

REVIEW ARTICLE

Determinants of social norms I – the role of geography

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Abstract

It is now abundantly clear that social norms channel behaviour and impact economic development. This insight leads to the question: How do social norms evolve? This survey examines research that relies on geography to explain the development of social norms. It turns out that many social norms are either directly or indirectly determined by geography broadly conceived and can, hence, be considered largely time invariant. Given that successful economic development presupposes the congruence between formal institutions and social norms, this insight is highly relevant for all policy interventions designed to foster economic development. In a companion paper, the role of religion and family organization as potential mediators between geography and social norms assumes centre stage.

Keywords: geography; informal institutions; institutional economics; internal institutions; social norms

JEL classification: A13; D90; K00; O10; Z10

1. Introduction

In his survey on the emergence of social norms, Elster (1989) does not exclude the possibility that their emergence might be determined entirely by chance, thus admitting that there is no convincing theory regarding their emergence. Given the large number of studies published in recent years dealing with this topic, it is hard to believe that Elster's equivocation was written a mere 30 years ago. For a long time, economists paid little attention to social norms, but a growing interest in the 'deep' determinants of economic development has kindled a renewed relevance and rapid progress in the discussion of social norms.

Many studies analyse the potential effects of geography on development. An important debate ensued on whether these effects are direct or mediated by institutions. Formal or external institutions are the main focus of many scholars examining how institutions mediate the effects of geography (e.g., Acemoglu *et al.*, 2002, Easterly and Levine, 2003, or Rodrik *et al.*, 2004). More recently, however, the possibility that the effects of geography on development are also mediated by informal or internal institutions has received more traction. In this paper, because social norms are a special type of informal institutions, I survey many of the recent contributions that connect geography to social norms. More specifically, I ask how geography shapes those institutions that are not enforced by representatives of the state. This question is of interest for at least two reasons: First, many scholars (such as Basu, 2018, Hayek, 1973, Platteau, 1994, and Weingast, 1997) have argued that social norms are crucial for the actual implementation and enforcement of formal law. And second, it has also been argued (e.g. by Gorodnichenko and Roland, 2011, 2017, 2021; Knack and Keefer, 1997; Morrison *et al.*, 2007, or Bjørnskov, 2012) that social norms – and other internal institutions – directly impact on the development prospects of society. Here, I will not add to those literatures. The focus of this paper is thus exclusively on the possible impact that different aspects of geography have on social norms.

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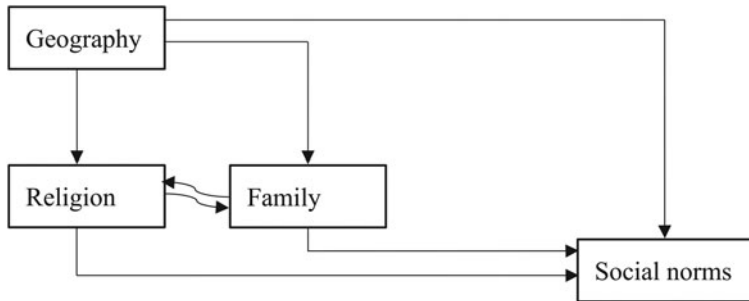


Figure 1. The impact of geography on social norms.

It is frequently observed that formally identical institutions can have very different consequences. Tabellini (2010), for example, conjectures that culturally transmitted norms may be more important than formal ones for the public goods provided by states, and asks whether largely time-invariant traits of culture can explain differences in the economic development of regions that share formally identical external institutions. If social norms are crucial for development, the factors influencing the social norms shared by members of different groups move to centre stage.

There is ample evidence that various aspects of geography broadly conceived such as the suitability of land for certain crops, the regularity of rainfall, ruggedness of terrain, the disease environment and other geographical factors critically influence human interactions. While geography is clearly exogenous, there are also man-made factors that resist far-reaching modification by individuals and groups. These include religious practices and traditions of family organization, among others. Although these man-made factors are probably influenced by geographic conditions, they might, in turn, impact on the development of internal institutions above and beyond the effects of geography. To examine the interplay of these exogenous and endogenous influences, a companion paper surveys studies that establish a link between geography and religion or family structure, both of which have an impact on social norms. Figure 1 shows the interplay between geography, and religion and family structure. Hence, this paper deals with the direct link between geography and social norms and the companion paper with the link mediated by religion and family. There is a sizable literature dealing with the little arrows indicating the existence of a relationship between family structure and religion.

The rest of the paper is organized as follows: In Section 2, besides defining our key terms, we specify a list of social norms that have been shown to be significant for economic development. Section 3 discusses geographical factors identified as playing causal roles in generating social norms. The aspects dealt with include the dominant subsistence mode, pathogen prevalence, volatility of weather conditions, prevalence of natural disasters, terrain characteristics, and climate change. Section 4 summarizes our survey and discusses its relevance for policy decisions. The companion paper (Voigt, 2023) focuses on how religious practices as well as family structures are shaped by geography and how they influence social norms in turn.

2. Social norms

In his 1989 paper, Jon Elster observes that for ‘norms to be *social*, they must be shared by other people and partly sustained by their approval and disapproval. They are also sustained by the feelings of embarrassment, anxiety, guilt, and shame that a person suffers at the prospect of violating them’ (Elster, 1989: 99f.).¹ Based on this definition, social norms consist of a rule (do x, don’t do y, etc.) and the threat of a sanction, which includes disapproval by others, if the rule is violated.

¹Social norms have been defined in many ways, but there is consensus on their basic traits. For example, compare Elster’s definition with the description proposed by Bicchieri (2006: 8): ‘By the term social norm, I shall always refer to informal

I proposed to define institutions as consisting of a rule endowed with a sanction and to distinguish between different types of institutions based on who does the sanctioning (Voigt, 2013; this definition is inspired by – but not identical to – Ostrom, 1986). If the sanctioning agent is a representative of the state, I am referring to an external institution. In contrast, if the sanctioning agent is a conventional member of society, I am referring to an internal institution. One can also think of this as private versus public enforcement.² The organizing criterion of this taxonomy relies on who sanctions non-compliance. Others (e.g., North, 1990: 4) propose a distinction based on the formality of the rule, and suggest that there are formal and informal institutions. North thinks of formal constraints as being devised and deliberately created and of informal ones as simply having evolved over time and cites the common law as an example for the latter. One can thus also think of formal rules as having been created in a centralized fashion (i.e. top-down) and of informal ones as having evolved bottom-up. If we combine the distinction of informal versus formal institutions (i.e., referring to the rule component) with those of internal versus external institutions (i.e., referring to the sanctioning component), this can be depicted as Table 1.³

