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EVOLUTION, EMPOWERMENT AND EMANCIPATION: HOW SOCIETIES ASCEND THE UTILITY LADDER OF FREEDOMS

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EVOLUTION, EMPOWERMENT AND EMANCIPATION: HOW SOCIETIES ASCEND THE UTILITY LADDER OF FREEDOMS

This article presents a new theory of development that unifies disparate insights into a single framework, focusing on human empowerment—a process that emancipates people from domination. Human empowerment sets in when mass-scale technological progress widens ordinary people's 'action resources.' As this happens, life turns from a source of threats into a source of opportunities, and societies climb the utility ladder of freedoms: universal freedoms become instrumental to taking advantage of what a more promising life offers. Accordingly, people adopt 'emancipative values' that emphasize universal freedoms. As the utility and value of freedoms rise, 'civic entitlements' that guarantee these become undeniable at some point. Human empowerment thus proceeds as the sequential growth in the utility, value and guarantee of freedoms (*sequence thesis*). Because universal freedoms are a reciprocal good that flourishes through mutual recognition, the utility ladder of freedoms is a social ladder: people climb it in alliance with like-minded others who share similar utilities (*solidarity thesis*). Historically speaking, human empowerment on a mass scale started only recently because civilization matured late where natural conditions bestow an initial utility on freedoms that has been absent elsewhere (*initiation thesis*). However, globalization is breaking human empowerment free from its confinement to the initially favourable conditions (*contagion thesis*). Together, these theses form an *evolutionary theory of emancipation*. After unfolding this theory, the article presents evidence in support of its major propositions.

Key Words: action resources - civic entitlements - civilization process - cool-water condition - democratization - economic development - emancipation theory - emancipative values - human empowerment - social evolution - technological progress - utility ladder of freedoms

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Introduction

Why are some countries richer than others? This question puzzles scholars since Adam Smith's (1993 [1776]) first account of the issue. And indeed, as is well documented, per capita income differs enormously between countries (Barro 1997; Landes 1998), although the extreme differences of today are recent on the time scale of history (Goldstone 2009; Galor 2011).

Interestingly, until 1500 CE 'Eastern' civilizations were richer than the 'West' (Morris 2010).[3] But the East led by a small margin compared to the Western income explosion after 1500—the first time point in Maddison's (2007) estimates at which the pioneering regions of Europe's industrial take-off show per capita incomes significantly above those of all other regions in the world. This 'reversal of fortunes' is the object of much debate (Jones 1987; Acemoglu, Johnson & Robinson 2001; Pommeranz 2005; Goldstone 2009).

Researchers stress different factors as the sources of prosperity. Many authors emphasize accumulated stocks of technological knowledge (Becker & Barro 1988; Romer 1990; Nolan & Lenski 1999; Galor 2011). Others champion cultural factors, especially the emancipation of individual initiative from rigid norms (Lal 1998; Landes 1998; Florida 2002). Still others highlight institutional factors, most notably legal protection of freedoms (North 1990; North, Wallis & Weingast 2009; Acemoglu & Robinson 2012).

Debating which of these factors is more important hides a fundamental point, as I will show: technological progress, cultural emancipation and institutional freedoms all reflect a *single syndrome* of development. This is an important insight. It points to the root principle that integrates development into a syndrome. I suggest this principle is *human empowerment*—a process that emancipates people from domination. Historically speaking, human empowerment on a mass scale is a recent process whose emergence demarcates a sharp turn in the civilization process. And this turn gains significance as the trend towards human empowerment shows signs of spreading around the globe (Welzel 2013: 4).

As this article tries to demonstrate, looking at development through the lens of human empowerment offers new insights that help us to better understand the nature of the process. The article proceeds in five sections. Section one reviews the literature on development, culture and institutions, and outlines how the human empowerment concept unifies separately

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[3] As the 'West' I define the Atlantic Northwest of Europe and its oceanic offshoots in North America, Australia, and New Zealand. Eurasian civilizations from the Middle East and Russia to China are 'Eastern' by this definition (cf. Fernandez-Armesto 2002).

gained insights in a single framework. Section two derives from this framework six hypotheses. Section three describes the data and methods to test them. Section four presents the evidence. I close with a discussion of my findings' main implications. The article is accompanied by an extensive Online Appendix (OA) at www.___.org. The last section of this appendix (OA 18, p. 71 ff.) discusses in detail a number of points raised by reviewers and provides a series of complementary analyses, with additional support for the theses suggested below.

Theory

Converging Insights into Development, Culture and Institutions

Without mutual notice, scientists from various disciplines formulated converging theories about development, especially as concerns the linkages between societies' existential conditions, cultural orientations and institutional formats. Triandis (1995), to begin with, differentiates between 'collectivistic' cultures in which strict obligations tie people closely to their in-group, and 'individualistic' cultures in which people associate with others upon their choice. Triandis argues that collectivism is the psychological response to existential hardship because hardship makes people dependent on in-group support. This condition requires collective discipline, which favours authoritarian institutions as a tool of enforcement. Conversely, individualism emerges under receding existential pressures because then collective discipline is no longer needed. This opens room for individual creativity and shifts utility to liberal institutions that provide guarantees to protect creative activities.

Gelfand et al. (2011) present cross-national data in support of similar propositions, albeit with different terminology. Specifically, the authors find that existential pressures influence whether a culture is 'tight' or 'loose.' Fading pressures diminish the need for rigid norms, which makes cultures loose: taboos loose importance and a greater diversity of activities is tolerated, as long as these do not collide with each other. Again, the nexus to institutional formats is obvious: tight cultures breed authoritarian institutions to enforce taboos; loose cultures favour liberal institutions to open a protected room for creativity.

A seventy-nation study by Fincher et al. (2008) identifies a particular source of reduced existential pressures: a lower natural disease load. As the data show, countries with lesser threats from diseases tend to favour inter-group exchange over in-group closure, individualism over collectivism and liberalism over authoritarianism (Thornhill et al. 2009). Supporting this insight, Woodley and Bell (2013) find that societies with high disease threats foster group separation along kinship lines. This is evident in 'consanguinity': a marriage

pattern that couples distant relatives instead of non-relatives. Consanguinity exemplifies a grouping pattern that associates people along kinship lines. The resulting clan-structure is yet another feature of collectivism that contrasts with the contractual pattern of group association under individualism. Again, the clan-style pattern of group formation is linked with authoritarian institutions and patriarchy (Hudson et al. 2012). By the same token, the contractual pattern of group formation is more gender-egalitarian and lends itself to liberal institutions (Hartman 2004). These institutions serve to guarantee contractual freedom, including women's reproductive freedom.

Evidence from group experiments also supports these linkages. For instance, Higgins (2005) shows that a 'prevention focus' guides people's actions when they are confronted with threats. Conversely, people switch into a 'promotion focus' when exposed to opportunities instead of threats. This is a switch from a fixation on discipline and routine to an emphasis on creativity and innovation. These findings suggest that most people in existentially stressed societies are *chronically* in a prevention focus. A chronic prevention focus should be a breeding ground for authoritarian institutions because these institutions enforce the discipline that 'preventionists' need. By contrast, existential thrive makes the promotion focus chronic. This should favour liberal institutions because they guarantee the room of manoeuvre for which 'promotionists' seek.

These insights resonate with Rokeach's (1960) classic categorization of human belief systems. The author argues that the beliefs of people are located on a continuum between 'closed' and 'open' mindedness: the closed minded pole is characterized by faith, dogmatism, rigidity and obedience; the open minded pole involves rationality, criticalness, creativity and autonomy. Closed beliefs characterize people who perceive life as a source of threats, whereas open beliefs are typical of people who see life as a source of opportunities. Once more, the link to institutions is obvious: closed beliefs lend themselves to authoritarian institutions, open beliefs to liberal institutions.

Countless studies confirm that people's socioeconomic status influences whether they perceive life as a source of threats or a source of opportunities: people in lower status positions are more vulnerable and, thus, more likely to feel threatened. People in higher status positions, by contrast, possess more options and tend to perceive life that way (Brint 1984; Lamont 1987; Goldthorpe 2001; Loftus 2001; Sullivan & Transue 2003). Accordingly, cross-national survey data show that support for right-wing authoritarianism is most widespread among the 'residual underclass': low-skilled workers in insecure jobs (Jackson et al. 2001;

Scheve & Slaughter 2001; Norris 2005; Wilson 2005; Wagner et al. 2006; Coenders et al. 2008).

The logic that separates population segments within a country also distinguishes entire countries. Thus, Inglehart and Welzel (2005) find that people in countries in which existential hardship prevails cling to protective orientations that support authoritarian institutions. By contrast, in countries with thriving existential conditions people adopt emancipatory orientations that support liberal institutions.

Summarizing these insights, there are two points of convergence. First, there is an intimate link between (a) existential conditions, (b) cultural orientations and (c) institutional formats. Second, this link manifests itself in two polar configurations, each of which seems to exist in a self-sustaining cycle: a 'vicious' cycle of existential hardship, protective orientations and authoritarian institutions at one polar end, versus a 'virtuous' cycle of existential thrive, emancipatory orientations and liberal institutions at the opposite end--with transitory stages in between. As concerns the human condition, this polarity can be described as one between disempowerment and empowerment: when existential hardship, protective orientations and authoritarian institutions dominate, ordinary people have little control over their lives and their societies' agendas—they are disempowered. When existential thrive, emancipatory orientations and liberal institutions prevail, ordinary people have significant control over their lives and their societies' agendas—they are empowered.

Evolutionary Emancipation Theory

In an attempt to provide a comprehensive understanding of human empowerment, I propose an Evolutionary Emancipation Theory (EET). This theory centres on the human desire for a life free from domination (for a book-length treatment see Welzel 2013). It locates the source of this desire in a root principle of human existence: the *utility ladder of freedoms*. This principle resides in an evolved 'gift' of our species: human *agency*, that is, people's faculty to act with purpose (Nussbaum 1993; Sen 1999).

Agency is an inherently emancipatory quality that has been selected for its power to shape reality (Geary 2007). Agency embodies the desire to be unrestricted in the usage of one's potential for intentional action—which is the seed of our wish for an existence free from constraints (Deci & Ryan 2000). Every world religion appeals to this desire by the idea of salvation in an eternal afterlife (Dumont 1986). But how much people pursue the desire for emancipation in *this* life, waxes and wanes in response to existential pressures beyond their control (Welzel 2013). This adaptability in the emancipatory drive is vital: it ties subjective

values to objective utilities. Without this utility-value link, human lives would be out of touch with reality and our species had probably gone extinct since long.

How threatening or promising, how pressing or permissive existential conditions are, is visible in ordinary people's control over resources of action. The extent to which common people control action resources in turn is a result of 'mass-scale'[4] technological progress (Bell 1973; Toffler 1990; Drucker 1993; Florida 2002; Baker 2007). Technologically advanced societies prolong human lives and equip people with tools that free up time from doing unpleasant work for doing more exciting things. As Veenhoven (2005) shows, longer lives with less time wasted for unpleasant things lead to a measurable increase in 'happy life years.' Technological progress also amplifies labour productivity, which enhances the value of our work hours, thus elevating incomes and purchasing power. Moreover, modern-day technological progress feeds itself from mobilizing intellectual capacities on a mass level, which involves widespread education and information. Finally, technological progress interlinks people in wide-ranging webs of exchange. All in all, technological progress enhances ordinary people's material means, intellectual skills and connective opportunities. These are resources of action because each of them expands the options of what people can do at will. Action resources unlock the gift of agency.

As this happens, life turns from a source of threats into a source of opportunities. This means that societies ascend the utility ladder of freedoms: universal freedoms become increasingly important to take advantage of what a more promising life offers. Recognizing this, people begin to value freedoms accordingly: they adopt emancipative values. Again, this utility-value link is vital to keep human lives in touch with reality. Once the utility and value of freedoms rise, denying their guarantee becomes ever more costly and turns eventually into an unsustainable option. Thus, if it proceeds, human empowerment proceeds as the sequential growth in the utility, value and guarantee of freedoms.

Figure 1 depicts this sequence, pinpointing two processes: the 'utility-valuation' process due to which action resources give rise to emancipative values; and the 'value codification' process according to which emancipative values make civic entitlements more likely.

