European Vaccine-rollout Policy, Unraveled Markets, and Moral Externalities

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Abstract

This paper seeks to address the role of European public policy in addressing the problem of Covid-19 or any other vaccine-rollout policy. Currently in Europe, instead of market-based allocation a centralized command-based approach has been implemented to address the essential questions of production and distribution of vaccines throughout the EU. This is centralized, command-based decision-making on the allocation of vaccines which is leading to political and sociological tensions among EU Member States. Paper argues that in order to mitigate these shortcomings European public policy could employ a more nuanced approach. While employing law and economics tools this paper addresses the questions on how European societies should allocate vaccine and, more importantly, who should make this allocation decisions. Moreover, identified moral negative externalities, status quo and omission biases, planning fallacy, risk aversion, administrative rigidity, notorious type-I-type-II error fallacy and related unraveled markets phenomena might result in vaccine-rollout failures.

KEYWORDS: Covid-19 vaccination-rollout, moral negative externality, moral transaction costs, risk aversion, coordination, unraveled markets.

Introduction

The coronavirus (COVID-19) pandemic is a human tragedy of potentially unheard-of proportions with many epicentres around the world, including one on the European continent. The shockingly accelerating number of infected and perished citizens, the overflow of the entire healthcare systems, and the seemingly unstoppable character of this superspreading pathogen almost brought the European Union (EU) to its knees. In such dire circumstances, the development and distribution of safe and effective vaccines against COVID-19 represents the most effective and lasting response to the current pandemic and also to any other that mihght follow in the future. As proclaimed by the EU Commission (2021) provisions of effective vaccines against COVID-19 is also at the heart of the European Commission's coronavirus response. According to the EU Commission (2021) "all Member States [MS] will have access to COVID-19 vaccines at the same time and the distribution will be done on a per capita basis to ensure fair access".

Yet, while Israel, the US, and England up until mid-April 2021 for example have already managed to vaccinate approximately 60% of their population, European countries are lagging far behind with merely 16% of the population vaccinated (WHO, 2021). For all intents and purposes, Europe's vaccination-rollout is seen as a failure that has produced numerous human tragedies and enormous political tensions among EU MS. For example, on March 12, 2021 the Austrian prime-minister Sebastian Kurz accused the EU of unfairly distributing vaccine doses among its

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27 member states. While lashing out at the "EU bazaar", he demanded adjustments in favor of EU MS that received less doses than others (Chadwick, 2021). Additionally, billions of dollars have been paid by the EU Commission and MS to pharmaceutical companies to create vaccines with the expectation once they were approved for use there would be enough already produced to vaccinate large portions of the population. However, it seems there was a misalignment in these expectations and the pharmaceutical companies only started producing after approval.

Undoubtedly, the European vaccine-rollout debacle is an epic one and may even be worse than the euro debacle (Krugman, 2021). As argued by Krugman (2021) Europe's vaccination debacle will almost surely end up causing thousands of unnecessary deaths. Moreover, one may wonder what lessons for future pandemics and corresponding vaccine rollout polices may be learned and already implemented by current policymakers.

However, such failures and related political tensions have not came as a surprise to the law and economics scholarship. Namely, almost 40 years ago Calabresi and Bobbitt (1978) wrote, the pathbreaking book "Tragic Choices" in which they studied scarcities where they illustrate how making particularly painful choices is necessary. As they argue, scarcity is a fundamental fact of existence and in the distribution of scarce goods society has to decide which methods of allotment (markets, political allocations, or forces of custom) to use (Calabresi and Bobbitt, 1978). Insightfully, current issues related to the Covid-19 vaccine-rollout are actually exactly the same as addressed by Calabresi and Bobbitt (1978) in their seminal book on tragic choices of allocating scarce resources.

This paper joins this critical debate and attempts to show that the details of the European coronavirus failure in the early stages of pandemics have been complex. The paper aims to illustrate how moral transaction costs, administrative failures, risk aversion resulting form type-I-type-II error, and behavioural phenomena result in vaccine-rollout failures. By incorporating the main insights from the classic law and economics literature (Calabresi, 1970; Shavell, 2004; Schäfer and Ott, 2004; Posner, 2011, Leitzel, 2015) and behavioral law and economics scholarship (Zamir and Teichman, 2020; Sunstein, 2019, 2007), this paper examines current vaccination-rollout policies and provides a set of substantive insights on an improved public policy respond in the Covid-19 vaccination-rollout practices in the EU and for any future potential pandemic vaccination-rollout challenge.

Specifically, one may wonder why is there a scarcity of vaccines at all? If there is scarcity, the ordinary market will be signalled to produce more enabling it to supply enough of that good for the buyers. In other words, standard economic theory suggests that if there is a demand then the market produces enough for the people that want it (Pindyck and Rubinfeld, 2018; Cooter and Ulen, 2012; Varian, 2010; Roth, 2002; Arrow and Debreu, 1954). Yet, while markets provide the optimal production decision (ie. the most efficient one) on how many vaccines should be produced, the EU seem reluctant to let the market decide just that. In fact, in the current European reality, the decision on how much to produce is at odds and contrary to all findings of law and economics literature, given to the collective-centralized-decision-maker of the first order (i.e. decision on how much to produce). Of course, one may argue that such vaccine scarcity is, in the current Covid-19 pandemic, inevitable and that there is nothing that can be done. Yet, as law and economics literature convincingly show (Calabresi and Bobbitt, 1978; Roth, 2002) this might not be the case and markets might be implemented to allocate almost all scarce resources (Roth, 2002).

Moreover, the decision who gets the vaccine seems perfectly suitable for the market-based allotment approach, yet the market has in Europe not been allowed to play any role. Calabresi (2016) suggests that such rejection of a market-based allocation approach might be explained

by the so-called concept of moral externalities. Europeans might be unwilling or even offended to let the market - due to wealth distributions or because they do not want particular goods to be priced - make decisions of this sort (Calabresi, 2016).