The table shows that social norms are an informal rule with an internal sanctioning mechanism.⁴ They can thus be thought of as having simply evolved and as being enforced by members of society without resorting to the power of the state and its representatives. The basic notions underlying vague legal concepts such as ‘fairness’ are likely to have evolved spontaneously but are now enforced by state representatives. Laws demanding ‘reasonable behaviour’ or ‘good faith’ are examples for such concepts.⁵ The procedural rules of arbitral tribunals such as the International Court of Arbitration run by the International Chamber of Commerce in Paris are highly formal, yet its decisions are usually enforced without resorting to the power of the state. Finally, most of the legislation created by contemporary nation-state parliaments is both formal and enforced by state representatives.⁶

In her book on the emergence of norms, Ullmann-Margalit (1977) quips that trying to explain the origin of a specific norm would be as futile as trying to identify the origin of a particular folk joke. Applied to our context, her quip implies that it is types or classes rather than particular social norms that should be researched.

norms, as opposed to formal, codified norms such as legal rules. Social norms are, like legal ones, public and shared, but, unlike legal rules, which are supported by formal sanctions, social norms may not be enforced at all.’

²Internal’ does not refer to the individual but to society. The distinction between ‘society’ and ‘state’ used to be well-established, had fallen into oblivion but the most recent book by Acemoglu and Robinson (2019) brings the distinction back into focus. Translated into English, the German subtitle of the book is ‘On the perpetual conflict between state and society’.

³These two dimensions (rule plus sanction) are collapsed into a single dimension in Ostrom and Busarto (2011: 318f.). After pointing out that rules can be written or unwritten and that many laws are not followed as rules, the authors follow Commons and Vincent Ostrom in defining rules as ‘shared understandings by actors about *enforced* prescriptions concerning what actions (or outcomes) are *required, prohibited, or permitted*’ (emphasis i.o.). Once a rule is endowed with an enforcement mechanism, I prefer to call it ‘institution.’ My proposal, following North, is to take into account the formality of the rule and the identity of the sanctionor which leads to the more fine-grained delineation depicted in Table 2.

⁴This delineation of social norms is by and large compatible with Ostrom’s (1990: 35ff.). She distinguishes between norms that actors adopt individually and those that are shared more generally. Such norms affect the perception of available ways to behave by making some choices more costly. If widely shared, such norms can mitigate the degree of opportunism and thus reduce the resources needed to monitor and sanction opportunistic behaviour.

⁵A reviewer insisted that legal systems may have developed rigorous definitions for such terms and mentioned the famous formula created by Judge Learned Hand. This is exactly the point: in order to implement a vague rule additional tools are needed simply because the written law is not precise enough.

⁶Culture has been defined as ‘those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation’ (Guiso *et al.*, 2006: 23). This delineation of culture thus comprises beliefs about how the world is and how it should be (values) and focuses on the transmission of beliefs and values. Social norms can be conceptualized as values applied to more specific situations. The definition here proposed focuses on the existence of a rule and a sanction. Culture and social norms, hence, overlap but none of the two concepts encompasses the other one entirely.

Table 1. Combining two taxonomies

		Sanction	
		Internal	External
Rule:	Informal	Social norms	Vague legal concepts
	Formal	Private arbitration	Formal law

Our interest in social norms is motivated by the possibility that they impact economic development. Quite generally speaking, different social norms may induce different equilibria to be realized. This is why I focus on those social norms that have been shown to affect economic development, and are likely to also have an effect on the implementation and enforcement of formal law. Here is a list of types of social norms I focus on in this survey.

- (1) *Norms endorsing individualism (or its opposite, collectivism)*. Individualism describes cultural orientations in favour of a loosely knit social framework in which individuals are expected to take care of themselves and their immediate family. In contrast, collectivism describes cultural orientations in favour of a tightly knit social framework in which individuals expect their relatives or members of their in-group to look after them in exchange for loyalty (Hofstede, 1980). Neither individualism nor collectivism are social norms themselves. But both individualism and collectivism are backed up by a variety of social norms. We here follow Robinson (2013) who argues that while trying to identify specific individual norms makes little sense, focusing on their functions is more relevant. In a number of papers, Gorodnichenko and Roland (2011, 2017, 2021) have shown that individualism not only explains cross-country differences in growth and productivity, but also in innovativeness and the establishment of democracy.
- (2) *Cooperation norms*. Encouraging people to voluntarily cooperate helps create value. Cooperation also helps citizens to act collectively which is a precondition for monitoring government and thus conducive to the implementation of formal laws. It has been shown that to sustain rule-complying behaviour, the threat of being sanctioned if a rule is violated is key (Fehr and Gächter, 2002). Such norms are also referred to as prosocial punishment norms and deserve particular attention. On the other hand, antisocial punishment behaviour has been observed frequently (Herrmann *et al.*, 2008). This occurs when people are punished even though they cooperated, and it is likely detrimental for development. Norms endorsing antisocial punishment, therefore, also deserve attention. This also refers to norms endorsing aggression and even violence. In a much-cited paper, Knack and Keefer (1997) show that norms of civil cooperation are, indeed, closely associated with economic growth. Woolcock and Narayan (2000) discuss the economic effects of social capital, of which cooperation norms are an explicit aspect.
- (3) *Sharing norms*. These norms imply that those hit hardest by some exogenous event, say a natural disaster, enjoy the solidarity of those relatively better off. More generally, charitable giving and altruistic behaviour can be grouped under the heading of sharing norms. Yet, as a number of studies on African societies have shown (e.g., Platteau, 2009, 2015), strict sharing norms can engender a common pool problem: If a lot of people expect to share someone else's wealth, their own achievement incentives may be reduced.
- (4) *Equality norms*. Equality norms can refer to different kinds of equality, such as gender equality or equality between ethnic groups. A society implementing social norms of procedural (as opposed to outcome) equality is less likely to discriminate against anybody on insufficient grounds, and is more likely to profit from the efficiency-enhancing contributions of very different people. Delineated as such, equality norms should be conducive to the rule of law. Morrison *et al.* (2007) is a careful survey of the intricate transmission channels through which gender equality impacts economic growth, both in the short and the long term.

- (5) *Norms of honesty.* When most people behave honestly, it is less risky to interact with others and this reduces transaction costs. These norms make complex and multiple interactions profitable, and are conducive to (economic) development. The degree to which they are enforced also influences the behaviour of state representatives, and might lead to lower corruption levels and improved government efficiency. Emphasizing that honesty is an important aspect of social capital, Bjørnskov (2012) shows that higher levels of social capital affect both schooling and the rule of law which, in turn, lead to higher growth rates.

