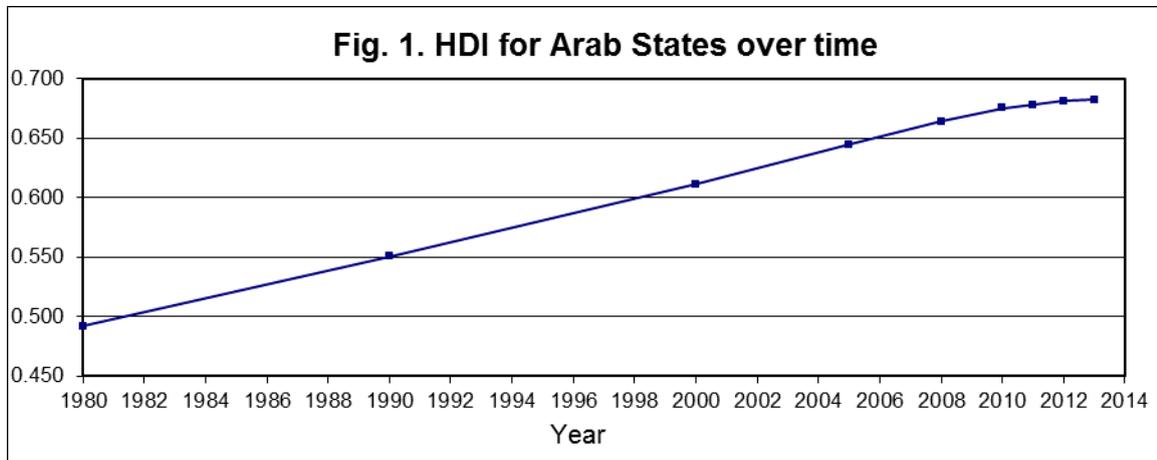
Table 2 shows the results of our nonparametric tests that compare the improvement (i.e. the percentage change) in HDI pre- and post-crisis. We compare the pre- and post-crisis periods for each region. It is important to note that our sample size has been reduced due to not having the required data (i.e. the 2005, 2008, and 2011 data) for sixteen of the countries (see the notes below the table).

We run nonparametric tests (i.e. Mann-Whitney-Wilcoxon tests) to compare the pre- and post-crisis periods. Due to data availability issues, we use the 2005 to 2008 period as our pre-crisis period, and the 2008 to 2011 period as our post-crisis period.

For the "Arab States", the drop in the median value of the HDI Index from 1.8656 before the crisis to 1.4386 after the crisis, is not statistically significant (p-value=0.2796). For the "South Asian Countries", again, the slowdown is not statistically significant (p-value=0.3183). The HDI Index for these countries falls from 4.7959 to 3.8986.

For the other four regions, the slowdown is statistically significant. For "East Asia and the Pacific", the HDI Index falls from 3.0018 to 1.8412 (p-value=0.0453). The drop is significant at 5% level.

For "Europe and Central Asia", the HDI Index falls from 2.7350 to 0.8624 (p-value=0.0004). The drop is significant at 0.1% level.

For "Latin America and the Caribbean", the HDI Index falls from 2.4460 to 1.3343 (p-value<0.0001). The drop is significant at 0.01% level.

Finally, for "Sub-Saharan Africa", the HDI Index falls from 4.9742 to 3.8994 (p-value=0.0165). The drop is significant at 5% level.

Table 2.
% Change in the Human Dev. Index before and after the 2008 Crisis

	2005-2008			2008-2011			Wilcoxon
Variables	**Mean**	**Median**	**Std**	**Mean**	**Median**	**Std**	**p-value**
Arab States	2.1656	1.8656	1.9662	2.0195	1.4386	3.1100	0.2796
East Asia/Pacific	3.7527	3.0018	3.3328	2.0779	1.8412	1.8684	0.0453
Europe/Cent. Asia	2.9451	2.7350	1.3124	1.3111	0.8624	1.4890	0.0004
Latin Am./Carib.	2.6620	2.4460	1.5090	1.2738	1.3343	0.9883	<0.0001
South Asia	4.8212	4.7959	2.0572	3.8543	3.8986	2.7359	0.3183
Sub-Saharan Africa	5.4916	4.9742	3.1767	4.0736	3.8994	2.5360	0.0165

Note: Somalia, Kiribati, Marshall Islands, Fed. States of Micronesia, Nauru, Tuvalu, Vanuatu, Turkmenistan, Antigua and Barbuda, Grenada, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Bhutan, Eritrea, and South Sudan are not included in the analysis due to lack of data.

5. Conclusion
In this study, we examine the impact of the 2008 Global Crisis on the Human Development Index (i.e. HDI) values of 149 countries. Over the 1980 to 2013 period, there has been a gradual and consistent improvement in the index values for the overall sample. We are seeing how individual governments' efforts have resulted in continuous improvements over the recent 30-35 year period.

When we look closer, however, we are seeing that this improvement in human development has slowed down sharply after the 2008 crisis. This slowing down differs from region to region. While some regions are affected immediately, others have been more resilient.

When we examine the time trend in HDI for several regions including Arab states, East Asia and the Pacific countries, European and Central Asian countries, Latin American and the Caribbean countries, South Asian countries, and Sub-Saharan Africa countries, we are seeing that for Latin American and the Caribbean countries, the East Asia and the Pacific countries, and Sub-Saharan Africa countries, the slowdown started in 2008. So, for these regions, there has been an immediate impact on human development.

For European and Central Asian countries, the slowdown started in 2011. Interestingly, for Arab states and the South Asian countries, the slowdown is not statistically significant.

Although for the Sub-Saharan Africa countries, the slowdown started immediately in 2008, interestingly, these countries have been more resilient than some of the other regions. Their slowdown has been much softer compared to at least two of the other regions. This may be explained by these countries' already low HDI levels at the beginning of the crisis. One may argue that, since these countries had the lowest HDI Index values at the start of the crisis (i.e. the average index value was 0.475), they had more room to grow when compared to the other regions. The closest group with a low HDI Index value at the start of the crisis was the South Asian Countries (i.e. their average index value was 0.56).

In order to officially test for the difference between the HDI values pre- and post-crisis, we run nonparametric tests (i.e. Mann-Whitney-Wilcoxon test). We find that, for Latin American and the Caribbean countries, the East Asia and the Pacific countries, and Sub-Saharan Africa countries, the slowdown started in 2008. For European and Central Asian countries, the slowdown started in 2011. For Arab States and South Asian countries, the slowdown is not statistically significant.

Our results show evidence of economic crises' impact on regional human development efforts. We find that some of the regions are more negatively affected by the 2008 crisis. We conclude that, countries around the world, especially the European and the Central Asian countries, the Latin American and the Caribbean countries, the Sub-Saharan Africa countries, and the East Asian and Pacific countries need to take precautions before a crisis hits.

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