The employed analysis presented here is both positive and normative. The analytical approach employs inter-disciplinary assessment and enriches it with the concepts used in the economic analysis of law (Posner, 2011; Shavell, 2004; van den Bergh, 2018).

The employment of the law and economics methodology (Posner, 2011; Leitzel, 2015; MacKaay 2015) may offer an additional insight in to the institutional advantages and/or disadvantages of various centralised or decentralised institutional designs of vaccine distribution. Moreover, this novel approach toward vaccine distribution might offer a fresh perspective able to provide valuable policy information on which particular institutional arrangements can assist with realising the public interest goals of distributing vaccines in the early phases of current COVID-19 pandemic and also in instances oy any other potential future pandemics (Posner, 2011, p. 891; Ogus, 2004, p. 58; Van den Bergh 2016; pp. 937-964). Further, the law and economics methodology offers guidance on whether the appropriate source of regulatory rule-making should be on a centralised or decentralised (market-based) level. In other words, the law and economics methodology may offer additional scholarly and policy suggestions regarding how to best organise the vertical structure of governmental institutional arrangements of vaccine dissemination policy during pandemics (Inman and Rubinfeld, 1997, pp. 43-64).

However, several caveats are at place. Namely, this paper merely addresses the market allocation issues and omits discussion on vaccination's economic consequences in terms of financial instability, sustainability, economic recession, lower incomes, and policy challenges at the national and European levels. Moreover, as of this writing the research merely encompasses period from the outburst of the Covid-19 pandemic in beginning of 2020 and until spring 2022.

This paper is structured as follows. The first part provides a narrative of the European COVID-19 vaccine strategy. The second part offers an economically inspired conceptual framework showing that the moral transaction costs, status quo and omission biases, risk aversion, administrative rigidity, notorious type-I-type-II error fallacy, and related unravelled markets phenomena might be one of the additional sources of current European vaccine-rollout failure. The third part offers a set of recommendations for an improved vaccine-rollout institutional mechanism. Finally, some brief conclusions are presented.

European COVID-19 Vaccine Strategy

Creating a vaccine is a complex and extensive process which under normal circumstances would take approximately 10 years. However, considering the situation the world is now in, there is a need for a much faster development and distribution of a vaccine. As such, the European Commission drafted a strategy for a faster development and manufacture of the vaccine against COVID-19. With this strategy, the Commission reinforced the determination of shortening this timeframe of 10 years to 12 to 18 months, if not earlier. While simultaneously, still having the vaccine must meet the harsh authorization trials and safety ethics (Coronavirus vaccine strategy, 2020). On June 17th, the EU Commission decided on this central level plan of distribution by considering Article 4 paragraph 5 of the XXX(ESI) Regulation, which states that the Commission can fund emergency support on behalf of the Member States. As a result, on June 12th, 2020, the Council of Ministers of Health settled to support this action of creating a safe and effective vaccine against COVID-19 by obtaining necessary and equitable supplies for MS as fast as possible. Moreover, for the strategy to be implemented, MS had to sign EU level Advance Purchase Agreements (APAs) with the producers. In return, APAs would provide for each MS doses within a specified

timeframe and price. In order for this action to run centrally and efficiently, the Commission had to create a steering board, whose responsibility is to assist and deliver guidance during the whole process. The idea behind this centralized plan is to provide all MS with accessibility to COVID-19 vaccines at a similar time with the supply being dependent on the country's capita to guarantee fair distribution (Commission centralized EU approach, 2020). The Commission's plan for a centralized approach came with several benefits such as greater bargaining power on prices and delivery time. Also, the ability of having several vaccines and various technologies in display of choice should initially increase the odds of securing them at the amount needed and in a shorter timeframe. Currently, the EU's portfolio of vaccines, is in whole 2.3 billion doses which is more than adequate to protect the entire residents of the EU. The official negotiations started on the 17th of June, where the EU's vaccine strategy was implemented when negotiations commenced with all six vaccine producing companies.

On January 19th, 2021 - Member's of the European Parliament (MEPs) started to put more pressure on the issue of unity and clarity during vaccine roll-out. As this would be the only way how the centralized approach to thevaccine strategy would work. On January 28th - The MS had to implement some guiding principles on evidence of vaccination that will be used if it is decided to arrange vaccination documentations in order to make them inter-operable. On January 29th, each EU MS who had signed the APA with the EU had been informed about plans to export vaccines manufactured inside the EU. On February 5th - The EU Parliaments public health board required from each MS data and results on the distribution of doses in their countries and correspondingly agendas of vaccination on monthly basis. On February 10th - MEPs demand crucial actions to ramp up vaccine production (Coronavirus: a timeline of EU action in 2021, 2021).

Conceptual framework and theoretical mechanisms

This section offers, literature review and an economically inspired conceptual framework by first showing that the Covid-19 vaccination failure is a result of systemic negative externalities and problems caused by public goods. It will then detail how non-simultaneous exchanges have contributed to the shortage of vaccines and why moral transaction cost have justified the use of command-based allocation. Finally, administrative failures, the type-I-type-II error fallacy, risk aversion, and behavioral phenomena will be explored to understand there part in the vaccine-rollout failure.

