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IMPACT OF TOLERANCE ON
ECONOMIC MODERNIZATION IN A
COMPARATIVE PERSPECTIVE**

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DOES CULTURE MATTER? THE IMPACT OF TOLERANCE ON ECONOMIC MODERNIZATION IN A COMPARATIVE PERSPECTIVE²

Is tolerance important for modernization? What can one say about the relationship and causality between tolerance and modernization? It is assumed that an increase in tolerance, expressed as a tolerant attitude towards homosexuality, gender equality, and a decrease in xenophobia, has a significant impact on modernization. Here modernization is understood in a “narrow” sense, referring to economic and technological modernization. The author uses the “cultural modernization” approaches of R.Inglehart and the “creative class” concept of R.Florida. Based on data from 55 countries, the author concludes that tolerance does have a significant impact on modernization, with gender equality being the most predictive factor and proving to be important in three groups of compared models (Index of Modernization, Innovation Index, and Investment Index). A tolerant attitude towards homosexuals and a decrease in xenophobia play a less significant role. Gender equality is an important predictor for modernization because women are in the majority – not the minority – and lowering entry barriers for women leads to their inclusion in a post-industrial economy. The results show that this is extremely important for economic modernization.

Two distinct patterns of modernization are revealed: A tolerant model and a catching-up model. The former model focuses on innovation, high levels of tolerance, and strong institutions, while the latter focuses on investment, a lower-level of tolerance, and weak political institutions. Institutions do matter – they seem to be a causal mechanism in the relationship between tolerance and modernization. Institutions play a significant role in the tolerant model, where a post-industrial economy is associated with a post-industrial society. However, some countries try to build a post-industrial economy without building a post-industrial society, putting the main emphasis not on innovation, but on higher investment rates.

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This paper focuses on the relationship between tolerance and modernization. Is tolerance so important for modernization? How may one explain the causality between tolerance and technological modernization? What is the causal mechanism between tolerance and modernization? There are a vast number of research studies in this area. I plan to use several theoretical approaches in my research: Modernization theory and the creative class concept.

There might be a perception that successful modernization only requires an increase in investment in the economy, importing and implementing new technologies, and adopting new management approaches. But modernization is associated not only with new “hardware”, such as new industries, new infrastructure projects, and new technologies, but also – and, perhaps, even more important – with new “software”, such as new ideas, new values, and new institutions. The main argument of this paper is that a change in culture or values is an essential condition for modernization. In other words, culture does matter, especially for successful modernization.

I use some aspects of modernization theory. In the social sciences, the “modernization” concept in its most general terms refers to the transition process of different countries to a modern society that presupposes the adoption or creation of Western-style institutions. The existence of different approaches to the concept of modernization leads to the alignment of different accents, which in turn leads to different interpretations. Some models put an emphasis on socio-economic issues (industrialization, urbanization, and increases in education, income, and mobility), while others focus on the risks of modernization (political instability, government crises, rise of conflicts, and political violence). I refer to some general arguments about “catching-up modernization” and political conditions for rapid economic development. For example, these issues were explored by S.Lipset (1960), S.Huntington (1968), A.Przeworski, M.Alvarez, J.Cheibub, F.Limongi (2000), M.Olson (1993).

The modernization concept can be applied both to the industrialization phase (i.e., transition from an agrarian to an industrial economy), as well as to the post-industrialization phase (i.e., transition from an industrial to a post-industrial economy). The post-industrial economy is usually defined as a knowledge-based economy, or as an innovative economy. An ever-larger share of economic output is created in the innovative sector, which can be measured as a share of hi-tech exports in total manufactured exports. Science and technology become the driving force of economic growth in these societies. More and more people are employed in the innovative/post-industrial sector, as compared to the industrial, agriculture, and service sectors.

In this paper I understand modernization in a narrow sense – as economic and technological modernization in creating a knowledge-based economy. In my opinion, this kind of modernization is based on two factors: Innovations and investments. Therefore, successful societies have to have both a large innovative sector in the economy and high investment rates. Two models are possible: Countries with a large innovation sector and relatively low investment rates and countries with a relatively small innovation sector and high investment rates. The former model mostly applies to developed countries that have already created a large innovation sector, while the latter mostly applies to developing countries that are committed to the idea of catch-up modernization.

The relationship between modernization and values systems and modernization and tolerance is one of the popular topics in political science. Using data from the World Values Survey project, R.Inglehart has shown a causal link between economic growth and a change in values: There is a positive correlation between the distribution of self-expression values and income growth. Transition to post-industrial growth, which is based on innovation and technology, requires a change in a society’s values (Inglehart, 1997).

Cultural change is inseparable from modernization. The first change leads to a shift from traditional to secular and rational values, usually during the first phase of modernization. The second change is from survival values to self-expression values and is associated with post-industrial modernization. The latter value change is followed by the creation of more open political institutions, empowerment of people, an increase in tolerance, and democratization.

Tolerance is associated with a post-industrial society, whose economy is knowledge-based. The creation of a knowledge-based economy is the desired goal of most governments and societies. No post-industrial values leads to no post-industrial economy. In other words, a post-industrial economy is likely to emerge in post-industrial societies.

A knowledge-based economy is strongly associated with human capital, which means that it is people who contribute the most to post-industrial economic growth. This idea was perfectly expressed in the concept of the “creative class”. R. Florida has proposed the idea of a new social class – a “creative class” – which is considered to be a driving force for economic growth in post-industrial society (Florida, 2002). Florida claimed that the crucial factor contributing to social and economic development in post-industrial societies is an increasing size of the “creative class”, meaning people who are employed in creative professions, such as science, engineering, technology, the arts, design, media and entertainment, the financial sector, etc., whose economic function is to create new ideas, new technology, and/or new creative content. The creative class also includes a broader group of creative professionals in finance, business, law, health care, and other related fields. More importantly, all members of the creative class share a common creative ethos that values creativity, individuality, difference, and merit (Florida, 2002: 8). According to this concept, creativity is the engine of new economy growth.

Florida argues in his book that economic growth is now based on three “Ts” – talent, tolerance, and technology – mostly because these factors attract members of the creative class. Companies tend to move to those regions with large numbers of the creative class. From this perspective, an increase in the distribution of self-expression and innovative values can be considered as an important precondition for the enlargement of the “creative class” (Florida and Mellander, 2010; Mellander and Florida, 2006; Florida, Mellander, Stolarick, 2008).

But why is tolerance important? Tolerance is considered as main indicator of low barriers, diversity, and new opportunities for attracting creative people to specific locations. Members of the creative class believe that tolerance promotes creativity in many different ways: It helps to establish links with many creative networks of people from different professions and occupations and it becomes a signal that all new ideas and prepositions are welcomed. In other words, members of the creative class prefer places that are diverse, tolerant, and open to new ideas. Furthermore, places with diverse mixes of creative people are more likely to generate new combinations (Florida, 2002: 249). Moreover, the absence of tolerance and diversity causes creative people to leave their locations.

Tolerance is important in many spheres, such as work, leisure, community, and life-style. Creative people are likely to have new perceptions of their careers and working place and of the communities they would prefer to live in. In general, they are characterized by commitment to new life style (Florida, 2002).

What is tolerance? How to measure it?

How is tolerance understood in the social sciences? There have been many attempts to measure tolerance. For example, Florida proposed two indices for measuring tolerance: The Gay Index and Bohemian Index. He argues that the Gay Index is a good measure for diversity because gays

have been subject to a particularly high level of discrimination. Openness to the gay community is a good indicator of low entry barriers to human capital (Florida, 2002: 255-56). According to his findings, the same places that were popular among gays were also the ones where a high-tech industry was located.

Florida also puts forward the argument that openness to immigration is crucially important for innovation-based economic growth. Locations that are able to attract immigrants are considered to be open and diverse and, therefore, are likely to attract innovative and energetic people from around the world. According to Florida, since 1990 immigrants founded roughly one-quarter of new businesses in Silicon Valley (Florida, 2002: 252).

