

ECONOMIC ANALYSIS OF HETEROGENEITY AND DIVERSITY IN ECONOMIC AND POLITICAL ENVIRONMENTS

abbrevated title: "HETEROGENEITY AND DIVERSITY"

NES RESEARCH PROJECT FOR 2006/2007 ACADEMIC YEAR

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At the entrance to
Higashi Honganji Temple in Kyoto,
the ancient capital of Japan,

a visitor is greeted by
two sentences written on the wall:

**Living together in diversity.
Learning to accept our differences.**

General description of the project

Co-existence under diversity has become one of the most important and challenging issues in our society. Eternal source of controversy is the co-existence of different cultures, languages, nations and religions in such a big country as Russia. Another example is the enlargement of the European Union and the question it raises on whether there exists a threshold on the degree of sustainable internal heterogeneity. The main focus of the proposed research is the analysis of the link between the degree of heterogeneity in the economic or political settings, the properties of emerging equilibria and policy implications.

An important feature of this project is to emphasize *ex ante* heterogeneity (environments where agents possess *a priori* distinct characteristics), contrary to *ex post* heterogeneity (environments with identical agents that nevertheless face distinct outcomes). The project is divided in two parts, where the first part provides theoretical foundations for treating the practical issues that we address in the second part. The applied questions we consider are those in the area of competence of our team and amenable to our chosen methodology, namely the tools developed in game theory and mechanism design, as well as the techniques used in industrial organization and political economy. These are questions of hierarchical structures of federations, linguistic diversity and other aspects of heterogeneity of nations and population.

Literature overview and research plans of the project

Of course these questions could be — actually, have been — studied from other perspectives and using different methodologies in other social sciences. We plan to compare our results with those in other disciplines. This project partially builds upon the progresses made in the related fields such as Economic geography and fiscal federalism.

The optimization problem related to a hierarchical structure arises in different fields and by various reasons. For example, (Qian 1994) considers an economic organization that owns a capital stock and uses a hierarchy to control the production. The optimal problem is to find the number of tiers in the hierarchy and the optimal quantity of workers in each tier. The trade off is between the two parameters: the number of bureaucrats to control workers, on the one hand, and efficiency of working activity under the control, on

the other. In the paper (Jacob, Chen, Silverman and Mudge 1996) one can find a survey and different approaches to the optimal hierarchical problem in the technical field, like an organization of computer memory, etc. Closer to our perspective is (Lockwood 2004) who investigates the tradeoff between local provision of a project (which is better for local political authorities) and centralized provision (which is less costly, due to economy of scale, for example, R&D).

Needless to say, there are other causes for jurisdiction's creation. For example, in the paper (Zax 1988) one can find an empirical analysis of relations between the number and types of jurisdictions and tastes and other characteristics of the population, based on US data. For European Union, Russia, India and China, one of the major characteristics in which regions differ from each other is language. The challenge of linguistic diversity has been, and still is, one of the most intense and troublesome issues in multilingual societies. A linguistically diversified society that limits the usage of some of its languages would necessarily disenfranchise the individuals who speak them. On the other hand, the introduction of excessively large set of official languages could put a heavy financial burden and be detrimental for purposes of communication within and outside of the society institutions.

Thus, the society, like the European Union, has to weigh the costs of sustaining a large number of official languages versus its own tolerance of disenfranchisement of some of its members. In (Ginsburgh and Weber 2003, Fidrmuc et al. 2004) there have been conducted empirical studies of language disenfranchisement by using the survey and population data on language proficiency in the European Union. The analysis of language disenfranchisement has been extended in (Ginsburgh et al. 2004a), by utilizing the percentage cognate Dyen matrix of linguistic distances between Indo-European languages (Dyen et al. 1992) that takes into account the linguistic pairwise proximity between languages. The natural way to tackle the language disenfranchisement and lack of ability to communicate in relevant languages is the study of foreign languages.

This problem can be related to the problem of network externalities: since the welfare of an individual raises with the number of people he or she can communicate, then the larger the number of speakers of a foreign language, the more attractive is the prospect of acquiring it by non-speakers. Obviously, this benefit has to be contrasted with the cost of learning another language, which depends on the linguistic proximity between the native language of an individual and the language to be acquired, see (Ginsburgh et al. 2004b).