Literature review

Economically speaking Covid-19 and any other pandemic and the superspreading nature of pathogens are a classic example of negative externalities and tragedy of commons. Namely, the problem of positive transaction costs and asymmetric information results in the so-called market failures (Akerloff, 1970) which cause suboptimal (inefficient) amount of economic activity and inefficient allocation of resources. Collective-action problem, agency problem, tragedy of commons and game theoretical prisoner's dilemma phenomena are the notorious embodiment of positive transaction costs and asymmetric information problems that generate negative externalities and, relevant to our discussions, also the suboptimal/inefficient amount of public action and Covid-19's contagion. The materialization of these negative externalities accompanied by the "private law failure" prima facie warrants the employment of the regulatory intervention in the public interest (Ogus, 2004). In other words, allocative efficiency and optimal human behaviour will result only if decision-making process achieves 100% internalization of all external costs and benefits. Yet, since people are in aggregate self-interested, maximizing their own welfare and since not all of them suffers the health costs of being infected (asymptomatic signs of Covid-19) such an internalization of costs of people's behavior and their incentives to get vaccinated tends to be suboptimal.

The specific phenomena that interest us in investigation of the Covid-19 pandemic is that of external effects or externalities, also called spillover effects. Negative externality arises when one person's decision affects someone else, but where there is lack of institutional mechanism to induce the decision-maker to fully account for the spillover effect of their action or inaction (Leitzel, 2015; Viscusi, 2007, 1992; Coase, 1959, 1960; Pigou, 1932). These negative externalities can then also lead to market failures and the reason is that the generator of the externality does not have to pay for harming others, and so exercises too little self-restrain (Cooter and Ulen, 2016; Miller, Benjamin and North, 2017). In other words, the private cost to the person who creates the negative externality is smaller than the social cost, which in the sum of that private cost and the cost incurred by third persons (Pigou, 1932; MacKaay, 2015). Corresponding public policies are then one of the most effective remedies to correct this failing. Hence, institutional respond and political decision-making should aim at internalization of this negative externalities, inducing decision-makers (population) to respond to the consequences of their choices upon others just as if those consequences fell upon the decision-maker directly (Leitzel, 2015). Inadequate internalization of such negative externalities might also materialize as a notorious "tragedy of commons". This "tragedy of the commons" concept, coined by Hardin (1968) and Gordon (1954), suggests that individuals might not see themselves as responsible for common resources such as public health and might eventually destroy such common resource (Demsetz, 1967).

Extrapolation of these concepts of negative externality and "tragedy of commons" upon the current Covid-19 pandemic enables us to argue that Covid-19 contagion should be regarded as a systemic negative externality where actions of individuals and EU Member States affect bystanders and other Member States. Namely, the generator of externality – with Covid-19 infected person - which does not have to pay for harming others and so exercises too little self-restrain (social distancing). He or she acts if the cost of spreading the Covid-19 are zero, when in fact, there are real cost involved, as the people which has been infected by such a person (eventually ending up with severe pneumonia in the emergency care unit) can testify. Such sub-optimal level of self-isolation and social distancing is even more exacerbated when an infected person is an asymptomatic one. Economically speaking asymptomatic Covid-19 contagion represents a severe informational asymmetry and can even amplify the negative externality problem. Namely, in such cases a person is already infected but due to the lack of information has no idea that she or he is already spreading the virus and harming others. Hence, the problem of sub-optimal level of self-restrain is greatly amplified and leads to socially disastrous quantity of negative externalities (i.e. superspreading of the pathogen).

Moreover, Roziqin et al. (2021) while assessing Indonesian government policies against COVID-19 that the Indonesian government issued various policies in handling the spread of COVID-19 cases. Even though as Roziqin et al. (2021) argue the Indonesian government's initial response was not good, and there was a policy crisis, some policies were directly related to the handling of COVID-19, including physical distancing, Large-Scale Social Restriction (PSBB) and social safety net. Their study shows that some policies made by the government were not effective in suppressing the number of COVID-19 cases, as such type of policy is more top-down (Roziqin et al., 2021). They also argue that in the case of COVID-19 handling in Indonesia, the community can be a determinant of the success or failure in handling COVID-19 (Roziqin et al., 2021). Cifuentes-Faura (2021) examines the virus containment measures implemented by the European countries most affected by the pandemic, with the aim of detecting whether those countries that anticipated taking restrictive measures managed to minimize the impact of the pandemic. He suggests that actually among analyzed EU Member States Germany had managed to have one of the lowest death rates in Europe and to impose fewer restrictions than other countries

(Cifuentes-Faura, 2021). Cifuentes-Faura (2021) argues that its success was due to its decentralised testing system and laboratory infrastructure, as well as being the European country where most rapid tests for the disease were carried out. Insightfully, countries that took longer to take action would have to pursue more restrictive policies and allocate more spending to bring about economic recovery (Cifuentes-Faura, 2021).

Dinleyici et al. (2021) argue that the ongoing COVID-19 pandemic is a reminder of the importance of vaccination as a critical public health strategy for disease prevention and control. Public health officials have agreed that the most important global protection strategy, and the best method for controlling the SARS-CoV-2 pandemic and any other pandemic, is a vaccine (Dinleyici et al., 2021). They suggest that during pandemics every effort should be made to continue routine immunizations for children and persons at risk for vaccine-preventable diseases (Dinleyici et al., 2021). The potential for vaccine shortages related to closing borders and limited transport during the pandemic are also causes for concern (Dinleyici et al., 2021). Although recent experiences know that there will be many demands on health systems and frontline health-care workers during and beyond the threat of COVID-19 (or any other pandemic), continuing preventive health services, especially children's vaccinations, are of great importance for the months and years to come (Dinleyici et al., 2021).