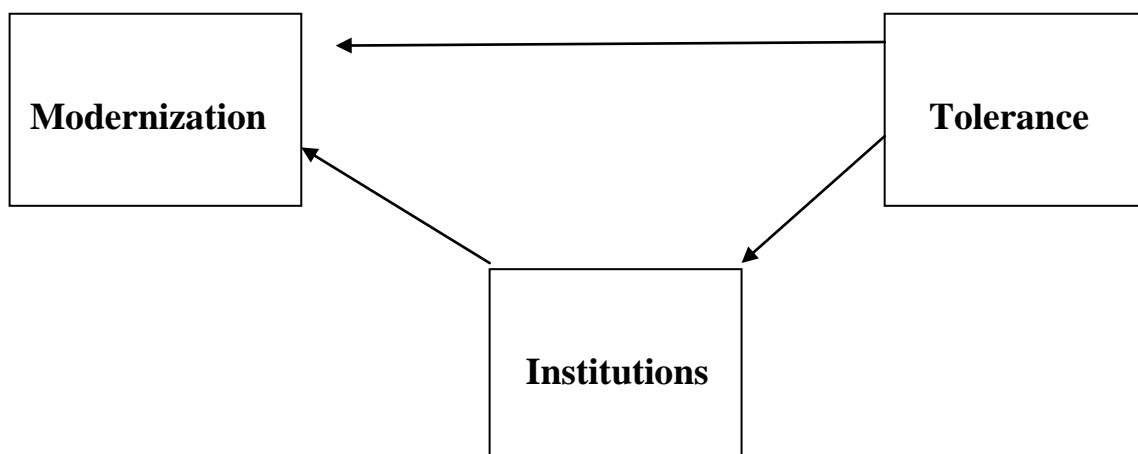
Gender equality is one of the most striking indicators for tolerance. Some studies show that gender equality is strongly associated with modernization and democratization (Inglehart, Norris, Welzel, 2002). In a global perspective this is part of a wider cultural change around the world. The empowerment of women is an essential feature of modernizing societies. Gender equality is the most central component of value change in post-industrial societies. In post-industrial societies, gender roles have increasingly converged due to a structural revolution in the paid labor force, as well as in educational opportunities for women and in the characteristics of modern families (Inglehart, Norris, 2003: 39).

Therefore, in my work I define tolerance in relation to society's attitude towards homosexuality, to gender equality, and to foreigners. The larger the share of tolerant attitudes to these issues, the more tolerant a given society is. I believe that these three factors contribute to maintaining entry barriers to members of the creative class. States that provide equal opportunities to women and that are open to gays and immigrants will be attractive to creative people and this concentration will foster knowledge-based economic growth. People, specifically creative people, create the post-industrial economy. In order to be competitive in an economic sense, societies must be tolerant to the creative class because innovation flourishes only a tolerant environment with low entry barriers. I assume that tolerance is a predictor for technological modernization.

A new question arises: How may one explain the causality between tolerance and technological modernization? What serves as a causal mechanism? I propose that strong political institutions are intermediate between tolerance and modernization. A rise in tolerance means a change in values, which in turn affects institutions in society. Much research based on data from the WVS project has shown this (e.g., Inglehart, 1997; Inglehart, 2003). Tolerance is associated with an increase in the distribution of self-expression values, which affects political institutions. Cultural change and tolerance affects institutions and leads to the establishment of more open political institutions. People become more democratically minded and the political system as a result becomes more democratic. Here I refer to neo-institutional economists, such as D.North, who argue that "strong" institutions are the *sine qua non* of modernization (North, 1990). I argue that strong political institutions, such as a democratic political regime, the rule of law, and control over corruption, have an impact on a society's system of values.

These institutions create an innovation-friendly environment for the creative class. This environment is the most comfortable environment for the rise and development of the creative class. Research has shown that the creative class is very sensitive to this environment (Florida). Not just high profits, but also self-expression, a creative spirit, and respect for other identities are necessary conditions for developing a creative class. Such institutions as property rights, contract enforcement, and the rule of law are the *sine qua non* of the emergence of a significant creative class.

Pic. 1. Causal link between Modernization and Tolerance.



This paper aims to test whether such values as tolerance affect developing countries, especially those that have passed through a period of political transition during the 1980s and 1990s. The key indicators for measuring tolerance are, as discussed above, tolerance of homosexuality, level of gender equality, and attitude towards immigrants. One possible causal mechanism to be tested is the quality and strength of political institutions.

It seems reasonable that an alternative path to modernization might be possible. Some societies would definitely prefer to achieve narrow modernization goals without a full-scale value change. Widespread tolerance is an indicator of a radical shift and a transition to post-industrial society. Many societies would like to claim that they prefer to preserve their traditional values. This seems even more reasonable when taking onto account the fact that cultural change leads to democratization and regime change. Therefore, an alternative argument is possible: Economic and technological modernization might be achieved without a change in values. Some societies may focus their development policies on increasing investment rates, but not on support for innovation.

Put differently, is it possible to build a knowledge-based economy without a change in values – without a penetration of post-industrial values? Many governments in developing countries claim that they are committed to modernization but without the adoption of a “western lifestyle”, which they see as hostile to their traditional values. In these cases, modernization is to be based on higher investment rates in particular “innovative” sectors of the economy.

Some countries try to “avoid” or “skip” cultural change by applying an investment-based model of modernization. I believe that this approach often coincides with the vision of political elites in most developing countries, who understand modernization as progress in science and technology. Therefore, modernization may be measured via a change in innovation and investment. In other words, it is the sum of a technological base and investment. In this case higher investment rates might be regarded as a substitute for institutions.

Therefore, I assume that two models for economic modernization are possible with respect to the relationship between tolerance and innovation: A “catching-up” model and “tolerant” model. The catching-up model puts emphasis not on tolerance and innovation, but on higher investment rates, while the tolerant model, on the contrary, places its emphasis on tolerance and innovation (see Table 1).

Table 1. Models of Modernization

	Catching-up model	Tolerant model
Innovation	Low	High
Investment	High	Low
Tolerance	Low	High

There is no correlation between the Investment Index and Modernization Index (see Table 2):

Table 2. Correlation between Modernization, Innovation, and Investment Indices.

	Innovation index	Investment index	Modernization index
Innovation index	1,000	-,054	,947**
Investment index	-,054	1,000	,271**
Modernization index	,947**	,271**	1,000

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

Data, Methods, and Results

My main argument is as follows: Increases in tolerance, which can be expressed via a tolerant attitude towards homosexuality, gender equality, and immigrants, have a significant impact on modernization.

As mentioned above, modernization here is understood in a “narrow” sense, referring to economic and technological modernization. In other words, in this research I focus on the interdependence between modernization and culture.

Despite this narrow definition, I assume that modernization depends not only on innovation and investment, but also on the formation and distribution of new values. Therefore, modernization is not only a technological, but also a socio-cultural shift.

The main question I address is as follows: Does an increase in tolerance lead to innovation-based economic growth? I measure tolerance in three ways: Tolerance of homosexuality, tolerance of gender equality, and tolerance of immigrants.

My key hypothesis is that increases in tolerance lead to increases in modernization. Moreover, a possible causal mechanism is the quality and strength of political institutions. Basically, an increase in tolerance is likely to affect political institutions and strong political institutions are required for building a knowledge-based economy, regarded as the goal of economic modernization. This might be a factor of crucial importance for developing countries that have

over the past two decades asserted their intentions to increase the innovative sector's share of GDP.

Additionally, in order to test my proposition about the existence of two patterns of modernization, I also split the Modernization Index into two parts: An Innovation Index and an Investment Index. My main hypothesis in this case is that tolerance affects innovation much more than investment. That is, while on the one hand an increase in innovation requires a high level of tolerance in society and strong institutions as a causal mechanism, on the other hand an increase in investment does not require tolerance. Using regional proxies might help to distinguish those areas that focus on innovation and investment respectively in their attempts to modernize.

Data

For this study, I take data for the period of 1998 to 2008 from the following 55 countries: Argentina, Armenia, Australia, Azerbaijan, Belarus, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Cyprus, Czech Republic, Estonia, Finland, France, Georgia, Germany, Great Britain, Guatemala, Hungary, India, Indonesia, Iran, Israel, Italy, Japan, Kyrgyzstan, Latvia, Lithuania, Malaysia, Mexico, Moldova, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Romania, Russian Federation, Singapore, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United States, Uruguay. It would be desirable to include data from more countries, but these were dropped from the study on account of data not being available for all variables and years.

The main databases used are the World Values Survey (data for tolerance), World Development Indicators from the World Bank (data on socio-economic development and demography), and the Worldwide Governance Indicators (data on institutional quality).

Variables

Dependent variable

The key dependent variable is the **Index of Modernization (IM)**. As mentioned above, I understand modernization as a function of innovation and investment. Therefore, the IM consists of two parts: An *innovation index*, with a weight of 65% of total IM, and an *investment index*, with a weight of 35% of total IM.

The **Innovation index** is a function of four indicators:

- *High-tech exports as share of total merchandise exports* (weighted as 40% of the Innovation Index)
- *R&D expenditures as a share of GDP* (weighted as 40% of the Innovation Index)
- *Scientific and technical journal articles per million of population* (weighted as 10% of the Innovation Index)
- *Patent applications by residents per million of population* (weighted as 10% of the Innovation Index).

Investment Index is a function of two indicators:

- *Gross capital formation as share of GDP* (weighted as 50% of the Investment Index)
- *Foreign direct investment as share of GDP* (weighted as 50% of the Investment Index)

I transform absolute figures for every indicator in points on a 100-point system, where 0 points is the minimum value and 100 points is the maximum value and all values for each indicator are adjusted to the median value.

I take all data, except for those regarding scientific and technical journal articles, from the World Development Indicators database. I take data on scientific and technical journal articles from the Science and Engineering Indicators of 2010 by the US National Science Board.

