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## Institution transfers, the Marshall Plan, Europe, and Ukraine: An analytical narrativ

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# *Institution Transfers, The Marshall Plan, Europe, and Ukraine: An Analytical Narrativ*

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**Institution Transfers, The Marshall Plan, Europe, and Ukraine: An Analytical Narrative**

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**Abstract:** This paper offers an analytical narrative based on an assurance game with two separate populations in an evolutionary setting. In our model, Donors and Recipients are two populations; let us call them Europe and Ukraine. The donor population has two types. A proportion of this population wants to promote a Marshall Plan-type model for the recipient state, and another prefers isolationism. A proportion of the population of the recipient state also intends to coordinate a Marshall Plan-type economic integration. In contrast, others prefer foreign aid but view further integration as a violation of sovereignty (or, with Ukraine, may be afraid of further Russian attacks from this integration). Marshall plan type coordination provides the highest payoffs through, e.g., the peace dividend, better institutions in Ukraine, widened European integration trade links, or global financial integration. Coordination is costly because it requires substantial institutional change on both sides. We use simulations to track outcomes given that European support for Ukraine and Ukrainian desire for aid may be endogenous. Further, we show how these endogenous outcomes respond to political shocks in Europe that affect European support for Ukraine and implicitly the lack of support for Ukraine.

JEL codes: P41, C73

Keywords: Institutional Transfer, Institutional Coordination, Evolutionary Game Theory, Ukraine War, Foreign Aid

\*Author names appear in alphabetical order and are not to be construed in any other way.

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## **Institution Transfers, The Marshall Plan, Europe, and Ukraine: An Analytical Narrative**

### **1. Introduction**

Almost a year ago, the Russian army started its inhumane, murderous, and lawless attack on Ukraine. Apart from the humane tragedies the war brought to the Ukrainian population; it destroyed a large part of the country's infrastructure, manufacturing sites and houses. This destruction was not justified by any military necessities. It will take years and hundreds of billions of dollars to reconstruct Ukraine.

International donors already actively support Ukraine both with humanitarian and military funds. They also are thinking about the future after the war will have ended, presuming that Ukraine will finally win this conflict and the Russian aggressors are contained. Only then the reconstruction process can begin and normality returns. One proposal used the catchy phrase Marshall-Plan for Ukraine to support the reconstruction process in Ukraine. However, it is obvious that a massive injection of funds into post-war Ukraine can only be successful if the donors and the Ukrainian government consider problems on both sides of the negotiation table. One aspect to mention is the high degree of corruption in Ukraine already rendering some current support activities unsuccessful. Notwithstanding, Ukraine wishes to become an EU member. Therefore, the Western support will be conditional.

In this paper, we consider these difficulties and offer an analytical narrative based on an assurance game with two separate populations in an evolutionary setting. In our model, Donors and Recipients are two populations; let us call them Europe and Ukraine. The donor population has two types. A proportion  $M_e$  of this population, wants to promote a Marshall plan-type model for the recipient state, and another,  $I_e$ , prefers isolationism. A proportion,  $M_u$  of the population of the recipient state also intends to coordinate a Marshall plan type of economic integration. In contrast, others, a proportion  $A_u$ , prefer foreign aid but view further integration as a violation of sovereignty (or with Ukraine, may be afraid of further Russian attacks from this integration).

Marshall plan type coordination provides the highest payoffs through, e.g., the peace dividend, better institutions in Ukraine, widened European integration trade links, or global financial integration. Coordination is costly because it requires substantial institutional change on both sides. This modeling approach allows us to create a two-species evolutionary stage game. Analysis reveals how population proportions change depending on the initial proportions of each type and the relative costs and benefits of being a particular type.

The paper starts with an overview of the situation in Ukraine. It analyzes potential donor-recipient relationships. In a third section, we investigate the Marshall Plan's history after World War II to identify a potential way forward. The core of the paper is the evolutionary game theoretical model, which will allow us to identify realistic scenarios for the future of Ukraine after the war has ended. Conclusions round off the paper.

## **2. The current situation in Ukraine**

Ukraine has suffered enormously from Russian aggression since February 24, 2022. News media have reported war crimes like mass civilian killing and rape. Infrastructure such as hospitals, schools, energy and water-producing utilities, networks, roads, manufacturing sites, and houses have been destroyed. According to the World Bank (2023a) GDP in 2022 30 percent less than in 2021, in 2023 growth will be probably around 2 percent. The public budget needs a monthly injection in aid to the extent of up to 5 billion US dollars. The World Bank in April 2023 estimated the damage in infrastructure, manufacturing sites, and housing to be almost 350 billion US dollars (World Bank 2023b). It is difficult to forecast the capital needed to reconstruct Ukraine; some observers have already indicated the sum of 750 billion US dollars. Further, high inflation (estimated to be as high as almost 27 percent in December 2022) makes a central bank-financed reconstruction unlikely.

Besides the material losses, we witness a humanitarian catastrophe in Ukraine. Poverty is increasing in the country (World Bank 2022, pp. 157 ff). Thousands have been killed, and about seven million citizens are said to be internally displaced. Already eight million inhabitants are estimated to have left the country as refugees. The Russian occupiers have also detained many Ukrainian citizens.

