

Reform Design: A Field for Mathematical Investigation?

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Rehovot, December 26, 2012

“I work at the interface between abstract mathematics and everyday reality. I expect to find ever more ways of using mathematics to contribute to an understanding of the real world, to benefit humankind.”

Yakar Kannai:

<http://weizmann.org.au/in-israel/the-scientists/prof-yakar-kannai/>

-2010

Introduction-1

- **The Latin verb “reform” originally meant “to return to the former state” (re-form). In a traditional society, a reformer had to find the roots of changes that he has suggested, in the past experience. This was not so foolish taking into account that the consequences of institutional changes were too difficult to predict. Today we know this very well due to rich experience of large scale unsuccessful reforms. In our world, Reform is the main mechanism of institutional changes. This experience requires development of better methodology of institutional reforming.**
- **A draft formulation of the main problem:**
A reformer wants to transform existing institutions into institutions with desirable properties. One has to find an optimal or at least an acceptable option to reach this goal.

Introduction-2

- **Discussions of different economic and social reforms are quite common for religious philosophers, including adherents of Bible or Talmud; for social philosophers, including Plato, Aristotle, Kant, Hegel, Proudhon, Marks, Schumpeter and many others; for constructors of ideal states like Thomas More and Tommaso Campanella. In modern times, different political parties took different social and economic doctrines as foundations of their programs. Marxists and liberals, social democrats and anarchists, national democrats and national socialists – all of them have their particular views on what the best social order is and all were subjected to slashing criticism of each other as well as of independent social thinkers. Critique of the socialistic views by Mises and Hyek is the best example.**
- **Some of the doctrines turned out to be subjects of real experimentations. Mankind went through hundreds of reforms, including great revolutions, attempts of building socialistic societies and economic miracles. Having all this in mind, one has to be surprised by the fact that in 1990s, when about 30 socialist countries started their transition to the market, we knew almost nothing about how to conduct reforms.**

Introduction-3

- **I do not try to consider hundreds of works in which concrete reforms were discussed. I will concentrate on a few past contributions that have touched upon general methodology of reforming and were directly mentioned in the discussions of 1990s, when the Theory of Reform arisen.**
- **I will try to discuss some important steps in the development of the Theory of Reform, and then describe its state-of-the art.**
- **Since the theory is new, its architecture is not set completely. In the second part of the paper, I will present my own vision of this architecture.**

Plan

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2. From Edmund Burke to Karl Popper-1

- In 1990s the interest to the reform problems jumped. However, early debates on the issues were forgotten or ignored at all. The exceptions were papers by Peter Murrell (1990, 1992), which contain references on Edmund Burke and Karl Popper.**
- Edmund Burke, a statesman, and political philosopher, who lived in England of the times of the Great French Revolution, pointed out *the costs of reforms*. In his “Reflections on the Revolution in France”, 1790, he wrote:
“France, when she let loose the reins of regal authority.... has extended through all ranks of life.... all the unhappy corruptions that usually were the disease of wealth and power. ”**

2. From Edmund Burke to Karl Popper-2

Today we know very well that intensification of corruption is a quite usual result of radical reforms.

Burke underlined that destroying production and decreasing wealth of French people were the results of wrong reforms.

- He was probably the first who named reforming as a science, and warned of the impossibility of simple solutions.**

“The science of constructing a commonwealth, or renovating it, or reforming it, is, like every other experimental science, not to be taught a priori.”

2. From Edmund Burke to Karl Popper-3

After more than one and a half century, Karl Popper in his “Open society and its Enemies” (first published in 1945) made a difference between Utopian and piecemeal social engineering. A Utopian engineer defines an Ideal State and searches for a direct way to build it. Against this approach, Popper offered exactly the same arguments, which were raised against shock therapy in the discussion of 90s.

a) Uncertainty and possibilities of mistakes:

“Social life is so complicated that few men or none at all, could judge a blueprint for social engineering on the grand scale; whether it be practicable; whether it would result in a real improvement;...” This method “if really tried, may easily lead to an intolerable increase in human suffering”, and “to the use of violence in place of reason”.