Brownstein et al. (2022) find that the presence of a participating retail pharmacy vaccination site in a county leads to an approximately 26% increase in the per-capita number of doses administered, possibly indicating that proximity and familiarity play a substantial role in vaccine take-up decisions. They also show that increases in county-level per capita participating retail pharmacies lead to an increase in COVID-19 vaccination rates and a decline in the number of new COVID-19 cases, hospitalizations, and deaths, with substantial heterogeneity based on county rurality, political leanings, income, and race composition (Brownstein et al., 2022). The relationship they estimate suggests that averting one COVID-19 case, hospitalization, and death requires approximately 25, 200, and 1,500 county-level vaccine total doses, respectively (Brownstein et al., 2022). They argue that their results imply a 9,500% to 22,500% economic return on the full costs of COVID-19 vaccination (Brownstein et al., 2022). Overall, their findings add to understanding vaccine take-up decisions for the design of COVID era and other public health interventions (Brownstein et al., 2022). Whereas Ildirim et al. (2021) demonstrates the importance of making the vaccine globally available, not from a moral standpoint but from an economic one, by illustrating the large economic costs in the absence of global vaccinations. They also suggest that ironically, a significant portion of these costs will be borne by the advanced countries, despite the fact that they might vaccinate most of their citizens by the summer of 2021 (Ildirim et al., 2021). In addition, Çakmaklı et al. (2022) argue that endogenous lockdowns triggered by lack of vaccinations in the emerging markets and developing economies hurt advance economies via a shortage of intermediate inputs, higher import prices, and weak demand for their exports. They provide upper and lower bound estimates for negative output effects of global supply chain disruptions, depending on the degree of complementarity across factors of production (Çakmaklı et al., 2022). They show that vaccinating emerging markets and developing economies is a high return investment for advance economies to smooth out the economic impact of the pandemic in their home countries (Çakmaklı et al., 2022).

Why was there a shortage of Covid-19 or any other vaccines

As mentioned previously, there was misalignment in expectations of when the vaccine producers would start to produce doses. The EU was under the impression that producers would manufacture enough supply to satisfy the vaccine needs even before receiving government approval.

However, producers had a different view and were hesitant to manufacture large amounts of the vaccine before this point.

Regarding economic risk, the production of vaccines requires large capital expenditures with significant lead-time to become operational (Mendoza, Linderman, Peipert, & Hwang, 2020). Additionally, the process involves highly specialized expertise that requires government certification which can take a company a considerable amount of time and money to acquire (Jacobs, 2021). While the certification is important to ensure the quality of the product it acts as an entry and exit barrier which increases the financial risk for companies. Additionally, these companies have been asked to make these investments with no guarantee for approval or long-term purchasing agreements (Mendoza, Linderman, Peipert, & Hwang, 2020). This is where the demand uncertainty appears as the companies cannot predict if the demand is sustainable in order for such investments to be economically viable.

Tragic choices, repugnant transactions, and moral negative externalities

The significance of moral externalities and the interplay of market-based and command-based allocative mechanisms on the proper treatment of Covid-19 vaccine rollout can hardly be overstated. Sixty years ago, Musgrave (1959) and Tobin (1970) called attention to the existence of groups of goods that our societies do not allow to be allocated via market mechanisms. They called them "merit goods" and suggested what characterized them was the fact that decisions to their purchase and uses did not adequately take into account their costs (or benefits) to others in society (Musgrave, 1959; Tobin, 1970). Moreover, since individual decisions to any goods may create negative externalities the market itself, as Coase (1960) demonstrates, operates as a mechanism that tend to reduce or eliminate such externalities. Furthermore, Calabresi and Bobbitt (1978) introduce further distinction and suggest that merit goods come in two types: a) goods that significant number of people do not wish to have priced and whose pricing causes a diminution in utility for significant group of people; and b) goods whose pricing is not intrinsically negative, but whose allocation through the prevailing distribution of wealth is highly undesirable to a significant number of people. As to the second, it is not their pricing that is objected by many, but actually the capacity of the rich to outbid the poor that renders their allocation through markets unacceptable and costly to many people (Calabresi and Bobbit, 1978; Radin, 1996; Calabresi, 2016). The costs that adhere to such merit goods are moral costs (i.e. moral negative externalities) where classic Coasen internalization is almost always impossible (Calabresi, 2016). In other words, such transaction are repugnant transactions where some people want to engage in and that are objected to by people who may not themselves experience any direct harm but find such transaction reprehensible (Roth, 2007).

In the instance of the first category of goods, due to moral transaction costs, we absolutely do not wish them to be priced (e.g. disgust at any actual pricing of life) and to which we do not give absolute value, literature advocates their removal from the market and allocation via modified collective command-based mechanisms (Calabresi, 2016). In addition, the identified endowment effect (Thaler, 1980), where people place higher values on things that they already possess than on the equivalent things that they do not yet own may place a higher value on the existing governmental command-base mechanisms than on future market-based allocation. Obviously, vaccines do not belong into this first category since they are purchased daily and allocated via market-based mechanisms.

In the instance of the second category, European societies generally believe, for example, that COVID-19 vaccines should be made available and allocated via mechanisms that do not depend primarily on the prevailing distribution of wealth. In other words, allocation of such goods

through prevailing wealth distribution imposes significant external moral transaction costs and consequently the market-based allocation mechanisms are replaced by centralized command-based allocation (Calabresi, 2016). As shown in the brief examination of current European COVID-19 vaccine-rollout approach (Section 2), the market-based allocation was indeed replaced by a centralized command-based one which has resulted in myriad problems. Namely, such command-based approach suffers from two fundamental problems: a) different people desire vaccines differently; and b) any collective allocation of these goods will be greatly influenced by the prevailing distribution of political power (Calabresi, 2016). As to the former, if the vaccines were allocated in the market that derived from totally equal wealth distribution, some people would bid for a great deal of vaccines and forego other goods, while other people would seek to accrue a totally different combination" (Calabresi, 2016, Calabresi and Bobbitt, 1978). This implies that a politically advocated equal distribution of Covid-19 vaccines is actually merely a form of egalitarianism. Specifically, by treating alike what the central-decision-maker has defined as like cases, they treat people equally but not as equals (Calabresi and Bobbitt, 1978). As to the latter, allocation of the vaccines is depending on the distribution of political power and external moral costs of such a central command-based allocation may sooner or later become unacceptable great (Calabresi, 2016; Calabresi and Bobbitt, 1978). To sum up, such approach discriminates against groups disfavored in the society and fails to give effect to individual desires. As Calabresi and Bobbitt (1978) suggest "anomie is the disease of modern bureaucratic societies".