The Western world has supported Ukraine with moral, financial, and military means. On the moral side, many European countries have provided shelter for the Ukrainian refugees, which their populations have accepted with more patience than observed in 2015 when refugees from Africa arrived in Europe in large numbers. The European Union (EU) already 2015 concluded a Deep and Comprehensive Free Trade Area with Ukraine and has granted the country the status of an accession candidate in 2022. Until recently, this seemed to be a mere gesture because the country will have to meet the Copenhagen criteria to become a member, which many observers doubt against the background of rampant corruption. In Transparency International's Corruption Perception Index (CPI) for 2022 (2021), Ukraine ranks 116 (122) out of 180 countries with 33 (32) out of a possible 100 (corruption-free) points (TI 2023 and 2022 respectively). Notwithstanding, in November 2023, the European Commission (2023) evaluated the progress of Ukraine with respect to its chances to access the EU and recommended to start negotiations between Ukraine and the EU about the accession.

The exact amount of financial support so far is difficult to estimate. It has been estimated that Western donors have committed to more than 100 billion US dollars between February 2022 and November, of which roughly a fifth comprises grants (Devex 2022). The German Statistical Office estimated a sum of roughly 150 bn dollars until May 2023. Military support is obviously included in this numbers. However, the exact figures are not available since the Ukraine's needs do not diminish and there has been much support between May 2023 and the time of writing in November 2023. In any case, these sums indicate the fierce willingness of the West to support Ukrainian assertiveness. Economically, the sums involved suggest treating the money spent as sunk cost because the West will support Ukraine further.

This leads to the question of how the support after the war may look like. It seems obvious that any support for the future has to be massive, targeted and coming with conditions. Many human rights groups in Ukraine express their concerns about the level of corruption and demand NGO participation in the disbursement of funds. That said there is evidence that Ukraine is slowly improving its record as much of the past corruption was associated with oligarchs who partly are of Russian background. Already after the Maidan revolution in 2014, transparency of public spending has increased (The Economist 2022). The war may have changed the perception in the country even further and may have increased the urgency to

fight corruption more eagerly than before. According to Jacoby (2023), corruption in Ukraine is inherited, not intrinsic. This is good news in the fight against corruption.

### **3. The Marshall Plan as a blueprint for Ukrainian reconstruction?**

Here the idea of a Marshall Plan for Ukraine may offer a solution. This idea has been circulating for quite some time by Western politicians. The term Marshall Plan refers to the European Recovery Program (ERP), with which the United States (US) supported the European countries after World War II. This plan was both motivated politically and economically. In the first years after the end of World War II, the economic situation in Europe was dire. All over Europe, the economies still had not recovered from the enormous damages of the war, the population was almost starving, foreign trade was weakly developed, and the continent was short of dollars (The Economist 2022, Giersch, Paqué and Schmieding 1992, pp. 95ff).

Apart from that, the political situation in postwar Europe was characterized by the looming Cold War. It was obvious that in The Soviet Union tried to convince Western European countries to become part of its sphere of influence. Given the general political uncertainties, the chances were regarded as high since the decision for a modern liberal democracy was by no means made in 1947 in most countries that form the EU today. Consequently, the second superpower, the United States, were interested in binding the Western European countries including West Germany (then a Trizone) to their political and economic system (Eschenburg 1983, pp. 442ff).

In June 1947, the United States government announced the ERP, which is also known as Marshall-Plan.<sup>1</sup> It was in place for almost five years, until 1952. In sum, the United States gave about 12 billion US-dollars to the European recipients. Although the US government also invited Eastern European countries to the first initiative, they declined this invitation upon pressure from the Soviet Union. The transfer was planned to buy imports from the US, but the payment was blurred with other transfers by the US government to Europe. Thus, it is not clear to what extent this condition held. Of the 12 billion US-dollars, more than 83 per cent were granted without conditions, further almost 12 per cent were granted as long-term credits and about five per cent were to be repaid. The recipient countries had to match the grant with the same amount in domestic currency, this was labelled counterpart funds

In 1953, after the Marshall Plan expired, the German government used their share (roughly 1.3 billion US-dollar) to equip the Kreditanstalt für Wiederaufbau (generally known as KfW) with a revolving fund, which is used for several domestic (and later also foreign) development purposes, among them to finance private housebuilding, promote exports and finance development cooperation projects (KfW 2022). This way, the initial US support was made available for generations of investors.

The success of the Marshall Plan has been discussed fiercely among historians and economists (see e.g. Paqué and Schmieding 1992, pp. 95ff). Many observers argue that the recovery was due to economic policy decisions made in the recipient countries, since they introduced a liberal economic policy model. This is the case particularly in Germany, which more or less parallelly to the introduction of the Marshall Plan in June 1948 introduced the so-called Social Market Economy model. As a consequence of this policy choice, Germany experienced the so-called economic miracle (Giersch, Paqué and Schmieding 1992). As

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<sup>1</sup> The name is a reference to U.S. Secretary of State George C. Marshall, a VMI alumni, who was driving the plan.

Robinson (1986) makes clear, already in 1945 it was obvious that the German production capacities were less destroyed than one would expect at first glance. There is some hope that the same holds in the Ukraine (e.g. Eichengreen 2023). The Marshall Plan may have helped utilizing this potential successfully.