Independent variables

Attitude towards Homosexuals is an indicator for measuring tolerance towards homosexuality in a country. This tracks responses to the statement “Homosexuality is never justifiable” from the WVS. The lower the share of positive responses (affirming that homosexuality is never justifiable), the more tolerant this society is towards homosexuality. I take these data from the World Values Surveys from 1995, 2000, and 2005. For each country I have from 1 to 3 observations. I have applied interpolation to get a larger dataset for 1996-2008.

Gender Equality is an indicator for gender equality in the country. It is the share of positive responses to the question “When jobs are scarce, men should have more rights to a job than women” from World Values Survey. The lower the share of positive responses, the more tolerant this society is to gender equality. I take these data from the World Values Surveys from 1995, 2000, and 2005. For each country I have from 1 to 3 observations. I have applied interpolation to get a larger dataset for 1996-2008.

Attitude towards Xenophobia is an indicator for tolerance towards immigrants and/or ethnic minorities. It is the share of individuals who responded to the question “Could you please sort out any that you would not like to have as neighbors?” with “Immigrants/foreign workers”. Again, the lower the share of these responses, the more tolerant this society is to immigrants. I take these data from the World Values Surveys from 1995, 2000, and 2005. For each country I have from 1 to 3 observations. I have applied interpolation to get a larger dataset for 1996-2008.

In all three cases mentioned above, interpolation did not affect the correlation structure of my dataset. I used a Chi-squared test to check whether statistical difference exists between the two correlation matrices of actual observations and interpolated data. The chi-squared value is 1.125, which means that the interpolation did not change the correlation structure of my dataset. However, I use both datasets in my analysis.

Index of Tolerance is the total average assessment ratio for attitudes towards homosexuality, gender equality, and attitudes towards immigrants. This variable is the mean for *Attitude towards Homosexuality*, *Gender Equality*, and *Attitude towards Xenophobia*. Each part has the same weight in the index (33%). I transform absolute figures for every indicator in points on a 100-point system, where 0 points is minimum value, 100 points is the maximum value, and all values for each indicator are adjusted to the median value. I take these data from the World Values Surveys from 1995, 2000, and 2005.

Voice and Accountability is an indicator to measure the openness of a political system from the World Bank’s Worldwide Government Indicators dataset. The higher a country’s score is, the more democratic the country is. Estimates for *Voice and Accountability* vary from -2.5 to 2.5. For convenience, the variable has been reformulated such that 2.5 points was added to each score in order to produce only positive values.

Control of Corruption is an indicator for the level of corruption from the World Bank's Worldwide Government Indicators dataset. Estimates for *Control of Corruption* vary from -2.5 to 2.5 and the higher a country's score, the less corrupt the country is. For convenience, the variable has been reformulated such that 2.5 points was added to each score in order to produce only positive values.

Rule of Law is an indicator for the level of rule of law in a country from the World Bank's Worldwide Government Indicators dataset. It captures perceptions of the extent to which agents have confidence in and abide by the rules of society, in particular regarding the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimates for the *Rule of Law* vary from -2.5 to 2.5. For convenience, the variable has been reformulated such that 2.5 points was added to each score in order to produce only positive values.

Regulatory Quality is an indicator for the quality of a country's business environment and investment climate from the World Bank's Worldwide Government Indicators dataset. Estimates for *Regulatory Quality* vary from -2.5 to 2.5 and the higher a country's score, the more friendly its environment for private businesses is. For convenience, the variable has been reformulated such that 2.5 points was added to each score in order to produce only positive values.

Control Variables are regional proxies. They are designed to capture country-specific effects. I group them in two sets: 1) "Developed Regions", such as Europe, Asia, and North America; and, 2) "Developing Regions", such as South America and the former Soviet Union.

Hypotheses and Models

I test the following hypotheses for this study:

- 1) A higher level of average tolerance has a positive impact on modernization.
- 2) A higher level of tolerance towards homosexuality has a positive impact on modernization.
- 3) A higher level of tolerance towards immigrants and ethnic minorities has a positive impact on modernization.
- 4) A higher level of tolerance towards gender equality has a positive impact on modernization.
- 5) A higher score for tolerance has a positive impact on the openness of a political system.
- 6) A higher score for tolerance has a positive impact on the level of rule of law.
- 7) A higher score for tolerance has a positive impact on the control of corruption.
- 8) A higher score for tolerance has a positive impact on regulatory quality.
- 9) A higher level of average tolerance has a positive impact on innovation.
- 10) A higher level of tolerance towards homosexuality has a positive impact on innovation.
- 11) A higher level of tolerance towards immigrants and ethnic minorities has a positive impact on innovation.
- 12) A higher level of tolerance towards gender equality has a positive impact on innovation.
- 13) A higher level of average tolerance does not have a positive impact on investment.
- 14) A higher level of tolerance towards homosexuality does not have a positive impact on investment.
- 15) A higher level of tolerance towards immigrants and ethnic minorities does not have a positive impact on investment.
- 16) A higher level of tolerance towards gender equality does not have a positive impact on investment.

I created 12 groups of models to test these hypotheses:

- 1) Dependent Variable: *Index of Modernization*. Independent variables: *Tolerance Index (tolerance average)*, *lagged DV* and sets of regional proxies for *Europe, Asia, N.America, or S.America, former SU*.
- 2) Dependent Variable: *Index of Modernization*. Independent variables: *Gender Equality, Attitude towards Homosexuality, Attitude towards Xenophobia, lagged DV* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 3) Dependent Variable: *Index of Modernization*. Independent variables: *Tolerance Index (tolerance average)*, *lagged DV, Institutions (sequentially adding Control of Corruption, Rule of Law, Regulatory Quality, Voice and Accountability)* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 4) Dependent Variable: *Index of Modernization*. Independent variables: *Gender Equality, Attitude to Homosexuality, Attitude to Xenophobia, lagged DV, Institutions (sequentially adding Control of Corruption, Rule of Law, Regulatory Quality, Voice and Accountability), Immigration* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 5) Dependent Variable: *Index of Innovation*. Independent variables: *Tolerance Index (tolerance average)*, *lagged DV* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 6) Dependent Variable: *Index of Innovation*. Independent variables: *Gender Equality, Attitude towards Homosexuality, Attitude towards Xenophobia, lagged DV* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 7) Dependent Variable: *Index of Innovation*. Independent variables: *Tolerance Index (tolerance average)*, *lagged DV, Institutions (sequentially adding Control of Corruption, Rule of Law, Regulatory Quality, Voice and Accountability)* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 8) Dependent Variable: *Index of Innovation*. Independent variables: *Gender Equality, Attitude towards Homosexuality, Attitude towards Xenophobia, lagged DV, Institutions (sequentially adding Control of Corruption, Rule of Law, Regulatory Quality, Voice and Accountability), Immigration* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 9) Dependent Variable: *Index of Investment*. Independent variables: *Tolerance Index (tolerance average)*, *lagged DV* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 10) Dependent Variable: *Index of Investment*. Independent variables: *Gender Equality, Attitude towards Homosexuality, Attitude towards Xenophobia, lagged DV* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 11) Dependent Variable: *Index of Investment*. Independent variables: *Tolerance Index (tolerance average)*, *lagged DV, Institutions (sequentially adding Control of Corruption, Rule of Law, Regulatory Quality, Voice and Accountability)* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.
- 12) Dependent Variable: *Index of Investment*. Independent variables: *Gender Equality, Attitude to Homosexuality, Attitude to Xenophobia, lagged DV, Institutions (sequentially adding Control of Corruption, Rule of Law, Regulatory Quality, Voice and Accountability), Immigration* and sets of regional proxies *Europe, Asia, N.America, or S.America, former SU*.

In order to confirm my hypotheses, I use additional tests for robustness:

- a) I run all sets of my models once more, adding lagged dependent variable. This may reinforce my main arguments.
- b) I run the main sets of my regressions using both interpolated and non-interpolated datasets.

Methods

To test my hypotheses, I use linear regression models with a time-series cross-country dataset. In order to confirm my hypotheses, I use additional tests for robustness:

- a) I run all sets of my models once more, adding lagged dependent variable. This may reinforce my main arguments.
- b) I run the main sets of my regressions using both interpolated and non-interpolated datasets.

I also run the following tests for causality between modernization (*Index of Modernization*) and tolerance (*Tolerance Index*): Seemingly unrelated regressions and ‘residual tests’.

The basic idea of the “seemingly unrelated regressions” approach is to estimate a system of reciprocal regressions, one from changing tolerance to changing modernization and another going the opposite direction, and then compare the regression coefficients. A stronger and more significant coefficient identifies a driving change. In the first step, we look at how changes in values and changes in rights affect each other, controlling for each variable’s self-determination. Formally speaking, we model modernization at time t_2 as a function of modernization at time t_1 and the change in tolerance from time t_1 to time t_2 . Going the other direction, we model tolerance at time t_2 as a function of tolerance at time t_1 and the change in modernization from time t_1 to time t_2 . In both models, we explain the dependent variable under control of its prior level, which is equivalent to explaining the *change* in the dependent variable because we explain its later level insofar as it *deviates* from its earlier level (for a detailed description of this approach, see Welzel, 2011).