However, analytically speaking COVID-19 vaccines could be, as currently any other vaccine (e.g. vaccine against tick-borne (meningo)encephalitis), or any other medicine allotted with market-based mechanism (or quasi-market). For example, an economist is triggered by the question of why is there at all a scarcity of Covid-19 vaccines (first order decision)? Namely, if there is scarcity ordinary market produces, supplies enough of that good for the buyers, people that want such a good. In other words, standard economic theory suggests that if there is a demand then the market produces enough for the people that want it (Pindyck and Rubinfeld, 2018; Cooter and Ulen, 2012; Varian, 2010; Roth, 2007; Katz and Rosen, 1997; Arrow and Debreu, 1954). Yet, although markets provide the optimal production decision (ie. the most efficient one) on how much vaccines should be produced Europeans seem reluctant to let the market to do that decision. On the contrary, in current European reality, the decision on how much to produce is at all odds and contrary to all findings of law and economics literature, given to the collective-centralized-decision-maker of the first order. As an example of such centralized command-based approach failure one may recall that although billions of dollars have been paid by EU Commission and EU MS to pharmaceutical companies to create vaccines, yet no one at the EU Commission told to these pharmaceutical companies that they have to start producing them well before they were approved so that there would be enough vaccines in the moment they were approved. Of course, one may argue that such vaccine scarcity is, in current Covid-19 pandemic, inevitable and that there is nothing that can be done. Yet, as Roth (2007) and Kojima et al. (2013) show markets might be implemented to allocate almost all scarce resources (Ashlagi et al., 2014; Kojima et al., 2013; Roth, 2007; Kreps, 1990; Katz and Rosen, 1997). Moreover, also the decision who gets the vaccine (and who should make this allocation decisions) seems perfectly suitable for market-based allotment approach and yet the market has in Europe not been allowed to play any role.

Thus, given these problems why do we still stick with such a command-based mechanism? Well, it appears to Europeans the cost of the moral negative externalities (i.e. moral transaction costs) outweighs the benefits of the traditional market-based approach. This crucially affect our behavior and the legal structures that are, for example, evident in European's treatment of COVID-19 vaccines-rollouts. It may also well be that the very presence of such sales would tell us

painfully how unequal our wealth distribution is (Calabresi, 2016), or we simply prefer the status quo and tend to stick with the existing state of affairs (Samuelson and Zeckhouser, 1988; Kahneman, Knetsch and Thaler, 1991; Schweitzer, 1994).

Administrative failures, Type-I-Type-II Error Fallacy, risk aversion, and behavioral biases

Arrow (1972) argues that possible alternatives to market-based allocation include administrative "authority and hierarchy", as well as "rational bureaucracy with places determined by merit". However, current the European vaccine-rollout failure may serve as evidence that such alternatives may give rise to externalities of different sorts with respect to the allocation of COVID-19 vaccines.

The current European central-based approach in the COVID-19 vaccine allocation might be spurred by political pressures that the EU Commission should in an effort to control the vaccine costs use its immense "buying power" to depress vaccines prices. In this line of reasoning, the EU Commission could then reduce by some arbitrary amount the COVID-19 vaccine prices that it is willing to reimburse and still have the pharmaceutical companies continue to sell and provide such vaccines timely. However, law and economics literature suggest that such reasoning was politically naïve and that pharmaceutical companies would under such pressures eventually reduce their output, R&D expenditures, and rationally prioritize among their higher price paying customers (Cheung, 1974; Abbott and Vernon, 2007; Dimasi et al., 2003; Danzon, 2000; Cooter and Ulen, 2007; Posner, 2011). The cost of developing and of obtaining XXX(EMA) approval for COVID-19 vaccines is actually a large percentage of the total cost and is incurred before the drug goes on the market (Posner, 2011). One has to note that the marginal costs of producing the drug itself are generally quite low. The sale price is therefore driven primarily by the presale development costs, and so the effect of the EU Commission's refusing to pay the same price as for example Israel or UK is, by depressing firm's profits (especially its projected profits from new vaccines), a reduction of output, reduction of development of new vaccines and allocation of existing output to higher paying purchasers. Although the initial decrease of prices achieved by the EU Commission in comparison to Israel or UK was politically attractive, it soon backfired. The most obvious effect is the current vaccination-rollout failure and resulting political tensions among MS. Moreover, literature (Posner, 2011; Abbot and Vernon, 2007; Cheung, 1974) suggest that the costs of slower development of new vaccines are deferred because no one in Europe would know for sure how much faster the development and introduction of new COVID-19 vaccines would have been had it not been for the EU Commission's exercise of its monopsony power.

Moreover, public choice theory suggests that centralized command-based approach may well be prone to the so-called government failures (Tullock, 1965). Namely, administrators that operate such a command-based approach may have diverging interest, which lead to conflict of interest and thus to inefficiencies (Downs, 1967; Niskanen, 1971; Towfigh and Petersen, 2015).