However, despite an allegedly limited economic impact, it has often been argued that the political effect of the Marshall Plan was immense. It (i) encouraged the European countries to follow the liberal economic model of the States (with their individual flavor such as Germany), (ii) helped to gain French and British support for the re-inclusion of West Germany into the world economy and the European family of nations and (iii) documented the US willingness to stay in Europe for longer as a friendly hegemon.

The second gain is not necessary in the case of Ukraine, since there is a potential difference to the current situation, as it seems inconceivable that Russia becomes part of any recovery program in the coming years. However, points (i) and (iii) are of importance. A Marshall Plan may help overcome unwillingness or inability on the Ukrainian side to reform the economy and substantially reduce corruption. This again seems easier than in the post-war German history, since according to the national Democratic Institute (2023) that commissioned a survey to the Kyiv International Institute of Sociology, 92 per cent of the Ukrainian population want the country to become a member of the EU; even in the East, this number is as high as 88 per cent. On the same token, 94 per cent of the population wants the country to become a democracy (as compared to 76 per cent in December 2021).

Such a recovery program may also signal the willingness of the donors to stay engaged in the Ukraine. It is also necessary to stabilize this support, as many Europeans still mistrust the country's elites whom they perceive as corrupt. This sentiment seems to be shared with Ukrainian citizens, but to a declining extent. The share of Ukrainian citizens who believe that the government is fighting corruption effectively has doubled between 2021 and June 2023 from 25 per cent to 50 percent, whereas the share of people doubting that has almost halved (from 39 per cent to 22 per cent).

There is another huge difference to the postwar period in the 1940s. The original Marshall Plan was financed and organized entirely by one country, the US. In the Ukrainian case, a group of donors must cooperate and agree on both a scheme and the distribution of the contributions among themselves. The current situation already gives an indication of how difficult this may be; e.g. Hungary is opposing sanctions for political reasons, and Austria still imports gas from Russia. In other words, some countries follow different narratives than most EU members, and some have different interests.

Therefore, it may be conducive for a successful implementation of a structured support for the Ukraine beyond pure funding if the effort to help Ukraine is both mitigated by lower financial burdens for the EU members and by institutional reforms in Ukraine. Regarding the first, Åslund (2023) suggests to use the Russian central bank's assets of more than 300 billion Dollars as reparations. This would increase the benefit B of a Marshall Plan. Adema et al (2023) show the importance of remittances from the Ukrainian diaspora that made up 7 percent of the 2021 GDP; we refrain from adding that to B as it can be seen as a substitute for income generated in Ukraine, if there was no war and no need to emigrate. Concerning reforms, Hartwell and Boyarchuk (2023) suggest that the process must be organized so that reforms are irreversible, and Bjerde (2023) implies that the planned EU-access of Ukraine can be instrumentalized, as it is only viable when the Copenhagen criteria are met – this is a serious requirement.

These considerations may result in issue linkages in the sense that Ukraine reforms its economy, which increases both increases political stability on the EU's Eastern flank and enhances the chances of economic

cooperation for the EU members' business community. We take account these different interest with the help of evolutionary game theory and use the following model to display the consequences of a situation when several donors are asked to help with substantial financial sums and – at the same time – the potential recipient may have disincentives to adhere to conditions imposed by the donor community.

#### 4. The model

##### Basics

We model an evolutionary game between two populations (Gintis, 2000). Population I is European,<sup>2</sup> while population II is in Ukraine. The European population has two types of culture; one culture – a proportion  $y$  of the population -- wants to create a Marshall plan type union with Ukraine, and another is isolationist. This dichotomy models reality in the European polity. The Ukrainian population is culturally dichotomous as well. One part of the population, a proportion  $x$  say, also wants to be part of a Marshall Plan type union, and another would prefer to receive direct aid. There are many good reasons to choose direct assistance over a more intrusive financial arrangement like a Marshall Plan; the ability to appropriate aid for personal use (a behavior often labeled corruption) or perhaps gain power are two apparent reasons highlighted in the public choice literature. Individuals from each culture meet (a pairwise interaction) and learn from each other. Specifically, each type of individual typified by a particular culture in a population can meet one of two types of people from the other population.

The chance of interaction is determined by the overall proportion of a particular type in a population. Each interaction produces a payoff determined by the evolutionary stage game, Fig 1. Thus, each culture has an expected payoff or "fitness" defined by this interaction. Agents belonging to a culture with a lower expected payoff "learn" from their predicament and switch to the culture with the higher expected payoff. Thus, the culture with the higher expected payoff in a population increases its proportion through the replicator dynamic process.

Europe		Ukraine	
		Marshall ( $M_u$ ) Proportion $x$	Direct Aid Recipient ( $A_u$ ) Proportion $1 - x$
	Marshall ( $M_e$ ) Proportion $y$	B-C, B-C	-P, P
	Isolate ( $I_e$ ) Proportion $1 - y$	I, -D	0, 0

Figure 1. The Evolutionary Stage Game.