2. From Edmund Burke to Karl Popper-4

- b) Necessity of experimentation, using trial and error method, having in mind possibilities of corrections of reforms and even reversal of reforms without big costs. This is possible under the piecemeal approach, but not under Utopian one.**
- c) Necessity to avoid people resistance and to gain their support. The simplest way to solve this problem is permanent piecemeal improvement of the people wealth.**
- d) Another important point raised by Popper: he asserted that radical approach requires dictatorship. This is not exactly true as examples of the East European transitions demonstrate. Nevertheless, the question of the best government structure for conducting reform is very important and unsolved up to now.**

3. Jan Tinbergen's Theory of Economic policy-1

- Jan Tinbergen was probably the first who has considered Reform Design as a self- contained chapter of Economics.**
- In his fundamental book “On the Theory of Economic Policy” (1952) , he laid down the foundations of the theory of planning as the best policy choice.**
- A foundation of planning theory was developed earlier by F. Ramsey, W. Leontief, G. Feldman, L. Kantorovich, R. Frish, T. Koopmans and others. However, they did not take into account, at least in general formulation, the possibilities and constraints of choosing policy parameters consistent with existing market conditions.**

3. Jan Tinbergen's Theory of Economic policy-2

Tinbergen started with observation that, quite often, politicians formulate inconsistent targets, want “too much”. He suggested to construct models, which describe connections among desirable targets, exogenous variables and instruments - parameters, which can be chosen by policymaker. If the instruments can be determined from a model as some functions of targets and observed exogenous variables then the system of targets is consistent and may be realized. The next step includes optimal choice of the system of targets, using a social utility function.

3. Jan Tinbergen's Theory of Economic policy-3

- **The results of calculations should be considered only as a hint on the efficient decisions.**
- **Constraints to the implementation of “qualitative” economic policy:**
 - 1. Political constraints: “....sound policy has to satisfy certain *principles* set by or accepted by the majority of parliament...”**
 - 2. Cultural constraints: “the whole complex of *psychological* factors such as “confidence” ; “personal or institutional *inertia* and the tendency to maintain the existent” (p. 76); the officials aversion to the complexity (p. 77).”**

3. Jan Tinbergen's Theory of Economic policy-4

- 3. Uncertainty and lack of our knowledge (“...we know very little about what a man does if private property is changed into public property...” (p. 72)**
- 4. “The *costs* of realization” which arise for example when a policy measure “hits a large number of people” (p. 75).**

Two Tinbergen's remarks started the new research directions: a) negotiations between supporters of an economic policy and oppositions are often necessary to realize it. Later on, this topic was studied by game theory methods. b) He also wrote “about organization of economic policy as distinct from its contents” and raised the question of the efficiency of expert meetings (pp. 77-78). The future development of the Foresight and similar methods is an attempt to answer this question.

3. Jan Tinbergen's Theory of Economic policy-5

In “The Theory of the Optimum Regime”, 1959, Tinbergen summarized his results in the theory of “qualitative” policy.

- **Simple model to discuss the choice of the tax system, optimal size of the public sector, the degrees of centralization in administration and in production, etc. He concluded**
- **“.....as a rule the optimum regime will not be some form of extreme.” (P.300). For example, “it is very improbable” that complete centralization or complete decentralization is optimal.**
- **However, his models don't take into account reactions of the economic agents on the reform as well as the costs connected with these reactions.**

4. The First Manual for Reformers: Washington Consensus-1

Developments after Tinbergen:

- **Optimal planning, decentralized many-level planning algorithms, Kantorovich, Koopmans , Johansen, Malinvaud, Danzig and Wolf , Kornai and Liptak, Uncertainty (see Blythe, 1999).**
- **Principal –agent models, contract theory and the theory of mechanism design (Hurwitz, Groves, Meyerson, Tirole, Laffont).**
- **New institutional economics and neo-institutional economics (O.Williamson and D. North). Theories of rent seeking behavior, tax avoidance, lobbying and corruption (Tullock, Krueger)**
- **No substantial progress in the theory of reform!**

4. The First Manual for Reformers: Washington Consensus-2

”No preestablished theory of transition existed before the fall of the Berlin Wall. The ratio of theory to policy papers in transition economics has nevertheless been surprisingly low.” (Roland, 2007, p. 2).

John Williamson, an expert of IMF, UN, UK treasury, and WB, suggested the first manual for reformers in 1989 – ten recommendations which seemed to be, at the first glance, obvious and indisputable. The recommendations were as follows.

