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IN THIS ISSUE: V TOMTO ČÍSLE:

Punishing the teacher by the teacher - p 2
BusinessSIM - artificial intelligence - p 10
Modeling public policy - p 11

Science Dynamics Masterclass

We believe that a man should speak only when he has something to say. That is why, after a long hiatus, we bring you the fifteenth issue of SDR, which is devoted to the topic of crime and punishment. Both from the perspective of the individual and from the perspective of the country. You will learn here about the potential consequences of a policy based on economic punishment of the adversary for the punisher.



Punishing the teacher by the teacher

-aur-*

Abstract: This article examines the historical background of punishing individuals, the current practice of criminal justice at the individual level, and then explores the options available to states for punishing other states. It studies mental models behind the policies implemented and presents a systemic view of the consequences of the chosen policy. Subsequently, it suggests possible consequences of the chosen policy for both the punisher and the punished by simulating a model based on the presented causal loop diagrams.

The somewhat odd title of this issue of SDR sounds familiar to anyone who has heard or seen Ladislav Smoljak's wonderful play "Investigation of the Loss of the School Ledger [1]." They may still remember that this is one of the principles of Cimrman's** **Pedagogical Sextet**, which was intended to serve as a means of **disciplining naughty schoolchildren**. It is based on the concept of pedagogy as propounded by the immortal Jan Amos Comenius, according to which pupils **should love their teacher** and so should not like to see the teacher **suffer**. The play gives cute examples of the application of the principle in practice. In the first, the teacher withholds his favorite **Virginia cigar** and tells the pupils that their crying won't make any difference because they are the cause of his suffering. In the second, the teacher orders self-imposed house arrest, and the students are given time off while he is incarcerated, giving them ample time to **agonizingly ruminate** on their **debauchery**.

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** To explain to those who do not know Czech realities. A group of educated Czechs invented the never-existing Czech genius Cimrman in the 1960s, at a time when Czechoslovakia was under a totalitarian communist regime. According to them, Cimrman fruitfully intervened in all fields of human activity and science, but remained misunderstood and forgotten.

When a poll was held in 2005 for the Greatest Czechs (similar to Britain's Greatest Britons in 2002), Cimrman won outright. The organizers had to stipulate subsequently that the final selection would include only existing figures, and so the official choice was Emperor Charles IV. But the Czechs know very well that Charles came in second...

The greatest of Czechs would surely be pleased to know that his principle has survived to the present day and is widely applied, not only in pedagogy. I am an ardent supporter of it myself, and by shopping at competitors I punish the unworthy multinational chains that try, by repainting logos and erasing symbols, to impose their misguided political agenda on me. The truth is that as a simple, insignificant citizen, even if, according to our Prime Minister, of one of the most important countries on the planet, I can't do much.

But fortunately the Sextet has taken hold in the minds of the powerful of this world and we have the privilege of watching its victorious march, especially through the Western world.

The intention of the principle is to **punish the guilty**. I do not intend to delve deeply into penology here, after all, my lectures on the subject are still available on the web, I will only mention, to the extent necessary, the general human experience of the discipline. Those who wish to explore the issue of punishment from multiple sides can use the available academic [2-5] or non-academic literature [6]. Before placing a request with a library, however, first make sure that the book you are requesting is not *librum prohibitum* or that the author is not *persona non grata*, lest you commit the **crime of propagandizing*****.

*** It seems that propaganda is banned in our country. It's not clear to everyone what kind.

I hereby fulfill my civic duty and inform the competent authorities that the staff of the **propaganda department** of a certain faculty of an even more certain university in the north-east of our country, according to the published description of their activities, commit propaganda every day and is, believe it or not, even **proud of it!**

During ontogeny, punishment is first encountered in childhood when a parent, using his or her authority and physical superiority, beats an unworthy son or daughter with the palm of their hand or with a suitable instrument. At a younger school age, the palm is replaced by the teacher's pointer or other striking instrument, and this progresses according to the conformity of the individual's behavior to the demands of society.

