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----- Contents -----

Understanding Culture and Economic Development

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Culture plays a critical role in various aspects of economic activities (Alesina & Giuliano, 2015). At the aggregate level, it can affect political, economic, and social institutions. At the individual level, it can shape preferences and norms that form the basis of individual choices. As such an influential variable by itself, culture can also be affected and transformed by other variables. Exploring the dynamic relationship among these variables provides an important opportunity to understand individual choices and economic consequences.

The practice of marital payment is a cultural practice that has drastically changed throughout history. Marital payment such as dowry and brideprice[1] used to be commonplace in a number of countries in Europe, the Middle East, and Asia, but has either disappeared or lost its substance (Anderson, 2007; Fafchamps & Quisumbing, 2007). Brideprice in Sub-Saharan Africa (SSA) provides a particularly unique setting for economic research since countries in the region are showing both rapid socio-economic and cultural changes. Indeed, an increasing number of studies are investigating the topic in SSA and creating a new strand of literature in economics. Fafchamps and Quisumbing (2002, 2005a, 2005b) used own-collected data from Ethiopia and analyzed its relationship with intra-household bargaining power, asset ownership, and marriage market outcomes. Mbaye and Wagner (2016) demonstrated the reduced fertility for females with higher brideprice payment in Senegal. Based on their research in Zambia and Indonesia,

[1] Typically, a dowry is paid by the bride's parents to the groom or the newly married couple, while brideprice is paid by the groom, and his parents in some cases, to the parents of the bride (Papps *et al.*, 1983).

Ashraf *et al*. (2020) showed that a higher brideprice is paid for better educated females, and thus brideprice serves as additional returns to female education for parents. Corno *et al*. (2020) revealed that draughts in brideprice-paying societies in SSA increased earlier marriages and fertility since parents of daughters may have coped with negative income shocks due to brideprice transfer.

Prof. Chikako Yamauchi at National Graduate Institute for Policy Studies and I have conducted a study using data from Uganda and attempt to provide a new perspective to this growing literature. Uganda provides a perfect setting for research, since while the practice is still carried out in the country (*e.g.*, Daily Monitor, 2019), there is a secular declining trend (Anderson, 2007). Past studies have examined behaviors and consequences that are unique to societies where brideprice practice is common, *that is*, they are concerned with the *intensive margin* of the cultural practice. By contrast, our study addresses a slightly different question. It has been suggested that brideprice culture starts to decline during economic development, but little is known regarding the exact variables that causally facilitate such a cultural change (Anderson, 2007). In other words, we attempt to understand the *extensive margin* of the culture. Using data from Uganda collected by the Research on Poverty, Environment, Agriculture, and Technology survey conducted in 2015, we show that female education is likely to be one variable that leads to the decline of the practice. Gaspart and Platteau (2010) highlighted the possible negative effect of female education, but our study is perhaps the first to causally link female education and the cultural decline.

Our preferred interpretation of the cultural decline resulting from female education is two-fold. One is that better educated females and their altruistic parents became more aware of potential downsides of brideprice such as spousal extra-marital affairs (Bishai & Grossbard, 2010) and divorce (Platteau & Gaspart, 2007),[2] and hence declined brideprice payment altogether. Another is that females' payoff from marriage is likely to increase through rejection of brideprice payment due to the downsides, and better educated brides, who are likely to possess greater bargaining power, convinced their grooms not to make such payment. In addition to the intensive margin of brideprice culture, our study suggests the extensive margin may also be endogenous with respect to female education. A natural next step will therefore be to model both choices endogenously and determine when the amount of payment increases and when the cultural practice *per se* declines.

Our study attempts to expand the realm of economic research by clarifying the dynamics of cultural practices in relation to changes in political and socio-economic environment and institutions. In a broader sense, studies that establish the interlinkage between culture and other variables provide a new perspective from which to uncover individual behaviors at the micro level and economic development at the macro level. The potential of this emerging body of literature is yet to be observed, or are we witnessing the door opening to a new frontier?

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[2] These downsides have long been debated (*e.g.*, Wendo, 2004), and are still discussed in recent local newspapers (*e.g.*, Daily Monitor, 2020).

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Thinking Spatially: GIS for Development Economists

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Geographic information systems (GIS) have been used extensively in economic research for more than a decade. However, the number of economic departments offering a GIS course is still limited.[1] To fill the gap, this column briefly describes how researchers can incorporate GIS data and important caveats are also mentioned. Due to limitations of space, each description tends to be very short; interested readers may also visit Masayuki Kudamatsu's website and go through his lecture slides, which describe how to create a spatial dataset using ArcGIS, a commonly used GIS software suite.[2]

Applications in development economics are growing. For example, GIS have been used to measure (de)forestation in India (Foster and Rosenzweig 2003), Indonesia (Burgess et al. 2012), and Uganda (Jayachandran et al. 2017), road construction in Kenya (Burgess et al. 2015), air pollution in Indonesia (Jayachandran 2009), dwelling investments as measured by the quality of roofs in a Nairobi slum (Marx et al. 2019), tourism attractiveness (beach quality) in Mexico (Faber and Gaubert 2019), and city shape in India (Harari 2020). GIS can also be used to construct instruments. For example, Duflo and Pande (2007), Dinkelman (2011), and Lipscomb et al. (2013) use geographic information such as slope as instruments for the installation of dams, the assignment of electrification projects, and the provision of electricity, respectively.