The idea is to run two models: From the DV (Tolerance) measured prior to the IV (Modernization) measured later and the DV (Modernization) measured prior to the IV (Tolerance) measured later. This should be done using a system of “seemingly unrelated regressions” to control the correlated error terms in reciprocal systems. Then one compares the coefficients in the two models to decide if X_{t1} has a stronger effect on Y_{t2} or if Y_{t1} has a stronger effect on X_{t2} .

The second causality test is a “residuals test”. I plan to directly test the suggestion that modernization changes in response to its misfit with tolerance, whereas tolerance does not change in response to its misfit with modernization. I measure the misfit by regressing the Tolerance Index in t_0 on the estimated Modernization Index of this year and save the residuals (for a more detailed description of this approach, see Welzel, 2011).

*Table 3. Tolerance and Modernization
Dependent variable – Modernization Index*

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
	<i>Beta Coefficients Standardized</i>					
Tolerance Index _(t-2)	-0.451** (0.025)	-0.829** (0.029)	-0.541** (0.022)	-	-	-
Gender Equality _(t-2)	-	-	-	-0.389** (0.038)	-0.729** (0.038)	-0.433** (0.032)
Attitude towards Homosexuals _(t-2)	-	-	-	-0.315** (0.024)	-0.234** (0.020)	-0.217** (0.022)
Xenophobia _(t-2)	-	-	-	0.208** (0.042)	-0.092** (0.040)	0.033 (0.039)
Europe	-	0.626** (1.197)		-	0.523** (1.039)	-
Asia	-	0.882** (1.671)		-	0.936** (1.620)	-
N.America	-	0.245** (2.355)		-	0.205** (2.036)	-
S.America	-	-	-0.536** (1.260)	-	-	-0.480** (1.176)
Former SU	-	-	-0.124** (1.116)	-	-	-0.083** (1.097)
<i>R-squared</i>	0.203	0.471	0.473	0.330	0.550	0.521
<i>Adjusted R-squared</i>	0.202	0.467	0.470	0.327	0.546	0.517
<i>Observations</i>	571	571	571	675	675	675

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey

These results confirm my basic hypothesis that tolerance has a positive impact on modernization. The adjusted R-square, which shows that the variation explained is relatively high, is no less than 0.202 in Model 1 and up to 0.546 in Model 5. Tolerance has a strong significance when including all sets of regional proxies; the Europe, Asia, and N.America proxies have a positive impact; and the S.America and Former SU proxies have a negative impact. These findings are quite predictable: All regions that are expected to be relatively rich have positive values, while developing regions have negative values.

When I split the Tolerance Index into its parts, one may see that Gender Equality has the most predictive power because it is significant, has the predicted sign, and has the strongest coefficients. This sounds reasonable: The empowerment of women, who make up about half of the world's population, seems to have a stronger effect than having a tolerant attitude towards homosexuals and immigrants. Attitude towards homosexuals is also significant, has the predicted sign, but has less strong coefficients than does Gender Equality. Level of xenophobia is the least significant predictor: In Model 6 it lost significance, while in Model 4 it is significant, albeit with an unpredicted sign, meaning that xenophobia has a positive impact on modernization. Emphasizing regional proxies, it should be stressed that tolerance has a positive impact in Europe, Asia, and N.America, but has a negative impact in S.America and the former Soviet Union.

Including LDV confirms the main argument that the Tolerance Index remains significant with a predicted sign, but among separate tolerance variables only Gender Equality is significant. That

supports the finding that gender equality is the strongest predictor among those variables. Attitude to homosexuals and xenophobia are insignificant³.

I also run additional robustness tests, specifically regressions on the non-interpolated dataset. The dataset with non-interpolated tolerance variables is much smaller, which affected the significance of my results. However, Gender Equality and Attitude towards Homosexuals are significant with the predicted sign, while Xenophobia is significant with an unpredicted sign. All models with lagged DV are insignificant.

Next I test institutions, our proposed causal mechanisms. I suppose that strong (political) institutions are needed for increasing tolerance in societies. Therefore, tolerance becomes a crucial factor for modernization's success in those countries where tolerance-friendly institutions persist. In other words, if there are no institutions, then there is no tolerance and, thus, no successful modernization. To test our hypotheses, I choose the following institutions: political openness (Voice and Accountability), Control of Corruption, Rule of Law, and Regulatory Quality. I sequentially add these variables one by one.

The first set of models includes Europe and Asia regional proxies (see Table 4).

Table 4. Institutions, Europe, Asia, N.America
Dependent variable – Modernization Index

	<i>Model 7</i>	<i>Model 8</i>	<i>Model 9</i>	<i>Model 10</i>	<i>Model 11</i>	<i>Model 12</i>	<i>Model 13</i>	<i>Model 14</i>
	<i>Standardized Beta Coefficients</i>							
Tolerance Index _(t-2)	-0.611** (0.036)	-0.273** (0.036)	-0.344** (0.035)	-0.498** (0.033)	-	-	-	-
Gender Equality _(t-2)	-	-	-	-	-0.664** (0.039)	-0.461** (0.037)	-0.503** (0.037)	-0.529* (0.040)
Attitude towards Homosexuals _(t-2)	-	-	-	-	-0.146* (0.022)	-0.015 (0.019)	-0.010 (0.020)	-0.126* (0.020)
Xenophobia _(t-2)	-	-	-	-	-0.098** (0.040)	-0.048 (0.036)	-0.090** (0.036)	-0.130** (0.039)
Voice and Accountability _(t-2)	0.297** (0.736)	-	-	-	0.195** (0.675)	-	-	-
Control of Corruption _(t-2)	-	0.591** (0.520)	-	-	-	0.510** (0.456)	-	-
Rule of Law _(t-2)	-	-	0.535** (0.568)	-	-	-	0.471** (0.521)	-
Regulatory Quality _(t-2)	-	-	-	0.430** (0.596)	-	-	-	0.328** (0.599)
Europe	0.528** (1.232)	0.433** (1.095)	0.393** (1.150)	0.513** (1.116)	0.486** (1.049)	0.422** (0.939)	0.393** (0.973)	0.496** (0.989)
Asia	0.833** (1.634)	0.586** (1.570)	0.561** (1.632)	0.752** (1.551)	0.935** (1.598)	0.729** (1.500)	0.726** (1.536)	0.879** (1.550)
North America	0.207** (2.319)	0.156** (2.076)	0.141** (2.133)	0.195** (2.154)	0.181** (2.042)	0.134** (1.836s)	0.123** (1.884)	0.328** (1.942)
<i>R-squared</i>	0.505	0.608	0.596	0.567	0.564	0.650	0.638	0.596
<i>Adjusted R-squared</i>	0.501	0.605	0.592	0.563	0.559	0.646	0.635	0.592
<i>Observations</i>	571	571	571	571	675	675	675	675

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

³ All robustness tests are presented in Appendix 1

These results confirm my second basic hypothesis that strong institutions can be regarded as a causal mechanism behind the positive relationship between tolerance and modernization. In models with the Tolerance Index (Models 7-10), regressions show the strong positive impact of political openness (Model 7), the control of corruption (Model 8), the rule of law (Model 9), and regulatory quality (Model 10), with all coefficients being significant and having predicted signs. Regional proxies (Europe, Asia, and N.America) are significant and have positive signs, which means that the hypothesis is true for Europe, Asia, and N.America.

When I split the Tolerance Index into its parts, one may see yet again that gender equality has the most predictive power because it is significant, has predicted signs, and has the strongest coefficients. Level of xenophobia has less predictive power, even though in all models the signs are as predicted. The attitude towards homosexuals has even less predictive power, being insignificant in Models 12 and 13 and not having the predicted signs. All control variables are significant and have signs as predicted. Regional proxies (Europe, Asia, and N.America) are significant and have positive signs, which means that this has a modernization effect on these countries. Among independent variables, Gender Equality has the most predictive power.

After the inclusion of the LDV, the Tolerance Index lost its significance. Institutions, such as the control of corruption and the Rule of law, are nevertheless significant. Gender equality remains the only predictor of technological modernization. A society's attitude towards homosexuals and xenophobia is insignificant. Among institutional variables, only the control of corruption and the rule of law remain significant. These findings partly support my main argument that tolerance, represented only as gender equality, and institutions have an impact on modernization.

The results of this test demonstrate that tolerance in fact has a positive effect on modernization. Among the different kinds of tolerance – gender equality, attitude towards homosexuals, and level of xenophobia – the first one, gender equality, has the strongest impact on modernization. The other kinds of tolerance – attitude towards homosexuality and level of xenophobia – have a less impressive impact.