However, these are not always punishments given by **adults to children**. Every parent and educator knows that children can also punish. Some even by their mere existence. One three-year-old princess's father, with pencil and paper, counted the number of times a day his daughter would ask, "Why?" At the number one hundred and thirty-four, both the pencil and his will to live were broken, so he rushed to me, demanding therapeutic intervention, "or at least some pills..." Even the children's collective can be ruthless towards the disfavored; children will make an outcast of anyone in a heartbeat and punish with contempt with a bravado that would make any government minister envious. Adolescents and adults who have been unlucky or too dumb and got caught in the act of doing the forbidden then feel firsthand the punishing hand of the law, which deprives them of goods acquired in various ways, of liberty and, in some cases, of life.

Many of us will recall how the punishing parent used to say before the spanking: "It will hurt me more than it will hurt you!" I have not met **anyone** in my long life who has ever believed that after the first punishment session. As my childhood sweetheart Lena told me one day on the way home from school, when she was getting her bottom smacked by her dad, "**...he didn't scream or shed a tear or snot at all during the whole execution!**" Her sad experience was corroborated by many other individuals of both sexes in elementary school and, many years later, by the testimony of patients in the office. Based on this data, therefore, let us consider the above parental claim to be **completely refuted**. From the foregoing, it can easily be inferred that the primary purpose of punishment is to **punish the offender, not the punisher**, and the easily transparent parental lie was merely intended to lull us into believing that we would **not be alone** in the impending ordeal.

With corporal punishment, the punisher is perhaps at risk of the consequences of the predominant leakage of fluids into the extravascular space over their reabsorption into the blood (his or her hand may simply swell up...), but with non-corporal punishment, the impact of the punishment on the punisher is somewhat **more complicated**.

Today, the most common punishment given worldwide is a **fine**. For more serious offenses, there are various forms of **imprisonment**. Either suspended sentences or actual imprisonments. We have dealt with imprisonment from the point of view of the individual in SDR 14, we will now look at the penal system from the point of view of society. It is not news that the prison system is costly, and it is not just a consequence of its "humanization".

Even in ancient and medieval times, states and their superiors refused to fund the construction and maintenance of prisons, and the problem of criminal population was addressed **pragmatically**. As recently as the mid-19th century, the death penalty could be imposed in Britain for over one hundred and forty crimes which today the police shrug off and do not deal with at all. As recently as the last century, conditions in prisons in the southern United States were such that the average survival time of a convict was around four years, and the average sentence exceeded that by a considerable margin. No one there or then much believed that the purpose of incarceration was to **reform the convict**; the pretense or sincere belief in a reformatory effect was and still is tied to states dominated by **collectivist ideologies**. So in some you find "penitentiaries" and in others "correctional institutions". Not that there weren't prisons in monarchies, but their capacity was negligible compared to the population and compared to today. Many of them have gone down in history. Take the **Tower of London**, the **Bastille** in Paris, Brno's **Špilberk**, or St. Petersburg's **Петропáвловская крѣпость** none of which serve their original purpose today.

Modern prisons in the Western world have an infinitely higher level of comfort for staff and inmates compared to historical ones, but the operating costs are incomparably higher [7, 8]. As the prison population grows, the correctional effect is not high in all cases and thus **recidivism occurs**. The system does not contain any mechanism to **reduce the felon population** (by shortening their life...), so there is a need to continually increase the capacity of these facilities.

In order to stem the rising costs of prisons, the United States, for example, has taken the route of **privatizing** the prison system. In some states, the political establishment is forcing the judicial system to **reduce the length of sentences** in order to free up capacity for more new convicts. In many cases, this provokes resentment from victims and their families, because even perpetrators of violent crimes soon find themselves free and often continue on their path. This means that punishment ceases to fit the crime and its purpose, whether it be re-education, revenge or isolation of the criminal from society, is lost. However, it can be argued that the justice system at **least somehow** judges, sends convicts to prison and they return from there reformed or at least punished and society is **temporarily** protected from their criminal activity [9].