Theoretical Foundations

Now we see a rising interest to operations on jurisdictions as among theoreticians (Alesina and Spolaore 1997, Bogomolnaia et al 2005, 2005a, 2006, 2006a) and among practitioners as well. Russian Federation is under the total reform of local self governance. And at the same time there is academic and public discussion about Federal Constitutional structure of Russia. See for example, (Юрьев 2004). In practice, there was a merger of the two subjects of Russian Federation (Perm oblast and Comi national district), and several other mergers are on the agenda (starting with the unification of Krasnoyarsk Krai with two national districts). A general problem is a big uncertainty in the rules of jurisdictions' creations and liquidations. The process of new states' formation, unifications and so on is increasing in the world last decades. At the same time, more or less precise rules governing

this process, which could have been acknowledged by international community, are absent. A practical experience is accumulated gradually, and theoretical people have to contribute in the field as well.

Another part of the research project analyses theoretical aspects of group formation with heterogeneous individuals, where the intra-heterogeneity of the group is not only crucial for the group itself, but also creates externalities for non-members. It is possible that these group or network effects induce asymmetric equilibrium outcomes even in models with symmetric agents, an aspect which was largely ignored by the existing literature on the topic. Our theoretical investigations will use the framework of (i) cooperative games in partition function form à la Aumann-Drèze; (ii) non-cooperative simultaneous games, including potential games; and (iii) models with farsighted view of coalition formation.

Third, we address the issue of optimal size and composition of nations and blocks. In order to mitigate a threat of secession by dissatisfied regions, the central government may implement various compensation and redistribution transfer schemes, and we plan to examine, both theoretically and empirically, whether the degree of redistribution is positively correlated with the level of income inequality and regional disparities within the country. We plan to conduct a theoretical and empirical analysis of country formation by allowing an endogenous degree of redistribution, which is consistent with the preferences of the majority of citizens.

Applications

Linguistic diversity

As is shown by empirical studies of the language disenfranchisement in the EU, a society has to weigh the costs of sustaining a large number of official languages versus its own tolerance of disenfranchisement of some of its members. It is natural to examine the language issues in the context of network externalities mentioned above; second challenge is to work out indices of linguistic divergency, and to apply them to various multilingual countries, e.g. Russia, India, China, and the European Union.

Spatial heterogeneity

Location is one of the main facets of heterogeneity across the population of economic agents. It is fair to say that almost all models focus either on two regions or on a symmetric multi-regional setting that ignores most of heterogeneity aspects within countries. We plan to examine, both theoretically and empirically, the impact of location and income distributions in an asymmetric multi-regional setting.

Another important facet of the space-economy is a heterogeneous size of the cities that is manifested by the coexistence of large and small cities, even in the case of ex ante identical individuals. By using the Christaller and Lösch approach, we plan to extend the two-sector two-city model of the interaction between urban hierarchy and the level of transport costs of different goods to an arbitrary number of sectors and cities. We also plan to address the redistribution issues in environments with multidimensional citizens' characteristics (income, location, political preferences, etc).

Possible titles of Master's Thesis

In this section, we offer several possible topics for Master's Thesis. Students are by no means restricted to this list; any questions concerning contents of these topics could be addressed by an e-mail via hibiny@mail.ru and savvateev@gmail.com to Alexei Savvateev.

1. Mergers of subjects of the Russian Federation: theory and practice
2. Indices of political polarization and diversity: an application to Russia
3. Distribution of voting power in electoral bodies
4. An optimal number of municipalities under the new reform in RF: theoretical and empirical investigation
5. Analysis of hierarchical structure of municipalities in a federation
6. Indices of horizontal diversity of regions in Russia: theory and empirics
7. Hierarchical structure and distribution of responsibilities between different tiers of government
8. Optimal linguistic policies in multi-national organizations
9. Indices of linguistic diversity: examples of Russia, China and India
10. An analysis of constitutional rules of secession: theoretical investigation and overview
11. Stability and migration in different institutional settings
12. Cost sharing and equalization: a study of the European Union
13. Regional non-monetary privileges in the Russian federation

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