Institutions do matter and strong political institutions are likely to be a causal link between tolerance and modernization. Such institutions, like political openness (voice and accountability), control of corruption, the rule of law, and regulatory quality, seem to create a tolerance-friendly environment, which in turn promotes modernization.

Two patterns of modernization

The next step in our analysis is to split our dependent variable – the Index of Modernization – into two original parts: The Index of innovation and the Index of Investment. I assume that, with the Index of Innovation serving as the dependent variable, tolerance, represented by the Tolerance Index, gender equality, attitude towards homosexuality, and level xenophobia, will have even more predictive power. The role of institutions will be even more important as a causal mechanism between tolerance and innovations. Also, I assume that the Index of Investment will be much less associated with tolerance and strong institutions. I expect that it

should either not be significance or convey a negative relationship between investment and tolerance.

Table 5. Tolerance and Innovations
Dependent variable – Innovation Index

	<i>Model 15</i>	<i>Model 16</i>	<i>Model 17</i>	<i>Model 18</i>	<i>Model 19</i>	<i>Model 20</i>
	<i>Standardized Beta Coefficients</i>					
Tolerance Index _(t-2)	-0.504** (0.036)	-0.915** (0.040)	-0.561** (0.031)	-	-	-
Gender Equality _(t-2)	-	-	-	-0.315** (0.054)	-0.653** (0.054)	-0.361** (0.046)
Attitude to Homosexuals _(t-2)	-	-	-	-0.409** (0.034)	-0.329** (0.028)	-0.263** (0.032)
Xenophobia _(t-2)	-	-	-	0.162** (0.061)	-0.127** (0.058)	-0.031 (0.056)
Europe	-	0.580** (1.664)	-	-	0.479** (1.477)	-
Asia	-	0.920** (2.323)	-	-	0.913** (2.303)	-
N.America	-	0.265** (3.275)	-	-	0.235** (2.894)	-
S.America	-	-	-0.520** (1.775)	-	-	-0.474** (1.681)
Former SU	-	-	-0.217** (1.573)	-	-	-0.177** (1.567)
<i>R-squared</i>	0.254	0.535	0.524	0.368	0.585	0.553
<i>Adjusted R-squared</i>	0.252	0.531	0.522	0.365	0.581	0.549
<i>Observations</i>	571	571	571	675	675	675

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey.

Inclusion of the Innovation Index as a new dependent variable slightly improves the model (compared to Table 3). The adjusted R-squared value becomes even higher (in Models 15-17) and the Tolerance Index has stronger coefficients. All regional proxies are significant and have the expected: Europe, Asia, and N.America see a positive effect on innovation growth, while S.America and the former SU countries see a negative effect.

When I split the Tolerance Index into its parts, one may see again that gender equality has the highest predictive power in all models (Models 18-20). Attitude towards homosexuals is significant in all models with a predicted sign. Level of xenophobia shows different values: In Model 18 it is significant and lack the expected sign, meaning that level of xenophobia is positively correlated with innovation, whereas in Model 19 it is significant, with the predicted sign. In Model 20 it is insignificant and with the predicted sign.

All regional proxies are significant and have the expected signs: Europe, Asia, and N.America see a positive effect on innovation growth, while S.America and the former SU countries see a negative effect.

In models containing LDV, all tolerance variables are insignificant.

I also run additional robustness test on the non-interpolated dataset. The results are similar to those for the interpolated dataset. Models show the significance of Gender Equality and Attitude towards homosexuals and all signs are as predicted. Level of xenophobia is significant only in one model, but with an unpredicted sign. All models with lagged DV are insignificant.

The hypothesis regarding a positive correlation between innovation and tolerance is confirmed in these models. But what can one say about institutions? The next models show the significance of institutions for innovation. The first set of models includes Europe, Asia, and N.America as regional proxies (see Table 6).

Table 6. Institutions, Tolerance, and Innovation. Europe, Asia, and N.America.
Dependent variable – Innovation Index

	Model 21	Model 22	Model 23	Model 24	Model 25	Model 26	Model 27	Model 28
	<i>Standardized Beta Coefficients</i>							
Tolerance Index (t-2)	-0.697** (0.050)	-0.273** (0.049)	-0.441** (0.048)	-0.626** (0.046)	-	-	-	-
Gender Equality (t-2)	-	-	-	-	-0.578** (0.055)	-0.376** (0.051)	-0.420** (0.051)	-0.479** (0.058)
Attitude to Homosexuals (t-2)	-	-	-	-	-0.230** (0.031)	-0.104** (0.027)	-0.099** (0.028)	-0.236** (0.028)
Xenophobia (t-2)	-	-	-	-	-0.134** (0.056)	-0.082** (0.050)	-0.125** (0.051)	-0.160** (0.056)
Voice and Accountability (t-2)	0.296** (1.018)	-	-	-	0.222** (0.954)	-	-	-
Control of Corruption (t-2)	-	0.591** (0.707)	-	-	-	0.527** (0.633)	-	-
Rule of Law (t-2)	-	-	0.523** (0.779)	-	-	-	0.485** (0.727)	-
Regulatory Quality (t-2)	-	-	-	0.376** (0.841)	-	-	-	0.285** (0.860)
Europe	0.483** (1.705)	0.433** (1.489)	0.353** (1.577)	0.482** (1.575)	0.436** (1.482)	0.374** (1.305)	0.345** (1.358)	0.455** (1.421)
Asia	0.872** (2.261)	0.586** (2.135)	0.607** (2.238)	0.807** (2.188)	0.912** (2.256)	0.700** (2.085)	0.697** (2.144)	0.864** (2.226)
North America	0.227** (3.209)	0.156** (2.824)	0.163** (2.925)	0.221** (3.039)	0.209** (2.884)	0.163** (2.551)	0.152** (2.631)	0.215** (2.789)
<i>R-squared</i>	0.569	0.608	0.596	0.608	0.602	0.691	0.678	0.619
<i>Adjusted R-squared</i>	0.565	0.605	0.592	0.605	0.598	0.688	0.675	0.615
<i>Observations</i>	571	571	571	571	675	675	675	675

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

These results confirm my second basic hypothesis that strong institutions can be regarded as a causal mechanism for a positive correlation between tolerance and innovation. Adjusted R-squared values vary from 0.565 to 0.605 in models with the Tolerance Index (Models 21-24) and from 0.598 to 0.688 in models with the 3 separate tolerance variables (Models 25-28). In Models 21-24 the Tolerance Index is significant and has the predicted signs. Regression analysis shows the strong positive impact of political openness (Model 21), control of corruption (Model 22), the rule of law (Model 23), and regulatory quality (Model 24). Moreover, all coefficients are significant and have the predicted signs. Regional proxies (Europe, Asia and N.America) are

significant and have positive signs, which means that this hypothesis is true for Europe, Asia and N.America.

When I split the Tolerance Index into its parts, it becomes evident again that Gender Equality has the most predictive power because it is significant, has the predicted signs, and has the strongest coefficients. Level of xenophobia and attitude towards homosexuals have less predictive power, even though in all models the signs were as predicted. Again, the regional proxies (Europe, Asia, and N.America) are significant and have positive signs, which mean that the hypothesis is correct for Europe, Asia, and N.America. Among institutional indicators, control of corruption has the strongest coefficients in both sets of models.

After including LDV in these sets of models, all tolerance variables are insignificant with the exception of Gender equality. However, all institutional variables, except for voice and accountability, are significant. Again, institutions are likely to be more important than culture for the development of innovation.

Next, I test the existence of the second model – the “catching-up” model. I will use the Investment Index as a dependent variable in the next sets of models. I expect that tolerance will be lower and the impact of institutions will be much less.

Table 7. Tolerance and Investment
Dependent variable – Investment Index

	Model 29	Model 30	Model 31	Model 32	Model 33	Model 34
	<i>Standardized Beta Coefficients</i>					
Tolerance Index _(t-2)	0.105* (0.026)	0.161** (0.036)	-0.003 (0.027)	-	-	-
Gender Equality _(t-2)	-	-	-	-0.259** (0.042)	-0.308** (0.051)	-0.260** (0.041)
Attitude towards Homosexuals _(t-2)	-	-	-	0.236** (0.027)	0.252** (0.026)	0.102 (0.029)
Xenophobia _(t-2)	-	-	-	0.159** (0.047)	0.092 (0.055)	0.190** (0.050)
Europe	-	0.203** (1.496)	-	-	0.190** (1.402)	-
Asia	-	-0.017 (2.089)	-	-	0.175* (2.186)	-
N.America	-	-0.031 (2.944)	-	-	-0.065 (2.747)	-
S.America	-	-	-0.108* (1.552)	-	-	-0.073 (1.505)
Former SU	-	-	-0.258** (1.375)	-	-	0.262** (1.403)
<i>R-squared</i>	<i>0.011</i>	<i>0.057</i>	<i>0.088</i>	<i>0.051</i>	<i>0.079</i>	<i>0.116</i>
<i>Adjusted R-squared</i>	<i>0.009</i>	<i>0.050</i>	<i>0.084</i>	<i>0.046</i>	<i>0.070</i>	<i>0.110</i>
<i>Observations</i>	<i>571</i>	<i>571</i>	<i>571</i>	<i>675</i>	<i>675</i>	<i>675</i>

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, World Values Survey.