Thus, we have described cases where the state punishes **individuals**, criminal groups or organizations within its jurisdiction. But what about the situation where it is necessary to **punish another country**? It is usually not possible to imprison it, and so since the dawn of time three ways have been available. **Diplomatic, economic and military**. If diplomatic channels are blocked, either by the will of one, both sides, or by the will of a third party in the background, the possibility of **war** becomes an option. Skipping the economic route for now, according to one of Germany's most famous military theorists, war is "the continuation of politics by other means [10]." There are many difficulties associated with declaring a war. It usually means very **high expenses**, and if the adversary is stronger, our chances of victory may not be high. And so, after what may at first sight be described as **rational reasoning**, we may resort to the **economic path**.

Here the adversary can be punished in a number of ways. For example, we can **restrict** or **ban** the **operation of companies** owned by the adversary in our territory, we can deny them the purchase of our product, and finally we can **stop buying their product**, which means **reduced profits for their merchants**. Hoping that the adversary, having suffered a loss, will come back at its senses and eventually change unacceptable behavior (unacceptable to us). After all, that was the reason we went into the conflict in the first place. The causal loop diagram that describes the above story can be found in Figure 1.

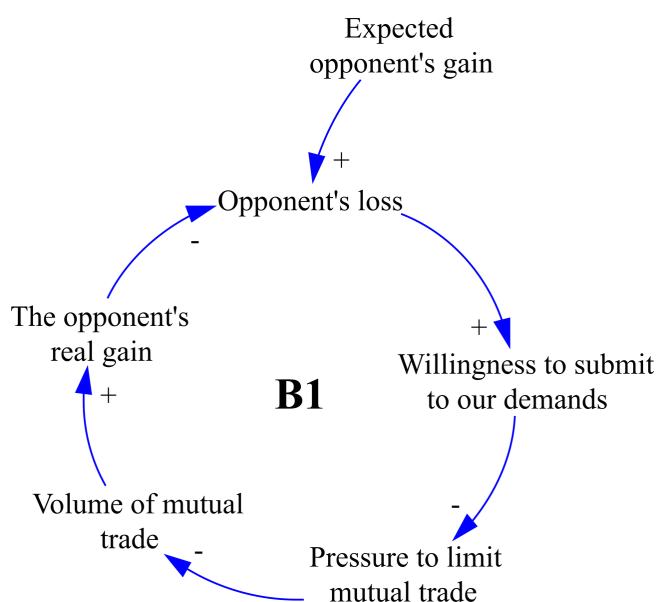


Fig. 1 CLD mental model of state leaders who intend to economically punish the opponent.

Profit does not necessarily have to be seen as an economic parameter, it can also be understood as the **overall benefit of trade**. The greater the adversary's loss, the greater will be its willingness to submit to our demands.

The more they are willing to submit to our demands, the less pressure there will be to punish them economically. Apparently, the reasoning of the mighty of this world usually goes no further and no deeper. We will try to think a little more carefully.

It can easily be shown that a trade exchange involves an interaction between at least two parties, taking place between a state offering to sell something that the other state wants and is eventually able to pay for. If **both parties benefit** from the trade, the diagram needs to be supplemented by the impact of the reduction in trade **on us**. The result can be found in Figure 2.