Some scholars rely on trust and social capital as proxies for informal institutions. I think this is not helpful. Social trust can be understood as shared expectation of honest and cooperative behaviour in a community (Fukuyama, 1995). As such, trust itself is not a social norm, but rather a consequence of the degree to which norms of cooperation and honesty are upheld in a society. Moreover, trust may also be influenced by the reliability of external institutions.⁷ However, since high trust societies enjoy enhanced development, I include studies establishing a link between geography and social trust in an effort to ascertain its determinants. A voluminous literature documenting the relationship between trust and a number of desirable outcomes suggests that high trust levels are associated with higher economic growth (Algan and Cahuc, 2013; Berggren *et al.*, 2008; Knack and Keefer, 1997; Zak and Knack, 2001), better governance (Knack, 2002), and higher democratic stability (Uslaner, 2003).

We now turn to a brief discussion of the potential determinants of the five groups of social norms listed above. Many economists consider geography to be a deep determinant of economic development (Spolaore and Wacziarg, 2013 is an early survey). The various dimensions of geography include: climate, soil quality, terrain and natural disaster prevalence. It is assumed to be 'deep' because it is exogenous to human behaviour and very time-invariant. This survey includes studies that identify a relationship between a dimension of geography and the emergence of a particular norm.

3. Geography

To establish a connection between geography and social norms, I distinguish six aspects of geography: (1) predominant (historic) subsistence mode, (2) pathogen prevalence, (3) volatility of weather conditions, (4) proneness to natural disasters, (5) terrain characteristics, and (6) historic climate change. It may be worth noting that they rely on very different time frames: whereas the predominant subsistence modes explicitly refers to the – possibly long gone – past, the proneness to natural disasters does include the present. This implies that the mechanisms used to transmit the respective social norms are of particular interest with regard to the first aspect. Section 3.1 is not only longer than the other sections because there is most evidence to report but also because it contains information on frequently used sources for historic data (such as the Ethnographic Atlas) and a frequently used method to demonstrate the time-invariance of some norms (the epidemiological approach). In selecting the studies to include in this survey, I primarily relied on empirical studies drawing on state of the art econometric techniques.

Predominant (historic) subsistence mode

Geographic conditions were probably the single most important determinant for the predominant subsistence mode of historic societies. The soil, in combination with the climate, makes the cultivation of some crops more suitable than others. Although the historic subsistence mode is not completely exogenous, numerous studies document a high fit between theoretically ascertained land suitability and the actually observed subsistence mode.⁸

⁷Guiso *et al.* (2009) with a well-documented example of how external institutions can determine trust levels.

⁸Fischer *et al.* (2002) produced a suitability atlas for the Food and Agricultural Organization of the United Nations including 154 crop-types for grid cells of a size smaller than 10 × 10 km. This suitability measure has been used as an instrumental

First introduced in the 1960s, the Ethnographic Atlas (EA; Murdock, 1967) is an indispensable tool for anthropologists. The EA includes more than 1,200 historic societies and provides information about, for example, family organization, political structure, or dominant subsistence mode. It is also an important data source underlying many of the studies summarized here.⁹ The EA distinguishes five subsistence modes: (1) collection of wild plants and small land fauna, (2) hunting (including trapping and fowling), (3) fishing (including shell-fishing and pursuit of large aquatic animals), (4) animal husbandry, and (5) agriculture. Today, the last three categories have overwhelming relevance. Picking up on the fourth and fifth mode proposed by Murdock, I distinguish between animal raising versus non-animal raising agriculture, i.e., between herders and farmers. I also propose to distinguish between irrigation versus non-irrigation farming, and between crops that are grown using the plough versus the hoe stick (Alesina *et al.*, 2013).

Fishermen's norms

Fishing is one of the subsistence modes named by Murdock (1967). Gneezy *et al.* (2016) conduct an interesting study that relies on the similarities of each fisherman's behaviour to infer whether or not a norm exists. Comparing the cooperative behaviour of open sea fishermen with that of fishermen working on lakes, they find that norms of cooperation are significantly more pronounced with fisherman who work in the open sea and, due to the heightened danger there, depend on cooperation with others. Gneezy *et al.* (2016) construct a simple index of cooperation based on four games: the trustworthiness in a trust game, the offer in an ultimatum game, donations in a donation game, and the contribution in a public good game. Using this indicator, the authors find that the distribution of cooperation among the open sea-going fishermen is highly compressed (all players hover between the 40 to 45% level); this indicates a significant similarity in how sea-going fishermen engage in cooperative behaviour. Based on this observation, the authors conclude that a norm must exist prescribing the appropriate share that one should contribute. The cooperation levels of lake fishermen are a lot more dispersed, indicating a lack of similar behaviours and making the existence of a specific social norm unlikely. When the wives of the two different groups of fishermen play the same games, unlike their husbands, they all share a similar approach to cooperation. This finding suggests that the norms found among the men are not transmitted horizontally between male and female family members. The authors of this study are, hence, able to establish a direct link between a specific mode of subsistence – fishing – and the prevalence of specific norms.

But fishing has also been shown to determine one important aspect of family organization, namely whether property is inherited via the male (patriliny) or female (matriliny) family line. BenYishay *et al.* (2017) find that if fishing is the most important means of subsistence, matrilineal inheritance rules are significantly more likely. Their study is based on primary data collected in the Salomon islands. Data from the Ethnographic Atlas reveals that their findings can be generalized to the rest of world. When they extend their analysis, BenYishay *et al.* (2017) find that matriliney does not confer women with higher bargaining power or more political agency. Previous research has, however, shown that matriliney does have other far-reaching effects, e.g., on labour productivity (Goldstein and Udry, 2008), on welfare (La Ferrara, 2007), and the effectiveness of land right reforms (Deininger *et al.*, 2013).

variable for the actually cultivated crops out of concerns regarding the possibility of reversed causality in a number of papers including Alesina *et al.* (2013), Bentzen *et al.* (2017) and Bugge (2020).

⁹Murdock also introduced the Standard Cross-Cultural Sample (SCCS). It reports key traits of 186 cultures that were chosen such that they would be most independent from each other. Some of the results reported here rely on the SCCS for some of their data. One shortcoming of the EA was the underrepresentation of European ethnic groups. Giuliano and Nunn (2018) recently added information on 44 groups. The problems and pitfalls of quantitative cross-cultural databases such as the EA and the SCCS are discussed in Watts *et al.* (2022). Bahrami-Rad *et al.* (2021) document associations between data from EA and contemporaneous surveys and conclude that 'the *Atlas* is a meaningful source of information about diverse human societies' (*ibid.*, 2).