[4] The term 'mass-scale' is supposed to indicate technologies that benefit wide population segments, not just some exclusionary elite.

(Figure 1 about here)

The utility ladder of freedoms is a *social* ladder—climbing it is a solidary process that people undertake in alliance with like-minded others who share similar utilities. Solidarity is a crucial element here because emancipative values support *universal* freedoms, which includes the freedoms of *others*. This is a more easily adopted orientation when the others reciprocate the favour and support my freedoms as well. Such mutual recognition in turn is more likely when action resources are widespread because then people have joint utilities from universal freedoms. Solidarity emerging from jointly valued freedoms provides a continuous source of collective pressures to guarantee these freedoms.

There is no iron law guaranteeing human emancipation to progress. At any point, external shocks can reverse the process. Yet, the latency of the desire for emancipation silently guides human efforts towards this end—as much as external circumstances allow. In this sense, humans are evolutionary 'programmed' to work *upward* the utility ladder of freedoms, staying on a given rung no longer than necessary and continuing to ascend as soon as possible.

Still, human emancipation is historically speaking a recent process. Before the breakthrough into the industrial age, no society could have been described as advanced in emancipatory terms. Even today, emancipatory gains show a highly discriminant geographical pattern, as we will see: the technologically progressed, emancipatory oriented and civically entitled populations of the world concentrate in what I call 'cool-water' (CW) environments. These environments combine (1) fairly low average annual temperatures with (2) continuous rainfall over all seasons and (3) the presence of permanently navigable waterways.

Interestingly, areas with these CW-features lagged behind for the most time in the history of civilization but then it was these areas where the breakthrough into the industrial age happened and where an emancipatory dynamic started. This puzzling pattern raises two questions: (1) Why did the CW-areas lag behind so long in the civilization process? (2) Why did the CW-areas at one point take off and redirect civilization towards emancipatory outcomes? The chapter-length treatment by Welzel (2013: 335-375) and the complementary analyses in the last section of the Online Appendix (OA 18, p. 71 ff.) discuss these questions in detail. The following paragraphs provide only a rough sketch.

The first question may be answered by location. On the continent where humanity adopted advanced agriculture first—Eurasia--the CW-features are most pronounced at the Northwestern and Northeastern flanks, culminating in Northwestern Europe and Japan. As

we will see, on a CW-index with a theoretical maximum of 1.0, these two areas have a score of around .90. No other civilization reached more than half of that score and in most cases the scores are much lower.[5] Importantly, the Eurasian fringe location placed Northwestern Europa and Japan at a large distance from the early centres of agriculture stretching from the Mediterranean to China. The diffusion of advanced agriculture and urban civilization reached Northwestern Europe and Japan late for this reason.[6] Indeed, the data by Putterman (2008) show that the flank civilizations adopted agriculture millennia after the older civilizations of the Middle East, India, China and the Mediterranean. Likewise, Maddison's (2007: 40) estimates suggest that levels of urbanization known from the older civilizations since long haven't been reached in Northwestern Europe before the 15th century BC and in Japan before 17th century BC. The *overseas* CW-areas were even more isolated: no advanced agrarian societies were in the vicinity of the Northern coastal areas of today's US, the southern coastal areas of today's Canada, the Southern tips of South America and Africa or the Southeast of Australia/Tasmania and New Zealand. Accordingly, advanced agriculture did not emerge in the overseas CW-areas until settlers from the European CW-areas imported it.

Northwestern Europe and Japan, by contrast, developed their own versions of urban civilization--even though this happened late. But when it happened a key feature of the CW-environment began to accelerate development and to redirect it towards emancipatory outcomes: this environment favours *plural autonomies*. The origin of this favour lies in the fact that the regular precipitation in CW-environments makes fresh water permanently accessible to everyone. And the cold temperatures of CW-environments make fresh water a safer resource by lowering its infestation (Welzel 2013: 335-375). Water access is a root existential autonomy whose presence closes a historic route to despotism: centralized control over water supply (Wittfogel 1957; Midlarsky & Midlarsky 1997; Bentzen, Kaarsen & Wingender 2012). Existential autonomy orients groups towards the assertion and defence of derivative autonomies, including control over their produce (Braudel 1987: 315-319). Widespread autonomy orientations provide a continuous source of resistance against

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[5] In Europe, CW-scores culminate in the Northwest: the highest scores exist in the British Islands, the Netherlands, Belgium, Northern France, Northwestern Germany and Southern Scandinavia. From there, scores drop as one moves eastward and southward. In Asia, CW-scores culminate in the Northeast: the highest scores exist in Japan from where scores drop as one moves westward and southward. By comparison, Russia as a total has a CW-score of .56 and China a CW-score of .41. In its most Northwestern region, Russia's CW-score gets as good as .73—still considerably below Northwestern Europe's overall score of .89. And China's CW-score in its most Northeastern region gets as good as .56—still below Japan's overall score of .90.

[6] The flank position of these two civilizations saved them from foreign imposition of despotism by Eurasia's recurrent land empires. Thus, the potential that resides in the CW-condition could unfold undisturbedly from foreign despotic absorption in Northwestern Europe and Japan. This was the exact opposite for the more inwardly located CW-areas in Eurasia, like Russia's Northwest or China's Northeast: they fell victim to despotic absorption.

unchecked rule and, hence, feed a pluralistic power structure. With such a structure in place, competing local, regional and national rulers must grant concessions in return for the tributes they wish to take. In line with this interpretation, prominent historians contrast a multitude of local, sectorial and corporate autonomies and a concomitant pluralistic power structure in pre-industrial Northwestern Europe and Japan with an apparent lack thereof in all of Eurasia's and Mesoamerica's pre-industrial civilizations (McNeill 1968; Jones 9185; Braudel 1987; Powelson 1997; Landes 1998).

The autonomies rooted in the CW-condition include reproductive autonomies over fertility decisions. The reason is that the colder temperatures of CW-environments are inhospitable to the numerous communicable diseases known from tropical and subtropical areas (Fincher et al. 2008). As a consequence, child mortalities are *naturally* lower in CW-environments. Lower child mortalities allow for lower fertilities to sustain the workforce and this means more elasticity in fertility decisions: households can opt for fewer children once newly arising opportunities incentivize this preference. This is exactly what emerging urban markets do: the profit opportunities they offer make it rewarding to divert time investments from the maximization of offspring toward the formation of profitable skills and the development of selling ideas (Becker & Barro 1988; Galor 2011). The resulting demographic transition upgrades the value of labour, which becomes the costly production factor that producers seek to replace with technologies that save labour. Supported by initiative-promoting policies of competing local, regional and national rulers, the then ubiquitous search for innovations feeds the science and technology explosion needed for an industrial take-off (Goldstone 2009; Galor 2011).

The complementary analyses in OA 18 (points 7 and 8) document that both Northwestern Europe and Japan had indeed lower child mortalities, lower female fertilities and later female ages of marriage than areas with weak CW-conditions *already before* the medical breakthroughs of the industrial age. These breakthroughs pushed things more dramatically towards the demographic transition but its origins are visible already earlier.

In summary, Northwestern Europe and Japan pioneered the industrial take-off because their societies entered the pre-industrial stage equipped with multiple autonomies and a pluralistic power structure. This was a decisive advantage because plural autonomies are a prerequisite to unleash the ubiquitous inquisitive energies needed to feed the science and technology explosion of an industrial take-off. But the root cause why these two civilizations had this advantage is environmental: the CW-condition harbours an existential

root autonomy--water access--from which derivative autonomies at more advanced stages of market development evolve.

Through European settlement, all overseas CW-areas have been incorporated into the advancement of industrialization and democratization. This process established a situation in which all CW-areas on the globe today score high in technological progress, emancipative values and civic entitlements—the three ingredients of human empowerment.

During the colonial period, Western nations monopolized emancipatory achievements. Since the beginning of decolonization, this monopoly shows signs of erosion. With the acceleration of globalization in the early 1990s, this erosion picks up speed: mass-scale technological progress and some of its emancipatory consequences diffuse beyond societies with pronounced CW-features. This happens because accelerating global exchange, together with a worldwide rise of education, ease the diffusion of technologies—like air conditioning, water procurement and vaccination--that offset the disadvantages of hot, dry and disease-loaded environments. This does not mean the Westernization of the world but, on the contrary, its de-Westernization: the West's monopoly over emancipatory achievements fades (cf. Morris 2010).

Hypotheses

The propositions of the above outlined theory can be summarized in six hypotheses:

1. *Syndrome Thesis*: Development is a coherent syndrome of empowering technological, cultural and institutional conditions, visible in a high cross-country correlation between technological progress, emancipative values and civic entitlements.
2. *Sequence Thesis*: Technological progress, emancipative values and civic entitlements merge into a syndrome by the sequential growth in the utility, value and guarantee of freedoms.
3. *Solidarity Thesis*: The action resources that people have in common with most others in their society strengthen their emancipative values more than the resources they have on top of others.
4. *Initiation Thesis*: Since the first civilization worldwide with pronounced CW-features, Northwestern Europe, reached the pre-industrial stage of development in the 15th century CE, a previously negative correlation between regional CW-scores and technological progress turns into an increasingly positive correlation until the beginning of the era of accelerated globalization.

5. *Fertility Thesis*: The CW-condition's technological impact is largely mediated by this condition's tendency to favour lower fertilities.
6. *Contagion Thesis*: Worldwide, the correlation between regional CW-scores and technological progress is declining since the era of accelerated globalization, beginning with the end of the Cold War.

Alternative Explanations

The literature has suggested many other causes of technological progress that potentially rival or mediate the impact of the CW-condition and its supposed tendency to favour low fertilities. Controlling the CW-condition for these factors could seriously diminish or render insignificant any previously documented effect of the CW-condition. This possibility requires a review of the potentially rivalling and mediating factors.

Since recently, an increasing number of scholars suggest genetic factors as a source of development (Hatemi 2012). Demographic variation in the frequency of two genes calls particular attention: the 'Val$^{108/158}$Met' polymorphism of the COMT (catechol-o-methyltransferase) gene, and the long-allelic version of the 5-HTTLPR gene. Both genes affect the emission level of stimulating hormones: dopamine in the case of the COMT gene, serotonin in the case of the HTTLPR gene. Data from the 'allele frequency database' (ALFRED) at Yale University suggest that both genes exist in different frequencies in different populations. What is more, both genes are linked with traits that supposedly stimulate innovation—the driving activity of technological progress. In the case of the COMT gene, there is a positive link with two of the 'Big Five' personality traits that supposedly encourage innovation: 'openness' and 'extraversion' (Stein et al. 2005; Wichers et al. 2008).[7] In the case of the HTTLPR gene, there is a positive link of its long-allelic version with cultural individualism—a trait that supposedly stimulates innovation (Chiao & Blizinsky 2010).

If the CW-condition indeed embodies existential autonomies, innovation is more rewarding under the CW-condition because autonomies are needed to reap the benefits of better ideas. Possibly, then, the CW-condition establishes a selective advantage for genes favouring the traits that encourage innovation. If so, the technological impact of the CW-condition should be mediated by the demographic prevalence of the respective genes and the

[7] The other two traits are 'agreebleness' and 'conscienceousness.' For the definition and measurement of the 'Big Five' personality traits see Matthews et al. (2003).

prevalence of their supposedly favoured traits, including openness, extraversion and individualism.

Additional cultural traits that supposedly affect technological progress include 'cultural looseness,' 'consanguinity' as well as Protestantism and Islam. Cultural looseness measures how much a society tolerates deviating behaviour. Following Gelfand et al. (2011), this trait should stimulate innovation. Consanguinity denotes a marriage pattern that keeps social circles narrow in preferring distant relatives over non-relatives. According to Woodley and Bell (2013), the effect on technological progress is negative. In the wake of Max Weber, many authors consider a Protestant legacy as a positive ideological influence on technological progress (e.g., Lal 2001). A similarly large literature assigns Islamic traditions a negative effect (e.g., Kuran 2004). Possibly, then, the technological impact of the CW-condition exists because this condition operated as a selective force in favour of Protestantism and cultural looseness and against consanguinity and Islam.