4. The First Manual for Reformers: Washington Consensus-3

- 1. Fiscal Discipline; 2. Redirecting Public Expenditure Priorities; 3. Tax Reform; 4. Liberalizing Interest Rates; 5. Competitive Exchange Rate***
 - 6. Trade Liberalization;***
 - 7. Liberalization of Foreign Direct Investment;***
 - 8. Privatization (“State enterprises should be privatized.”);***
 - 9. Deregulation (“Governments should abolish regulations that impede the entry of new firms or restrict competition”.);***
 - 10. Property Rights (“The legal system should provide secure property rights without excessive costs”).***
- (Williamson, 1994, pp. 27-28).**

4. The First Manual for Reformers: Washington Consensus-4

- Explaining his position, Williamson, called on minimizing the role of government” (Williamson, 1994, p.14), and asserted that the best policy is not country specific:**
- “the key to successful development is to emulate the policies preached (if not always practiced) by the developed countries.”(Williamson, 1994, p.12).**
- Williamson thought that his recommendations reflected the opinion of most experts from IMF, WB, USA congress and government. He succeeded. His text was used as a manual in many developing countries including 28 transition economies.**

4. The First Manual for Reformers: Washington Consensus-5

- **Moises Naim, an editor of Foreign Policy Magazine, has explained why it happened:**
- **” Because, at the time, it filled an ideological vacuum and it was relatively simple for politicians to understand It also gave ministers a practical action plan...; it had the endorsement of prestigious institutions and individuals and, last but not least,the adoption of the Washington Consensus, it was promised (and expected), would bring tons of foreign money. ” (Naim, 1999).**
- **The results: During 80s , Latin American region experienced the fall of GDP about 0.8% per year. In 90s , the average growth rate was only 1.5%. Much worse situation was observed in the region of former socialist (East Europe and CIS) countries: during 90s they lost in average about 30% of their GDP.**

5.1. Critique of Washington Consensus by Dani Rodrik

- **A survey of most important hypothesis and results concerning policy reform (Rodrik, 1996);**
- **Critique of the Washington Consensus:
South Korea and Taiwan, the East Asian miracle countries, followed only about five of the ten recommendations of Washington Consensus. In the periods of fast growth, they did not liberalize their import regime, did not conduct privatization or deregulation and “heavily interfered in the investment decisions of private enterprises.” (P.18). The same time, some Latin American countries implemented the Washington Consensus very diligently but experienced even lower growth rates than before.**

5.2. Joseph Stiglitz Critique

- **Washington Consensus “was incomplete and sometimes even misleading.” (Stiglitz, 1998, p.30).**
- **It ignores the role of government in creation of the robust financial system, supporting competitive environment and investing into human capital and technology transfers. Industrial policy is necessary for successful development.**
- **It ignores initial structure of society, and rent seeking behavior as a response to reform (Stiglitz, 2002).**
- **One size fits all policies are doomed to failure (Stiglitz, 2004).**
- **“the questions should have been, what can we do to improve the efficiency of *both* markets and the government, what is the right balance between the market and government, and how should that balance change over time, as markets improve and the competencies of governments change.” (p. 9)**

6. Gerard Roland: a theory of gradualism-1

- In 1990s there were two central points of discussions: the role of government and the choice of sequence and speed of reforms.**
- In Dewatripont , Roland (1995), Castanheira and Roland, (2000), and Roland (2000) there were made important contributions into the last problem.**
- Important concepts: informativeness of a reform, complimentarity of reforms, costs of reform reversal.**
- Two reforms are complementary if the gain from conducting both of them is larger than the sum of gains from each isolated reform.**

6. Gerard Roland: a theory of gradualism-2

Two reforms can be done simultaneously (“shock therapy”) or sequentially (“gradual approach”).

The outcomes of reforms are uncertain. If I conduct just one reform, I get some profit for citizen (maybe, negative) and also some additional information about outcome at the second step, when second reform is introduced. Having this information and taking into account the costs of reversal, I form my expectation of the outcome and decide what is more profitable: to introduce second reform or to reverse the first one. If the reversal cost are significant, if the reforms are informative and if the losses from conducting just one reform is not very high, the gradual approach is preferable. In the opposite case, and, particularly, when complementarity is very strong, shock therapy could be more efficient. (Dewatripont, Roland, 1995; Roland, 2000).

6. Gerard Roland: a theory of gradualism-3

In a dynamic Ramsey-type model, developed jointly with Castanheira, Roland compared big bang and gradual privatization reforms (Castanheira and Roland, 2000; Roland, 2000). It was assumed that privatization requires diverting some part of resources from production sector. The model demonstrated that, as a rule, gradualism is better than big bang.