Herders versus farmers

Behaviour deviating from a narrowly defined norm is often greeted with an aggressive response in the South of the U.S., but not in the North. Nisbett and Cohen (1996) suggest that this difference exists because livestock herders settled in the South, and farmers settled in the North. Herders are more vulnerable and operate in areas with low population density. Their (economic) survival depends on thwarting potential criminals themselves because a sheriff may be hours away. An initial aggressive response to deviant behaviour may have had positive returns. These differences in behaviour still exist in the U.S. today, even though occupations have changed.¹⁰

Nisbett and Cohen (1996)'s findings are specific to the U.S. A recent study by Cao *et al.* (2021) asks whether individuals belonging to groups that historically relied on herding are more violent even today on a global scale. Once again using information from the Ethnographic Atlas, the authors find that the folklore of traditional herders mentions violence, punishment, and retaliation more than the folklore of other groups. This discovery establishes a historical connection between herding and aggressive norms. Cao *et al.* (2021) also find that groups whose ancestors were herders are not only involved in more conflicts, but also in more intense conflicts. This clearly shows the persistence of a social norm similar to that found in the U.S. Societies in which transhumant pastoralism plays an important role are also characterized by a sharp distinction between in-group and out-group trust levels. People raised in such societies tend to be less trusting in strangers (Le Rossignol and Lowes, 2022).

Becker (2019) examines the potential consequences of pastoralism on the sexual mores of women. In pastoral societies, men are often away from their families for extended periods and unable to monitor the behaviour of their wives. Since fatherhood is essentially uncertain, men had an interest in restricting female sexuality. Relying on a survey of around 80,000 women living in 13 African countries, Becker finds that the historical prevalence of pastoralism is associated with a higher prevalence of female genital cutting. Extending her analysis to some 500,000 women from 275 ethnic groups and 35 countries in Africa, Asia, Europe, and South America, she finds that women who descend from historically pastoralist areas think it is extremely important that women be faithful. Since the answers might reflect experimenter demand effects rather than actual behaviour, Becker checks whether the number of HIV infections correlate with these declared norms and finds that this is, indeed, the case. Here, a particular historical subsistence mode – pastoralism – has clearly discernible effects on one group of social norms, namely equality norms.

Schulz (2022) is one of several scholars who argues that both animal husbandry and religious rules have an effect on family organization. Based on Mitterauer (2010) he claims that because of a camel's long gestation period, herds are subject to a minimum size below which the maintenance of the entire herd is endangered. Islamic inheritance law prescribes that both sons and daughters inherit, implying an imminent danger to the continued existence of camel herds. He argues that the need to maintain a minimum herd size and Islamic inheritance law are mutually responsible for the practice of cousin marriage as it keeps the livestock in the family. In this context, cousin marriage is a consequence of the interaction between a specific kind of herding subsistence and religious norms. Cousin marriage is also associated with more racist attitudes and, hence, incompatible with equality norms (Gutmann and Voigt, 2022: 10). It has also been found to correlate with lower levels of democracy, lower levels of political participation, and a lower quality of external institutions (Schulz, 2022).

Irrigation

Karl Wittfogel (1957) famously argued that agricultural systems dependent on a centrally controlled distribution of water, either for irrigation or flood protection, were bound to end up with autocratic rulers. Thirty years later, Elinor Ostrom (e.g., 1990) pointed out that irrigation can also be coordinated

¹⁰Grosjean (2014) tests the hypothesis that the culture of honour imported by the Scots-Irish herdsman to the US South is an important predictor for contemporaneous homicide rates and finds robust evidence confirming Nisbett and Cohen's original conjectures. Bazzi *et al.* (2020) found that historical frontier experience impacts social norms long after the frontier has vanished. For example, people living in U.S. counties that once had a frontier are more likely to share individualist values, and oppose redistributive policies.

horizontally and does not necessarily lead to autocracy. Wittfogel's theory has been challenged by many and is still discussed today. We focus on only those studies that address the consequences of irrigation systems on social norms.

Certain crops, such as rice, need constant irrigation. Since this presupposes collective action, it can be argued that groups relying primarily on rice or similar crops must have developed cooperation norms to be successful. Based on evidence from China, Talhelm *et al.* (2014) even try to establish a 'rice theory of culture.' Developing their argument, they point out that the cultivation of rice requires twice as much labour as the cultivation of wheat. Due to varying geographical features, China has both wheat growing and rice growing regions. Talhelm *et al.* (2014) expect the rice growing regions to display higher levels of interdependence and wheat growing regions higher levels of independence.

To test their hypotheses, Talhelm *et al.* (2014) ran lab experiments with students from six different regions in China. Participants from rice provinces are 'more holistic-thinking, interdependent, and loyal/nepotistic than participants from the wheat provinces' (*ibid.*, 607). Interestingly, the authors find that differences in behaviour can be attributed to all participants from the various regions independently of whether they were involved in rice or wheat cultivation themselves. This result is markedly different from the results reported by Gneezy *et al.* (2016) on the social norms of lake fishermen versus open sea fishermen. They found that their norms only applied to fisherman and not, for example, their wives. The results by Talhelm *et al.* (2014), however, show that the prevalent mode of farming has far-reaching consequences regarding the degree of individualism / collectivism even for those who have never been farming. Taking the results of these two studies into account, a follow-up question naturally suggests itself: under what circumstances is the activation of social norms constrained to the setting in which they (supposedly) emerged (fishing) and under what circumstances are they activated beyond (irrigation)?

Talhelm *et al.* (2014)'s claim that cultivating rice might drive a number of basic social norms has found a number of critics. Hu and Yuan (2015)'s critique is that both corn and soybean producing areas are grouped with the wheat producers. They propose a modified dichotomy simply separating 'rice' from 'non-rice agriculture.' This implies that many people from the Americas and the Middle East should be more like Westerners (i.e., grouped as 'non-rice agriculture'), an implication not in accordance with established findings. Ruan *et al.* (2015) criticize sample bias, measurement error, and model misspecification. Based on rice versus wheat farming in India, von Carnap (2017) claims that the equations 'wheat = no irrigation' and 'rice = irrigation' are incorrect at best. In India, 64% of rice cultivation does not require irrigation, whereas 56% of wheat cultivation does require irrigation. In addition, there are different kinds of irrigation that might have different consequences on cooperation norms.¹¹ Drawing on a large Indian household survey, von Carnap finds that different types of irrigation are associated with fewer communal conflicts and higher participation in public meetings. In spite of these findings, he states (*ibid.*, p. 316) that 'it is not possible to establish a broad and consistent relationship between agricultural indicators and social capital', which should be the case according to the theory proposed by Talhelm *et al.* (2014).

There are, however, other studies largely in line with the 'rice theory of culture'. In the Philippines, for example, some farmers rely only on rain to grow rice, whereas others rely on irrigation. What makes Tsusaka *et al.*'s (2015) comparison of the behaviour of the farmers particularly interesting is the fact that the respective irrigation systems were introduced only two years before the survey. The study supports their basic hypothesis that since the management of an irrigation system requires cooperation between its users, the degree of both cooperation and altruism will be higher in irrigation system areas than in rainfed areas.