Another set of factors addresses long lasting institutional path-dependencies. These include the timing of the Neolithic Revolution (Putterman 2008) and 'state antiquity,' a measure of the historic endurance of regulatory capacities (Bockstette et al. 2002). The proponents of these measures argue that the longer the Neolithic Revolution and state capacities date back, the more time a society had to expand its stock of knowledge, which should be visible in technological progress today (Olsson & Hibbs 2005).[8] Thus, it is quite possible that these factors mediate the technological effect of the CW-condition.

Acemoglu, Johnson and Robinson (2001) attribute a lasting influence on development to a certain colonial pattern. The authors claim that where the 'white settler mortality' was high, development was hampered, whereas it was boosted where the white settler mortality was low. Acemoglu, Johnson and Robinson support this claim by an institutional argument: development depends on liberal institutions (they call them 'inclusive institutions'). These institutions evolved in Western Europe and were transplanted only to those colonial areas where a low 'white' mortality allowed Europeans to settle in large numbers: temperate or cold areas outside the tropics. Conversely, in tropical areas where a high 'white' mortality hindered large-scale European settlement, smaller numbers of European rent-seekers came to extract natural resources. Finding physical work insufferable, these colonizers forced

[8] Olsson and Paik (2012) show that the relationship gets negative if one excludes areas of rice-based agriculture in Asia. But the authors do not demonstrate why a later adoption of agriculture outside Asia turned out to be advantageous for later development. My argument about the CW-condition (which is much more prevalent among the late adopters of agriculture) and its positive effect on the innovation-promoting transition to low fertilities solves the puzzle.

indigenous people and slaves from Africa to work on plantations and in mines. Tropical areas were, thus, left with a legacy of 'labour-repressive' institutions—a manifest hindrance to human capital formation (Engerman & Sokoloff 1997).

The thesis that development favours democracy is one of the most researched topics in political economy, usually with confirmatory results (cf. Teorell 2010; Benhabib et al. 2011). The opposite thesis that democracy also favours development has produced conflicting evidence (Krieckhaus 2004). Yet, as Gerring et al. (2005) show, most findings are misleading because they test an immediate effect of democracy, ignoring that the impact of democracy lies in its *long-term* endurance. Thus, they claim that the democratic tradition shows a pronounced effect on development. Possibly, then, the democratic tradition mediates the effect of the CW-condition on technological progress.

Other institutional factors that might mediate the technological effect of the CW-condition relate to contemporary institutional qualities of the state. These include 'state integrity,' that is, a low incidence of corruption among office holders (Kaufman et al. 2007). Equally important might be 'order and stability' as much as 'continuous peace' (Gleditsch et al. 2002). Most strongly emphasized among institutional economists are civic entitlements that guarantee universal freedoms, thus providing what North et al. (2009) call 'open access orders.'

An alternative geographic feature that possibly rivals the explanatory power of the CW-condition over technological progress is the 'geocondition' and 'biocondition.' These factors are operationalized by Olsson and Hibbs (2005) based on ideas by Jared Diamond (1997). 'Geocondition' measures a country's territorial size, east-west-axis orientation and latitude. 'Biocondition' measures a country's number of domesticable plants and animals. Although these factors explain an early timing of the Neolithic Revolution, it is doubtful that they explain the pioneering of the Industrial Revolution—precisely because they miss the CW-condition. The findings section will show that this assumption is accurate.

Data and Methods

To save space, details of a technical nature—including descriptive statistics, measurement procedures, and scaling information--are documented in the Online Appendix (OA) at www.____.org. The following paragraphs, hence, provide only short descriptions of the key variables.

To test the syndrome thesis, I employ a cross-country correlation analysis, showing how societies that are technologically more advanced also have more widespread

emancipative values and more extensive civic entitlements. I measure technological progress with the World Bank's (2008) 'knowledge index' over the period 1995 to 2005, as described in OA 1. Data are available for 146 countries and shown in OA-Table 5 (p. 13 ff.).

Emancipative values measure a population's mean emphasis on freedom of choice and equality of opportunities based on twelve items from representative population polls included in the 1995-2005 World Values Surveys (World Values Survey Association 2010). The index is known in the literature through the works of Inglehart and Welzel (2010), Alexander and Welzel (2010), Deutsch and Welzel (2011) and Welzel (2012). OA 2 provides a description of items, index construction as well as reliability and validity statistics. Data are available for 96 countries and shown in OA-Table 5. These countries are from all over the world and include the countries with the largest economy and biggest population in each world region. There is no sampling bias.

Civic entitlements are a combined measure of the 1995-2005 freedom ratings by Freedom House (2008) and human rights assessments over the same period by Cingranelli and Richards (2010), as described in OA 3. A detailed validation of the civic entitlements index is provided by Welzel (2013: 249-277). Data are available for 145 countries and shown in OA-Table 5.

To test the sequence thesis, I create a time-pooled-cross-sectional dataset to examine in a system of reciprocal panel regressions the dominant temporal order in the occurrence of technological progress, emancipative values and civic entitlements. However, the direct measures of technological progress, emancipative values and civic entitlements used to examine the syndrome thesis are not available in sufficient time series. Hence, for an examination of the sequence thesis I must use proxies. Specifically, I use resource and democracy measures from Vanhanen (2003) as proxies for technological progress and civic entitlements, as described in detail in OA 4 and 5, with descriptive statistics shown in OA-Table 7 (p. 19) and data displayed on a country-per-decade basis in OA-Table 8 (p. 20 ff.). The temporal intervals of these data are decades, from 1850-60 to 1990-2000. These are relatively large time intervals but when we deal with human empowerment, we face a glacial process that advances slowly. Thus, significant progress becomes visible only after considerable time, which justifies the use of wide time intervals.

Data for emancipative values are unavailable for any society before 1981, and even then they exist for just two dozen societies. However, recent analyses by Welzel (2013) suggest that the cohort differences in emancipative values exhibit the footprints of value change in a society's past. Stunning in its simplicity, the basic pattern is that younger cohorts

emphasize emancipative values more than older cohorts in societies from all culture zones around the world. What varies is merely the strength of this pattern. Moreover, Welzel's results indicate that the younger cohorts' stronger emancipative values are definitely *not* a lifecycle phenomenon. OA 18 (point 12) discusses additional evidence in support of this assessment. In light of this evidence, it seems safe to conclude that the cohort differences reflect generational value change. If this is true, the cohort differences provide a valid basis to estimate how much weaker a society's emancipative values have been in the past. Hence, we can estimate how much weaker a society's emancipative values have been a decade ago by calculating how much weaker these values are among the cohort born a decade before the youngest cohort. Likewise, we can estimate how much weaker the emancipative values of this society have been two, three, four and even five decades ago by calculating how much weaker these values are among cohorts born this number of decades before the youngest cohort. Doing so, we obtain backward estimates of emancipative values for 96 societies for six decades back in time, covering the decennial sequence from 1940-1950 to 1990-2000. OA 6 documents the details of the estimation procedure. OA-Table 7 (p. 19) shows descriptive statistics and OA-Table 8 (p. 20 ff.) displays the data on a country-per-decade basis.

Based on this dataset, I run temporally ordered panel regressions to examine the dominant flow of impact among the three elements of human empowerment. To handle the problem of serial dependence, estimations are based on panel-corrected standard errors. OA-Table 9 (p. 32) and OA-Table 10 (p. 33) show that robustness checks with multiple imputations and 'seemingly unrelated regressions' confirm the results reported below in the findings section.

From an individual-level perspective, technological progress is important because it indicates the abundance of people's action resources, including material, intellectual and connective resources. Now, to test the solidarity thesis, I use multi-level models in which individual-level emancipative values are explained by (a) how much a person's own action resources deviate from what is common in her country and by (b) the common level of the respective type of resource in her country. Individual-level resource measures are country-mean centred because then they indicate an individual's deviating resource control. For this reason, there is no overlapping variance between individual-level resource measures and the country-level measure of the same type of resource. Hence, we can separate the individually unique from the commonly typical level of resources and isolate their distinct effects on emancipative values. This is examined separately for material, intellectual and connective resources as well as the combination of the three. Material resources at the country level are

measured by the per capita Gross Domestic Product (GDP) at the time of the survey. Data are taken from the World Bank's (2012) Development Indicators Series. At the individual level, material resources are measured by a ten-point household income scale from the World Values Surveys (World Values Survey Association 2010). Intellectual resources at the country-level are the mean schooling years of the average person (Barro & Lee 2010). At the individual level, I use a nine-point index of a respondent's education. Connective resources at the country-level are the per capita internet hosts at the time of the survey. At the individual-level, I use a nine-point index indicating the number of different sources from which a respondent reports to obtain information.[9]

To test the initiation thesis, I create a cool-water-index (CW-index). Specifically, I calculate the fraction of a country's inhabitable territory in cold and temperate zones without a dry season, in excess of the fraction in dry and hot zones, based on the Koeppen-Geiger classification of climate zones. Data are taken from Mellinger, Sachs and Gallup (2010). However, these area proportions still show considerable variation in (a) the amount of continuous rainfall as well as (b) the abundance of naturally navigable waterways—two important factors for water autonomy. Hence, I use a weighting procedure to factor in this uncovered variation, so as to create a truly fine-grained index. The precipitation data are from Parker (2000), indicating the minimum rainfall as an average over a country's entire territory in the driest month of the year. Waterways data are again from Mellinger, Sachs and Gallup, measuring the fraction of a country's territory in a 100-kilometers reach of permanently ice-free waterways. The ultimate CW-index varies between 0 for the complete absence of the cool-water-features to 1.0 for their maximal presence. The CW-index is at the same time a measure of a root existential autonomy: water access. The exact steps of the index construction are detailed in OA 9 (p. 35 ff.). The index is available for 173 countries and index scores are shown in OA-Table 13 (p. 38 ff.). I consider country differences in the CW-index as constant over the observation period.

A favourable feature linked with the CW-condition is a low threat from tropical and subtropical diseases. I use data on a society's natural disease load from Murray and Schaller (2010). The data measure to what extent a society's natural environment harbours various

[9] Technological progress correlates with schooling years at $r = .93$ ($N = 93$), with internet access at $r = .81$ ($N = 139$), and with per capita GDP at $r = .84$ ($N = 136$). It is, hence, a formidable indicator of the prevalence of all three types of action resources and more strongly so than the Human Development Index, which shows weaker correlations with these variables than does technological progress. In a factor analysis, schooling years, internet access, and GDP/capita represent a single dimension: action resources. This dimension captures 90 percent of the variance in its three components. Technological progress correlates with this dimension at $r = .95$ ($N = 88$).

infectious diseases, not how large a proportion of the population actually falls ill. Because I am interested in the role of disease *security*, I invert Murray and Schaller's measures, so that higher scores indicate a lower threat from diseases. A detailed description is provided in OA 10. The index is available for 187 countries and scores are shown in OA-Table 14 (p. 43). Again I consider country differences on this index as constant over the study period.

Welzel (2013) argues that an area's migratory distance from the human origin in East Africa is a reasonable proxy for how late the area has been populated by modern humans and how remote it is from other populations. Since remoteness is linked with delayed development, it explains the CW-areas' belatedness because they are in large distance from the human origin. To measure the migratory distance, I calculate the longitudinal and latitudinal distance of a country's centroid from Ethiopia's centroid, as documented in OA 11. To indicate *earliness* of human arrival I inverse the migratory distance, indicating proximity to the human origin. Data are available for 159 countries and displayed in OA-Table 15 (p. 49 ff.).

To test the fertility thesis, I use a variable labelled fertility control, which is simply the inverse of a society's fertility rate (World Bank 2010). As documented in OA 13, I take a measure of fertility control from 1980, so that it clearly predates the technological progress measure from 2005 (the latest point for which this is available at the time of this writing). Data on fertility control are available for 170 countries; scores are shown in OA-Table 15 (p. 49 ff.).

All other variables described in the theory section as rival or mediating factors of the CW-condition's technological impact are taken from the sources listed in OA 14 and scores for all variables are shown in OA-Table 18 (p. 58 ff.). Based on these variables, I use temporally ordered regression analyses to demonstrate that fertility control is the only mediator that largely absorbs the technology effect of the CW-condition. Thereafter, I use a two-stage-least-squares regression to show that fertility control is not endogenous to economic development. After that, I specify a temporally ordered path model to demonstrate the causal flow from human origin distance to disease security and the CW-condition to fertility control to technological progress.