Furthermore, centralized command-based approach suffers from the so called "type I and type II errors". Type I error, also known as a "false positive" is the error of rejecting a null hypothesis when it is actually true. In other words, this is the error of accepting an alternative hypothesis (the real hypothesis of interest) when the results can be attributed to chance. Plainly speaking, it occurs when we are observing a difference when in truth there is none (or more specifically - no statistically significant difference). Type II error, also known as a "false negative" is the error of not rejecting a null hypothesis when the alternative hypothesis is the true state of nature. In other words, it occurs when we are failing to observe a difference when in truth there is one. For example, vaccine-approving authority (e.g. EMA) can make two types of errors: a) type I error – approving vaccines that are too dangerous to be put on market (sanction negligence criterion);

or b) type II error – not approving drugs that should be allowed. Consequently, the maximizing EMA will play it on the safe side and approve too little (type I error) and too late (type II error). In the European political reality, doctors (EMA) are liable only if they did too little to prevent harm and thus will be inclined to require more examinations of the COVID-19 vaccines than what would be considered optimal.

These findings can also be extrapolated to the fact that European officials were not just risk averse, but averse to the wrong risks. They seemed deeply worried about the possibility that they might end up paying drug companies too much (type I. error) or discover that they had laid out money for vaccines that either proved ineffective or turned out to have dangerous side effects (type I. error), yet they seemed not to be worried with the timely provision and redistribution (type II error). It is possible the reason for this palpable favoritism is due to the EU's endless bargaining (egocentrism and motivated reasoning) in order to lower prices or that they suffer from various behavioral phenomena (e.g. omission bias, status quo bias, planning fallacy, loss aversion). Although it has proved to be effective in comparison to US and UK prices; it does, however, empower firms to prioritize countries offering triple that of the EU's agreed upon price. It is now clear that the EU, due to such negotiated prices, is experiencing vaccine shortages whereas other countries that implemented a more market-based approach were able to vaccinate larger proportions of their citizens up until this point.

In addition, as already emphasized administrators may suffer from various behavioural phenomena. They may in their decision-making suffer from so-called *status quo bias* which refers to the phenomenon that administrators tend to stick to the state of affairs they perceive as the status quo rather than opting for an alternative one (Samuelson and Zeckhouser, 1988). For example, if administrators' usual way of purchasing goods was to employ lengthy public procurement procedures, where the proof of ultimate success is an extracted price that is beyond sellers (i.e. vaccine's producers) marginal costs, then they will stick with such procedures also in time of global pandemic. Namely, if changing the *status quo* requires an action, while maintaining the *status quo* involves a mere omission, then administrators will prefer omission to action– invoking omission bias (Schweitzer, 1994; Zamir and Teichman, 2020). Moreover, such administrator's decision-making forms reference point and any departure from this reference point is regarded as a loss (Tversky and Kahneman, 1979). Since losses generally loom larger than gains, people are generally loss-averse, and this makes any departure from *status quo* unlikely.

Furthermore, administrators may also have overly optimistic predictions regarding the time (and costs) involved in completing projects (Buehler et al., 2010; Buehler et al., 1994; Kahneman and Tversky, 1982). This phenomenon is known as *planning fallacy* and could explain why the EU Commission was in comparison to other countries so late in concluding agreements with COVID-19 vaccine producers. In addition, when it comes to judgmental tasks, group deliberation (i.e. group decision making) may actually exacerbate all previously discussed individual biases (Laughlin and Ellis, 1986; Kameda and Davis, 1990; Paese et al., 1993; Blumenthal, 2012).

Towards an optimal European public policy framework

This section offers a set of recommendations for an improved European public policy framework. While employing the previously elaborated conceptual framework this part also offers several, economically inspired, instrumental insights for an improved policy respond in tackling the Covid-19 vaccination-rollout failure or in addressing any other potential vaccination-rollout challenge that might materialize in future.

Efficient mixture of command- and market-based allocation mechanisms

Are COVID-19 vaccines pure merit goods, where relating market transactions are repugnant and thus market allocation should be replaced with command-based allocation as it is done currently

in the EU? Well, current European vaccination-rollout failure may serve as evidence how quickly external moral costs of central command-based allocation can become unacceptably great. We argue that COVID-19 vaccines should not be regarded as pure merit goods and that efficient mixture of command and market-based allocation should be implemented. Almost every other vaccine (and medicine) in Europe is actually allocated via market mechanisms and thus there is no rational reason not to allocate the COVID-19 vaccines (as it is done for example in the US, UK, and Israel) in the same, market-based, manner.

However, the pure market's primary shortcoming in the Covid-19 vaccine allocation might be that it depends on the prevailing distribution of wealth which among Europeans generates negative moral externalities (moral transaction costs). In other words, most Europeans might, due to various reasons, currently find such transactions repugnant. The market-based allocation would require setting a price on Covid-19 vaccines and it seems that our societies would desperately like to treat vaccines as priceless making such a pure market approach undesirable. What, then, shall we do? Calabresi (2016) suggest that we can either modify collective command-based allocation that would involve a less dramatically unequal distribution, or we can modify markets in a way that market allocation does not depend on the generally prevailing distribution of wealth.

If we would opt for the modified command-based system than the allocation (purchasing, contracting, vaccination-rollout ect.) of COVID-19 vaccines could be transferred to the local command-structures (i.e., MS government or regional MS governments) which may be better able than centralized ones to take into account different relative desires and needs for the vaccines among recipients (Calabresi and Bobbitt, 1978). Moreover, in such local command-structures accountability towards recipients (i.e. citizens of national state) could then be employed as a de-biasing mechanism as well as ensure the efficient and timely distribution of vaccines. Such local command-based system might then, since it removes vaccines from the market-based allocation, also decrease the moral transaction costs.

Thus, if pure markets that depend on current generalized wealth distribution and pure command-based approach that depends on overall general power distribution cause moral transaction costs (i.e. moral negative externalities causing market failures) when applied to the allocation of COVID-19 vaccines in EU, what modifications to reduce such moral negative externalities while at the same time preserving the benefits of market allotment should be done?