The benefit to both populations of coordinating a Marshall plan type process is B since both the donor and recipient benefit from financial integration. Nevertheless, integration is costly – C. Ukrainians can also benefit from direct aid, P. In this case, it is a direct transfer, - P, from Europe. Isolationism in Europe also has a benefit, I. It is costly, -D, if Ukraine expects a Marshall plan type union and gets an isolationist

<sup>2</sup> For the sake of simplicity, we call population I European, although it also may contain donors from overseas in reality.



response from Europe instead. The evolutionary stage game expressed by the structure and payoffs above is represented below in Fig 1.

A few simplifying and, in our opinion, plausible assumptions help determine an analytical solution. We assume that  $P < B - C$ . This implies that the net benefit of coordinating the Marshall-type plan for Ukraine is larger than direct aid. In short, we are “priming the pump” to be favorable to the Marshall Plan type solution.<sup>3</sup> Consequently, one of our possible outcomes, where the Marshall plan type union is not an equilibrium, is particularly surprising.

Further, we assume that  $I < B - C$ . Isolationism has a lower payoff than a synergistic Marshall plan. Last, we assume that the cost of coordinating the Marshall plan is smaller than the benefit. Otherwise, why bother?

#### *Solving the model*

The European populations’ payoffs depend on their likelihood of “meeting” the two types of Ukrainian populations. Thus, the expected payoff to adherents of the European Marshall plan culture is,

$$E(M_e) = (B - C)x - P(1 - x) \quad (1)$$

and the expected payoff to isolationists is

$$E(I_e) = Ix. \quad (2)$$

If  $(1) > (2)$ , the proportion of M types,  $y$ , increases in the population. A little introductory algebra shows that  $(1)$  is bigger than  $(2)$  when,

$$x > \frac{P}{B - C + P - I}. \quad (3)$$

Recall that  $I < B - C$ . Thus, the denominator of  $(3)$  is a positive integer greater than  $P$ .  $P$  is also a positive integer. Therefore, the RHS of  $(3)$  is a positive fraction. In short, if the proportion of Marshall plan type Ukrainians exceeds a particular fraction  $x^* = \frac{P}{B - C + P - I}$ , the Marshall culture in Europe is incentivized, and the proportion  $y$  of Marshall Plan type culture grows in Europe. If  $x < x^*$ , the isolationist culture will grow in Europe.

In Ukraine, a similar dynamic occurs in response to European conditions. The expected payoff to Ukrainian Marshall Plan types is,

$$E(M_u) = (B - C)y - D(1 - y) \quad (4)$$

and the expected payoff to the proportion of the population who prefer direct aid is,

$$E(A_u) = -Py. \quad (5)$$

This time, if  $(4) > (5)$ , then the proportion of the Ukrainian population who prefer the Marshall Plan type union,  $x$ , will increase in the population. This happens when

$$y > \frac{D}{B - C + D + P}. \quad (6)$$

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<sup>3</sup> Historical evidence suggests that this correct (see above).

Now recall that  $B-C > 0$ . Therefore, the denominator of (6) is positive and larger than the numerator. The numerator is positive too. Thus,  $y^* = \frac{D}{B-C+D+P}$ , is a positive fraction. For any  $y > y^*$ , the proportion of the Ukrainian population preferring the Marshall Plan type policy will increase.

We represent the outcomes of the dynamic system described above in a phase diagram where the arrows show the population dynamics. Figure 2 illustrates this phase diagram.

Figure 2 is a unit box with the  $x$  and  $y$  axis representing the proportion of Marshall plan type populations in Ukraine and Europe, respectively. The arrows represent the direction of population dynamics. Depending on the initial proportions of Marshall Plan type people in either population, there are two possible dynamic equilibria. Both populations have a basin of attraction where the Marshall Plan type outcome prevails. Isolationism and the desire for direct aid can also be an attractor. The reader will recall that this latter outcome happens despite “priming the pump” favoring the Marshall Plan.