To see how far the technological impact of the CW-condition can be traced back in time, I use historic estimates of per capita income from Maddison (2007) for 32 exemplary territories around the world. The income estimates are treated as a proxy for technological progress and reach back in decennial and centennial time intervals to the year One. I interpolate data for large sections of time between Maddison's estimates for the years 1,

1000, and 1500. In the absence of demonstrably better alternative assumptions, the interpolation assumes steady change between any two temporally adjacent measures. OA 15 documents Maddison's income estimates and OA-Table 19 (p. 65 ff.) displays the data.

To examine the contagion thesis, I measure change in a society's per capita GDP using the time series data from the World Bank (2012) with yearly observations from 1960 to 2010 for all countries in the world, as detailed in OA 16. Using longitudinal cross-country regressions, I explain decennially ordered change in per capita GDP by the CW-condition and measures of economic, social and political globalization from Dreher et al. (2008). These are available in time series from 1970 to 2000 on an annual basis. OA 17 documents the globalization measurement.

Findings

The Syndrome Thesis

Past and contemporary measures of technological progress, emancipative values and civic entitlements correlate strongly, positively and significantly across countries. Measured over the period 1995 to 2005, technological progress correlates at $r = .81$ with emancipative values ($N = 92$); emancipative values correlate at $r = .82$ with civic entitlements ($N = 85$); and civic entitlements correlate at $r = .73$ with technological progress ($N = 129$). Of course, such highly correlated variables reflect a single underlying dimension, with factor loadings of .95 for emancipative values and .92 for both civic entitlements and technological progress. The shared variation among the three variables is 86 per cent. The three-dimensional scatter plot in Figure 2 visualizes the *technology-culture-institution nexus* that merges these variables into a single continuum of human empowerment writ large. It is clear then that development is consistent across the technological, cultural and institutional domains of human existence. The syndrome thesis is confirmed beyond reasonable doubt.

(Figure 2 about here)

The Sequence Thesis

The three ingredients of human empowerment are highly correlated but correlation is not causation. To examine causality, one needs longitudinal data to examine temporal order models in alternative directions of impact to figure out in which direction among correlated variables the stronger flow of impact operates.

The three panel regressions in Table 1 apply this logic to the proxy measures described in the data and methods section. If we accept these proxies as valid measurements,

the results are far-reaching.[10] But let's first inspect the visual evidence. For better visibility, Figure 3 arranges the 84 societies covered by this analysis into ten global culture zones, as classified by Inglehart and Welzel (2005). Note that these culture zones account for 79 per cent of the cross-national variation in civic entitlements, 78 per cent in technological progress, and 72 per cent in emancipative values. Hence, summarizing countries into culture zones means relatively little loss of information. On this basis, Figure 3 shows how technological progress, emancipative values and civic entitlements increase from the first decade of observation, 1940-50, to the last decade of observation, 1990-2000. It is evident that the elements of human empowerment co-evolve and that progress clearly prevails in each of them: there is a long-term global trend towards human empowerment on each of this concept's three components.

(Figure 3 and Table 1 about here)

Figure 3 divides the picture according to the two processes posited by the human empowerment model in Figure 1. The left-hand diagram shows the 'utility-valuation' process due to which the action resources that emerge with technological progress give rise to emancipative values. The right-hand diagram shows the 'value codification' process according to which rising emancipative values pressure for wider civic entitlements.

In the relationship between emancipative values and civic entitlements, a move in values usually predates that in entitlements. This is evident from a pattern in which the trend lines move to the right first before a steep move upward follows. This is most obvious for the societies in the two ex-communist zones. For the 'Ex-communist West' especially, we see a build-up of emancipative values for quite some time, until the downfall of Soviet imperialism opens the gate for democratization. Once this happened, these societies' civic entitlements jumped rapidly to where rising emancipative values should have pulled them already earlier, were it not for the overriding veto of the Red Army.

The right-hand diagram of Figure 3 discloses another historical pattern. The link between emancipative values and civic entitlements is uniform in the sense that, over short or long, rising emancipative values bring wider civic entitlements. But while the rise of emancipative values in non-Western societies is more recent and linked with steeper gains, the gains among Western societies occur on a higher plateau from the start. Most likely, the

[10] Note that, as the variance inflation factors indicate, collinearity is not a problem in these regressions. The reason is that temporally separated measures of human empowerment are not as strongly correlated as contemporaneous measures.

West's higher plateau reflects its historic imprint from emancipatory movements and the early rights struggles inspired by these movements. On the other hand, at the time Western societies began to be shaped by emancipatory gains, they used their global power to deny such gains to the societies they colonized (except 'white' settler colonies). Even after the colonial period, Western societies propped up authoritarian regimes in Latin America, Africa and Asia for a long time. Hence, because of blockades erected by colonialism and neo-colonialism, emancipative values in non-Western societies had to surpass a higher threshold to gain similar civic entitlements as Western societies.

Incorporating this historic pattern, the panel regressions in Table 1 examine the causal relationship between the three elements of human empowerment. The results indicate that technological progress at time T_0 obtains no effect from either emancipative values or civic entitlements at T_{-1}, controlling for these elements' dependence on technological progress at T_{-2}. Emancipative values, however, do obtain an independent and positive effect from technological progress, though none from civic entitlements. Civic entitlements, for their part, obtain an effect from both technological progress and emancipative values while the one from emancipative values is stronger. Due to these findings, technological progress is the *founding* element, emancipative values the *linking* element, and civic entitlements the *completing* element of the human empowerment syndrome. Hence, if freedoms grow, they grow in a utility-value-guarantee sequence.

The Solidarity Thesis

The multi-level models in Table 2 examine how the action resources that mass-scale technological progress plays into the hands of ordinary people affect their emancipative values. For each of the three different types of action resources, it is the part that most people in a country have in common which strengthens emancipative values, rather than what people have on top of most others in their country. This is evident from the larger coefficients[11] of the country-level resource measures compared to the individual-level resource measures, and from the fact that the country-level component of each model explains more variance in people's emancipative values than does the individual-level component. This finding confirms the solidarity thesis: action resources strengthen emancipative values via the

[11] Coefficients are directly comparable as concerns effect size because all variables are standardized into a scale range from minimum 0 to maximum 1.0.

matching part that most people in a country have in common. The value of universal freedoms originates in socially *shared* utilities.

(Table 2 about here)

The Initiation Thesis

As the left-hand diagram in Figure 4 illustrates, the countries' CW-condition explains 73 per cent of the cross-national variation in technological progress today (N = 145). As the right-hand diagram shows, the CW-condition of 25 global regions explain almost 90 per cent of the inter-regional variance in technological progress. The explained variance is higher at the regional level because the average CW-condition in a country's surrounding region has an additional effect on its technological progress: Swaziland and Switzerland have similar CW-scores but Swaziland is surrounded by countries with low CW-scores, which reduces its technological progress below the level that Swaziland's own CW-score suggests; Switzerland, by contrast, is surrounded by countries with high CW-scores, which elevates its technological progress above the level that its own CW-score suggests.

(Figure 4 about here)

Even if the CW-condition does by no means fully determine a country's technological progress, the clarity of this condition's impact is astounding given the fact that this is a very remote condition. Hence, there must be more proximate conditions over which the CW-condition exerts its effect. To figure out which condition this is, we probe into a mediation analysis to see which conditions absorb the technological impact of the CW-condition.

The Fertility Thesis

Table 3 correlates contemporary technological progress with the variety of potential mediators discussed in the data and methods section. Table 4 uses multivariate regressions to examine which of these potential mediators absorbs the technological impact of the CW-condition. Arguably, the potential mediator that absorbs most of the technological impact of the CW-condition explains why that impact exists.

(Tables 3 and 4 about here)

Table 4 shows the variables' *partial* effects on technological progress, controlling for the CW-condition and disease security. These can be compared with the partial effects of the CW-condition and disease security further to the left. Comparing the partial effects, we see

how much of the technological impact of the CW-condition and disease security is absorbed by each of the other variables.

In Table 3, all variables—except the COMT gene and the 'Big Five' personality traits—show a significant effect on technological progress in the expected direction. Among the variables measured for more than a hundred societies, the largest uncontrolled effect on technological progress derives from fertility control (r = .87), followed by the CW-condition (r = .84), state integrity (r = .78), civic entitlements (r = .73), disease security (r = .72), order and stability (r = .71), the democratic tradition (r = .51), 'white' settler mortality (r = -.44), 'state antiquity' (r = .36) and continuous peace (r = .36). Thus, only fertility control trumps the uncontrolled impact of the CW-condition on technological progress.

Controlling each of these variables' effects for the impact of the CW-condition and disease security, the effect sizes drop considerably in the case of most variables. For instance, the effect of state integrity drops from r = .78 to $r_{partial}$ = .47 and those of civic entitlements and the democratic tradition, respectively, from an r of .73 and .51 to a partial r of .36 and .30. For all variables, except fertility control, the partial effect on technology is *much weaker* than that of the CW-condition, even though the CW-condition is temporally more remote to technological progress than each of these factors. Furthermore, other environmental factors—including the 'geocondition' and 'biocondition'—do not explain away the technological effect of the CW-condition.

Two of the most prominent variables in the development literature show a largely diminished or completely insignificant effect, once we control for the CW-condition: Protestantism and the 'white' settler mortality. In fact, these variables' technological effects are largely explained by the CW-condition. Protestantism and the institutions of white settlers evolved *exclusively* in societies where the CW-condition is pronounced and this is the reason why these factors *seem* to have a strong effect on technological progress. Once we control for the CW-condition, the apparent effect largely diminishes or vanishes.

The *only* variable that seriously diminishes and clearly exceeds the technological impact of the CW-condition is fertility control: under simultaneous inclusion, the technological impact of the CW-condition amounts to a partial r of .41, while that of fertility control amounts to a partial r of .61. This suggests that the CW-condition favours technological progress mainly because it encourages fertility control.

This conclusion rests on the assumption that fertility control is not itself endogenous to technological progress. Some scholars might question this assumption. The reason is that technological progress produces prosperity and it has been argued that fertility declines

because of rising prosperity (Becker 1981; Becker & Barro 1988). If this is correct, fertility control is a consequence of technological progress and not a cause of it. In this case, fertility control could not explain the impact of the CW-condition on technological progress.

The two-stage-least-squares regressions in Table 5 test this possibility, using per capita GDP from the same year as fertility control to measure prosperity. In the first stage, I instrument fertility control with the CW-condition, disease security and per capita GDP. The results of this regression show that fertility control is much more strongly determined by the remote CW-condition than by per capita GDP. The three instruments explain 69 per cent of the cross-national variance in fertility control. Of these 69 per cent, only 5 per cent are accounted for by per capita GDP.[12] Because disease security is insignificant, the CW-condition accounts for most of the remaining 64 per cent of explained variance in fertility control. In version B of this first-stage regression, I instrument fertility control only with the CW-condition and disease control, leaving out per capita GDP. We explain almost the same amount of variance: 63 per cent. In the second stage, I use the two instrumented versions of fertility control—each one at a time—to predict technological progress in 2005. The version in which fertility control is instrumented without per capita GDP explains just 5 percentage points less variance in technological progress than the version in which fertility control is instrumented under the inclusion of GDP. In short, there is *very little* endogeneity of fertility control to prosperity.

(Table 5 about here)

As far as one can tell, the cross-national fertility differences found in 1980 are not only representative for this particular time. Instead, they partly reflect differences reaching farther back in time.[13] Indeed, the complementary analyses in OA 18 (points 7 and 8) demonstrate that more pronounced CW-features produced lower fertilities already in pre-industrial times. Further supporting this point, Welzel (2013: 365) uses anthropological data from 34 pre-industrial populations around the world, showing that the presence of the CW-condition contributes significantly to 'female reproductive autonomy'—a precondition of fertility control (Hudson et al. 2012). All this suggests that the CW-condition indeed encourages lower fertilities.

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[12] The partial correlation coefficient of GDP/p.c. is .23, so the partial *r* squared is .05.

[13] From 1960 to 2000, the correlation between fertility and the CW-condition is consistently at the .75-level for a constant set of 155 countries.