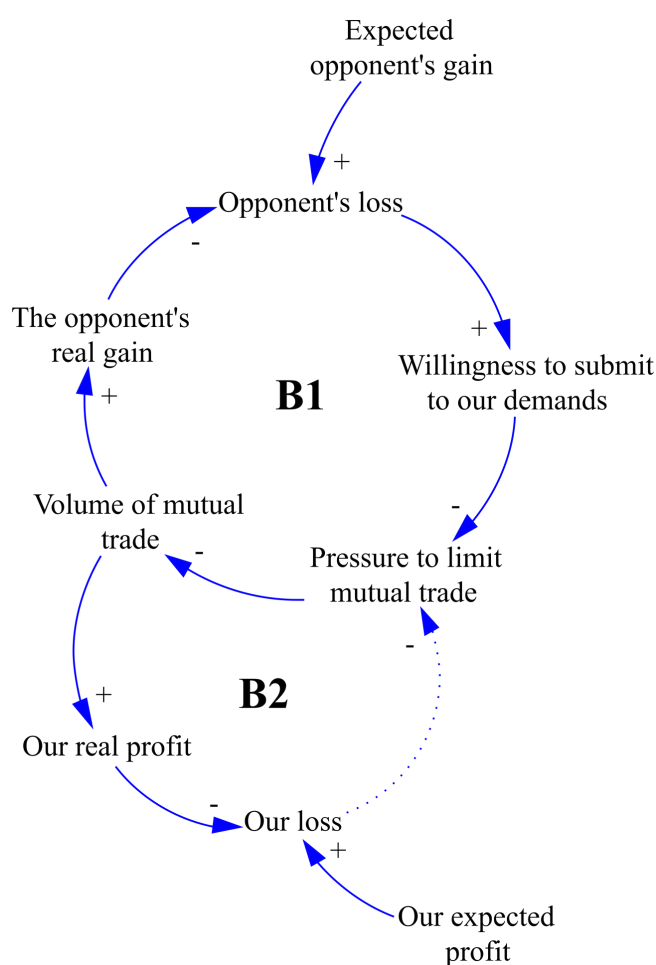


Fig. 2 CLD supplemented by the effects of reduced trade on us.

For us, too, the fall in trade is reflected in a reduction in our real profits, and the diagram also suggests a link between the size of our loss and our willingness to continue the downward pressure on trade, because just as individuals are punished by imprisonment, whose imprisonment is paid for by the taxes we pay, we are also punished by the punishment of our trading partner. Whether or not the link will be applied

is a political rather than an economic question. If we are convinced that we fight for a just cause, and better still, if we are **fighting an evil** represented by an adversary country, we cannot retreat from the path of justice, and the amount of our loss or will make no difference to the degree of pressure on the unworthy country. Just as no man is "an island to himself," as one can read at the beginning of Hemingway's famous novel [11], this is true of states as well. Many of today's policies are based on the notion that the rest of the world has no choice but to move along the path laid out by the **most progressive, democratic, just and moral**. That the savage state we threaten and begin to punish economically will eventually, in the face of its own economic disruption, come to its senses and return to the right path. The country will return what it may have stolen and perhaps even ask for forgiveness. The notion that our economic pressure will drive it into a corner is based on the rather poor

mental models in Figures 1 and 2. In the real world, it is somewhat more complicated, and so it is not surprising that the punished adversary seeks to find a **way out** of the unpleasant situation without having to dance as others whistle. Economic pressure forces them to **change established habits**, and only a fool can expect that if an unworthy state has an opportunity, it will not try to take it. What the whole story looks like can be seen from Figure 3.

The story has been modified, the original two **negative** feedback loops have been transformed into **positive** ones, because the left one, describing the adversary's interaction with someone other than us, is no longer about pushing a **political agenda**, but mainly about **business**. That someone else may have an alternative source of the product in question, the price at which the product is supplied to us may not be interesting to the other, but the adversary may divert the product elsewhere and obtain **at least something** at a price advantageous to the other.