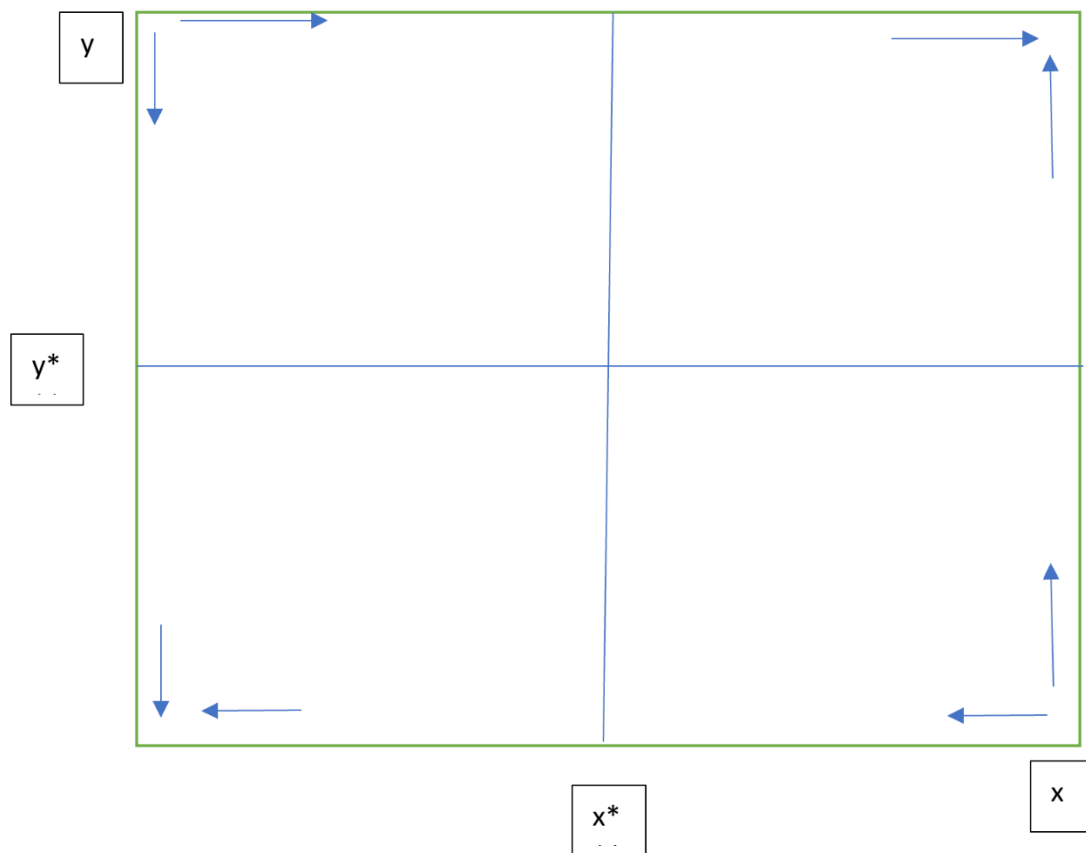


Figure 2. Phase Diagram

Thus, our first conclusion suggests that whether a Marshall Plan type program can succeed is not just a matter for Europeans to decide. It is a dynamic that depends on the interaction between the extent to

which Ukrainians will accept a Marshall Plan type outcome and the extent Europeans are unwilling to be isolationist. One feeds the other. Despite its obvious benefits, the success of a joint Marshall Plan type approach must respect the agency of a large segment of the Ukrainian population.

### *Model Analysis*

The result in the previous section might be surprising. Yet, the modeling approach notes the endogenous dynamic between segments of the population in both Europe and Ukraine. We suggest that our modeling approach highlights an emergent reality in aligning institutions that have hitherto remained the domain of anecdotes, if even acknowledged. Institutional alignment between countries depends on the interaction between like-minded segments of the population in both countries and can be derailed even if it benefits both countries. Our current model creates a framework for this sort of analysis. The question remains, as a predictive matter, can we learn something from the model that highlights this sort of institutional alignment?

We suggest an affirmative answer. Say we desire the coordinated outcome of a Marshall plan type outcome that encompasses both Ukraine and Europe. An expansion of the top right quadrant in Figure 2 increases the likelihood of just such an outcome. What can expand that space?

Anything that reduces  $x^*$  and  $y^*$  increases that space. This leads to some apparent results that make our framework plausible. For example, an increase in  $I$ , the payoff to populist isolationism, increases  $y^*$  to  $y^{**}$  and reduces the likelihood that any population proportion of Marshall types falls in the upper right-hand corner of our phase diagram. That is, our framework explicitly captures political dynamics internal to Europe.

For example, notice Figure 3. Say the initial distribution of types within each population is given by  $q$ . Say the initial conditions are such that the system thresholds are at  $x^*$  and  $y^*$ . In this scenario, the initial distribution of types within a population will move to the Evolutionary Stable Nash Equilibrium at  $x = 1$  and  $y = 1$ . Now, say within Europe, the political process increases the lure of populism. We can model this as an increase in  $I$ . As  $I$  increases, so does  $y$ . Say  $y$  increases from  $y^*$  to  $y^{**}$ . Now though, the same  $q$  will move to  $x = 0$ ,  $y = 0$ . Thus, our framework explicitly models the impact of internal politics on foreign policy outcomes.

Of course, an increase in  $B - C$  has the opposite effect. In this case, both  $x^*$  and  $y^*$  decrease. The consequent increase in the size of the upper left-hand quadrant increases the chance of a Marshall Plan type solution working for both Ukraine and Europe. For the Ukrainians this suggests that any internal reforms that bring the Ukrainian legal system closer to that of western Europe, thereby reducing  $C$ , can have a positive effect on the likelihood of both receiving and implementing a Marshall Plan type solution to war devastation – and perhaps more importantly the institutional reforms needed for long term economic and political stability.