For how long can we trace back the technological impact of the CW-condition? I would presume not longer than to the point when the first civilization in a CW-area began to reach the mature stage of urbanity. For it needs vibrant markets to make investments in technological progress profitable. The only two Eurasian civilizations in areas with high CW-scores were Northwestern Europe and Japan. Of these two, Northwestern Europe did not reach urbanization levels known from India, the Middle East, China or Southern Europe before about 1500 CE and Japan did not reach them before the beginning of the Tokugawa period in about 1600 CE (Maddison 2007: 40).[14] Beginning with the period leading to this catch-up, the technology impact of the CW-condition should surface. And it should have turned stronger since then because European settlement transplanted technological progress into all overseas CW-areas.

Figure 5 confirms this expectation with striking clarity. The diagram uses Maddison's (2007) historic estimates of the per capita incomes of exemplary territories from around the world. I interpret per capita income as a proxy for technological progress: the assumption is that societies with higher per capita incomes are richer because they have developed more productive technologies. Under this premise, Figure 5 illustrates powerfully that global history takes a sharp turn between 1300 and 1500 CE: the previously negative relationship between the CW-condition and technological progress, which goes all the way back to the year One, now turns positive and continues to increase steeply.

(Figure 5 about here)

Figure 5 suggests an answer why the CW-areas lagged behind before this turn. This is obvious from the correlation of the territories' per capita incomes with their geographic proximity to the human origin. Proximity shows a strongly positive correlation with cross-country income differences until the beginning of the turn. This reflects the fact that the old civilizations in the belt from the Mediterranean to India were closer to the human origin. Accordingly, they have been populated earlier by modern humans and also developed advanced agriculture and urban civilization earlier than the remote and belated CW-areas. Hence, until about 1300, people in the old and proximate civilizations had slightly but consistently higher incomes than people elsewhere. But since the rise of the remote and

[14] Comparing de Vries's (1984) data with those of Acemoglu, Johnson and Robinson (2001), one finds that in 1500 CE the Netherlands reach an urbanization rate of 15 per cent, overtaking Northern Africa (10%), India (9%), Mesoamerica (8%) and China (3%).

belated CW-areas, the early civilizations fall behind and the positive proximity-income correlation turns sharply negative.

Now, the pieces seem to fall in place. Located at the remote Northern coastal flanks, Eurasia's CW-areas were distant from the early centres of civilization. For this reason, they adopted advanced agriculture and urban civilization late. But once urban markets began to flourish, the existential autonomies that the CW-environment embodies bestow utilities on freedoms. These utilities encourage a low fertility preference and households begin to sacrifice fertility for productivity. This shortens the supply of cheap mass labour. Rising labour demands of growing cities must be met by labour-saving technology when the factor cost of labour is high. This fuels technological progress. The path diagram in Figure 6 fully supports this narrative with temporally ordered data from some 130 countries around the world.

(Figure 6 about here)

Figure 6 provides a fully exogenous explanation of technological progress. Since technological progress is the founding element of the human empowerment process from which emancipative values and civic entitlements follow, an exogenous explanation of technological progress means to explain the initiation of the human empowerment process writ large.

The Contagion Thesis

Fortunately, the human empowerment process is not doomed to remain limited to societies with Western-like CW-conditions. Quite the contrary, the process of globalization can greatly enhance the diffusion of technologies that overcome the disadvantages of dry, hot and disease-loaded environments. These technologies include such basic things as water procurement, air conditioning and vaccination. Accordingly, the demographic transition to lower fertility and higher education should become ubiquitous, which is exactly what we observe. As a consequence, the countries' per capita incomes should increasingly dissociate from such geographical conditions as the CW-features with accelerating globalization. If this is correct, the CW-condition should show a diminishing impact on per capita income growth while progressing globalization explains this shrinkage in impact.

Many scholars argue that the globalization process picked up speed with the breakdown of Soviet communism (e.g., Dreher 2006). Thus, the period for which we have sufficient data divides up into a pre-globalization period and a globalization period:

separating the growth periods 1970 to 1990 and 1990 to 2010. To illustrate this point, Figure 7 visualizes the results of two cross-country regressions in which the growth in per capita GDP from 1970 to 1990 and then from 1990 to 2010 is predicted by a country's CW-condition and its degree of globalization at the beginning of the period. The bars indicate the size of the partial effects of these two variables (using the partial *r*). The result is clear: even though the CW-condition and globalization show a positive growth effect in both regressions, they switch positions as concerns their predictive power. In the prediction of growth over the 1970-1990 period, the partial effect of the CW-condition points to .48 and that of globalization to .25 (N = 97); over the period 1990-2010, the partial effects are .19 for the CW-condition and .46 for globalization (N = 127).[15]

(Figure 7 about here)

Figure 8 provides more detailed temporal evidence, showing a steeply decreasing impact of the CW-condition on ten-year growth figures, using moving averages from 1960 to 2010 (N = 156). The decrease in the determining power of the CW-condition is paralleled by an increase in the world's globalization. In fact, rising globalization explains 56 per cent of the declining impact of the CW-condition.

(Figure 8 about here)

Conclusion

This article tried to show that disparate insights into development fall in place when considered in the framework of Evolutionary Emancipation Theory. The evidence available at the theory's level of generality confirms its propositions, although two caveats are due. To obtain evidence that allows one to test the sequence thesis, I had to estimate emancipative values back in time. Similarly, to examine the initiation thesis I needed to interpolate historic income estimates for large sections of time. These estimations and interpolations involve assumptions that are not directly testable. And even though there are good reasons to believe that these assumptions are defensible, there remains a speculative element in these parts of emancipation theory. A way to reduce the speculation is to test the hypotheses in microscopic contexts: can, for instance, regional variation in the CW-condition within nations explain differences in technological progress? In an article-length treatment this question could not be

[15] Running the second regression over the same set of 97 countries as in the first one, the result remains the same.

handled properly but it is worth mentioning at least that a recent study by Dell, Olken and Jones (2011) confirms the hypothesis for US-regions.

Other elements of EET stand on firm ground, however. Indeed, a key regularity shows striking robustness--the value-utility link that ties emancipative values to action resources. Thus, in each single country surveyed, people in control of more action resources emphasize emancipative values more than do people with fewer resources. More importantly still, this tendency rises steeply as the proportion of people in control of action resources increases. Hence, if life improves on a mass level, a drive towards emancipatory gains emerges naturally from the grassroots of society. This value-utility link keeps human lives in touch with reality. The link, thus, provides a major force of social evolution that exerts selective pressures on elite-level institutional choices.

Mass level emancipative values are an indicator of where on the utility ladder of freedoms a society is positioned. Guarantees for freedoms tend to be fixed at a level that fits a society's position on the utility ladder. Liberal institutions, thus, evolve from value-utility links at the grassroots of society.

What can we learn from these insights? In my eyes, the most important lesson is a change in perspective, away from the view that development is all about proper institutional choices. There is no question that institutions are part of the story. But instead of being the source of development, they are rather the consequence of it. Moreover, institutions are usually considered as the direct outcome of discrete historic choices by elites. This top-down perspective appears short-sighted to me. For it overlooks that elite choices are socially embedded, taking place under selective pressures from below. This calls for a bottom-up perspective that pays special attention to grassroots dynamics--including marriage, fertility and household formation patterns.

Over the past thirty years, the world has seen falling fertility, rising education and various waves of democratization. And despite the revival of autocracy in some countries, there has been no reverse wave away from democracy, as a recent study by Moeller and Skaaning (2013) shows. Nevertheless, the big question is whether China and other autocratic countries can embark on technological progress while denying its emancipatory consequences. EET predicts that such attempts would fail because it requires intellectual and other freedoms to sustain the creative energies needed to acquire technological leadership. It is up for future research to show whether this view is accurate.

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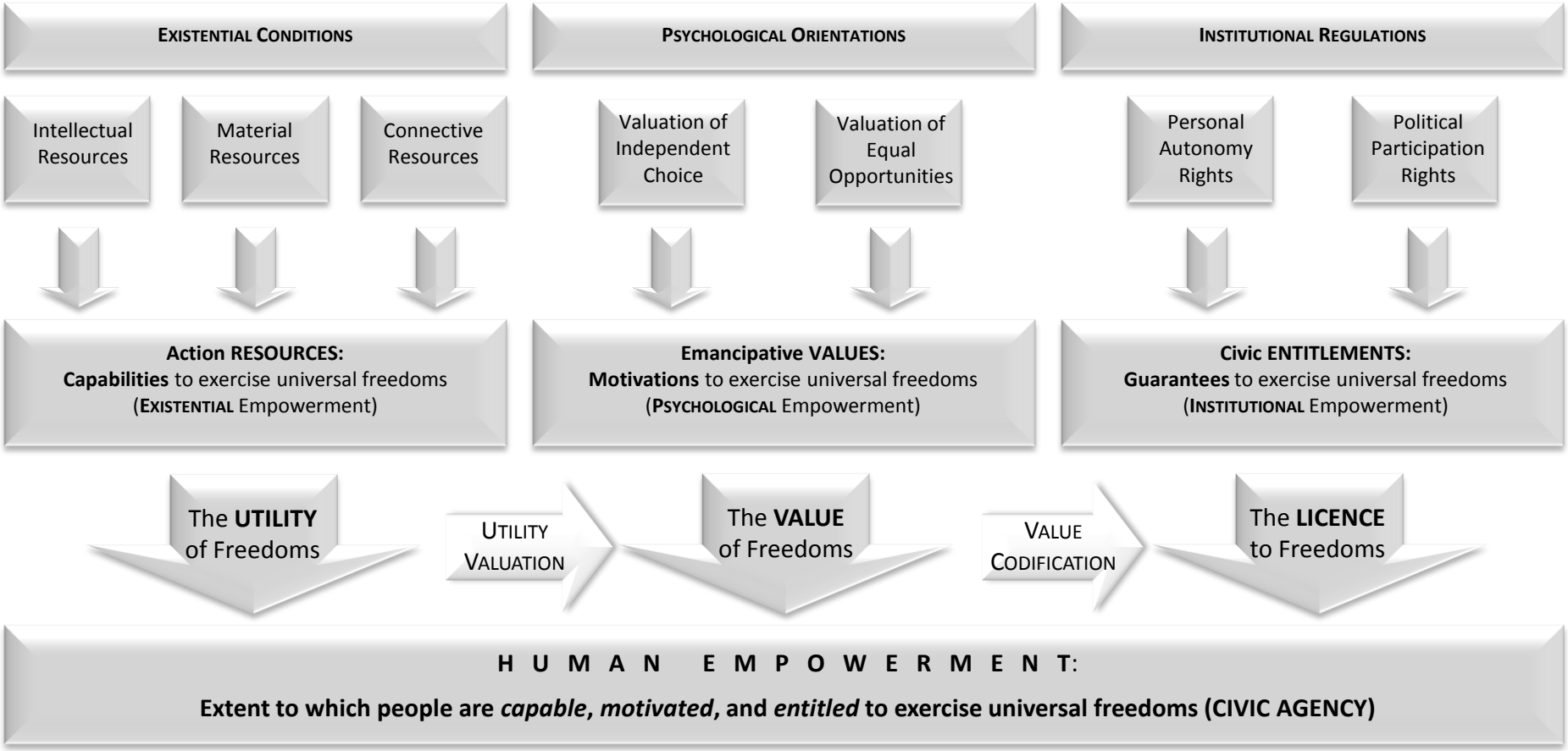
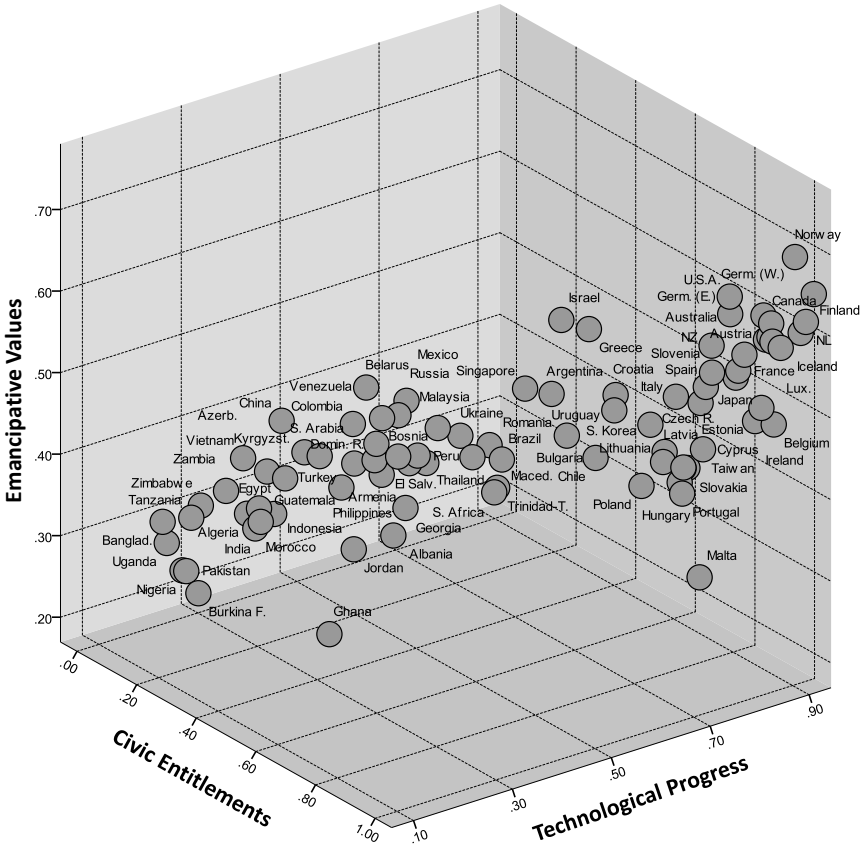
Figure 1: The Human Empowerment Framework of Author (2013)