7. Trainn Eggertsson: Imperfect institutions as Limits of Reform-1

- **In his “Imperfect institutions” (2004) Eggertsson summarizes contributions of the New Institutional Economics to understand obstacles for reforms. He argues that “problems with applying new social technologies are the critical barrier to growth in poor countries”. Successful transfer or introduction of new social technologies is complicated “because preexisting institutional arrangements often undermine the effort” .**
- **Important source of bad institutions is autocratic power. “A theory of institutional reform ideally should instruct reformers about how to constrain autocratic rulers” (p.71). We don’t know how to do that, however. Moreover, democracy is neither necessary nor sufficient condition of growth-oriented policy.**

7. Trainn Eggertsson: Imperfect institutions as Limits of Reform-2

- **Other important constraints to reforms are inefficient social norms (Tinbergen's argument). The question is how to change them. One can find some recommendations in the Posner's theory of the Cooperation-Defection Differential (Posner, 1996).**
- **An important problem, discussed by Eggertsson, is how to escape poverty trap. He analyzed several possible mechanisms including sudden economic crises and new personal social models that may change behavior of economic agents and result in a more efficient social equilibrium.**

8. Some other developments: getting rid of illusions-1

- Standard stabilization programs were not effective in the institutional arrangement of some transition countries where banking system transferred money very slowly and, the same time, direct connections among trading partners were developed. Attempts to fight inflation by restrictions of money supply led to arrears and barter crises, and creation of arrears and barter traps.**
- Estrin et al (2009) generalized the results of 35 empirical researches. Authors concluded: “...the performance effect of privatization to domestic owners ... has been ...positive in CEE; it has been nil or even negative in Russia and the rest of the CIS.” “The important policy implication is that privatization per se does not guarantee improved performance, at least not in the short- to medium-run”.**

8. Some other developments: getting rid of illusions-2

- Before transition most economists had believed that financing enterprises through private banks should lead to hardening budget constraints, and, therefore, should increase the efficiency of former planned economies. However, the experience did not support this belief. An explanation of this phenomenon was done in Berglof, Roland (1995).**
- Other illusions: undervaluation of the government role, in particular, industrial and social policies and the importance of planning; disregard of the costs of reforms; attempts to transplant the most advanced institutions.**

8. Some other developments: getting rid of illusions-3

- Probably the most important mistake was the belief in the advantage of shock therapy. About this mistake, Janos Kornai has written in his memoirs: “Most of the western advisers who influenced the governments undergoing post social transition favored the strategy of accelerated privatization.” “Most experts ten to fifteen years later agree, in hindsight, that the gradualists were right.” (Kornai, 2006, p.354-355).**
- P. Murrell wrote on the disappointment in the shock therapy just after the start of reforms in East Europe (Murrell, 1992).**

9. “A practical approach to growth strategies” by Dani Rodrik -1

- **One economics, many recipes (2007): Three steps:**
- **I. Growth diagnostics: to identify “the most binding constraints on economic activity” and the set of policies, which are the most welfare promoting .**
- **Three options: A) high cost of financing economic activity, B) low social return to economic activity, C) low private appropriability of the social return. The choice can be made by analyzing economic indicators of a country. For example, if the constraint A is a problem, then real interest rate and the current account deficit have to be high as well as the number of efficient but underfinanced investment projects. By contrast, if B is the most important constraint, then interest rates should be low, the current account should be surplus, and capital outflow should be observed.**

9. “A practical approach to growth strategies” by Dani Rodrik -2

- Appropriability problem can be observed due to unwillingness of the private sector to realize socially efficient investment projects; that is a signal of big gap between social and private efficiency.**
- The growth diagnostics was originally developed in Hausmann, Velasco, and Rodrik (2005).**
- After identification of the most binding constraint, one has to look at the deeper roots of it. For example, low social returns can be due to poor human capital or bad infrastructure. Choosing between these two, one has to detect again the main causes, why the most strongly binding factor is not proper. Thus, we go through the tree of factors from the most abstract to the most concrete ones determining the most influential concrete barrier to growth.(Rodrik, 2007, p.89-90).**

9. “A practical approach to growth strategies” by Dani Rodrik -3

- II. The second step of the Rodrik methodology is the policy design. At this step, one has to choose policies or institutions which eliminate the most binding constraint that was determined at the first step. Rodrik underlines that, at this step, straightforward solution (price liberalization, abolishment of subsidies, etc.) usually doesn't work. A reformer has to find second-best institutions that can work in the imperfect real environment. As examples, he makes references on the two-track pricing system and township and village enterprises – institutions that played decisive role in the Chinese price liberalization and privatization processes.**

9. “A practical approach to growth strategies” by Dani Rodrik -4

- III. The binding constraints are changing over time. Therefore the reformer has to permanently switch from one institution reform to another. To support sustainable growth, the third step is necessary. Rodrik called it as Institutionalizing Reform. In fact, this is the task of conducting reforms in quite usual sense: strengthening the rule of law, fighting corruption, improving democratic institutions, etc. Besides, Rodrik suggests design principles and institutional arrangements for industrial policy, including coordination and deliberation councils, development banks and special development agencies.**

9. “A practical approach to growth strategies” by Dani Rodrik -5

Comments:

