

PRACE NAUKOWE

Uniwersytetu Ekonomicznego we Wrocławiu

RESEARCH PAPERS

of Wrocław University of Economics

Nr 447

Asian Economies in the Context of Globalization



Publishing House of Wrocław University of Economics
Wrocław 2016

Copy-editing: Agnieszka Flasińska

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Cover design: Beata Dębska

Information on submitting and reviewing papers is available on websites

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Wrocław 2016

ISSN 1899-3192
e-ISSN 2392-0041

ISBN 978-83-7695-611-4

The original version: printed

Publication may be ordered in Publishing House
Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu
ul. Komandorska 118/120, 53-345 Wrocław
tel./fax 71 36-80-602; e-mail: econbook@ue.wroc.pl
www.ksiegarnia.ue.wroc.pl

Printing: TOTEM

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Introduction

It is our great pleasure to deliver another volume of Research Papers on Asia-Pacific economic issues. Each year we present you multiple points of view on that topic, trying to show how much the processes in Asia & Pacific affect the world economy. After nine years of hosting international scientific conference dealing with that region's affairs, we are still confident that these issues are important not only for the countries of the region, but also for economies worldwide.

This year we have chosen for you 15 articles. All of them were submitted for this year's conference entitled "Asian Economies in the Context of Globalization". Seeing that some authors describe the issues of countrywide importance and others of those having regional or global meaning, we have decided to group them according to the criterion of impact range.

The first chapter – Asian Economies in the Global Context – is a collection of papers on general regionalization or globalization issues. T. Sporek is trying to refresh the view of the globalization processes occurring at the crossroads of economy and politics. M. Bartosik-Purgat is analyzing sources of information about products and services in the light of cross-cultural research. E. Majchrowska is using Regional Comprehensive Economic Partnership case to show the importance of mega-regional blocks in global trade. In addition, we decided to add to this part the articles the subject of which is not so general, but it applies to trade relationships of a global nature. This will be the EU-India trade and investment agreement (G. Mazur), Poland-ASEAN agri-food products trade (K. Kita) or anti-dumping procedures against China under WTO rules (J. Skrzypczyńska).

Articles in the second chapter are – as the title implies – embedded in a regional context. P. Pasierbiak deals with trade regionalization in East Asia. S. Bobowski offers an insight into ASEAN-Japan Economic Partnership. A. Kuropka and A.H. Jankowiak analyse the impact of natural disasters on production networks in the region. As the last in this section we have placed the article about Singaporean Competitiveness Model applied in European economies (M. Żmuda). It may be not strictly connected with Asia & Pacific, but its concept is to transfer Asian experience to Europe at the regional level.

The last chapter – Asian Economies in the Local Context – is mostly about domestic matters of Asian countries. You will find there three articles about China (J. Bogołębska writing about Chinese monetary policy, A. Klimek describing cross-border mergers and acquisitions by Chinese state-controlled enterprises, S. Stępień and A. Sapa showing Chinese pork sector), one about Indonesia (*Development of Islamic banking in Indonesia* by I. Sobol) and one about North Korea (M. Kightley applying game theory in prediction of political changes in that state).

We think it is an interesting set of papers you will find valuable in your studies. We also hope that your scientific interests will continue to be associated with Asia and that is why we invite you to the 10th anniversary conference which will be held at the Wrocław University of Economics in November 2017.

We appreciate your time and consideration, as also time and effort of our peer reviewers. We look forward to the further submissions of interesting papers on Asia & Pacific. Thank you!

Bogusława Drelich-Skulska, Anna H. Jankowiak, Szymon Mazurek

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WHY THE REGIME CHANGE IN NORTH KOREA WILL NOT COME FROM SOCIETY – AN EVOLUTIONARY GAME THEORY EXPLANATION

DLACZEGO ZMIANA REŻIMU W KOREI PÓŁNOCNEJ NIE NASTĄPI POD WPŁYWEM SPOŁECZEŃSTWA – WYJAŚNIENIE ZA POMOCĄ EWOLUCYJNEJ TEORII GIER

DOI: 10.15611/pn.2016.447.15

JEL Classification: F54, P16, C73

Summary: The purpose of the article is to explain the mechanisms behind the stability of the North Korean regime with regard to social dynamics. The continuing survival of the regime decades after the fall of its former patron and sponsor, the Soviet Union, poses an interesting question regarding the mechanism preventing change. The author uses an evolutionary game theory model to show constraints in the evolution of institutions initiated by a change of behaviour in a population. As a result, she singles out three basic constraints of social change: the proportion of the population bearing a new trait or predisposed to change and the difference in payoff between the new and old model of behaviour. The author shows that the North Korean regime monitors those three factors very carefully in order to prevent the formation of a critical mass of opponents within the system which could eventually lead to the subversion of the regime.