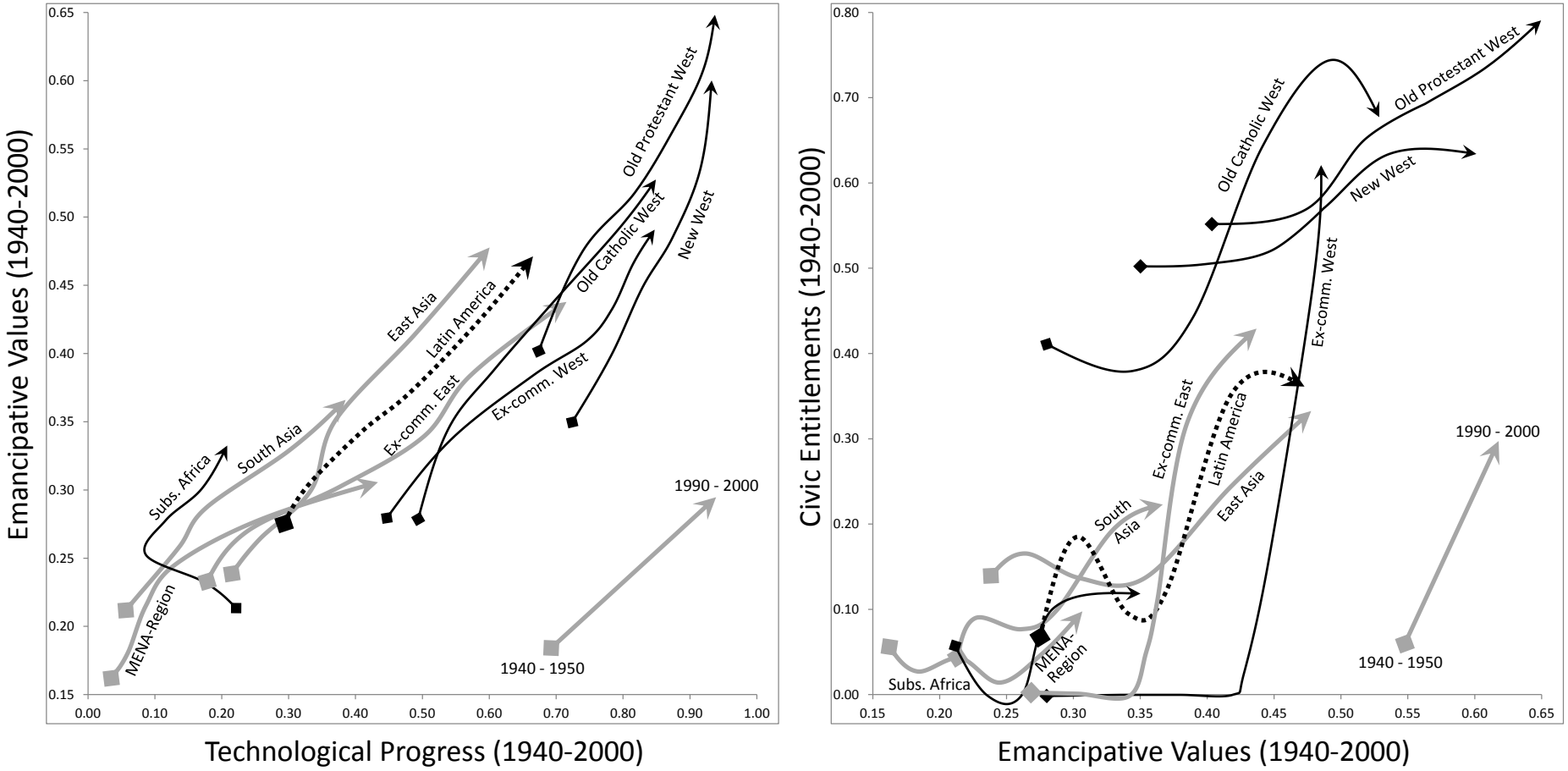
Source: Author (2013).

Figure 2: The Threefold Syndrome of Human Empowerment



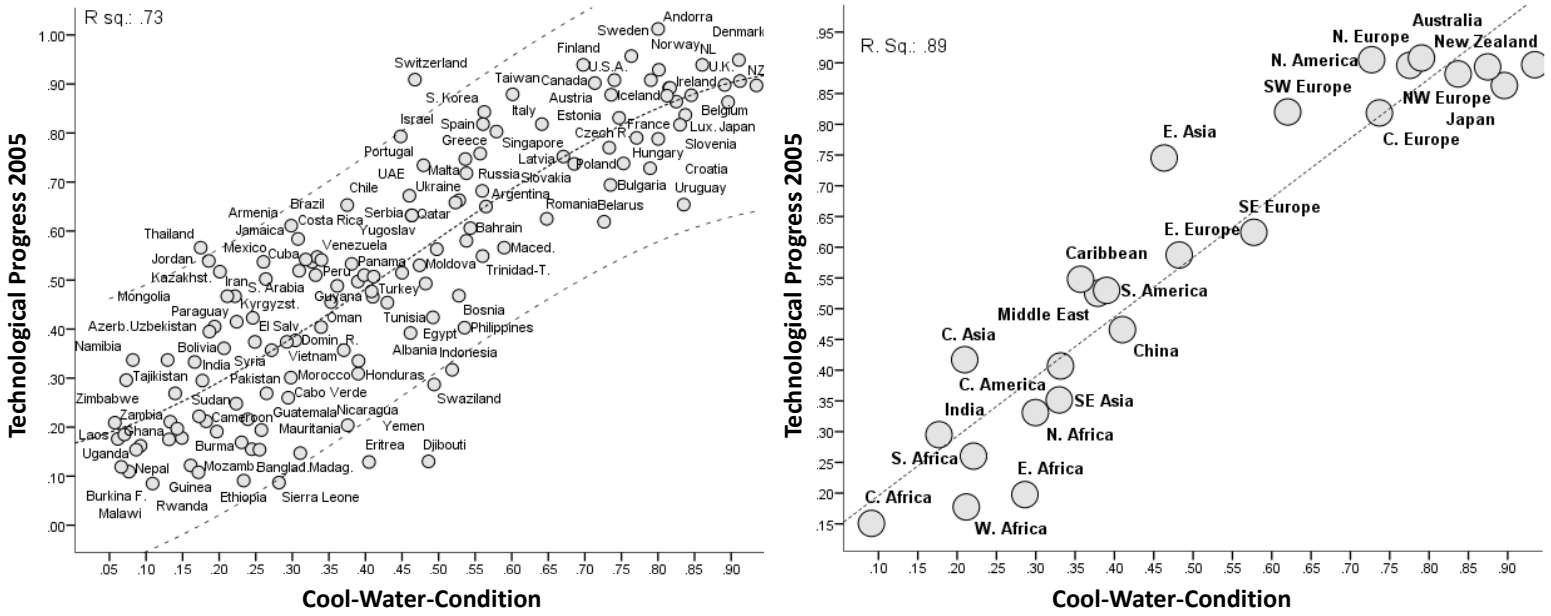
Note: Variables are described in OA 1 to 3 and data are shown in OA-Table 5 (p. 13 ff.).

Figure 3: The Co-Evolution of the Three Elements of Human Empowerment in Global Culture Zones from 1940 to 2000



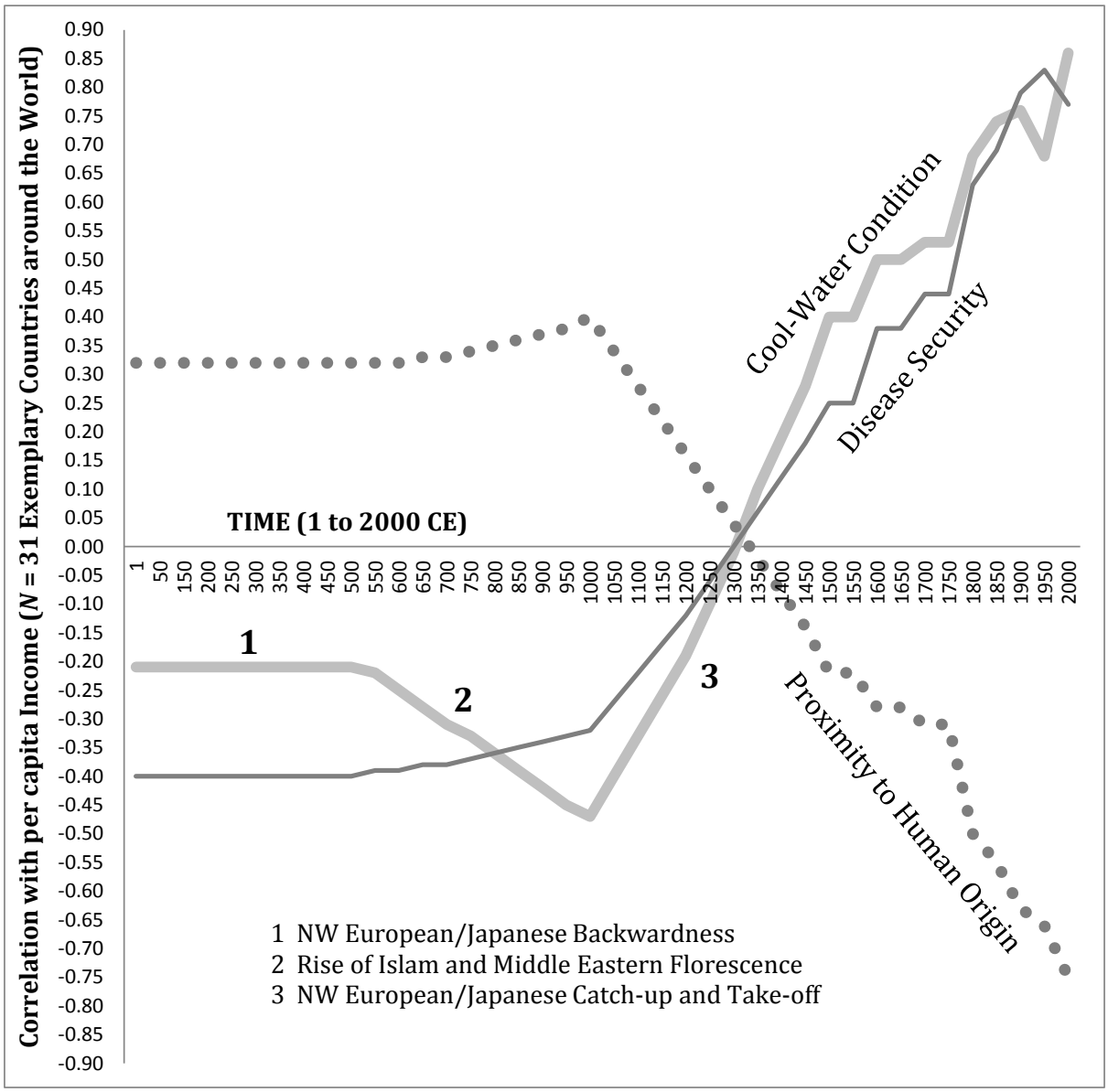
Note: Variables are described in OA 4 to 6. Grouping of countries into culture zones documented at the bottom of OA 6 (p. 30). Data are displayed in OA-Table 8 (p. 20 ff.).