- **If the number of our instruments is less than the number of binding constraints, then the most binding constraint may not exist. In this case, the Rodrik’s first step does not work, and the problem of finding piecemeal improving policy is much more complicated.**
- **Rodrik considers the dynamic problem of building modern institutions and finding catching-up strategies as a sequence of static problems. This is a development of Karl Popper’s piecemeal approach. Whereas, this could be a reasonable approximate method for some cases, a general formulation is necessary to make better one-step choices.**

9. “A practical approach to growth strategies” by Dani Rodrik -6

Comments:

- **The first step (the growth diagnostics) is shortsighted, and does not take into account the costs of institutional reforms of the second step. Another point is that mistaken diagnostics has to be corrected at the second step. Both arguments mean that the first and the second steps should not be separated. This is related also to the third step, at which a general mechanism of catching up development has to be created.**

10. Architecture of the Theory of Reform: some suggestions

10a. General reformer's problem: a formulation-1

In what follows , I suggest

- **a general formulation of the Institutional Reform Design problem,**
- **a system of concepts, which gives a possibility to outline main problems of the Reform Design in general terms, and to generalize some important results, mentioned in the previous sections.**
- **I will base on the results described above as well as on a number of my own works (Polterovich, 1999a,b, 2001, 2004, 2007, 2008).**

General reformer's problem: a more precise formulation (cont.)

- **One has to design an *efficient* sequence of *interim* institutions so that this sequence links an *initial* institution with a *final desirable institution*, and each transformation of one interim institution into next one is *feasible*.**
- **I borrow the concept “sequence of institutions” (institutional trajectory) from North (1990).**
- **Concept of interim institution:**
Polterovich (2001) ;
Qian (2001)- transition institution;
Rodrik (2008) – second- best institution

10a. General reformer's problem: a formulation-2

- The *final desirable institution* is the goal of the reformer. It is not necessarily described in detail. For example, “a market with free prices”, or “a system of private enterprises” may be considered as goals. Correspondingly, “a market with centrally determined prices”, or “a system of state owned enterprises” are examples of initial institutions.

10a. General reformer's problem: a formulation-3

- **Usually, direct transition from initial to final institution is impossible or too costly due to cultural, institutional, technological, or resource constraints.**
- **Therefore, interim institutions are necessary.**
- **Each interim institution should function under existing constraints.**
- **The constraints are changing, and the changes create possibilities of transition from one interim institution to another one.**
- **Thus, a feasible trajectory arises; it leads from initial to final institution.**

10a. General reformer's problem: a formulation-4

- **The changes of the constraints may be spontaneous, so that the reformer may just wait for a possibility to make a next step. However, it is much more effective to design interim institutions, which soften existing constraints.**
- **Usually, every interim institution has a set of installed control parameters so that the reformer can use these parameters and some additional information to transform one interim institution into the next one. A class of interim institutions and a set of control and observed parameters both define institutional space where different trajectories may be chosen.**

10a. General reformer's problem: a formulation-5

- A trajectory is characterized by its results, for example, the corresponding present value of the costs flow that required for realization of the trajectory. The reformer has to find an efficient feasible trajectory that does not require too large costs.**
- In the case of Chinese dual track liberalization, each interim institution was characterized by the set of centrally planned parameters including prices and production targets (all above-target production was allowed to be sold at the free market). Controlling targets and observing the share of above-target production, the government was able to slow, or to accelerate transition. This process continued 15 years until the share of free market production reached 95%.**
- Binding constraints: cultural; lack of market infrastructure; danger of inflation.**

10a. General reformer's problem: a formulation-6

- **Note, that the shock therapy is a special case of trajectories: it contains just one step – immediate introduction of final institution. Sometimes, it can be feasible and even efficient. It is important, that the decision should be not a result of a prior belief but the consequence of an investigation.**
- **Due to incomplete knowledge and uncertainty, the reformer sometimes makes mistakes. They may lead to high *transformation costs, disfunctions* of the introduced institutions and to formation of imperfect institutions due to *institutional traps*.**

10b. Sources of transformation costs-1

- **One has to distinguish between transaction costs and transformation costs. If an agent uses an institution it bears a flow of the transaction costs. The transformation costs are required to transit from one institution to another one. The society bears social transformation costs, and the private agents that are switching from an old institution to the new one, bear private transformation costs.**
- **The transition is called as improving, iff it is feasible and the present value of the transaction costs for the old institution is larger than the sum of the transformation costs and the present value of the transaction costs for the new institution.**

10b. Sources of transformation costs-2

**1.Diversion of resources from traditional directions of investments (production, infrastructure, etc.)
(Castanheira, Roland, 1995)**

2.Disorganization. Two causes:

2a. Destruction of an old institution happens earlier than the new institution can reveal its efficiency. For example, quick privatization breaks connections among firms, consumers and suppliers, but not all of them can find new partners quick enough (Blanchard, Kremer, 1996).