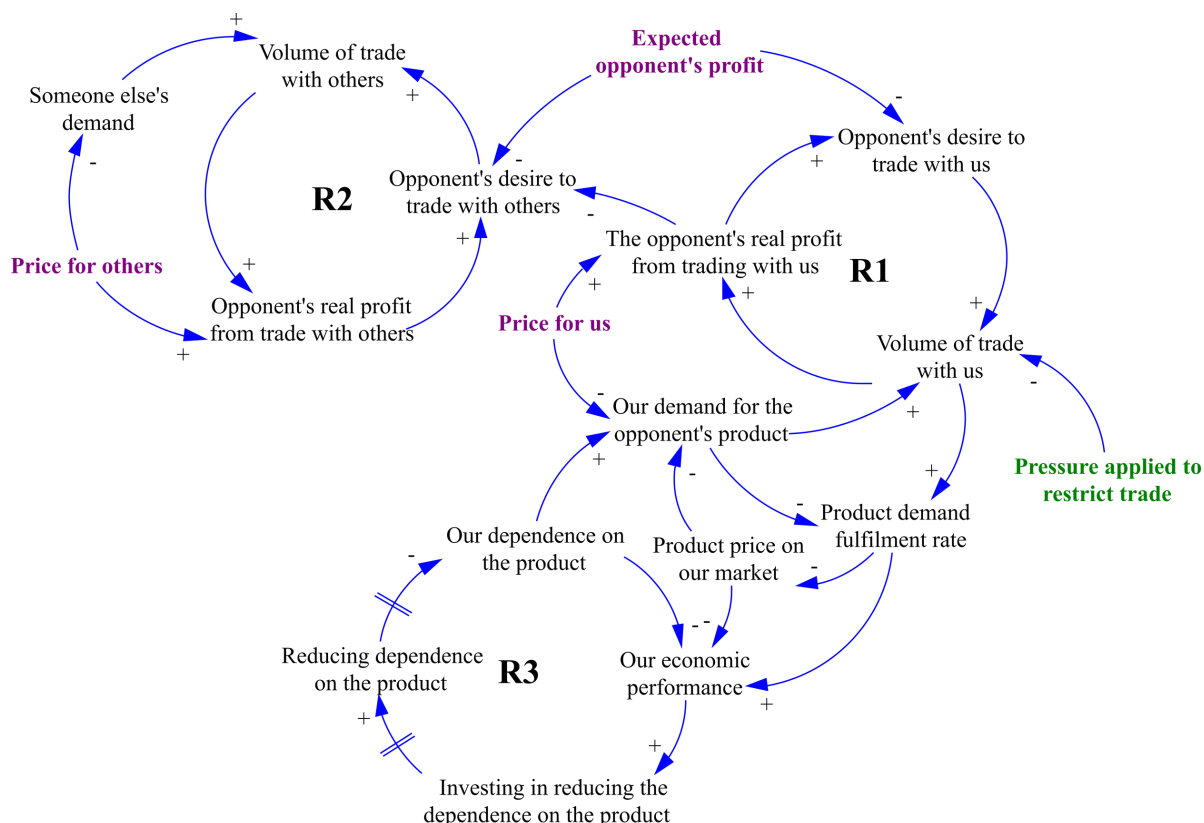


Fig. 3 An almost complete diagram of the consequences of punishing an opponent. Note that the only variable we influence is the green Pressure applied to restrict trade. Everything else is in the hands of others.

Especially in a situation where we *de facto* reject their product and/or do not intend to pay for it. The opponent is forced to sell at a lower margin and we are left with the good feeling that we are putting economic pressure on them. Lower margins will surely, sooner or later, lead the adversary into a desperate situation and our agenda will eventually be accepted. Not as quickly as we would like, but those who bide their time will see it through.

There are still a few details to deal with. Some people may ask whether **our economy depends** on the adversary's product. If so, what prevents us from doing like the adversary and buying from **someone else**? This is where some tragicomic situations can arise. For example, we may be forced to buy a product from someone who has himself bought it from our adversary, added his margin to it, and is reselling it to us.