The most comprehensive study on irrigation's impact on individualism/collectivism is Buggle (2020). It is a worldwide survey using irrigation data derived from the Ethnographic Atlas, Buggle finds that irrigation agriculture robustly predicts social norms associated with collectivism. The effect is considerable. For example, had the South Koreans not practiced irrigation agriculture, collectivism

¹¹Von Carnap (2017) names four, namely (1) tanks, (2) canals, (3) tube wells, and (4) other wells.

would be 22 to 43% lower depending on the estimation approach. This would translate into South Koreans having the same level of collectivism found among Uruguayans or Israelis (*ibid.*, 149). In addition, he finds that irrigation agriculture is associated with higher levels of in-group favouritism and more tightness (i.e., the leeway in interpreting social norms).¹² He digs deeper into the individualism/collectivism dichotomy by differentiating between horizontal and vertical versions of both. Whereas horizontal collectivism is characterized by strong norms of cooperation between equals, vertical collectivism is characterized by the acceptance of hierarchical authority described by Wittfogel (1957). Buggle's results reveal that small-scale irrigation produces horizontal collectivism, whereas large-scale irrigation produces vertical collectivism.

In principle, it is possible that people who have collectivist norms choose irrigation culture. In other words, the causality could run from culture to the type of agriculture practiced. Buggle (2020) controls for causality issues by using instrumental variables that indicate the geographical suitability for different types of agriculture. It appears that irrigation agriculture is responsible for establishing collectivism as a social norm that is transmitted across generations, and that persists in individuals who are no longer involved in agriculture, and who no longer live in the relevant regions. To wit, collectivist norms are still found in second generation migrants born in countries other than the origin countries of their parents or grandparents. The effects of irrigation agriculture are, moreover, not limited to social norms. Buggle (2020) shows that people originating from such regions are also less innovative and more likely to work in routine-intensive occupations.

As Buggle, many studies here surveyed rely on the epidemiological approach as popularized by Fernández (2008) in which the variation in social norms across different immigrant groups residing in the same country is analysed. Given that they are all subject to the same external institutions (namely that of the country in which they were born and in which they live) but the norms are significantly different across the various immigrant groups, the differences are attributed to the culture from which their parents originated. The epidemiological approach has become almost a standard tool to demonstrate how time-invariant some norms are but also to document the main channels through which social norms are transmitted.

Litina (2016) assumes that constructing irrigation systems requires a high degree of cooperation and she uses the fraction between irrigation potential and actual irrigation as a proxy for cooperation on a societal level. The main hypothesis of her study is that highly productive agricultural land made investment in a collective agricultural infrastructure less necessary and less likely. Her empirical evidence supports this conjecture. She extends her study by suggesting that successful industrialization requires a substantial investment in infrastructure, and regions with low arable land were more likely to industrialize. Although this sounds like the reversal of fortunes à la Acemoglu *et al.* (2002), Litina (*ibid.*) insists that her theory is less far-reaching because it does not claim that variations in arable land is the dominating factor for economic outcomes.

Plough versus hoe

Alesina *et al.* (2013) observed that the degree to which societies relied on the plough in traditional agriculture is a good predictor for today's role of women in society. The argument that specific agricultural practices could have an important influence on gender role differences was first advanced by Boserup (1970). The argument is straightforward; cultivation of the soil relying on the plough requires a lot of body strength to either pull the plough or control the animal that pulls it, giving men an advantage over women. Agriculture that relies more on the hoe and the digging stick requires less strength and is more labour-intensive allowing women to actively participate in farming. Work with these tools can easily be interrupted and resumed again, a characteristic that is compatible with child caring, a task performed by women almost everywhere. Ploughs are used to grow wheat,

¹²The concept of tightness is used to describe how tight or loose the rules and norms are that members of a society are supposed to follow (Pelto, 1968; Triandis, 1995). Tight cultures have many strong norms and a low tolerance of deviant behaviour, whereas loose societies have weak social norms and a high tolerance of deviant behaviour (Gelfand *et al.*, 2011).

barley, and rye, hoes are used to grow sorghum, millet, root, and tree crops. Plow-using societies include Egypt, India, and Pakistan; hoe-using societies include Burundi, Rwanda, and Kenya.

Relying on information about whether or not the use of a plough is suitable for a particular area, Alesina and his co-authors show that norms about the appropriate role of women in society and the participation of women in the workplace, can be predicted based on the use of the plough versus the hoe. In this context, geography exerts a lasting impact on culture by influencing the norms and beliefs regarding the proper role of women in society. Alesina *et al.*, citing the World Development Indicator Data on female labour force participation, show figures that range from 16.1% in Pakistan (relying on plough agriculture) to 90.5% in Burundi (relying on hoe agriculture). In countries relying on the plough, women are less likely to work outside the home, to be elected to parliament, or to run a business. This study also reveals that societies relying on plough agriculture accept inequality to a higher degree. Similar to some of the studies surveyed above, this study also investigates second generation immigrants to the U.S., and confirms that the norms are culturally transmitted and do not depend on the context of their origin.

As the predominant subsistence mode has become less relevant in many societies, the question how the respective social norms are upheld although the reason for their original emergence has vanished becomes prevalent. Over the last two decades, economists have developed a number of models surveyed in Bisin and Verdier (2022). The main focus has long been on vertical (from parents to children) and oblique transmission (e.g. from teachers to children). More recently, the potentially competing influence from horizontal transmission (among kids in school, e.g.) has received more attention. In a related literature that is interested in explaining the survival of inefficient social norms, Bicchieri (2016) has alluded to the potentially important role of second order beliefs. With them, people primarily follow a social norm because they think that others expect them to and expect to be sanctioned in case they do not.

Pathogen prevalence

Pathogens are organisms that cause diseases. Important pathogens include malaria, dengue, typhus, and tuberculosis. Sachs and Maleney (2002) show that the countries most prone to malaria are also the least economically developed and suffer from the lowest growth rates. Alsan (2015) offers another example of a pathogen negatively influencing economic development. He shows that areas plagued by the tsetse fly are less likely to domesticate animals and use the plough, less likely to be politically centralized and have a lower population density.