There are two main types of GIS data: vector data and raster data.[3] Vector data include points, polylines, and polygons, which are regarded as points, lines, and planes on a map, respectively. By contrast, a raster is comprised of many pixels (cells), or "small squares," on a map (or a map itself). For example, aerial photographs and satellite images are typical examples of raster data. Below, I will explain how researchers can apply these different types of spatial data.

Vector data

Points (no dimensions)

Point data are depicted as points on a map such as houses, buildings, train stations, ports, and the location of historical events. A point has geo-coordinates, that is, latitude and longitude.

The simplest application of point data is to extract the information at each location, such as elevation, slope, and soil type, using raster data. Point data can also be used to measure

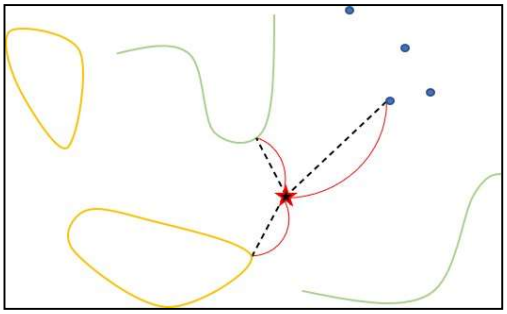

Figure 1. Distance from the observation of interest (a star icon) to the closest point (colored in blue), polyline (green), or polygon (orange).

[1] For example, OSIPP offers such a course.
[2] https://sites.google.com/site/mkudamatsu/gis. See also Dell (2009). QGIS is alternative GIS application. See https://gis-oer.github.io/gitbook/book/ (in Japanese).
[3] 3D GIS data also exist, which I do not cover in this column. However, the application of such data in economic research is still limited.

the distance between a point and another point, a polyline, or a polygon, as in Figure 1. For example, Nunn (2008) uses distance to closest slave trade centers as an instrument for slave exports and finds that such trade dampened economic prosperity. Similarly, Becker and Woessmann (2009) use distance to Luther's city of Wittenberg as an instrument for the share of Protestants and show that Protestantism promoted economic development.

However, an important caveat for using a distance measure is that it can be a proxy for something other than what is intended. For example, even if the distance to the closest market place is considered a good proxy for access to the market, it can be correlated with many other things. Therefore, robustness checks are (as always) needed to show that your distance measure makes sense. Another caveat is that a proper projection method for computing distance measures has to be used if your GIS software does not properly adjust the distance by taking the curvature of the Earth into account.[4] There are several ways to project a 3D object, the Earth, onto a two-dimensional map. One should pick the projection that preserves the actual distance as much as possible (e.g., UTM).

Polylines (one-dimensional)

Polylines are displayed as lines on a map such as rivers, roads, coastlines, and administrative boundaries. In addition to making distance measures, the length of lines within a geographical unit such as municipality can be computed using polylines. For example, Dell (2010) uses road density (by dividing the length of roads by the surface area) as a proxy for public goods provision and finds that an extractive labor system in Peru (*mita*) lowers road network density.

Polygons (two-dimensional)

Polygons are like planes on a map such as administrative units (counties, municipalities, prefectures, provinces, states, countries, etc.) and grid cells. With polygons, the land area within a polygon, such as municipality, can be calculated. To do so, similar to the above caveat for measuring distances, the right projection method that reflects the actual land area (e.g., Sinusoidal) needs to be selected. Moreover, since polygons are two-dimensional objects, the summary statistics within each polygon such as average precipitation and agricultural suitability can be obtained if you combine them with raster data.

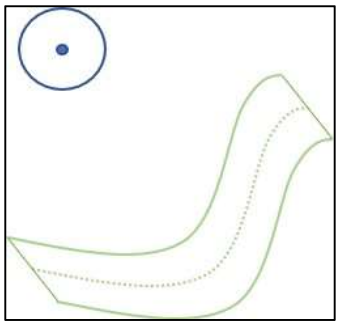

Figure 2. Buffer around a point and a polyline.

A polygon can also be constructed from a point or a polyline using a buffer (Figure 2). For example, one can create a 10km buffer around a point or a polyline and obtain the summary statistics within the buffer. A tool for making buffers in ArcGIS is *Buffer*.

[4] For example, the *Near* tool in ArcGIS automatically finds the closest object (e.g., point) and returns the distance by talking the curvature of the Earth into account if the Geodesic option is specified.

Raster data

Raster data are a "sheet of information" on a map or a map itself. Typical raster data include nightlights, soil type, agricultural suitability, precipitation, and temperature.[5] Like using a cookie cutter to make a cut out cookie, the summary statistics (a cookie) for each polygon can be obtained by putting a polygon (cookie cutter) on a raster (cookie sheet). *Zonal Statistics as Table* in ArcGIS is a powerful tool to compile summary statistics.

The author (in the middle) in East Laguna Village (Hayami Village)

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[5] See Donaldson and Storeygard (2016) for a great summary on this topic.

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----- Announcement -----

The Second JADE Conference (JADE-CEPR-TIME-CREPE Conference on Economic Development), which was planned to be held in April 2020, is cancelled due to the COVID-19 outbreak. We will organize a similar joint conference with a new call for papers in 2021.

The (new) Second JADE Conference will be held in November 2020 in collaboration with the Young JADE Conference and the Hitotsubashi Summer Institute 2020.

For more information, please visit (http://www.jade.gr.jp/conference.html)

----- From the Editorial Office -----

- We are pleased to deliver the second issue of JADE Letter. Although it is currently difficult to have face-to-face meetings and exchange ideas due to the COVID 19 pandemic, we hope JADE Letter compensates for this by providing useful information to its members. (TO and KK)

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