This will have an interesting effect. The adversary may sell the product to the reseller at a **lower price**, but we ultimately **pay more** for the same product. If we can afford it, and our main goal is to punish the adversary with lower profits, why not? But a side effect is our increased costs. And if the adversary is already selling to someone else, that someone else can start serving a previously **unserved market**. Thus, the adversary's margin shortfall may be **completely eliminated**, or the adversary's overall profit may even increase. In the second scenario, no one but the adversary **has** the product on which our economy depends. In this case, two solutions exist. Either we can **shut down the economy** or we can **reduce our dependence** on the product in question. Shutting down the economy is tantamount to the economic collapse of the state.

Wicked people say that our countries are already bankrupt, but now it would mean that only government employees

will remain employed. Since the work of civil servants is surely indispensable to the economic success of businesses in any given country, the state and the army of unemployed people from closed businesses could thus be **financed by the work of civil servants, right**? Some may argue that it is actually **the other way around**, and that the army of civil servants is financed by the work of businesses that alone produce **cashable added value**. Let us leave it to the country's finance department, as long as there is no business entity, to add up the **revenues** of any government office and subtract the **costs** and use the positive difference (i.e. profit) to finance the welfare expenditure of the country. If the difference is, for any reason, not positive, social expenditure can be financed from debt. The question is what the debt expenses will look like for a state with **no tax revenue**. The second option is to reduce or eliminate the state's dependency on the product by shifting the economy to another product. This is a matter of changing technology, which requires **time** and **financial resources**, one of which cannot be substituted for the other. What does this mean? That in such situations there is no amount of money that can reduce the **time required to rebuild the technology to zero**. Not even to one. But it is possible to start rebuilding the economy with another product, the cost of which, unfortunately, we will not know. Unless we are the only ones who are forced to do the same for political reasons, it is difficult to determine the course of demand and thus the price at which we will buy the product. Even if this were possible, the cost of investing in retooling will have to be gradually melted into the price of our own products, which will increase the price and thus reduce the competitiveness of our products on the world market.

Technological transformation needs to be financed. This can be done from our

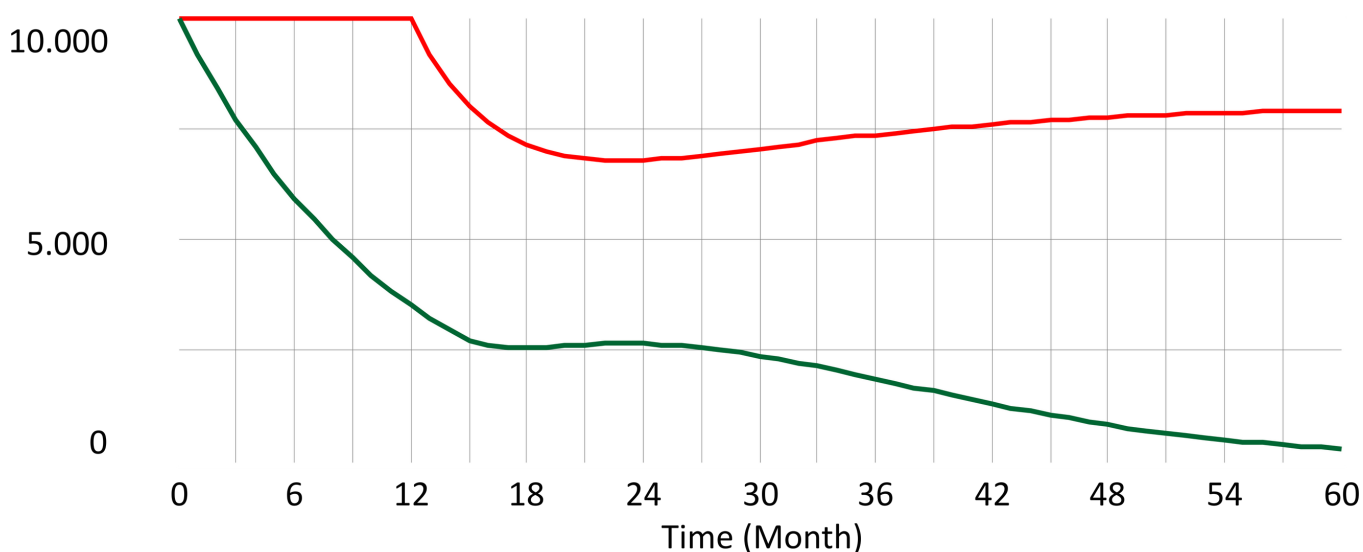
own resources if the economy is sufficiently efficient, or from debt if it is not. The cost of borrowing will then make the price of our products even higher. Then, if the rebuilding of technology requires a longer period of time, the question is how businesses and the state will finance their existence **during the transition** period. The state may be able to borrow, as we have seen in recent decades, essentially *ad infinitum*, but the evolution of the exchange rate of the continent's main currency, given the years of printing of **unsecured money**, does not look optimistic. A further complication is that **existing technologies** need to work to build **new ones**, because new capacity will not fall from the sky and new production lines need to be built on the old ones.