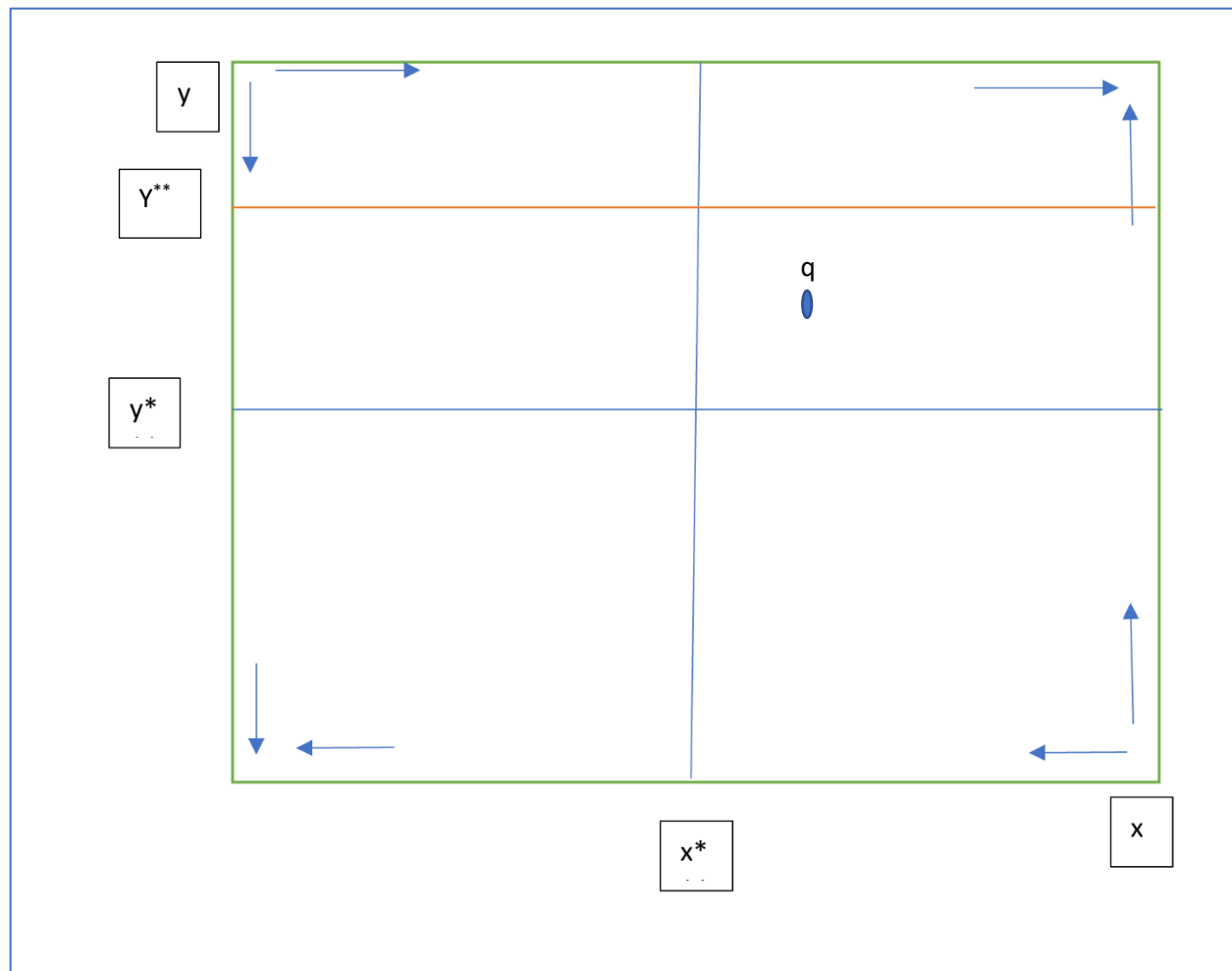


Figure 3. European Political Shocks

The case for changes in  $P$  is a little more complicated. As  $P$  rises,  $y^*$  goes down. This suggests that increasing direct foreign aid to Ukraine makes it easier for Europeans to accept a Marshall Plan-like solution. However, as  $P$  rises,  $x^*$  may go up or down.<sup>4</sup> If  $B - C > I$  then  $x^*$  goes up. In this case, we cannot make an unambiguous claim about the relative sizes of the 4 quadrants in Figure 2. If  $B - C < I$  then both  $x^*$  and  $y^*$  go down as  $P$  rises. This result suggests that paradoxically, more direct foreign aid can help the Marshall Plan-type outcome with a higher probability when the political payoff to populism/isolationism is higher than the net benefit from a Marshall Plan-type solution.

Our outcomes critically depend on the population proportions who want a particular type of policy. This finding points to the importance of a marketing campaign designed to increase the proportion of people in Europe and Ukraine who will support the Marshall Plan. This is a precondition. Second, the efficacy of the learning process is front and center. A Marshall Plan with a regional focus where the domestic population is more receptive (perhaps Kyiv) may become a learning “example” whose success will convince more skeptical people to adopt the new institutions. The focus though, remains on

<sup>4</sup> The derivative w.r.t  $P$  for equation (3) is  $\frac{B-C-I}{(B-C-I+P)^2}$ . Thus, the sign on the expression depends on the relative magnitudes  $B$ ,  $C$ , and  $I$ .

communication and learning. This fundamental result highlights the importance of rhetoric in the manner noted by Deirdre McCloskey (2021). Moreover, our results inform a number of testable hypotheses. Obviously, we cannot do randomized control trials to test these hypotheses. Nor can we do an observational causal study since we're talking about events that have not happened. Our “empirical” approach, therefore, is to simulate a system where electronic agents with very basic learning capabilities are let loose in a cyber sandbox to play the game we have demonstrated above. Are the outcomes reminiscent of our analytical outcomes? Of course, we must model these agents carefully – since agents who behave the way we tell them to may end up behaving exactly the way we expect! Our cyber agents must have some modicum of “free will.” In this instance it means that they are allowed to make mistakes. Thus, we should expect a few anomalous outcomes.