Keywords: North Korea, institutional change, evolutionary game theory.

Streszczenie: Artykuł poświęcony jest analizie sytuacji społecznej w Korei Północnej z punktu widzenia jej stabilności. Komunistyczny reżim w tym kraju utrzymuje się od dziesięcioleci pomimo upadku jego najważniejszego sponsora – Związku Radzieckiego. Panująca dynastia Kimów utrzymuje władzę pomimo upadku gospodarczego kraju, czemu towarzyszą fale głodu. Autorka analizuje powyższą sytuację, stosując model z zakresu ewolucyjnej teorii gier. Pokazuje on, jakie czynniki doprowadzają do zatrzymania zmiany instytucji społecznych, która mogłaby nastąpić pod wpływem nowego typu zachowań w danej populacji. Zastosowanie tego aparatu pozwala zrozumieć, że reżim północnokoreański kładzie szczególny nacisk na ograniczanie działania czynników, które mogłyby doprowadzić do rozprzestrzenienia się w społeczeństwie postawy negatywnej wobec obecnej władzy i w konsekwencji jej upadku pod wpływem masowych zmian społecznych. Są nimi: liczba osób zarówno tych, które cechują się negatywnym stosunkiem do reżimu, jak i tych, które są podatne na zmianę stosunku

wobec reżimu z pozytywnego na negatywny oraz różnica w zyskach pomiędzy starym i nowym modelami zachowań (stosunkiem do reżimu).

Słowa kluczowe: Korea Północna, zmiana instytucjonalna, ewolucyjna teoria gier.

1. Introduction

North Korean society under the third generation of Kim family dictatorial rule suffers from deep poverty, extreme political oppression and is shielded from the globalized world by a tight information barrier. The primary aim of the ruling class of the most reclusive state in the world is to stay in power and exploit its benefits, such as a lavish lifestyle. The continuing survival of the regime decades after the fall of its former patron and sponsor, the Soviet Union, has required undeniably high skills and rational calculations. On the one hand the devastated and inefficient Soviet-style centrally planned economy requires a constant inflow of economic aid from abroad. On the other hand the society has to be constantly mobilized against a supposed external threat in order to keep it under control. The need for hard currency has exposed some North Koreans to the outside world. Disastrous economic conditions have forced limited international economic cooperation and a growing unofficial market economy, which have brought some changes to North Korean society over the last two decades. However, foreign experts on North Korea remain very sceptical about what actual change can it bring to the nation. Evolutionary game theory provides a useful insight into the dynamics of change in a given population and its constraints. It shows that both the information barrier and the very high cost of any involvement in anti-regime activities are of utmost importance for the stability of the regime.

2. The political and economic situation in North Korea

North Korea is the least democratic country in the world [*Democracy Index...* 2016]. It is ruled by the third generation of a family of dictators, the subjects of a personality cult. The Kim family has stayed in power for decades due to an information barrier with the outside world and total control of all citizens. A 2014 United Nations report on human rights abuses in North Korea wrote that “The gravity, scale and nature of these violations reveal a State that does not have any parallel in the contemporary world.” It is estimated that labour camps for political prisoners hold over 100,000 North Koreans who suffer extreme conditions, starvation, tortures and show executions.

One of the official doctrines of the state is *songun* – military first. The North Korean army is the fourth largest in the world by number of soldiers: a 1.2 million standing army in addition to reserve forces consisting of 9.5 million out of a population of 25 million. North Korea develops and has been accused of involvement in the

proliferation of nuclear weapons. The country has been responsible for cyber attacks on South Korea and the US as well as recent conventional attacks on South Korean ships and border islands.

The economic situation in North Korea is dire. GDP *per capita* PPP is estimated at 1800 USD which places North Korea among the poorest 15% of countries in the world. The official economy has been very inefficient and to a substantial extent has collapsed. It has been estimated that only 30% of the capacity of production capital has been utilized. The official central food distribution system is unable to supply food at survival levels resulting in a malnourished population. The average difference in height between North and South Korean 5-year-olds is 10 cm in favour of the latter and the expected lifespan of North Koreans is 10 years shorter than that of South Koreans. The shrinking official economy is being supplemented by an unofficial black or grey market economy. The existence of this dual economic system is possible due to widespread corruption which enables the extension of economic activity far beyond what is accepted in the light of the official legal framework. The representatives of the state use their position and the labour camp system to ensure a constant flow of income from the illegal economy.