The prevalence of pathogens might also influence social norms. In regions where pathogens are prevalent, contacts with others can lead to serious illness or even death. It is plausible to assume that ethnocentrism, xenophobia, and other forms of prejudice might be part of an antipathogen defence strategy (see, e.g., Fincher and Thornhill, 2008). A high degree of collectivism could also be caused by pathogen prevalence, because collectivists make a sharp distinction between in-group and out-group interactions. Being cautious about mingling with people who do not belong to one's own group makes the import of pathogens by members of an out-group less likely. People sharing collectivist social norms also insist on conformity (as opposed to tolerance for deviance), making deviating behaviour (such as being in contact with potential infectors) less likely. Fincher *et al.* (2008) analyse the relationship between pathogen prevalence and collectivism. Based on 98 countries and taking into considerations up to nine pathogens, they find a strong correlation between pathogen prevalence and four collectivism measures widely used in the literature, among them the well-known Hofstede measure.¹³

In a study in which he is interested in identifying the effects of culture on institutions, Maseland (2013) uses the pathogen *Toxoplasma gondii* as an instrument for a number of cultural traits. This pathogen is uncommon as a cause of manifest disease but has been shown to cause a number of personality

¹³In Thornhill and Fincher (2014), this is referred to as the 'parasite stress theory of cultural values'. Morand and Walther (2018) examine the flipside of this theory and hypothesize that more individualistic societies suffer from a higher number of infectious disease outbreaks. Their results do confirm the hypothesis.

changes such as increases in guilt, vigilance and distrust, and is associated with a strong focus on competition at the expense of concern for others (*ibid.*, 114f.). In the 61 countries included in the study, prevalence rates range between close to zero and 80 per cent and Maseland shows that those differences can explain variation in the degree of individualism/collectivism but also in trust levels.

In a modified Prisoners' Dilemma experiment conducted in 42 countries, Romano *et al.* (2021) find that cooperation is higher in countries with a (historically) low prevalence of infectious diseases. While this evidence suggests that pathogen prevalence has a direct effect on social norms, others have asked whether it can also be a determinant of family organization. Pathogen prevalence can be deadly. To increase chances that at least some of their offspring will survive the childhood years, women will tend to select healthy males as fathers. Low (1990) hypothesizes that pathogen stress increases the likelihood of polygyny, and that sororal polygyny (where the cowives are sisters and is a preferred form) is unlikely as this does not increase variable offspring. Low finds empirical support for both hypotheses.

Henrich (2020: 263–274; Henrich *et al.*, 2012) discusses the societal problems that polygyny can create. If some men get to marry more than one woman, other men may not get the chance to marry at all. Getting married and becoming a father reduces testosterone levels; this phenomenon is associated with lower crime rates (Henrich, 2020, with numerous references; Renner and Krieger, 2022 is a recent paper that shows that both polygyny and gender inequality matter individually, but also jointly, for explaining the onset of armed domestic conflicts). If pathogen prevalence influences marriage patterns and marriage patterns influence crime rates, we have a straightforward link between pathogen prevalence and conflict in society.

Volatility of weather conditions

For their well-being and sometimes even their survival, traditional agricultural societies depend on weather conditions. Too little or too much rain could ruin a crop. Dell *et al.* (2014) survey the effects of weather variation on outcome variables such as economic growth, agricultural output, labour productivity, energy consumption and so forth, but do not survey how weather variation influences social norms.¹⁴ Platteau (2015), for example, conjectures that volatile weather conditions inspire risk-pooling and mutual insurance schemes. Assuming the absence of a state-enforced system of property rights, these mechanisms need to be self-enforcing. Social norms with specific traits might ensure self-enforceability, and Platteau (*ibid.*, p. 196) argues that equality norms are likely to emerge where volatile weather conditions exist.

Extending this thought, Buggle and Durante (2021) ask whether people living in European regions that were subject to high weather variability in pre-industrial times display high levels of general trust today. Whether a harvest was successful depended in large part on the weather, and high variability might result in bad harvests. In order to reduce the effects of a bad harvest, cooperation measures like food storage and the arrangement of cultivated plots may have evolved that showed how reliable other people are and to what degree they can be trusted. Buggle and Durante are able to show that people living in those European areas subject to higher year-to-year variability in precipitation and temperature between 1500 and 1750, still display higher trust levels today. Interestingly, high trust levels are only found in locals and not immigrants. Also, including the timing of the Neolithic revolution as a confounder neither reduces the significance of the variability variables nor is the timing itself significantly correlated with contemporaneous trust levels.¹⁵

¹⁴It has been proposed that the (local) adoption of the neolithic revolution was a function of temperature variability (Ashraf and Michalopoulos, 2015). Neither highly stationary nor extremely volatile weather conditions are conducive to development of new tools used in sedentary agriculture. Moderate variability in weather conditions, however, encourages sedentary agriculture. Based on temperature variability observed during the 20th century, the authors do indeed find a hump-shaped relationship between temperature variability and the adoption of sedentary agriculture.

¹⁵High variability in climatic conditions implies the necessity to cooperate with others far beyond the narrow realm of the family, which is why Buggle and Durante (*ibid.*) conjecture that family ties in regions of high variability might be lower. They find evidence that this is, indeed, the case.

Buggle and Durante (2021: 1951) summarize the underlying hypothesis as ‘norms of trust developed because they facilitated collective action and risk-sharing among subsistence farmers exposed to weather-related risk in pre-industrial times.’ Although the findings are impressive and survive a number of robustness tests, the hypothesized mechanism is dangerously close to a functionalist fallacy. It would be nice if trust regularly and reliably emerged whenever it was needed. But here, it seems to have been the case. A particular aspect of geography has, hence, induced mutual insurance schemes that have taught people to trust each other. The enhanced levels of trust in these regions lower transaction costs to this very day.

Dang and Dang (2021) report similar findings for farmers in Vietnam. Individuals who are threatened by weather variability display higher levels of trust in their neighbours and those who are close to them. As logical and straightforward as these results may seem, the precise opposite may also be plausible. If someone suffers because of weather conditions and receives no help, trust in others may be reduced. It has been shown (Nunn and Puga, 2012; Nunn and Wantchekon, 2011, will be discussed in Section 3.5 below) that those African regions that suffered most from the extraction of slaves display low levels of general trust even today. In a paper relying on data from 17 African countries, BenYishay (2013) asks if low levels of precipitation during the first five years of childhood negatively impacts children’s trust in others during adulthood. Although he finds this effect, it is only significant in areas that were heavily affected by the slave trade. It seems that in this case, the impact of weather on trust level is affected by a man-made determinant of trust, namely the extraction of slaves. BenYishay (2013) also finds that the propensity to share food is negatively affected by abnormally low levels of rainfall during early childhood, implying an effect on cooperation norms.¹⁶

There is strong evidence from both Europe and Asia that a bad harvest caused by unfavourable weather conditions encourages farmers to cooperate and trust each other. There is also evidence that these effects are persistent, even if individuals living in these regions have never been to a farm. On the other hand, there is evidence that unfavourable weather conditions can have long-lasting negative effects on trust and cooperation. If there are (at least) two possible equilibria, future research must identify the conditions under which mutual cooperation (mutual defection) is more likely to emerge. Although the evidence reported by Buggle and Durante (2021) is strong, it is necessary to specify the underlying mechanism that may have induced the emergence of a particular equilibrium.