I suppose one will hear the poor in spirit saying now and then that "they don't need the product". It is pointless to tell them that the functioning of the whole economy will determine what they can buy in the shop and for how much. And

the fact that they are using a different product may mean that everyone will start using it at once, the distribution network for that product will become overloaded, and the excess of demand over supply will mean that the **price of the alternative will skyrocket**, so that they will no longer be able to afford the originally available alternate product.

Now try to develop a simulation model according to the CLD in Figure 3. You can simulate with a monthly simulation step; we are interested in the **qualitative outcome** of the simulation, i.e. the behavioral patterns of the key variables. In terms of the assignment, this will be the **opponent's total profit** (from trade with us and with someone else) and **our economic performance**. As we intend, the opponent's profit will **go down** sharply, our economy will decline, but will eventually reach its pre-crisis level, while the adversary will **go bankrupt**.

I tried it myself, and the result of the five-year simulation can be found in the graph in Figure 4, which requires no further comment.



Our economic performance : S1

Opponent's total profit : S1

Fig. 4 Simulation results of selected parameters of the adversary economic punishment model. After twelve months, our consumption of the adversary's product drops to zero. While his profit gradually stabilizes after the initial drop, our too-slowly declining product dependence drags our economic performance down to zero. In addition, if the adversary manages to break into new markets with a lower price, its overall profit will continue to rise.

This puts us in a difficult situation, where on the one hand we need to **punish the wrongdoer**, on the other hand we need to **face the consequences** of such a move. Surely the political representation cannot be suspected of behaving like the one described by one of the greatest Czech poets - Kryl's Doubts: "Then they said that begging was not a manly thing, that one should not take gifts, that one should despise alms; and they themselves go about overfed, and the alms feed them, and the disciples go about ragged, and hunger stares them in the face, and poverty and want." I, unlike Karel, have no doubt that all the considerations mentioned above were conducted by our rulers long before me, that they worked out a **clear and effective procedures** for dealing with the consequences of punishing the guilty, and that they did not intend to solve resulting trouble by throwing them on the **backs of their subjects**.

After all, it is as we are told, "No sacrifice is high enough in the fight against evil." Although the situation is extremely critical, according to the official communication, there's no need to worry. The absence of gas in winter is to be solved by **two sweaters**. It's not entirely clear to some, how the sweaters can be used to produce fertilizers or bake bread, but with only three PhDs one can not possibly know everything. As long as the bakers can figure it out, nothing else matters. If I understood the calling of our government officials correctly, **nobody will be allowed to release any gas in vain**, but must deliver it all to our endangered industry instead. "Don't you cry, *hostes*, you brought this on yourselves!"

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- Creating Causal loop diagram of the problem at hand
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