Figure 4: The Cross-national and Cross-regional Technological Impact of the CW-Condition



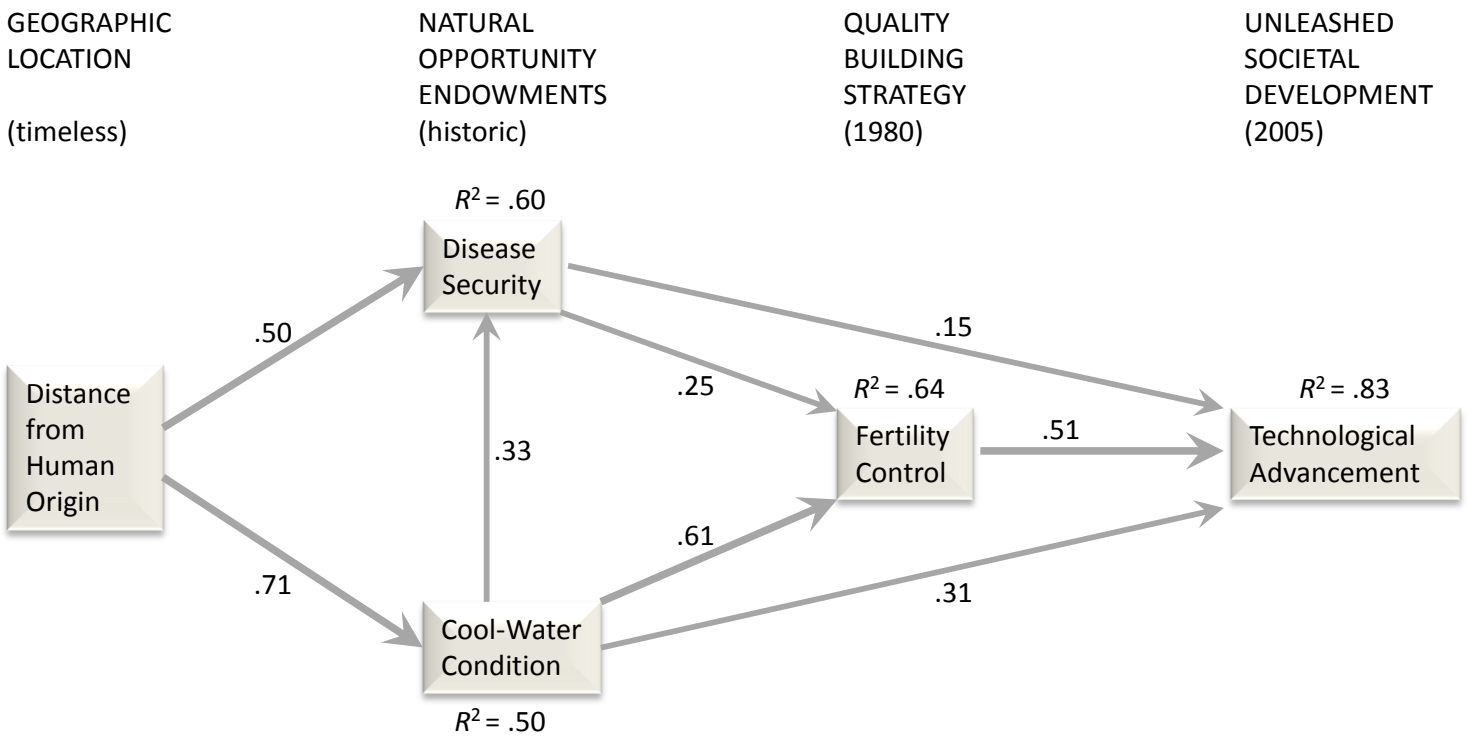
Note: Variables are described in OA 9. Data are displayed in OA-Table 13 (p. 38 ff.).

Figure 5: Inter-Regional Correlation of the CW-Condition, Disease Security, and Early Human Arrival with Income/p.c. over the Last 2000 Years



Note: Data documented in OA 15, see in particular OA-Table 19 (p. 65) and OA-Table 20 (p. 67 f.).

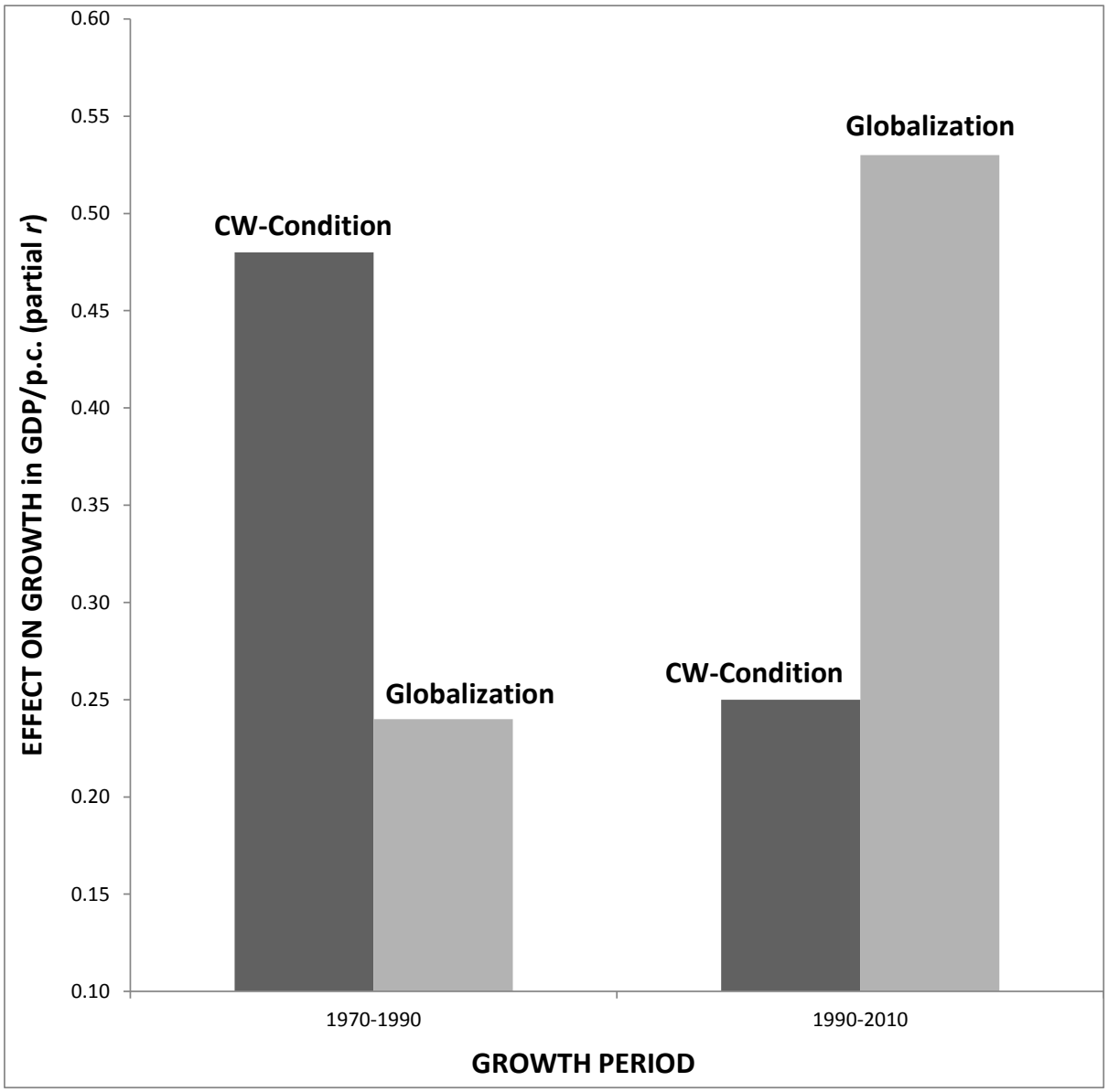
Figure 6: Path Diagram Illustrating the Causal Flow Suggested by the Initiation Thesis and the Fertility Thesis



Note: Entries are partial correlation coefficients, calculated with AMOS 19. Units of observation are national societies: *N* is 127, incl all societies with available data on each variable. Fertility Control in this model is *exogenous* to prosperity: it is the residuals in fertili control not predicted by per capita GDP in the same year. Goodness of fit indices: GFI .94, NFI .97, IFI .97, CFI .97. All effects are significant at the .001-level. To inspect the data matrix for the 127 societies included in this analysis, see Appendix 11

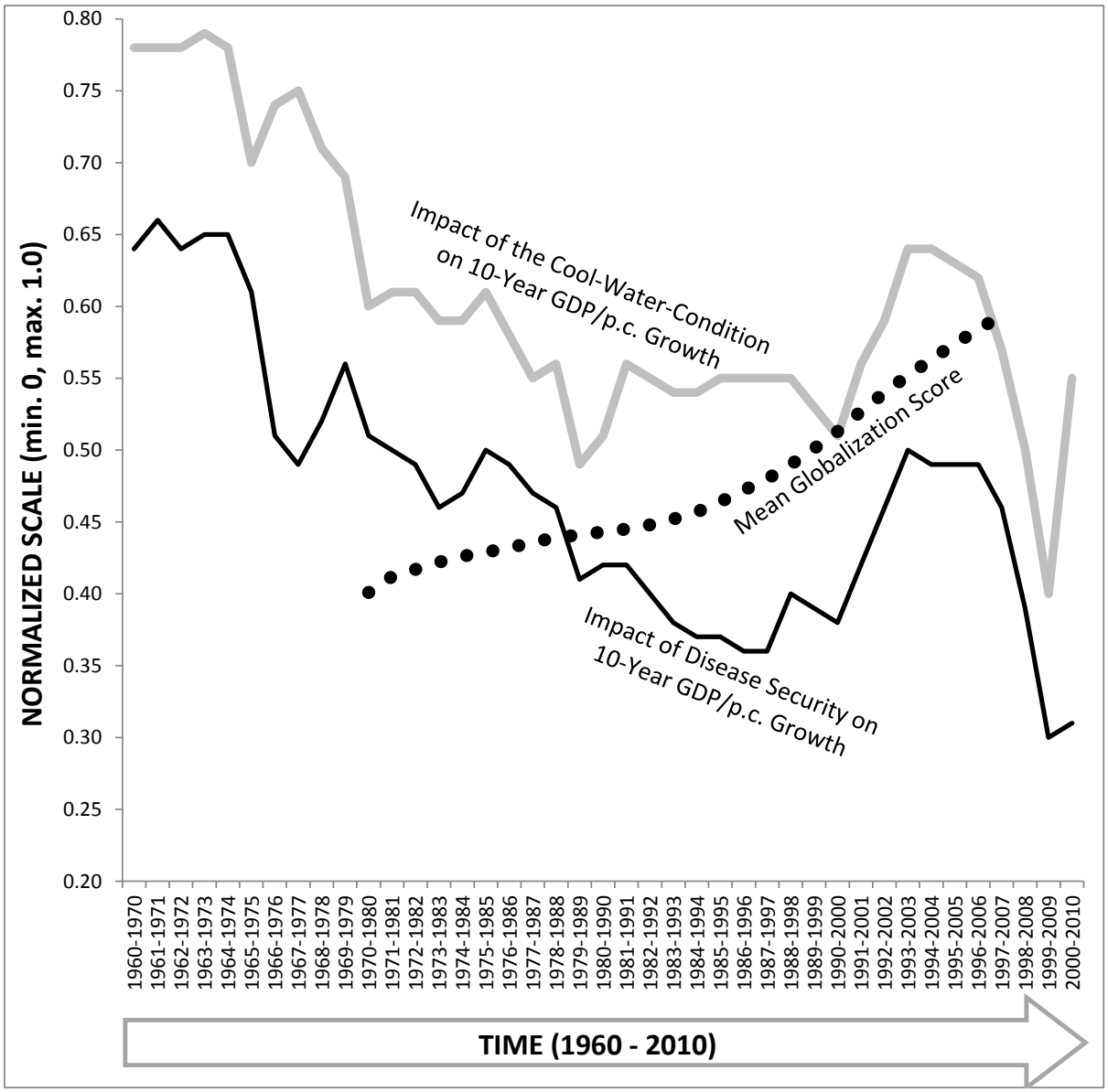
Note: Variables are described in OA 1 and 9 to 13. Data matrix is displayed in OA-Table 15 (p. 49 ff.).