Considering all previous arguments, we propose the following modifications to the current mixture of command-based and market-based allocation of COVID-19 vaccines. Principally, the first order decision on how societies should get the vaccine and how much is going to be produced should be done via market-based allocation. In other words, scarcity of vaccines should be addresses via modified market-based approach where markets should be as tick, smart, and fast as possible. Thus, MS should purchase vaccines directly from the producers and such transactions will make markets ticker, faster, smarter, and more efficient. The moral negative externalities of such market-based approach can be mitigated with the employment of wealth distribution neutral modified-market based allocation. Such a modified market-based approach may be achieved by eliminating the effects of prevailing wealth differences among MS through taxes and EU COVID-19 vaccine subsidies. Such system may preserve the benefits of market-based allocation (incentive stream, decreased transaction costs and information flow) while simultaneously reducing the prevailing wealth distribution among MS. Moreover, it would still allow MS to determine the total availability of vaccines making the first order decision atomistic. Furthermore, when designing such market-based allocation one should made them safer, thicker, faster and smarter (Roth, 2002).

The second order decision on who shall get the COVID-19 vaccine should be, due to immense moral negative externalities in current European societies, done via local command-based allo-

cation. Such allocation may succeed in doing well what markets seek to do and what centralized command has difficulty doing. Moreover, local command-based allocation can better discern between different desires and needs among different individuals as to the COVID-19 vaccines. Thus, as Calabresi (2016) suggest such local command-based allocation could be used in order to allocate such merit goods and to achieve an equal allocation. Although, we do not know how great the costs of local-based command control are (e.g. friends of local political elites might get vaccines prior to others), they do seem preferable to the moral costs associated by Europeans with a pure market approach. Such combination with respect to COVID-19 vaccines can then achieve minimization of the external moral costs while at the same time giving recognition to actual differences in European's desire for COVID-19 vaccines.

De-biasing of administrators

Previously discussed administrators and policy-maker's behavioral biases and related type-I and type-II errors that might also be driven by extreme risk aversion could be mitigated with the employment of cognitive debiasing techniques. Although employment of debiasing techniques raise a considerable amount of controversy (Larick, 2004: Soll et al., 2015) they may be classified as technological, cognitive, and motivational (Larrick, 2004). Among technological tolls one may suggest the employment of linear models that provide to the decision-maker a combined score for each policy alternative (empirically established relationships between data and given dependent variable) based on the weighted value of each attribute (Zamir and Teichman, 2020; Dawes et al., 1989). Motivational techniques focus on increasing administrator's motivation to perform well. Literature suggest that this can be achieved by providing incentives (e.g. rewards, financial incentives, commitment devices) to overcome decision errors, and by asking administrators to provide other citizens with reasons for their decisions – i.e. accountability (Zamir and Teichman, 2020; Hong et al., 2015; Siegel-Jacobs and Yates, 1996). Namely, literature shows that accountability is a very powerful form of social control that strengthens the motivation to make the right decision (Tetlock and Boettger, 1994; Lerner and Tetlock, 1999; Lerner and Tetlock, 2003).

Finally, cognitive strategies for debiasing aim to help decision-makers overcome their cognitive biases, or to modify the decision environment so that their ordinary cognitive process would bring about better judgements and decisions (Zamir and Teichman, 2020). Examples of direct debiasing techniques include drawing the decision-maker's attention to the existence of the bias, asking them to think about alternative possibilities or perspectives, and training in probabilistic reasoning (Kahn et al., 2006). A very effective debiasing technique is asking decision-makers to consider evidence or arguments (e.g. UK, US, or Israeli approach in case of COVID-19 vaccination-rollout) that might lead to a different conclusion (i.e. *consider the opposite*), or to generate – via comparative law and economics studies – additional alternatives to choose from (Lord et al., 1984; Hirt and Markman, 1995; Stallard and Worthington, 1998; George et al., 2000; Mussweiler et al., 2000). Soll et al. (2015) suggest that one should ask decision-makers to make the same judgement or estimation twice by using different thinking methods and then average responses. Finally, one could train decision-makers or administrators to employ adequate decision rules instead of intuitive heuristics (Larrick, 2004; Nisbett, 1993). For instance, Zamir and Teichman (2020) argue that decision-maker's probabilistic assessment may be improved significantly by studying statistics, and cost-benefit analysis may be improved by studying law and economics (Fong et al., 1986; Larrick et al., 1990). Thus, a plethora of different cognitive techniques is available to debias decision-makers in designing more effective COVID-19 vaccine-rollout policies.

Multi-tasking administrators, type I and type II error and sustainable development

European administrators could also be regarded as multi-tasking agents since public pressure urged them to purchase as many vaccines as possible at the lowest possible price. Such multitasking agents might be, as discussed previously, prone to type I and type II errors. Moreover, their choices might be distorted because type I error was in Europe traditionally more visible and more likely to get media and consequently also political attention. Moreover, administrators may simply not share the goals of their superiors and may collude to shield incompetent professionals (Niskanen, 1971). Rose-Ackerman (1986) suggest that where there is considerable uncertainty about the best type of behavior, professional training can encourage officials to share their problems and successes and work toward a fuller, mutual understanding of programs that they are administering. Thus, their errors could be mitigated by expertise and capacity building. Rose Ackerman (1986) also advocates inducing bureaucratic conduct through arm's-length incentive payments that do not interfere directly with the details of individual behavior (Rose-Ackerman, 1986). In such reward-based scheme administrators should be rewarded on the basis of what they accomplish, not on the basis of what they think or how they act. Thus, the development of performance-based incentive systems might be, as Rose-Ackerman (1986) suggest also a high priority for EU administrative reform, both in those cases where superiors can monitor performance and in those where the agency's clients are the only ones able to observe low-level officials' output.