These results are very controversial. The adjusted R-squared value is very low, ranging from 0.009 to 0.084 in models with the Tolerance Index (Models 29-31) and from 0.046 to 0.110 in models with the 3 separate tolerance variables (Models 32-34). This means that these models explain no more than 11% of the variation in the most predictive model.

The Tolerance Index is significant in Models 29-31, and has its predicted sign, which means that a rise in investment is likely to be negatively correlated with tolerance. Surprisingly, this is true for Europe, but is insignificant for Asia and N.America. In Model 31 the Tolerance Index is insignificant and does not have the predicted sign.

When I split the Tolerance Index into its parts, one may see yet again that Gender Equality has the most predictive power, being significant but also lacking the predicted sign. This means that gender equality is still important for catching-up models of modernizations that are based on increased investment rates. But the other variables – attitude towards homosexuals and level of xenophobia – are in almost all cases significant and have the expected sign. A rise in investments is associated with low levels of tolerance to homosexuals and immigrants.

After the inclusion of LDV in models where the Investment Index serves as the dependent variable, my argument finds some confirmation. An increase in investment is associated with intolerance. Gender equality is significant and has unpredicted signs, while attitude towards homosexuals is significant but also has the predicted sign. Level of xenophobia is insignificant.

In the next models I include institution variables to test the proposition that they are less important in this pattern.

Table 8. Institutions, Tolerance, and Investment. Europe, Asia, and N.America.
Dependent variable – Investment Index

	Model 35	Model 36	Model 37	Model 38	Model 39	Model 40	Model 41	Model 42
	<i>Standardized Beta Coefficients</i>							
Tolerance Index _(t-2)	0.186* (0.047)	0.234** (0.053)	0.247** (0.050)	0.321** (0.045)	-	-	-	-
Gender Equality _(t-2)	-	-	-	-	-0.327** (0.053)	-0.302** (0.056)	-0.300** (0.055)	-0.207** (0.057)
Attitude towards Homosexuals _(t-2)	-	-	-	-	0.227** (0.030)	0.257** (0.030)	0.260** (0.030)	0.306** (0.028)
Xenophobia _(t-2)	-	-	-	-	0.094 (0.055)	0.093 (0.055)	0.092 (0.055)	0.073 (0.055)
Voice and Accountability _(t-2)	0.034 (0.951)	-	-	-	-0.056 (0.934)	-	-	-
Control of Corruption _(t-2)	-	0.077 (0.754)	-	-	-	0.011 (0.697)	-	-
Rule of Law _(t-2)	-	-	0.095 (0.811)	-	-	-	0.017 (0.783)	-
Regulatory Quality _(t-2)	-	-	-	0.207** (0.814)	-	-	-	0.166** (0.847)
Europe	0.192** (1.592)	0.178** (1.589)	0.162** (1.642)	0.149* (1.525)	0.200** (1.436)	0.187** (1.436)	0.185** (1.463)	0.176** (1.399)
Asia	-0.022 (2.112)	-0.055 (2.279)	-0.073 (2.330)	-0.079 (2.119)	0.175* (2.186)	0.170* (2.294)	0.168* (2.310)	0.146 (2.192)
North America	-0.036 (2.998)	-0.043 (3.014)	-0.050 (3.045)	-0.056 (2.943)	-0.059 (2.795)	-0.067 (2.806)	-0.068 (2.835)	-0.077 (2.746)
<i>R-squared</i>	<i>0.057</i>	<i>0.059</i>	<i>0.061</i>	<i>0.079</i>	<i>0.080</i>	<i>0.079</i>	<i>0.079</i>	<i>0.090</i>
<i>Adjusted R-squared</i>	<i>0.049</i>	<i>0.051</i>	<i>0.053</i>	<i>0.071</i>	<i>0.070</i>	<i>0.069</i>	<i>0.069</i>	<i>0.081</i>
<i>Observations</i>	<i>571</i>	<i>571</i>	<i>571</i>	<i>571</i>	<i>675</i>	<i>675</i>	<i>675</i>	<i>675</i>

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, World Values Survey, Worldwide Governance Indicators.

Again, the adjusted R-squared value is very low, spanning from 0.049 to 0.071 in models with the Tolerance Index (Models 35-38) and from 0.069 to 0.081 in models with the 3 separate tolerance variables (Models 39-42). This means that these models explain no more than 8.1% of the variation in the most predictive model.

The Tolerance Index is significant and has its predicted sign in all models (Models 35-38), which means that investment is correlated with intolerance. Institutional variables are insignificant in all models with the exception of regulatory quality, which is significantly important for a rise in investment (Model 38). Surprisingly, a correlation between intolerance and investment is observed in Europe.

When I split the Tolerance Index into its parts, Gender Equality is again seen to have most predictive ability because it is significant and does not have the predicted sign. This means that gender equality is still important for the catching-up model of modernization, which is based on increased investment rates. This is true even after the inclusion of institutional variables in the models. Other variables – attitude towards homosexuals and level of xenophobia – have the predicted signs, but while attitude towards homosexuals is in all cases significant, level of xenophobia is not significant in all cases. Again, all institutional variables are insignificant in all models, with the exception of regulatory quality, which is significantly important for a rise in investment (Model 42). Surprisingly, a correlation between intolerance and investment is extant in Europe and, in some cases, in Asia as well.

After including LDV in this set of models, all institutional variables become insignificant, but some tolerance variables, in particular attitude towards homosexuals, are significant with the expected sign. This confirms my main argument that an increase in investment is associated with intolerance.

Results

The results of this analysis demonstrate that tolerance does in fact have a positive effect on modernization. Among the various kinds of tolerance – gender equality, attitude towards homosexuals, and level of xenophobia – the first one, gender equality, has the strongest impact on modernization. The other kinds of tolerance – attitude towards homosexuality and level of xenophobia – have a less impressive impact.

Institutions do matter, as strong political institutions are likely to serve as a causal link between tolerance and modernization. Such institutions, as political openness (voice and accountability), control of corruption, the rule of law, and regulatory quality, seem to create a tolerance-friendly environment, which in turn promotes modernization.

Causality

The research findings show that there is a strong link between modernization and tolerance. But this leads to the following question: What is the causal link between these two phenomena? Does tolerance have an impact on modernization, or does causality run in the other direction? I argue that it is tolerance that affects modernization. In order to test this assumption, I use the following

analysis in which I see how a change in the residual of my dependent variable is affected by changing the dependent and independent variables.

The first causality test is a ‘residual test’. First, I create a new dataset using values from the Index of Modernization (MI) for each country at the earliest point in time (t0) and the latest point in time (t1). I do the same for the Tolerance Index (TI). I also create two variables, “delta MI” and “delta TI”, as MI (t0-t1) and TI (t0-t1), respectively. These variables show the change in modernization and tolerance over the time.

Secondly, I run two regression tests:

a) The Tolerance Index over the Modernization Index at the earliest point of time

(1) TI (t0) → MI (t0)

and save the residuals as a new variable (resMI t0).

b) The Tolerance Index over the Modernization Index at the latest point of time

(2) TI (t1) → MI (t1)

and save the residuals as a new variable (resMI t1).

I then calculate a new variable, “delta of residuals” (del resMI = resMI t0 – resMI t1), which shows the change in residuals over time. This variable shows the change in modernization.

Thirdly, I test which factor has more explanatory power in the “modernization – tolerance” link by running a new regression:

(3) Del resMI = delMI+delTI

*Table 12. Causality test between Modernization and Tolerance.
Dependent variable – Delta residuals MI*

	<i>Standardized Beta Coefficients</i>
Delta Tolerance Index	0.236** (0.030)
Delta Modernization Index	0.975** (0.031)
<i>R-squared</i>	0.952
<i>Adjusted R-squared</i>	0.950
<i>Observations</i>	51

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, and World Values Survey.

The weaker coefficient is connected with the variable of causation, while the stronger coefficient is connected with the variable being caused. In our case it means that tolerance, with the weaker coefficient, is the driving force of modernization, which has the stronger coefficient. In the reciprocating relationship between Modernization and Tolerance, the results of this thought-

experiment identify tolerance as the driver of modernization; the casual arrow goes from tolerance to modernization.

The second causality test is the “seemingly unrelated regressions” approach.

$$(3) MI = MI (t-2) + \text{delTol} + \text{delInst}$$

$$(4) Tol = Tol (t-2) + \text{delMI} + \text{delInst}$$

I ran these regressions in R and in both equations the coefficients (delMI and delTol) are insignificant. In second equation, delInst is positive and significant, which may be interpreted as the impact of institutions on tolerance.