3. Changes in the society brought by the Sunshine policy

The country's central ideology *Juche* translates as "self-reliance" and in economic terms means "self-sufficiency," although from the early 1980s the country has relied on foreign aid. This has not always been the case; by the mid-1970s the DPRK was more economically developed than the ROK. Economic collapse came in 1990 with the fall of the Soviet Union, its main economic partner, and was exacerbated by unfavourable weather conditions. Attempts to adjust to the economic conditions resulting from the new geopolitical framework were problematic and resulted in a deep economic crisis with GDP falling by 30% and the starvation of 600,000 to 3 million North Koreans.

The collapse of the Soviet Union resulted in the increasing dependence of the DPRK on Chinese aid which in turn put the stability of the North Korean regime in danger. Securing a new source of income was critical for the Kim family to maintain both power and the entire existing political system. Apart from China, there were realistically only three countries willing to engage in cooperation with North Korea and provide badly needed economic assistance: the US, Japan and South Korea.

Already, as a result of the 1990 famine, North Korea had become the biggest recipient of American humanitarian aid in Asia. Access to increased economic assistance from the three greatest enemies of North Korea according to official propaganda required a change of image from a hostile country to one which seeks dialog – a transforming one. At the end of 1990 Kim Jong Il embarked on a "charm campaign" which resulted in the establishment of economic relations and several high profile summits with neighbouring countries including the most important inter-Korean summit in 2000.

This change in North Korean foreign policy coincided with the election of a socialist administration in South Korea which called for cooperation and reconciliation between the divided nation. It opened the “Sunshine policy” era in inter-Korean relations.

In economic terms the Sunshine policy resulted in increased humanitarian aid from the South and political support and exclusive rights for the South Korean Hyundai group to engage in business projects in North Korea. The most important and longest lasting results of the Sunshine policy was the support given by the South Korean government for the establishment of a South Korean industrial complex 60 km away from the South on the Northern side of the DMZ. The Kaesong Industrial Complex – KIC – was to be a means to improve the economic situation of the impoverished North and give access to South Korean small and medium enterprises to a vast pool of cheap and well-educated labour. The KIC was to be a gateway, transferring new technologies to the lagging economy and providing jobs. But above all it was envisaged as a showcase of a new inter-Korean relationship and proof of North Korean openness.

Initially it was planned that the KIC would be developed in three stages. The first phase, based on light industry, was to be completed in 2007 with 300 South Korean companies employing 100,000 North Koreans. By 2012 the last stage of the fully-fledged project with heavy and electronic industry production was to be completed, with 2000 South Korean companies present, employing 600,000 DPRK citizens. In reality even the first phase was never fully implemented. Before its operation was suspended by the South Korean government at the beginning of 2016, the KIC consisted of 150 South Korean companies employing just over 50,000 North Koreans.

The Sunshine Policy, including the flagship Kaesong project, was eventually ended by two consecutive conservative South Korean administrations. Years of limited cooperation failed to bring about the political changes hoped for by the South such as reducing political tension and the military threat from the North. Prominent right-wing South Korean politicians claim that the flow of millions of dollars from South to North in common projects during the rule of left wing administrations only fortified the system.

Even though expectations were not met there are reasons why this claim is not fully justified. Cooperation did contribute to a slow change in North Korea, but on a different level. The inflow of aid (which was directed by the authorities mostly to the army¹) ended up being privatised by those who had access to it and sold to those who could afford it. It led to the formation and rapid growth of semi-legal markets. It is estimated that half of North Korean society receives some income from gray market activities. The development of the gray market economy in turn has resulted in a better circulation of information, passed between buyers and sellers. Equally

¹ North Korean government vigorously opposed any foreign supervision of aid distribution.

importantly, it has led to the creation of a new class of well-off people who owe their fortunes not to the favour of the state, but to their own work and entrepreneurial skills. These two effects spark free thinking and the build-up of a group of people who are less dependent on the state.

There is evidence that North Korean society changes. In the 1990s, the government allowed a substantial part of the society to starve to death and did not face any significant resistance. Now, however, the authorities have to take into account a certain degree of possible social opposition. It can be observed in changes of direction around new policies – especially those affecting the economic sphere of life. In 2009 the government attempted a monetary reform which initially allowed only a very modest sum to be converted into the newly introduced currency. Social pressure against this policy was so strong that not only did the limits have to be increased several times, but the person responsible for introducing the reform was eventually executed as a scapegoat. Similar social pressure prevented the government from closing down local markets. The ability to exchange information has also increased due to the introduction of new technologies. Over 3 million North Koreans now have mobile phones² and over 15,000 have access to the internet. Still, experts on North Korea are sceptical when it comes to assessing the likelihood of society playing a major role in undermining the system.