## 5. Simulation

We simulated our model above in the following way. Recall that we divide the European group into Marshall ( $M_e$ ) and Isolate ( $I_s$ ) types with proportions  $x$  and  $1-x$ , respectively and the Ukraine group into Marshall ( $M_u$ ) and Direct Aid Recipient ( $A_u$ ) types with proportions  $y$  and  $1-y$ , respectively. In our algorithm, we have the following key parameters: total number of Europeans, total number of Ukrainians, number of generations, and number of interactions per generation. In specific runs mentioned here, we used 500 total Europeans and 500 total Ukrainians.

In the first generation, we randomly chose a pair of one European and one Ukrainian according to the distributions determined by  $x$  and  $y$ . These two people interact, and payouts are determined according to the payout matrix. We repeat this process of choosing pairs and allotting payouts a number of times, say 10 times. We add the payouts from all ten interactions to the population counts of the four groups ( $M_e$ ,  $I_s$ ,  $M_u$ ,  $A_u$ ), and then the populations of Rebels and State Elites are then rescaled back to 500 each, now with different proportions  $x$  and  $y$ . For example, in one trial with initial values of  $x_{init} = 0.25$  and  $y_{init} = .75$  we may have  $(M_e, I_s, M_u, A_u) = (125, 375, 375, 125)$  at the start, and after one generation  $x=0.256$  and  $y=0.748$  so the population levels are  $(M_e, I_s, M_u, A_u) = (128, 372, 374, 126)$ .

We repeat this process over a set number of generations. In the following pictures, the typical number of generations is 200, with 10 interactions per generation unless specified otherwise. If any of the values  $M_e$ ,  $I_s$ ,  $M_u$ , or  $A_u$  ever hit zero, that group has “died out” and we stop the process at that generation. This is quite possible if the payouts are much more favorable to one (more) group. This could also happen even if the payout structures are better for a group. Still, because of randomness, the interactions swing towards another group, i.e., the interactions are not predetermined by the model. At each generation, we keep track of the values  $x$  and  $y$  to produce plots to show the evolution of population types.

We completed this experiment multiple times for various values of  $B, C, D, P, I$  and initial starting values of  $x$  and  $y$ . A typical example is described below. The MATLAB app that created this picture is available for download:

[https://drive.google.com/file/d/16CNgmm\\_UDjiwiS\\_zwzOoCvCo1PgRGazE/view?usp=drive\\_link](https://drive.google.com/file/d/16CNgmm_UDjiwiS_zwzOoCvCo1PgRGazE/view?usp=drive_link)

Say,  $x^*=y^*-0.33$ ,  $B-c = 3$ ,  $P = 1$ , Initial populations:  $x = 0.75$ ,  $y = 0.25$ . Fig 4, represents the outcomes from the simulation in this case. This figure corresponds to the phase diagram in Fig. 2. Over 150 generations, the initial population proportions change. Starting from the bottom left quadrant, the simulated agents

“learn” via the replicator dynamic, moving to the top right and sometimes to the bottom left quadrants. We highlight this result by noting that our model is not deterministic. That is,

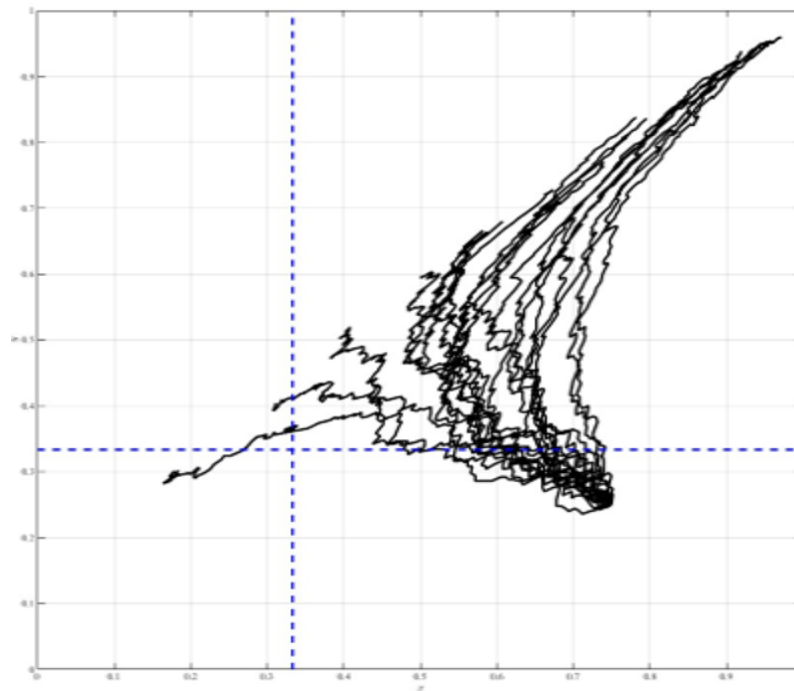


Figure 4.

our simulation approach, while not empirical in the usual sense of the term illustrates how our model may work in the wild. A plausible next step may be to create a wargame/experiment to replicate these results with live individuals.