Conclusion

A change in values towards more tolerance is essential for successful modernization. Tolerance has a significant impact on modernization and the most predictive factor is gender equality, which proved to be important in three groups of models compared (Index of Modernization, Innovation Index, and Investment Index). As for attitude towards homosexuals and level of xenophobia, their impact differs depending on the modernization pattern.

Why has gender equality proven to be more important than the other factors? This phenomenon finds its explanation in the academic literature. Numerous studies have shown that the process of industrialization is followed by a radical increase in female participation in the labor force of non-agricultural sectors. Female labor-force participation affects fertility rates: As income-earning opportunities for women increase, so does the opportunity cost of child rearing (Ross, 2008). Female movement to the formal labor market also has positive impact on higher literacy rates and school enrollment among women. Moreover, as we know, female labor-force participation is associated with rises in the political activism of women, the empowerment of women, and democratization in general (Inglehart, Welzel, 2010; Inglehart, Norris, 2003).

Gender equality not only maintained, but also increased in significance for postindustrial societies. I suggest two explanatory mechanisms:

- Higher literacy rates and school-enrollment rates among woman, and, as an eventual consequence, higher university enrollment rates for women, all lead to an enlargement of the creative class. If the process of industrialization is associated with low-wage jobs for women (often in export-oriented sectors) and high-wage positions for men (including managers, engineers, designers, etc.), then the process of post-industrialization provides much more opportunities for women due to expanded access to the education system.
- Women gain much more political influence in societies, which has a strong impact on political institutions. In general, the empowerment of women is associated with democratization.

The emphasis on gender equality is part of a broader tendency of increasing tolerance towards out-groups, including foreigners and homosexuals (Inglehart 2008: 140). Gender equality is such an important predictor for modernization because women are in the majority, not the minority, and lowering entry barriers for women to the labor force leads to their inclusion – the inclusion

of a majority of the population – in the post-industrial economy. My results show that this is extremely important for economic modernization.

In the tolerant model, which focuses on high levels of tolerance and strong institutions, tolerance to homosexuals is likely to be positively correlated with innovation. In contrast, tolerance to homosexuals is likely to be negatively correlated with investment in the catching-up model.

Tolerance to immigrants has the least impact on modernization. In fact, modernization is likely to be positively correlated with a low tolerance to immigrants.

Institutions do matter in that they seem to be the causal mechanism in the relationship between tolerance and modernization. Institutions play a significant role in the tolerant model, where a post-industrial economy is associated with a post-industrial society. However, some countries try to build a post-industrial economy without building a post-industrial society by putting emphasis not on innovation, but on higher investment rates. In this case, institutions seem to be much less important.

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Appendix 1.

Table 13. Tolerance and Modernization. LDV robustness test

Dependent variable – Modernization Index

	<i>Model 43</i>	<i>Model 44</i>	<i>Model 45</i>	<i>Model 46</i>	<i>Model 47</i>	<i>Model 48</i>
	<i>Standardized Beta Coefficients</i>					
Tolerance Index _(t-2)	-0.033* (0.010)	-0.064** (0.017)	-0.063** (0.012)	-	-	-
Modernization Index _(t-2)	0.929** (0.015)	0.900** (0.019)	0.887** (0.018)	0.918** (0.017)	0.878** (0.020)	0.878** (0.019)
Gender Equality _(t-2)	-	-	-	-0.057** (0.017)	-0.100** (0.023)	-0.075** (0.017)
Attitude towards Homosexuals _(t-2)	-	-	-	0.001 (0.011)	-0.007 (0.011)	0.007 (0.011)
Xenophobia _(t-2)	-	-	-	0.012 (0.019)	-0.014 (0.022)	-0.010 (0.020)
Europe	-	0.073** (0.623)	-	-	0.080** (0.623)	-
Asia	-	0.064* (0.911)	-	-	0.108** (1.060)	-
N.America	-	0.028 (1.105)	-	-	0.028 (1.102)	-
S.America	-		-0.067** (0.688)	-	-	-0.073** (0.697)
Former SU	-		-0.018 (0.506)	-	-	-0.027 (0.559)
<i>R-squared</i>	<i>0.892</i>	<i>0.894</i>	<i>0.894</i>	<i>0.893</i>	<i>0.895</i>	<i>0.896</i>
<i>Adjusted R-squared</i>	<i>0.891</i>	<i>0.893</i>	<i>0.894</i>	<i>0.892</i>	<i>0.894</i>	<i>0.895</i>
<i>Observations</i>	<i>571</i>	<i>571</i>	<i>571</i>	<i>571</i>	<i>571</i>	<i>571</i>

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey.

Table 14. Tolerance and Modernization. Non-interpolated data robustness test.

Dependent variable – Modernization Index

	<i>Model 49</i>	<i>Model 50</i>	<i>Model 51</i>	<i>Model 52</i>	<i>Model 53</i>	<i>Model 54</i>
	<i>Standardized Beta Coefficients</i>					
Modernization Index _(t-2)	-	-	-	0.950** (0.042)	0.950** (0.052)	0.908** (0.048)
Gender Equality _(t-2)	-0.291* (0.072)	-0.560** (0.072)	-0.305** (0.063)	0.003 (0.028)	-0.027 (0.037)	-0.013 (0.029)
Attitude towards Homosexuals _(t-2)	-0.549** (0.058)	-0.469** (0.049)	-0.440** (0.057)	-0.019 (0.025)	-0.008 (0.025)	-0.020 (0.027)
Xenophobia _(t-2)	0.256** (0.056)	0.029 (0.053)	0.084 (0.053)	-0.005 (0.022)	-0.030 (0.024)	-0.023 (0.023)
Europe	-	0.457** (2.637)	-	-	0.046 (1.322)	
Asia	-	0.744** (4.108)	-	-	0.048 (2.218)	
N.America	-	0.176* (4.878)	-	-	-0.057 (2.326)	
S.America	-	-	-0.416** (2.928)	-		0.069 (1.450)
Former SU	-	-	-0.095	-		0.023

			(2.707))			(1.181)
<i>R-squared</i>	0.463	0.636	0.605	0.924	0.929	0.927
<i>Adjusted R-squared</i>	0.445	0.610	0.581	0.920	0.923	0.921
<i>Observations</i>	90	90	90	90	90	90

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey,.

Table 15. Institutions, Europe, Asia, N.America. LDV robustness test.

Dependent variable – Modernization Index

	<i>Model 55</i>	<i>Model 56</i>	<i>Model 57</i>	<i>Model 58</i>	<i>Model 59</i>	<i>Model 60</i>	<i>Model 61</i>	<i>Model 62</i>
	<i>Standardized Beta Coefficients</i>							
Tolerance Index _(t-2)	-0.041 (0.019)	-0.024 (0.019)	-0.020 (0.019)	-0.052 (0.018)	-	-	-	-
Modernization Index _(t-2)	0.891** (0.019)	0.867** (0.022)	0.864** (0.021)	0.885** (0.021)	0.872** (0.021)	0.849** (0.023)	0.845** (0.022)	0.871** (0.022)
Gender Equality _(t-2)	-	-	-	-	-0.089** (0.024)	-0.083** (0.024)	-0.081** (0.023)	-0.091** (0.024)
Attitude towards Homosexuals _(t-2)	-	-	-	-	0.010 (0.012)	0.015 (0.015)	0.025 (0.012)	-0.001 (0.011)
Xenophobia _(t-2)	-	-	-	-	-0.016 (0.022)	-0.011 (0.021)	-0.017 (0.021)	-0.017 (0.022)
Voice and Accountability _(t-2)	0.042 (0.351)	-	-	-	0.042 (0.369)	-	-	-
Control of Corruption _(t-2)	-	0.072** (0.315)	-	-	-	0.068** (0.314)	-	-
Rule of Law _(t-2)	-	-	0.082** (0.329)	-	-	-	0.085** (0.339)	-
Regulatory Quality _(t-2)	-	-	-	0.032 (0.330)	-	-	-	0.022 (0.352)
Europe	0.065** (0.633)	0.070** (0.620)	0.060** (0.626)	0.074** (0.623)	0.075** (0.626)	0.081** (0.620)	0.073** (0.619)	0.081** (0.624)
Asia	0.065* (0.909)	0.057 (0.908)	0.047 (0.913)	0.067* (0.912)	0.113** (1.062)	0.106** (1.054)	0.100** (1.052)	0.109** (1.061)
North America	0.024 (1.110)	0.025 (1.101)	0.020 (1.104)	0.027 (1.104)	0.024 (1.109)	0.025 (1.099)	0.020 (1.103)	0.028 (1.102)
<i>R-squared</i>	0.894	0.895	0.896	0.894	0.896	0.896	0.897	0.895
<i>Adjusted R-squared</i>	0.893	0.894	0.895	0.893	0.894	0.895	0.896	0.894
<i>Observations</i>	571	571	571	571	571	571	571	571

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

Table 16. Tolerance and Innovations. LDV robustness test.