2b. After a reform, the system moves to a new equilibrium. The adjustment process may be costly because of discoordination of the agent decisions.

10b. Sources of transformation costs-3

- 3. Intensification of redistributive processes to the detriment of production.**

Shadow activity, lobbying, corruption, criminal activity all are examples of the redistributive processes. The intensification occurs since any reform changes existing constraints; it releases the transition rent (Gelb , Hillman, Ursprung (1996)), creating new possibilities of rent seeking.

- 4. Incompatibility of new institutions with old institutional arrangements and formation of inefficient institutions.**

Understanding of the sources of the reform costs is a necessarily prerequisite to study inefficient institutions, their types and their formation (compare Eggertsson, 2004).

10c. Dysfunctions of economic institutions-1

Polterovich, 2001

- **Atrophy,**
- **Rejection of transplanted or designed institution;**
- **Metamorphosis (misuse of the institution);**
- **Activation of alternative institutions;**
- **Institutional conflict (with existing norms).**

10c. Dysfunctions of economic institutions-2

- **Example 1. In July of 1992, the arrear crisis took place in Russia; all enterprises were in debt to each other. A bankruptcy law was introduced but did not work: everybody could be accused therefore nobody wanted to be a claimer. It was the atrophy of the new institution.**
- **After some time, however, criminal groups begun to use this law: they choose comparatively good firms, bought some part of their debts, bribed judges, bankrupted the firms and captured them. This was unexpected misuse of the institution, its metamorphosis.**

10c. Dysfunctions of economic institutions-3

- **Example 2. In 1990, the progressive income tax was introduced in USSR for the first time. Seven tax rates were set; the maximal one was equal to 60%. The scale of the tax has changed several times during 1990s. The problem was that a typical Russian citizen did not consider tax payments as his/her duty and never fulfilled tax declaration. As a result, a new bad institution has activated: shadow wage payment (without bookkeeping) has spread. In 2001 progressive income tax has been rejected at all, and flat tax has been introduced.**

10c. Dysfunctions of economic institutions-4

- I say about institutional conflict if an institution is using in accordance to its assigning goals but its functioning is inefficient due to bad compatibility with existing social norms or other prevailing institutions.**
- Example 3. Privatized firms have been inefficient in Russia and other CIS countries; one of the causes was that managers have aimed to keep firm collectives rather than to maximize profit. This is an example of the institutional conflict.**
- The examples above demonstrate that the reformer should recognize that incorrect decisions can lead to dysfunctions, and should try to avoid them.**

10d.Institutional trap-1

- **Wrong reformer's decision may lead to institutional trap; that is an important mechanism of formation of bad institutions.**
- **Institutional trap is a locally stable but yet inefficient equilibrium in a system where agents choose a norm of behavior (an institution) among several options. It is usually implied that multiplicity of equilibria prevails in the system and, under the same exogenous conditions, there exists another equilibrium, which is Pareto-improving or is better for the society in accordance to another accepted criterion.**
- **The concept of institutional trap is closely related to the notion of underdevelopment trap, and also to the notion of lock-in used by Arthur (1988) and North (1990).**

10d.Institutional trap-2

- In fact, concrete examples of institutional traps were studied in a number of papers (see Ickes, Ryterman, (1992), Tirole (1996), Bicchieri and Rovelli (1995), Jonson, Kaufman, Shleifer (1997), Uribe (1997)). In Polterovich (1999, 2000, 2004) a general scheme for the formation of an institutional trap was described; it was underlined that, frequently, traps are the results of incorrect reform policy. In particular, it was shown that such different phenomena as barter, mutual arrears, tax evasion, and corruption, all observed in transition countries in 1990s, were intensified and supported due to this mechanism.**

10d.Institutional trap-3

Norm stabilizing mechanisms:

- **Coordination effect:** the more consistently a norm is observed in a society, the greater are the costs incurred by each individual deviating from it. For example, the coordination effect takes place if a personal probability to be punished for a rule-breaking activity decreases with the number of people involved in the activity.
- **Learning effect:** the transaction costs of a norm's observance decrease in time since the agents learn to operate more efficiently.
- **Linkage effect:** with time, an established norm finds itself linked with a multitude of other rules; therefore, non-observance of this norm lead to higher transformation costs.
- **Lobbing effect -Hellman (1998).**
- **Cultural inertia:** agents' reluctance to review behavioral stereotypes (remind a Tinbergen's remark!).