Proneness to natural disasters

Lisbon was hit by an earthquake on November 1, 1755. The earthquake triggered a tsunami and widespread fires that caused between 30,000 and 100,000 deaths (out of a population of 275,000). The earthquake had a profound impact on contemporary philosophy. The text of Voltaire’s *poème sur le désastre de Lisbonne* argues against Leibniz’ belief that we live in the best of all possible worlds. In the 20th century, Adorno created an analogy between the earthquake and the Holocaust claiming that both were large enough to transform European philosophy and culture.

The eruption of the Tambora volcano on the Indonesian island of Sumbawa in April 1815 is considered to be the largest and most deadly eruption in history. As a direct consequence, more than 70,000 are said to have died on Sumbawa and the surrounding islands. There is evidence that the eruption is responsible for a temporary change in climate, and why 1816 is called ‘the year without summer’. Not only was there a noticeable drop in average temperatures, but there were also crop failures and famines.

¹⁶These studies are concerned with the effects of weather variability on general trust. But weather variability can also have long-lasting effects on the trust that citizens put in politicians. By now, there seems to be general consensus that large famines are primarily due to inadequate policy responses – and not droughts (Sen, 1982). So, it makes sense to ask if famines lead people to distrust politicians. This is exactly what Chen and Yang (2015) do in their study on the effects of the large Chinese famine that is said to have caused around 30 million deaths. They find that regions where people experienced personal hunger but were not subject to a particularly pronounced drought, are distrustful of politicians even today. This is also true for their children who did not experience the famine themselves.

Earthquakes, volcanic eruptions, tsunamis, floods, droughts, and pandemics have numerous effects both on the individual and collective level. Méon *et al.* (2021), for example, show that ‘a minute of earthquake’ can buy ‘years of patience’ in the sense that those who experienced an earthquake reduce their time discount rates. Belloc *et al.* (2016) show that each earthquake in Italy retarded the development of political institutions.¹⁷

There is ample evidence that pathogen prevalence is conducive to social norms connected to collectivism (Section 3.2). Natural disasters endanger survival in a similar way, and it is straightforward to ask whether they are also conducive to social norms associated with collectivism. Oishi and Komiya (2017) find a strong correlation between natural disasters and collectivism. However, when they run a multiple regression analysis and simultaneously include pathogen prevalence, distance from the equator and income per capita, natural disaster risk ceases to be a significant predictor for collectivism. This result shows that pathogen stress is more relevant in predicting collectivist norms than natural disasters.

Natural disasters remind people how powerless they are. Experiencing such an unbearable and unpredictable event induces many people to increase their religiosity.¹⁸ Bentzen (2019) finds that people who experience earthquakes become more religious. The effect decreases over time, but children of immigrants who experienced earthquakes still display higher levels of religiosity. Other unpredictable disasters have similar effects. Interestingly, these effects are found everywhere for adherents of all religions, except for Buddhists. Bentzen (*ibid.*, p. 2315) speculates that this may be due to Buddhist beliefs being ‘more efficient in providing stress relief than other beliefs, thus reducing the need for religion in the long term.’

Similar effects have been identified as a consequence of the COVID-19 pandemic. Bentzen (2021) finds that Google searches for ‘prayer’ significantly increased as a portion of all searches on Google in the early phases of the pandemic. Such an uptick was observed globally but it was particularly pronounced in poorer, more insecure, and more unequal societies. Religiosity as a determinant of social norms will be dealt with in part II of this study.

Terrain characteristics

There are a number of analyses dealing with economic development in landlocked countries (Faye *et al.*, 2004 is but one example). Landlocked countries are said to be at a disadvantage because higher transportation costs thwart their integration into the world economy. Being landlocked also slows down the exchange of ideas, hampering the adoption of and inducing low levels of innovation. Musitha (2021) argues that landlocked countries have higher levels of ethnocentrism and xenophobia. Although being landlocked is a consequence of how national borders are drawn and not a specific geographical feature, a number of terrain characteristics are highly correlated or have very similar effects with being landlocked. Mountainous regions, for example, have higher transportation costs and are at a disadvantage compared to regions with flatter terrain.

It is estimated that some 18 million Africans (out of a total population of 50 to 70 million at the time) were sold as slaves. Nunn and Wantchekon (2011) hypothesize that African regions heavily raided in search of slaves suffer from lower trust between family members, neighbours, and political office holders. One reason for developing a lack of trust is because chiefs, neighbours, and family members were involved in procuring and selling slaves. They confirm their hypothesis, and show that the negative impact on trust is measurable today.

Because extracting slaves from rugged areas is more difficult, individuals living in these areas were protected due to geography. Nunn and Puga (2012) find that in Africa rugged terrain is not only

¹⁷Based on a large panel dataset, Rahman *et al.* (2017) uncover two contracting effects of earthquakes. On the one hand, they drive transitions toward democracy, and on the other, they can also stabilize autocratic regimes as short-term emergency aid raises the opportunity cost of challenging the (autocratic) incumbent.

¹⁸Religiosity refers to how strongly someone believes and is often measured by how many times one participates in religious rituals.

correlated with a lower percentage of people being raided, but that it also offers advantageous income effects. Their finding that ruggedness in all other continents has income-reducing effects adds credibility to the transmission channel they proposed. They show that the interaction of an aspect of geography ('ruggedness') with a historical event ('slave raids') can have long-lasting effects.

Nunn and Wantchekon (2011) examine how slave raids in Africa impacted trust in Africa. But slaveholding might also have enduring effects on social norms at the receiving end, i.e. the Americas. Sokoloff and Engerman (2000) argue that the differences between slaveholding in the South and in the North was a direct consequence of the prevalent geographical conditions and the relevant resource endowment, rather than a historical accident. Their study establishes a direct link between geography and institutions, in this case the institution of slaveholding. Studies on the potential long-term effects, and their effects on social norms in particular, of slave raids in other parts of the world are differently a desideratum.

Long-term change in climate

Section 3.3 discusses the effects of weather variability. Here, I am concerned with changes in climate, i.e., more long-term events. Today's climate change is almost certainly man-made and should therefore not be subsumed under 'geography'. Previous episodes of climate change such as the late Antique Little Ice Age of the sixth century or the Little Ice Age of the 13th to the 19th century were almost certainly not man-made. Natural climate change is thought to have caused some of the most significant changes in the organization of human life on earth. Perhaps the most important change is the transition from hunter-gatherer to agricultural societies spawned by the Neolithic revolution. A significant and long-term change in the climate of the earth occurred some 12,000 years ago, and has been identified as the catalyst for humans to settle. There seems to be consensus that becoming sedentary initially decreased, rather than increased, average calorie intake. This is why Diamond (1987) referred to it as 'the worst mistake in the history of the human race.' Matranga (2017) suspects that becoming sedentary might have been a two-step process. As hunters and gatherers became more adept at storing food, they were able to survive winters in their primary hunting grounds and gradually became more stationary. Sedentary agriculture and permanent settlement was the logical next step.