In July 2014 the Ilmin International Relations Institute of Korea University published a report based on interviews with 135 North Korea experts. They represented 7 countries and regions: South Korea, US, China, Japan, Russia, Europe and others. The survey concerned the future of the North Korean regime. The experts nearly unanimously agreed that the regime is destined to collapse in the near future with over 80% of them expecting it to happen within the next 20 years. However, when questioned about the most likely trigger of the collapse only 3% of the experts pointed to social unrest. Indeed, it was the least popular answer with the majority predicting a power struggle within the leadership (64.4%), economic failure (27.4%) or foreign intervention (5.2%) as more likely reasons to cause the downfall of Kim Jong Un's dictatorship.

4. Evolutionary game theory explanation

Undermining the North Korean regime by social opposition is conditional on the creation of a critical mass of opponents of the regime within society. A useful explanation of the scepticism of experts regarding such a scenario is provided by the evolutionary game theory. A simple model developed by S. Bowles [2004, p. 70–73] shows the constraints of changes in a population, confronted with a new trait - in our case questioning the legitimacy of the North Korean regime.

²The mobile phone network is growing as it is very lucrative for the state.

The model shows the evolution of institutional characteristics of groups in a population over time, depending on which traits are copied and which are abandoned. It captures a process in which randomly-paired individuals who copy behaviours with above-average payoffs increase their share of the population.

The model assumes two mutually exclusive traits (x and y) present in each member of a large population that affects payoffs. Let x be opposing the regime and y be complying with it. The traits are acquired through learning. The model represents behavioural updating as a process of switching from one trait to another. We ask which factors decide how many copies of each trait are made at the end of each period.

Members of the population are randomly paired to interact in a symmetrical two-person game, the payoffs of which are denoted $\pi(i, j)$, the payoff to playing trait i against a j -playing partner. The size of the population is normalized to unity. For any population frequency of the x trait, $p \in [0, 1]$, the expected payoffs are thus:

$$\begin{aligned} b_x(p) &= p\pi(x, x) + (1 - p)\pi(x, y), \\ b_y(p) &= p\pi(y, x) + (1 - p)\pi(y, y). \end{aligned} \quad (1)$$

At the beginning of each period, some fraction of the population, $\omega \in (0, 1]$, may update their traits upon exposure to contact with a bearer of a certain trait. What is important in this model and relevant to North Korea is that the remainder of the population does not update irrespective of their experiences.

If the cultural model and the individual have the same trait, it is retained by the individual; this will happen with probabilities p and $(1 - p)$ for the x 's and y 's, respectively. But if the individual and the model have different traits, then the individual retains or replaces the trait on the basis of the payoffs enjoyed by the two in the previous period. The payoffs experienced by the cultural model and the individual depend on the particular pairing experienced by the two and hence vary with the population frequency of each trait. If the individual switches, then the model has made two replicas.

S. Bowles assumes further that y -person and x -person experienced payoffs b_y and b_x respectively in the previous period. A small difference in payoffs need not induce a switch or even be noticed, so we say that with probability $\beta(b_y - b_x)$ the x -person will switch if $b_y > b_x$. Conversely, if $b_y \leq b_x$ the individual does not switch. The coefficient β is a positive constant reflecting the greater effect on switching of relatively large payoff differences, scaled so that the probability of switching varies over the unit interval. Letting $p_{y>x} = 1$ if the payoff of the y -person exceeds that of the x -person and zero otherwise, and taking expected values (the population is large), we can write the expected population frequency with trait x in time $t + 1$, denoted by p' , as:

$$p' = p - \omega p(1 - p)p_{y>x}\beta(b_y - b_x) + \omega p(1 - p)(1 - p_{y>x})\beta(b_x - b_y), \quad (2)$$

$$\Delta p = p' - p = \omega p(1 - p)\beta(b_x - b_y). \quad (3)$$

S. Bowles states that from equation (3) it can be seen that there are two necessary components in this analysis of evolutionary change: variance and differential replication. Variance, represented by the term $p(1-p)$ is essential because the more homogeneous a population is, the slower will be the evolutionary process. The pressure of differential replication represented by the term $\omega\beta\{b_x(p) - b_y(p)\}$ will be weak if a small fraction of the population is in updating mode, if payoff differences are small, or if the response to payoff differences is small.