Figure 7: The Partial Growth Effects of the CW-Condition and Globalization over Two Phases



Note: Data documented in OA 15 and 16.

Figure 8: The Shrinking Growth Effect of Natural Conditions and the World's Increasing Globalization Score



Note: Variables are described in OA 16 and 17.

Table 1: Time-pooled Cross-Sectional Model of a Reciprocal System of Temporally Ordered Effects

Lagged Predictors:	*Dependent Variables* at time T_0: Technological Progress[a)]	Emancipative Values[b)]	Civic Entitlements[c)]
Technol. Progress at time T_{-1}		.07 (4.17) ***	.26 (1.76) *
Emancipative Values at time T_{-1}	.08 (0.70) †		.93 (4.80) ***
Civic Entitlements at time T_{-1}	- .00 (0.09) †	.01 (0.90) †	
Dependent Variable at time T_{-2}	.93 (29.20) ***	.89 (15.60) ***	.33 (1.50) †
Constant	.14 (3.72) ***	.08 (5.90) ***	- .21 (- 3.40) ***
Adj. R^2	.93	.91	.70
N (observations)	232	260	253
N (societies)	68	74	74
N (decades)	max. 4, mean 3.4	max. 4, mean 3.5	max. 4, mean 3.4

Notes: Time-pooled-cross-sectional regressions with 'panel corrected standard errors' calculated in STATA 11.2. Entries are unstandardized regression coefficients with their panel-corrected T-values in parentheses.
T_{-1} is the decade preceding any given decade (T_0); T_{-2} is any decade preceding T_{-1}.
Tests for heteroskedasticity (White-test), influential cases (DFFITs), and multicollinearity (variance inflation factors) reveal no violation of OLS-assumptions.
Significance levels (two-tailed): † $p \geq .100$, * $p < .100$, ** $p < .050$, *** $p < .005$.
Included are all societies with available measures on each of the involved variables.
a) Proxy for Technological Progress is a combined and indexed measure of a society's literacy and urbanizationrates in a given decade from Vanhanen (2003).
b) Emancipative values in a given decade are estimated from the contemporary cohort pattern in these values with society-specific trend adjustments as detailed in Appendix 4.
c) Proxy measure for a society's civic entitlements in a decade is Vanhanen's index of democratization for that decade. See Vanhanen (2003).
Measurement procedures and data are documented in OA _.

Note: Variables are described in OA 4 to 6. Data are displayed in OA-Table 8 (p. 20 ff.).

Table 2: Multi-level Models of the Impact of Action Resources on Emancipative Values

PREDICTORS:	DEPENDENT VARIABLE: Emancipative Values *Material* Empowerment[a)]	*Intellectual* Empowerment[a)]	*Connective* Empowerment	*Combined* Empowerment[b)]	*Combined* Empowerment II
• Constant	.43***(55.9)	.43***(47.1)	.44*** (47.4)	.46***(47.5)	.46***(46.3)
Country-level Effects:					
• Per Capita GDP	.51***(5.9)				
• Schooling Years		.46***(9.7)			
• Internet Access			.61***(9.2)		
• Technological Progress[b)]				.52***(9.1)	.41***(9.9)
Individual-level Effects:					
• Female Sex	.02***(10.5)	.02***(11.5)	.03***(11.2)	.03***(11.5)	.03***(11.5)
Cross-level Interactions:					
• Birth Year (indexed)	.14***(19.9)	.11***(12.3)	.09***(10.1)	.07***(6.8)	.07***(7.2)
*GDP/cap	.28***(5.0)				
*Schooling Years		.28***(6.6)			
*Internet Access			.14***(2.6)		
*Technological Advancement[b)]				.28***(4.4)	.17***(4.8)
• Household Income	.09***(16.6)			.02***(3.6)	.02***(3.7)
*GDP/cap	N.S.				
*Schooling Years					
*Internet Access					
*Technological Advancement[b)]				N.S.	N.S.
• Formal Education		.12***(19.0)		.10***(12.0)	.10***(12.6)
*GDP/cap					
*Schooling Years		.11***(4.2)			
*Internet Access					
*Technological Advancement[b)]				.21***(4.5)	.12***(5.1)
• Informational Connectedness			.08***(15.7)	.04***(11.0)	.04***(11.0)
*GDP/cap					
*Schooling Years					
*Internet Access			N.S.		
*Technological Advancement[b)]				N.S.	N.S.
Reduction of Error (of total):					
Within-country Variation of DV	08% (05%)	13% (09%)	08% (05%)	12% (08%)	12% (08%)
Between-country Variation of DV	57% (20%)	60% (21%)	71% (25%)	79% (28%)	77% (27%)
Variation in Age Effect	36%	41%	13%	31%	40%
Variation in Income Effect	ZERO			ZERO	ZERO
Variation in Education Effect		13%		28%	35%
Variation in Connectivity Effect			ZERO	ZERO	ZERO
Total Variance Explained	25%	30%	30%	36%	35%
N (number of observations)	128,908 individuals in 81 societies	116,390 individuals in 62 societies	58,272 individuals in 45 societies	41,808 individuals in 33 societies	41,808 individuals in 33 societies

[a)]The material and intellectual empowerment models cover data all societies surveyed in the last two rounds of the WVS, using the latest survey from each society (ca. 2000-2005) and weighting each national sample to equal size. The other models only cover data from WVS (ca. 2005) because the questions used to measure informational connectedness were only fielded then.

[b)]In the first combined model, instead of technological advancement[b)] I use the average of GDP/capita, schooling years, and internet access to measure combined action resources at the societal level. In all models, societal-level variables are taken from the year of the survey.

Notes: Entries are unstandardized regression coefficients (*b*'s) with T-ratios in parentheses. Models calculated with HLM 6.01. Societal-level variables are global-mean centered; individual-level variables (except female sex) are country-mean centered. Reduction of error calculated from change in random variance component relative to the empty model. 65% of the total variance in emancipative values is within, 35% between societies. Significance levels: * $p < .050$; ** $p < .010$; *** $p < .001$; N. S. not significant ($p > .050$).

Note: Variables are described in OA 8 (p. 34).

Table 3: Correlation of Technological Progress with the CW-Condition and Its Suspected Mediators on Later Technological Progress

PREDICTORS of Technological Advancement:	CORRELATION with Technological Progress 2005	*N* (societies)
• Fertility Control, 1980	.87 ***	141
• Cool Water, historic	.84 ***	142
• State Integrity, 2000	.78 ***	143
• Civic Entitlements, 2000	.73 ***	130
• Disease Security, historic	.72 ***	143
• Order and Stability, 2000	.71 ***	143
• Cultural Individualism, 1990s	.70 ***	84
• Consanguinity (logged)	- .70 ***	66
• 'Geocondition'	.65***	98
• "Biocondition'	.60***	98
• 'Val158Met' COMT Gene	.52 ***	50
• Democratic Tradition, until 2000	.51 ***	151
• 'White' Settler Mortality, historic	- .44 ***	108
• Cultural Looseness, 1990s	.40 **	33
• Continuous Peace, post WWII	.36 ***	142
• State Antiquity Index	.36 ***	121
• % Muslims, 1990s	- .33 ***	142
• % Protestants, 1990s	.31 ***	140
• Time since Neolithic Revolution	.28 ***	138
• Long-allele 5-HTTLPR Gene	.27 *	46
• % Catholics, 1990s	.19 **	142
• Neuroticism (Big 5), 1990s	.18 †	44
• Extraversion (Big 5), 1990s	.16 †	44
• Openness (Big 5), 1990s	- .02 †	44

Note: Entries are correlation coefficients (*r*). Included are all societies with available data on the respective variables.

Significance levels (two-tailed): † $p \geq .100$, * $p < .100$, ** $p < .050$, *** $p < .005$.

For documentation of data and variables, see OA 14 and OA-Table 18 (p. 58 ff.).

Table 4: Simultaneous Effects of the CW-Condition and Its Suspected Mediators on Technological Progress

Alternate PREDICTORS:	Simultaneous EFFECTS on Technological Progress 2005: Cool Water Controlling for Disease Security and Alternate Predictor	Disease Security Controlling for Cool Water and Alternate Predictor	Alternate Predictor Controlling for Cool Water and Disease Security	*N*
• Fertility Control	.41 ***	.28 ***	.61 ***	131
• State Integrity	.52 ***	.33 ***	.47 ***	138
• Civic Entitlements	.63 ***	.29 ***	.36 ***	127
• Long-allele 5-HTTLPR Gene	.68 ***	.37 **	.57 ***	48
• Order and Stability	.59 ***	.29 ***	.38 ***	138
• Cultural Individualism	.66 ***	.17 †	.34 ***	81
• State Antiquity Index	.69 ***	.35 ***	.34 ***	123
• Cultural Looseness	.79 ***	.19 †	.32 *	31
• Democratic Tradition	.62 ***	.39 ***	.30 ***	137
• Consanguinity (logged)	.66 ***	.32 **	- .25 *	67
• 'Geocondition'	.66***	.28**	.30***	95
• 'Biocondition'	.66***	.31	.25**	95
• Neuroticism (Big 5)			.25 †	
• Openness (Big 5)	.51 ***	.36 **	.03 †	48
• Extraversion (Big 5)			.00 †	
• 'White' Settler Mortality	.70 ***	.32 ***	- .21 **	105
• Time since Neolithic Revolution	.70 ***	.35 ***	.22 **	132
• % Muslims			- .12 †	
• % Protestants	.67 ***	.36 ***	.02 †	136
• % Catholics			.05 †	
• Continuous Peace	.67 ***	.36 ***	.09 †	137
• 'Val158Met' COMT Gene	.72 ***	.17 †	.17 †	49

Note: Entries are partial correlation coefficients to indicate each predictor's partial explanatory power for technological advancement. Each line represents a separate regression of technological advancement simultaneously on the cool-water-condition, disease security, and one of the alternate predictors shown in the left-hand column. Example: in the first line, the coefficient .41 indicates the partial effect of the cool-water-condition, .28 that of disease security, and .61 the one of fertility control.

Tests for heteroskedasticity (White-test), influential cases (DFFITs), and multicollinearity (variance inflation factors) reveal no violation of OLS-assumptions in any regression series.

Significance levels (two-tailed): † $p \geq .100$, * $p < .100$, ** $p < .050$, *** $p < .005$.

Gray-shaded coefficients show the strongest effect for each regression. For detailed description of variables, data sources, and a display of data see OA 14 and OA-Table 18 (p. 58 ff.).

Table 5: Two-Stage Least Squares Regression to Estimate Fertility Control's Degree of Endogeneity to GDP/p.c.

	STAGE 1(Fertility Control 1980 is DV)		STAGE 2 (Technological Progress 2005 is DV)	
PREDICTORS:	Version A	Version B	Version A	Version B
• Constant	.20 (5.42) ***	.14 (4.94) ***	- .12 (-3.28) ***	- .10 (-2.99) ***
• CW-Condtion, historic	.63 (6.10) ***	.67 (9.26) ***		
• Disease Security, historic	.13 (1.17) †	.32 (4.03) ***		
• GDP/p.c. (indexed), 1980	.25 (2.56) **			
• Predicted Fertility Control			1.11 (18.72) ***	1.07 (18.51) ***
Adjusted R^2	.69	.67	.81	.72
N (societies)	94	153	82	132

Note: Entries are unstandardized regression coefficients with their T-values in parentheses.

Tests for heteroskedasticity (White-test), influential cases (DFFITs), and multicollinearity (variance inflation factors) reveal no violation of OLS-assumptions.

In the first stage, water autonomy and disease security dating back to historic times as well as GDP/p.c. in 1980 (version B without the latter) are used as instruments to calculate predicted scores of fertility control in 1980. In the second stage, these predicted scores are used to predict technological progress in 2005.

Significance levels (two-tailed): † $p \geq .100$, * $p < .100$, ** $p < .050$, *** $p < .005$.

Note: Data documented in OA 9 to 13.

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