Dependent variable – Innovation Index

	<i>Model 63</i>	<i>Model 64</i>	<i>Model 65</i>	<i>Model 66</i>	<i>Model 67</i>	<i>Model 68</i>
	<i>Standardized Beta Coefficients</i>					
Tolerance Index _(t-2)	-0.003 (0.009)	-0.023 (0.016)	-0.008 (0.011)	-	-	-
Innovation Index _(t-2)	0.979** (0.010)	0.968** (0.012)	0.962** (0.012)	0.975** (0.010)	0.959** (0.013)	0.961** (0.012)

Gender Equality _(t-2)	-	-	-	-0.018 (0.015)	-0.043* (0.020)	-0.024 (0.015)
Attitude towards Homosexuals _(t-2)	-	-	-	0.004 (0.010)	0.000 (0.010)	0.016 (0.010)
Xenophobia _(t-2)	-	-	-	0.011 (0.017)	-0.001 (0.019)	-0.001 (0.018)
Europe	-	0.017 (0.556)	-	-	0.018 (0.550)	-
Asia	-	0.029 (0.832)	-	-	0.045* (0.945)	-
N.America	-	0.006 (0.999)	-	-	0.006 (1.000)	-
S.America	-	-	-0.021 (0.618)	-	-	-0.023 (0.625)
Former SU	-	-	-0.026 (0.459)	-	-	-0.031 (0.505)
<i>R-squared</i>	0.962	0.962	0.962	0.962	0.962	0.963
<i>Adjusted R-squared</i>	0.962	0.961	0.962	0.962	0.962	0.962
<i>Observations</i>	571	571	571	571	571	571

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

*Table 17. Institutions, Tolerance and Innovations. Europe, Asia and N.America. LDV robustness test.
Dependent variable – Innovation Index*

	<i>Model 69</i>	<i>Model 70</i>	<i>Model 71</i>	<i>Model 72</i>	<i>Model 73</i>	<i>Model 74</i>	<i>Model 75</i>	<i>Model 76</i>
	<i>Standardized Beta Coefficients</i>							
Tolerance Index _(t-2)	-0.011 (0.017)	0.010 (0.017)	0.008 (0.017)	-0.005 (0.017)	-	-	-	-
Innovation Index _(t-2)	0.962** (0.013)	0.936** (0.014)	0.937** (0.014)	0.950** (0.013)	0.955** (0.013)	0.931** (0.014)	0.932** (0.014)	0.948** (0.013)
Gender Equality _(t-2)	-	-	-	-	-0.037* (0.021)	-0.026 (0.021)	-0.027 (0.020)	-0.023 (0.022)
Attitude towards Homosexuals _(t-2)	-	-	-	-	0.009 (0.011)	0.018 (0.010)	0.022 (0.010)	0.010 (0.010)
Xenophobia _(t-2)	-	-	-	-	-0.002 (0.019)	0.002 (0.019)	-0.003 (0.019)	-0.005 (0.019)
Voice and Accountability _(t-2)	0.024 (0.314)	-	-	-	0.023 (0.330)	-	-	-
Control of Corruption _(t-2)	-	0.065** (0.277)	-	-	-	0.063** (0.278)	-	-
Rule of Law _(t-2)	-	-	0.065** (0.290)	-	-	-	0.067** (0.300)	-
Regulatory Quality _(t-2)	-	-	-	0.043** (0.280)	-	-	-	0.042** (0.303)
Europe	0.012 (0.564)	0.014 (0.548)	0.006 (0.553)	0.016 (0.550)	0.015 (0.553)	0.019 (0.543)	0.012 (0.543)	0.018 (0.546)
Asia	0.031 (0.831)	0.026 (0.820)	0.018 (0.823)	0.032 (0.824)	0.049* (0.947)	0.044* (0.931)	0.039 (0.930)	0.045* (0.937)
North America	0.004 (1.001)	0.004 (0.984)	0.001 (0.986)	0.005 (0.989)	0.004 (1.004)	0.004 (0.986)	0.001 (0.988)	0.005 (0.992)
<i>R-squared</i>	0.962	0.963	0.963	0.963	0.962	0.963	0.964	0.963
<i>Adjusted R-squared</i>	0.962	0.963	0.963	0.962	0.962	0.963	0.963	0.962
<i>Observations</i>	571	571	571	571	571	571	571	571

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

Table 18. Tolerance and Investment. LDV robustness test.

Dependent variable – Investment Index

	<i>Model 77</i>	<i>Model 78</i>	<i>Model 79</i>	<i>Model 80</i>	<i>Model 81</i>	<i>Model 82</i>
	<i>Standardized Beta Coefficients</i>					
Tolerance Index _(t-2)	0.024 (0.020)	0.099* (0.028)	-0.021 (0.021)	-	-	-
Investment Index _(t-2)	0.649** (0.033)	0.634** (0.033)	0.618** (0.033)	0.636** (0.033)	0.623** (0.033)	0.605** (0.034)
Gender Equality _(t-2)	-	-	-	-0.121** (0.035)	-0.081 (0.044)	-0.125** (0.035)
Attitude towards Homosexuals _(t-2)	-	-	-	0.128** (0.022)	0.125** (0.125)	0.075 (0.024)
Xenophobia _(t-2)	-	-	-	0.010 (0.040)	0.002 (0.046)	0.021 (0.044)
Europe	-	0.088 (1.161)	-	-	0.113** (1.198)	-
Asia	-	-0.074 (1.610)	-	-	0.009 (1.878)	-
N.America	-	-0.003 (2.269)	-	-	-0.012 (2.284)	-
S.America	-	-	-0.043 (1.222)	-	-	-0.049 (1.293)
Former SU	-	-	0.123** (1.102)	-	-	0.114** (1.230)
<i>R-squared</i>	0.426	0.442	0.442	0.435	0.446	0.448
<i>Adjusted R-squared</i>	0.424	0.437	0.438	0.431	0.439	0.442
<i>Observations</i>	571	571	571	571	571	571

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

Table 19. Institutions, Tolerance and Investment. Europe, Asia and N.America. LDV robustness test.

Dependent variable – Investment Index

	<i>Model 83</i>	<i>Model 84</i>	<i>Model 85</i>	<i>Model 86</i>	<i>Model 87</i>	<i>Model 88</i>	<i>Model 89</i>	<i>Model 90</i>
	<i>Standardized Beta Coefficients</i>							
Tolerance Index _(t-2)	0.102 (0.036)	0.046 (0.041)	0.081 (0.039)	0.080 (0.036)	-	-	-	-
Investment Index _(t-2)	0.634** (0.033)	0.638** (0.033)	0.635** (0.033)	0.638** (0.034)	0.623** (0.033)	0.627** (0.033)	0.625** (0.033)	0.631** (0.034)
Gender Equality _(t-2)	-	-	-	-	-0.081 (0.046)	-0.127 (0.049)	-0.099 (0.048)	-0.111 (0.049)
Attitude to Homosexuals _(t-2)	-	-	-	-	0.125* (0.025)	0.087 (0.025)	0.107* (0.025)	0.106* (0.024)
Xenophobia _(t-2)	-	-	-	-	0.002 (0.046)	-0.006 (0.046)	0.002 (0.046)	0.006 (0.046)
Voice and Accountability _(t-2)	0.004 (0.733)	-	-	-	0.001 (0.785)	-	-	-
Control of Corruption _(t-2)	-	-0.055 (0.586)	-	-	-	-0.084 (0.602)	-	-
Rule of Law _(t-2)	-	-	-0.020 (0.630)	-	-	-	-0.037 (0.670)	-
Regulatory Quality _(t-2)	-	-	-	-0.023	-	-	-	-0.050

				(0.658)				(0.731)
Europe	0.087 (1.234)	0.105* (1.227)	0.097 (1.269)	0.094* (1.190)	0.113* (1.227)	0.129** (1.223)	0.123* (1.251)	0.117* (1.203)
Asia	-0.075 (1.628)	-0.047 (1.755)	-0.062 (1.797)	-0.067 (1.651)	0.009 (1.880)	0.046 (1.980)	0.027 (1.999)	0.021 (1.904)
North America	-0.003 (2.311)	0.006 (2.327)	0.001 (2.355)	0.000 (2.301)	-0.012 (2.324)	0.000 (2.330)	-0.005 (2.365)	-0.007 (2.306)
<i>R-squared</i>	0.442	0.443	0.442	0.442	0.446	0.448	0.446	0.447
<i>Adjusted R-squared</i>	0.436	0.437	0.436	0.436	0.438	0.440	0.438	0.439
<i>Observations</i>	571	571	571	571	571	571	571	571

*0.05-level of significance. **0.01-level of significance.

Source: World Development Indicators, US National Science Board, World Values Survey, Worldwide Governance Indicators.

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