The above model is well suited to analyse the North Korean case for a few reasons. It assumes that individuals can adopt a new trait (attitude – conduct) upon personal contact with a bearer of a new trait subject to positive difference in payoff and their predisposition to change. Those three elements are very important. First of all, in a totalitarian state such as North Korea with complete control of public information, any opposition towards the regime is most likely to develop upon personal contact with individuals who were able to contradict official propaganda. This could originate with some form of contact with the outside world. Secondly it takes into account the difference in payoff which includes both an increase in wellbeing after the supposed collapse of the regime as well as the cost of opposing the current authorities while still in power. Thirdly, even if the benefits of opposing the regime were higher than complying with it we have to assume that not every individual is prone to change their mindset, especially in the context of ubiquitous state propaganda.

Based on the above model it can be concluded that a widespread change of the attitude of North Korean society towards the state is conditioned by three factors: the size of the share of the population prone to change, the size of the group with opposing attitudes towards the state and the difference in payoff between opposing and complying with the regime. The first two factors are limited by the information barrier imposed on the society by the regime and the third is very heavily influenced by the extremely high costs of political opposition in North Korea.

5. The information barrier

A series of provocations from the North Korean side resulted in the freezing of the development of the KIC at an early stage. The reason why the project was stopped at an embryonic stage was highly important to North Korea. The scale of the project had to be carefully calibrated not for economic, but social reasons. The country got involved in inter-Korean cooperation for the sake of a badly needed inflow of hard currency. At the same time the authorities had to watch for breaches in the information barrier which would certainly result in a change of perception of the regime by the society. Too large a scale of the south-north cooperation project would mean that an increasing number of North Koreans would have contact with South Korea in one form or another. The growing employment of the KIC would require an inflow of workforce from further afield. Assuming the employment of the KIC reached its

planed maximum of 600,000, this would have meant that millions of people were either exposed on a daily basis to some degree of contact with the outside world through South Koreans or were in close personal contact with the former group. That could change the dynamic of the whole system and eventually could lead to the subversion of the regime.

The same reason stands behind the consistent renouncing by North Korean leaders of the idea of following the Chinese or Vietnamese path.³ Such a scenario would require further opening and serious cracks in the information barrier. The regime cannot afford for society to find out that official propaganda saying that South Korean suffers badly under the oppression of American forces is simply not true. In addition widespread knowledge of South Korean economic success would undermine the legitimacy of the regime which portrays itself as one which feeds and protects.

6. The cost of political opposition

The second important factor with substantial impact on the evolutionary dynamic of the society is the cost of involvement in political opposition. According to experts [Haggard, Noland 2011], the political underground in North Korea is virtually nonexistent and any sign of dissatisfaction with the regime is severely punished. Accounts given by North Korean defectors show that even though there is a certain degree of economic freedom facilitated by corruption there is a very strict ban on any degree of political opposition, even in a form of political jokes. A price of life for decades in terrible conditions in a labour camp or even death is often paid not only by the person accused of opposing the regime, but by their whole family. That applies also to those who attempt to defect from the country and their families are left behind. Such a policy serves two ends: it puts the highest price on the person involved in illegal political activities – ultimately the death penalty on them and their loved ones, but it also eliminates from the society the bearers of “new traits” and the ones potentially affected by them. As a result, people are very careful of showing any signs of even potential criticism of the regime, similarly the number of defectors is also very modest.⁴ The composition of the population of defectors confirms this. The majority of them are middle-aged women who are the least supervised and the reason they defect are dire economic conditions, not any form of political opposition.

³ Chinese authorities supported very strongly the idea.

⁴ It has been estimated that since 1953 100,000–300,000 people defected from North Korea. Only 30,000 managed to find their way to South Korea, the majority are living in China.

7. Conclusions

The North Korean regime is based on an ideological and personality cult which is very easy to question. Nonetheless, its rule seems to be uncompromised decades after Soviet Union, its main political and economic patron, collapsed. International experts do not expect North Korean society to revolt against the dictatorship. The evolutionary game theory model developed by S. Bowles applied to the North Korean case gives an interesting insight into this issue. It shows that there are three key conditions preventing the dissemination of critical thinking within the society. Those are: the small number of bearers of change and subjects prone to change and, thirdly, limits in the difference in payoff between old and new behaviour. The North Korean regime consciously or unconsciously understands the logic and conditions of such evolutionary dynamics very well. It prevents the formation of a critical mass of opponents by strictly limiting both the number of people who have any contact with the outside world – potential bearers of change as well as those who are susceptible to change – through an information barrier and thirdly ensures any degree of political subversion bears the ultimate price. From the dictator's point of view, preventing changes in the mindset of North Koreans has to come before an increase in state income or an improvement in living conditions in the impoverished, starving nation. That is why North Korea cannot engage in deep economic cooperation with the outside world or allow a political joke.

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