Having established that on average people in our simulated world behave in ways predicted by our model, we move to the next stage of our paper. In Figure 5 we note how changing levels of support in

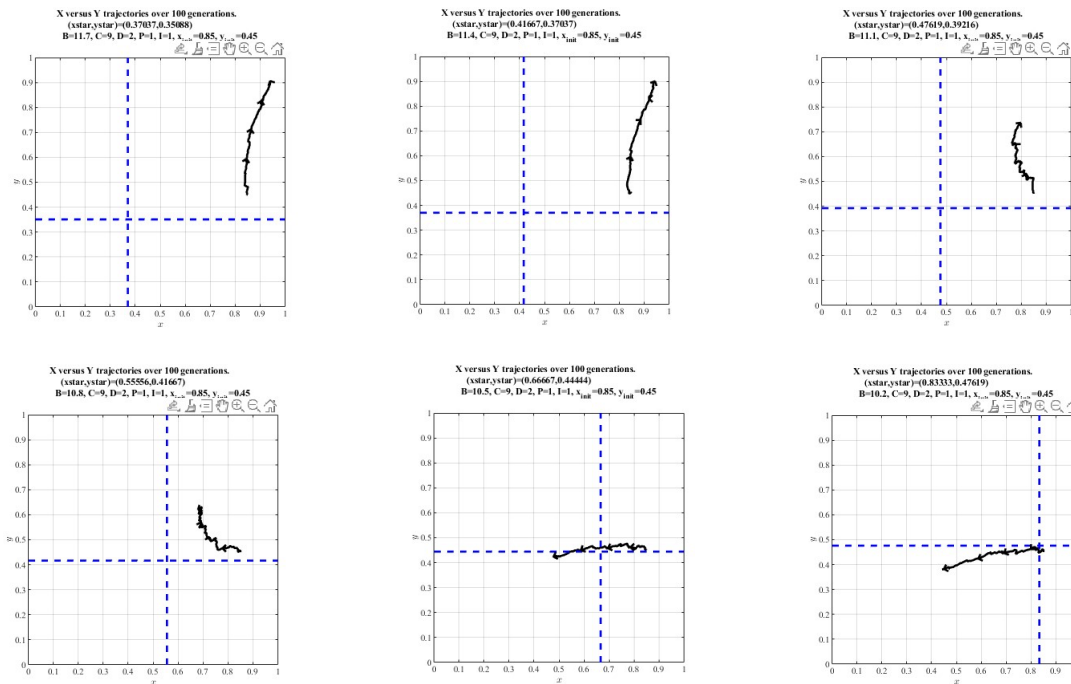


Figure 5. Same initial condition, different outcomes.

The two populations can lead to different outcomes even with the same initial levels of pro-Marshall Plan subpopulations in either population. This idea corresponds to the theoretical predictions shown in Figure 3. The reader will note that even small perturbations in political perceptions of the costs and benefits of a Marshall Plan for Ukraine change the trajectory of the ultimate outcome for supporting the Marshall Plan and its success. A change in  $B - C$  that leads to a change in  $x^*$  and  $y^*$  can swiftly tilt political opinion against the Marshall Plan, as shown in Figure 5, as one moves from the top left to the bottom right.

Our model, therefore, highlights several propositions. First, we note the importance of managing the political perceptions about the costs and benefits of integrating the Ukrainian economy with Europe using the German Marshall Plan. The **actual** costs and benefits of integration will matter greatly in managing these perceptions. Second, the timing of the plan matters as well. For example, if the discount rates for the Marshall project change substantially (the current macroeconomic turmoil in the West suggesting that macroeconomic volatility is here to stay as the Great Moderation recedes), the resulting change in the cost-benefit analysis of the Marshall Plan in Ukraine would change  $x^*$  and  $y^*$  in ways where even high levels of current support for the Marshall Plan may evaporate.

The reader will recall that the process of learning, i.e., of communication is key to the success or failure of an institution transfer like economic integration funded by the German Marshall Plan. This suggests the importance of rhetoric and places the political firmly in political economy. To that extent we suggest that our modeling approach can be a framework for explaining political economy dynamics formally and consistently – particularly when we talk about institutional transfers and integration.

## 6. Conclusions

This paper provides a unique framework for thinking about the transfer of institutions from the perspective of both the donor and the recipient. The model itself is simple but can be easily modified in terms of the nature of the payoffs, the type of interaction, and how learning happens. Nevertheless, even in its simple form, our model places institutional transfers as an outcome that critically depends on a communication and learning process in a boundedly rational system. Here, the “good” Pareto optimal outcome is not inevitable even if individuals are rational. Thus, such a model captures the reality of the political process. Further, our focus on the pressing global issue of getting Ukraine back on its feet after the Russian invasion (we prefer the optimistic outcome) with this model can be a blueprint for success in the same way Europe succeeded after WWII. At one level, leaders must have the courage to elevate humanity over parochial populism. At another level, leaders need to understand that actions have consequences, in this case virtue signaling direct aid can reduce the likelihood that a policy that can benefit both countries will succeed. This is not an abstract philosophical matter. Lives depend on it.

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