10d.Institutional trap-4

- **Under a strong perturbation, an efficient equilibrium may lose its stability or disappear so that the system moves to a potential institutional trap. After the disturbing factor is removed the system remains in the new equilibrium which is inefficient now. This is so-called hysteresis (ratchet) effect that is a form of path dependence.**
- **To getting out of institutional trap, one has to reach at least one of the following goals: a) to increase transaction costs of the prevalent inefficient norm; b) to decrease transaction costs of an alternative efficient norm; c) to bring down transformation costs of the transition to an efficient norm. The coordination, linkage, or/and inertia mechanisms have to be influenced for these purposes.**

10d.Institutional trap-5

Measures and mechanism of getting out of institutional traps:

- **Penalty for institutional trap behavior.**
- **Development of reputation mechanisms (Tirole, 1996).**
- **Amnesty.**
- **Economic growth acceleration.**
- **Systemic crisis.**
- **Development of civil culture**

10e. Promising trajectories: towards a new manual for reformers-1

- **I considered the inefficient institutions. To prevent their formation, the reformer should know this part of the theory. However, the main reformer problem is the design of efficient interim institutions. In general case, the theory could not work out precise recommendations about what should be done and how to avoid standard mistakes.**
- **However, from the theory and case studies, one can extract quite general and useful principles.**
- **It follows from the previous discussion, that the reformer should design a trajectory, which fulfills a set of conditions.**

10e. Promising trajectories: towards a new manual for reformers-2

- **Promising trajectory should:**
 - **1) be compatible with resource and technological constraints at each step;**
 - **2) take into account general level and particularities of civil culture and human capital;**
 - **3) take into account existing political processes of decision making, hence, possibilities of modifications and even the refuse of reformer's suggestions;**
 - **4) take into account other institutional constraints, and ensures softening of all constraints;**
 - **5) take into account static and dynamic complementarities of institutions;**
 - **6) include effective measures for control of redistributive activities;**
 - **7) form and keep positive institutional expectation of people, the belief to the advantage of the reform;**
 - **8) provide at least partial compensation to those who suffer from reforms;**
 - **9) be coordinated with the government policy of growth promotion.**
- (Polterovich, 1999b, 2006a, 2007).**

10e. Promising trajectories: towards a new manual for reformers-3

- **The concept of promising trajectories presents just general framework of reform. The reformer can get much more recommendations from the theories and case studies of concrete reforms such as price stabilization, privatization, etc.**
- **Unfortunately, the theory can't give concrete recommendations how to design interim institutions in the general case: every interim institution is an invention.**
- **However, there is a quite broad class of situations for which more concrete recommendations can be worked out. That is reforms based on institutional transplantations.**

10f. Transplantation of economic institutions-1

- **Four hypotheses on the transplantation (Polterovich, 2001):**
- **1. Creation of a new institution is a rare event. Institutional development is going on, mainly, due to transplantation.**
- **2. In its development each institution goes from primitive to more advanced stages. If a recipient tries to jump over some stages, using transplantation of more advanced institutions, then the probability of dysfunction increases.**
- **3. If the transplantation is successful, then the development of the institution is faster in the recipient country than in the donor country.**
- **4. There exists a structural analogy of development: in different countries, the transplants evolve similarly, passing the same stages as in the country-donor.**

10f. Transplantation of economic institutions-2

- **We studied data on 125 cases of transplantation of mortgage institutions; the cases took place in 53 countries during 230 years. The data support hypotheses formulated above.**
- **This study revealed the importance of understanding of the institutional evolution. *If we understand why and how a stage of development of an institution transforms into the next one, it helps us very much to choose a rational strategy of transplantation.***

Related to the Transplant effect: Berkovitz, Pistor, Richard, 1999, 2003; Oleinik, 2000 (with a reference to Bernard Badie, 1992).

- **The study also revealed how frequent costly mistakes take place in transplantation strategies of developing countries.**

Evolutionary tree of mortgage institutions

I. Mass mortgage

Liquidated savings and credit cooperative

1775



Bausparkasse

1840



Savings and loan association

1845

1938



III. Developed credit market

Private Agency of Secondary Mortgage Market -FM

1968



Secondary Mortgage Market

1971

II. Elite mortgage

1768

Savings Bank



State Agency of Secondary Mortgage Market -FM

1852

Mortgage Bank



10g. How to search for interim institutions-1

Three strategies

- **Use and modification of existing institutions.**
- **Example: township and village enterprises in China as a first step to privatization (changing attitude to private property, creation of effective owners and managers).**
- **Constructing a qualitatively new interim institution. European Union. Price liberalization in China.**
- **Transplantation (import, borrowing) an institution from more advanced countries (usually not the most advanced institution, however)**
 - **Slovakia and Check Republic (1992-1993) – German bauparkassen (credit and savings associations, building societies).**
- **Russia 1917 – constructing (Gosplan, Goskomtsen, etc.)**
- **Russia 1992 – transplantation (price and foreign trade liberalization, etc.).**