It is well accepted that the transition to settlement did not occur simultaneously in all regions of the world. In general, it is assumed that the Fertile Crescent, i.e. the boomerang shaped region in the Middle East spanning from Egypt via Israel, Jordan and Lebanon to Syria and Iraq, is the region where the first large-scale practice of sedentary agriculture occurred. From there, it slowly spread to other regions of the world. Because the initial practice of sedentary agriculture required a lot of cooperation, Olsson and Paik (2016) conjecture that people engaged in this form of subsistence developed more collectivist norms. Individuals unwilling to abide by these collectivist norms and preferring individual autonomy moved elsewhere. Olsson and Paik (ibid.) believe that this process repeated itself until individuals with the most individualistic attitudes ended up in northwestern Europe or the former British colonies.

Their empirical results seem to confirm the theory that the divergence of collectivist and individualist norms is contemporaneous with the development of sedentary agriculture. Inhabitants of regions with a long history of agriculture display more collectivist values, such as extolling obedience or perceiving a low control over their own lives. Since the early adoption of agriculture is correlated with lower standards of living today, Olsson and Paik (ibid.) consider this to be another 'reversal of fortunes.'^{19/20}

¹⁹Echoing the reversal of fortune idea introduced by Acemoglu *et al.* (2002), based on the observation that societies enjoying favourable geographic conditions and that were comparatively rich back in 1,500 tend to be rather poor today.

²⁰It had long been assumed that places of religious worship such as temples were only constructed after hunters and gatherers had turned into subsistence farmers. This assumption has been questioned by the temple ruins that were found in southeastern Turkey. It is estimated that Göbekli Tepe is some 11,500 years old definitely antedating stationary agriculture

Although the last glacial period ended around 12,000 years ago, the so-called ‘Little Ice Age’ was a much more recent phenomenon, taking place between ca. 1300 and 1860. These climate variations may have led to the cultivation of different crops which might have impacted development. Mitterauer (2010) states that worsening climatic conditions in Western Europe during the early Middle Ages led to an increase in the cultivation of both rye and oats. The cultivation of rye requires the use of heavy ploughs which, in turn, makes the use of draft animals more likely. As shown above in Section 3.1, use of the plough has been identified as being instrumental in determining gender roles.

Climate change may also have an impact on the benefits associated with social norms. In previous sections, I surveyed articles that show that geography is an important determinant of social norms. If geographical conditions change, the value of certain norms may diminish and individuals may be less inclined to stick to those norms. This is exactly the hypothesis that Giuliano and Nunn (2021) test in a recent paper using four different groups of outcome variables. First, they elicit the importance that those surveyed by the World Values Survey attach to tradition. Second, they ask how persistent two culturally maintained practices are, namely beliefs regarding polygamy and the participation of females in the labour force. Third, they examine the extent to which immigrants refrain from adopting the values and norms of their new institutional environment. Fourth, and in order to alleviate possible self-selection concerns regarding their third outcome, they look at indigenous populations of both Canada and the U.S. and their ability to withstand pressure to modify some of their beliefs and norms. Their results suggest that groups living in more stable climates are more conservative and cling on to their values and norms significantly more than groups subject to unstable climates.

Conclusions and outlook

In a survey on social norms written some 30 years ago, Jon Elster did not want to exclude the possibility that social norms were determined by chance events, hence admitting that no convincing theory regarding their emergence was readily available. In this survey, I have tried to show that we have made huge steps toward identifying some of the basic determinants driving the emergence of social norms.

Economics as a discipline has also made important progress over the last couple of decades. For a long time, property rights and contracting institutions had been assumed to be perfect and the enforcement of contracts as essentially costless. Institutional economists show that these assumptions were naïve at best, and possibly also dangerous if they inform policy design. The policy implication of recognizing the relevance of transaction costs seemed straightforward and can succinctly be summarized in ‘get the institutions right’. Frequently however, this imperative was confined to ‘get the formal institutions right’. But formal institutions need to be enforced somehow. The potential relevance of informal institutions (including social norms) playing a more prominent role is highlighted in recent research. Some scholars argue that it is in fact informal institutions that ensure the enforcement of formal institutions (e.g. Basu, 2018 or Platteau, 1994).

If development relies on formal and informal institutions complementing each other, then understanding various aspects of social norms becomes crucial. The evidence collected and summarized in this survey shows that many social norms prevalent today can be explained by geographical conditions. If social norms are largely time-invariant and exempt from intentional manipulation, this would have enormous policy implications. Formal institutions primarily built on an individualist mindset may simply not function effectively if most group members whose interactions are to be structured with a particular set of formal institutions share a collectivist mindset.

But given the current state of knowledge, drawing far-reaching policy conclusions seems unwarranted as many important questions still wait to be answered. Here are a few areas in which additional knowledge is highly desirable:

in that region. It could, hence, be that humans became sedentary to stay close to their places of religious worship as suggested by Schmidt (2010).

- (1) More (and better) measures for social norms and other internal institutions. These could rely on experiments and surveys (as argued, e.g. in Voigt, 2018), but also on historic sources such as fairy tales.
- (2) The precise channels allowing the transmission of social norms from person to person, and from generation to generation? Models focusing on cultural transmission are surveyed in Bisin and Verdier (2022); the theory that genes and culture are co-evolving has been propagated most prominently by Boyd and Richerson (2008) and Richerson and Boyd (2008).
- (3) The delineation of a group that is taught a particular set of social norms and who, as a consequence, is expected to abide by them. In Section 3.1, we saw that norms shared among fishermen in Brazil are not shared by their families, whereas norms shared by rice farmers in certain areas of China are also shared by those who have never been involved in rice farming. What conditions limit the practice of a social norm to a subgroup, and what conditions permit a social norm to be shared by everyone?
- (4) Further, an improved understanding regarding the time (in-)variance of internal institutions is needed: many of them, as shown in this survey, are highly time invariant. Then again, many norms are also subject to rapid change, just think of LGBTQ norms. What are central traits that distinguish fast-changing from slow-changing social norms? And closely related: how best to model the dynamics implied in changing social norms.
- (5) What means are available to induce change to social norms that are making many people worse off such as female genital mutilation? Bicchieri (2016) suggests to change second order beliefs, others focus on prominent citizens who could assume leading roles in propagating change (such as Acemoglu and Jackson, 2015).
- (6) What exactly does incompatibility between internal and external institutions mean and how does it affect transaction costs?

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