Insightfully, one should also take into account sustainable development objectives and sustainability as one of the key factors in making decisions and policy implications during outbreaks of different pathogens and pandemics. For example, Cifuentes-Faura (2022) argues that the coronavirus pandemic is revealing the fragility of the current economic system, based on profit and continuous consumption of resources. According to Cifuentes-Faura (2022) this model generates many problems such as pollution, contribution to climate change, loss of biodiversity or unfair distribution of wealth. As he suggests this must be an opportunity to redefine the social purpose of business and help generate a sustainable world through economic policies and for feasible economic recovery, a plan oriented towards energy and ecological transition and based on the circular economy must be followed (Cifuentes-Faura, 2022). In addition, Heggen at al. (2020) advance the argument that the COVID-19 pandemic shows that sustainable development goes beyond national strategies. They suggest that every individual needs to make health decisions that meet personal needs as well as the needs of the broader community, such as using facemasks on public transport, observing social distancing advice and self-quarantining when necessary (Heggen et al., 2020). In order to manage the COVID-19 pandemic, Heggen et al. (2020) argue that governments have had to balance the need for mitigation, control and eradication. Such emergency strategies should be consistent with targets such as universal health coverage that might reduce the risk for future pandemics (Heggen et al., 2020).

Conclusion

One of the most important questions European's have faced during the recent pandemic was the decisions that determine how much of the vaccines to be produced and who should decide on the final allocation of vaccines. Employed european approach assumed the supremacy of centralized governmental vaccine distribution policy and basically recommended that, after vaccinating healthcare workers, one should work down a list of demographic groups, starting with inoculating those with the highest death risks from COVID-19 and ending with those with the lowest. European policy approach actually took for granted that he the governments are in best position to decide how to distribute most vaccines, with those prioritized having neither the ability to give or sell that right to anyone else. Yet, as we show allocating scarce vaccinations to those person-

ally at risk from the disease could produce sub-optimal societal outcomes. Namely, in a world where trade-offs exist, we should be trying to minimize the overall costs of the pandemic, not just reduce the highest death risks for individuals. As we show such command-based approach also suffers from two additional fundamental problems: a) different people desire vaccines differently; and b) any central-collective allocation of these goods might be greatly influenced by the prevailing distribution of political power.

In other words, in the current European reality, the decision on how much to produce is at odds and contrary to all findings of law and economics literature, given to the collective-centralized-decision-maker of the first order. Of course, one may argue that such vaccine scarcity was, as in the first stages of current Covid-19 pandemic, and might always be inevitable and that there is nothing that can be done. Yet, as we show this might not be the case and instead of centralized governmental decisions making markets might be implemented to allocate almost all scarce resources. We also suggest that moral transaction costs, status quo and omission biases, planning fallacy, risk aversion, administrative rigidity, notorious type-I-type-II error fallacy and related unravelled markets phenomena might be one of the additional sources of current European vaccine-rollout failure. The identified phenomena and scarcity of vaccines should be in future pandemics, as we argue, addresses via modified market-based approach where markets should be as tick, smart, and fast as possible. However, the final decision on who shall get the vaccines should be, due to immense moral negative externalities in current European societies, done via de-centralized local command-based allocation system (i.e., regional/municipal governments). Such allocation could include also local partners beyond traditional health care organizations, such as community health centers, and leveraging relationships with community-based organizations such as the red cross, local voluntary firefighters and various social clubs. Other approaches might include using mobile vans, pop-up sites, and other interventions to bring vaccination efforts to where people live rather than expecting them to go to a clinic or hospital. Such allocation may succeed in doing well what markets seek to do and what centralized command has difficulty doing. However, while designing such alternative approaches one should also take into account sustainable development objectives and sustainability as one of the key policy factors in making decisions and policy implications during outbreaks of different pathogens and pandemics. Moreover, decentralized local command-based allocation can better discern between different desires and needs among different individuals as to the COVID-19 vaccines. Such local command-based allocation could then be used in order to allocate such merit goods (vaccines) and to achieve an equal allocation. Although, we do not know how great the costs of local-based command control are (e.g. friends of local political elites might get vaccines prior to others), they do seem preferable to the moral costs associated by Europeans with a pure market approach. Such combination with respect to COVID-19 vaccines will then achieve minimization of the external moral costs while at the same time giving recognition to actual differences in European's desire for COVID-19 vaccines. Finally, identified cognitive strategies for debiasing should be employed to help local command-based decision-makers overcome their cognitive biases, or to modify the decision environment so that their ordinary cognitive process would bring about better judgements and decisions. In other words, this paper contributes to extensive scholarly debate on how recent efforts, failures, successes and achievements during the COVID-19 pandemic to develop, manufacture, and effectively distribute a vaccine both in the EU and globally to help prepare for when—not if—the next pandemic unfolds.

However, several caveats should be stated. Namely, the paper aims not to impose a final word on the matter but to undertake an exploratory analysis of how the moral transaction costs, administrative failures, risk aversion resulting form type-I-type-II error, and behavioural phenomena

might result in vaccine-rollout failures in the early stages of current pandemic. Moreover, this paper merely addresses the market allocation issues and omits discussion on vaccination's economic consequences in terms of financial instability, economic recession, lower incomes, game theory, equity, logistics and sustainability policy challenges at the national and European levels. Furthermore, as of this writing the research merely encompasses period from the outburst of the Covid-19 pandemic in beginning of 2020 and until spring 2022 and hence addresses merely the early stages of vaccine-rollout policies where vaccines have indeed been overwhelmingly scarce. Finally, additional research might help policymakers understand what policies are needed to ensure global supply chains are up to the challenge of producing and distributing billions of doses of vaccines as efficiently as possible.

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