10h. Constructing of interim institutions: method of forcing out

- **This means “competition” between a desirable institution and the old one, so that agents have a choice between them. Their coexistence creates an interim institution (an interim institutional environment). However, due to purposeful or “natural” changes some systemic parameters, the old institution is partially or completely forcing out by the new one.**
- **Example 1: the moment of retirement could be chosen by pensioners. However, the later you retired the larger is your pension. If the increments are increasing then the average pension age will increase as well.**
- **Example 2: bauparkassen coexist with other mortgage market institutions.**

Constructing of interim institutions: mixing

- This means formation of a “mixture” of an old and a new institutions in some “proportion”. **The “proportion” is defined by some parameters that create a line of interim institutions.**
- Price liberalization in China: mixture of planned and market systems; parameters of the plan define the line.
- Mixture of fully funded and pay-as-you go pension systems; coefficients of contributions to the corresponding pension funds create the line.
- Privatization in Slovenia: a mixture of the collective (old), state (new), and private (new) properties. It is successful!

10i. Methodologies of the search: institutional experimentations

- **As a rule, these are “real” experimentations (auctions are an exception) : they are conducted in a set of enterprises, sectors or regions.**
- **Large scale experimentation in USSR (1984): degree of decentralization.**
- **The possibility of experimentations is an advantage of gradual reforms. One get a chance to improve the structure of interim institutions, and even to refuse from continuation of reforms (Roland, 2000).**

Institutional experimentations-purposes

- **To decrease of the transformation costs.**
- **To reveal obstacles for introduction of the desirable institution.**
- **To try a chosen institutional line (or even to compare different lines)**
- **To choose parameters of interim institutions.**
- **To reveal the conditions of the transition from an interim institution to the next one.**
- **To find a support of the reform (weakening political constraints).**

Institutional experimentations-purposes (cont.)

Regional experimentation – additional purposes:

- To adapt interim institutions to region particularities (to the culture, income levels, etc.).**
- To promote initiatives “from below” and to use regional material and human resources.**
- A law on institutional experimentation is necessary.**
- Example: foreign trade liberalization in China (1989-1994):**

Expanding sequence of special economic zones with different rules = interim institutions.

1979 – 2 zones (Guangdong, Fujian); 1980- + 4, 1984 - +14; ода 1988- +1; 1992- the majority of provinces; 1994 – all China.

- Transplantation of both the final and interime institutions + mixing + regional experimentation**

11. Conclusions-1

Instruments to develop the implementable Theory of Reform:

- **Modern institutional analysis**
- **Updated macro- and microeconomic disciplines.**
- **New chapters of economics: evolutionary economics, new political economy, the theory of rent-seeking behavior, law and economics , etc.**
- **System of institutional indicators, regularly prepared by agencies.**
- **Numerous well documented case studies, partially analyzed.**
- **Well developed econometric methods**

Tasks:

- **Helpful manuals for reformers;**
- **Infrastructure to conduct reforms (Tinbergen's problem!) - including institutions for broad discussions of the reform projects and for their selection by interactions among representatives of government, business, universities and research institutes as well as civil society.**

11. Conclusions-2

It is unclear to what extent math could help to design reforms.

Difficulties

- **Measurement problems**
- **Cultural and social indicators of the reform acceptability**
- **Cost of disorganization and rent seeking**
- **Reaction of economic agents on introduction of the new social norms**
- **Long horizons and great uncertainty**
- **Complexity of calculations**
- **General problem looks like dynamic optimal control problem in an appropriate institutional space (principal-agent problem or Stackelberg game) with changing norms of behavior of the interacting agents as control variables. In addition, it should be adaptive control with experimentation which is built in the decision process.**
- **I believe that some general methodology could be developed how to decompose these problems into a number of solvable tasks, and then create a computable reform model (an analogue of CGEM) to help reformers in search of optimal solution.**

Yakar Kannai:

“I work at the interface between abstract mathematics and everyday reality. I expect to find ever more ways of using mathematics to contribute to an understanding of the real world, to benefit humankind.”

**We have to to develop the implementable
Theory of Reform.**

**This would give us a chance to improve the
world.**

THANK YOU FOR YOUR

ATTENTION!