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Working Paper

Trust, regulation and trade

Working Paper Forschungsförderung, No. 337

Provided in Cooperation with:

The Hans Böckler Foundation

Suggested Citation: Von Arnim, Rudiger; Tröster, Bernhard; Raza, Werner (2024) : Trust, regulation and trade, Working Paper Forschungsförderung, No. 337, Hans-Böckler-Stiftung, Düsseldorf

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WORKING PAPER FORSCHUNGSFÖRDERUNG

Number 337, June 2024

Trust, Regulation and Trade

Rudi von Arnim, Bernhard Tröster and Werner Raza

This Working Paper at a Glance

Can consumers trust that the food they buy in the supermarket, even if imported, is not harmful to their health? What would be the consequences if their trust in existing health and safety standards were to be undermined by recognizing lower foreign standards? Against the backdrop of public debates (e.g., on the merits of chlorine-washed chicken, banned in the EU, but legal under the proposed TTIP agreement with the United States), this paper discusses the close link between trust, regulation and international trade. It turns out that as local regulatory systems have evolved, they have created a “generalized trust” that promotes economic activity. Aggressive regulatory harmonization through trade agreements could jeopardize the fragile balance of trust and activity.

Deutscher Kurzttext

Können Verbraucher:innen darauf vertrauen, dass im Supermarkt gekaufte Lebensmittel, auch wenn sie importiert sind, nicht gesundheitsschädlich sind? Was wären die Folgen, wenn dieses Vertrauen in gesetzliche Produkt- und Hygienestandards durch Anerkennung ausländischer Standards unterlaufen würde? Vor dem Hintergrund öffentlicher Debatten (z. B. importierte Chlorhühnchen) diskutiert dieses Papier die enge Verbindung zwischen Vertrauen, Regulierung und internationalem Handel. Es zeigt sich, dass historisch gewachsene Regulierungssysteme „generalisiertes Vertrauen“ schaffen, das wirtschaftliche Aktivität fördert. Eine aggressive regulatorische Angleichung durch Handelsabkommen könnte die fragile Balance von Vertrauen und Aktivität gefährden.

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ISSN 2509-2359

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Executive Summary

This working paper is part of a research project that seeks to incorporate the comprehensive effects of regulations in an economy-wide model for trade impact assessments.

Regulations and standards cause trade costs, and existing modeling approaches routinely focus on the estimation of potential gains from their removal. The omission of obviously existing economic benefits of regulation severely biases essentially all existing impact assessment models that report gains from “deep and comprehensive” free-trade agreements (DCFTAs). The problematic nature of this approach has been at the center of the controversy around Transatlantic Trade and Investment Partnership (TTIP) and the EU-Canada Free-Trade Agreement (CETA).

In the pursuit of ever freer global markets, Free-Trade Agreements (FTAs) have become an increasingly popular policy instrument. The World Trade Organization (WTO) reports that the number of active bilateral or regional FTAs has increased from around 50 in 1990 to 360 in 2023. Likewise, FTAs are at the center of the trade policy agenda of the European Union (EU). However, in contrast to traditional FTAs with their focus on tariff removal, the so-called new generation FTAs emphasize on the alignment and removal, respectively, of national regulations, or, in trade parlance, “behind-the-border measures” or “non-tariff barriers” (NTBs).

Thus, there is an increasing interconnection of trade liberalization with national policies and consequent macroeconomic, social and distributional as well as ecological effects. The content of DCFTAs potentially impacts core areas of national public policy, like health and consumer protection, labor standards or environmental regulations. The interlinkages between trade liberalization and regulatory change and their full economic and social effects are, however, not captured by prevailing trade impact assessment approaches.

Therefore, a deeper understanding based upon an alternative methodology is needed, which takes the full range of potential social costs and benefits of regulation into account and equips our macroeconomic model for trade impact assessment to provide a more realistic picture of DCFTA impacts on critical areas of public policy. Only based on such an analysis can informed decisions about the appropriate design of these trade agreements be made.

The methodological challenge consists precisely in identifying and implementing the nature of particular benefits of a regulation and determining the scale and direction of its economic impact vis-à-vis these costs. To narrow the scope, our project focuses on regulations that impact (i)

human health and safety, as well as (ii) societal trust. A companion paper delves deeper into aspects relating to human health and safety. The remainder of this summary pertains to the importance of societal trust.

Specifically, this paper offers a framework to discuss the linkages between trust, regulation and trade. We argue that local and historically grown legal and regulatory systems engender “generalized trust,” which in turn fosters economic activity. Aggressive regulatory alignment in international treaties risks undermining this fabric of trust and activity.

Our argument proceeds as follows. First, we review standard economic theory on the necessity of government intervention (i.e., regulation) to correct market failures. Second, we review foundational literature on trust in the social sciences, including the important concept of generalized trust. Third, we discuss aspects of game theory to elucidate how trust and regulation can guide the economy towards Pareto improvements and avoid inefficient Nash equilibria and summarize the ample evidence for trust to matter in the related experimental literature. Fourth, we review linkages between trust and economic growth and summarize the econometric findings that document positive associations. Lastly, we bring insights from these deep and growing literatures to the topic of global economic integration.

We emphasize that this paper presents only a first step in the larger research project. The literature we review—regarding market failures and the necessity of regulation; the foundational role of trust in societies (and markets), and findings on trust in experimental and econometric research—is to a large extent established and the topic of textbooks. However, we critically review all of it in the context of our research project on trade impact assessment, and with that indicate the way forward for implementation.

Our key findings can be summarized as follows:

- Generalized trust and enforcement mechanisms can complement each other over time and facilitate cooperation for the sake of economic activity and other socially desirable activities and ends.
- Generalized trust is easier to maintain in organically and “homegrown” systems of enforcement that tend to be superior to externally imposed structures.
- The available econometric evidence broadly suggests that trust fosters economic growth.
- Instruments of regulation and control must be (democratically) legitimated.

Robust legitimacy appears as the “best bet” to minimize principal-agent problems between members of society and public officials, and in that

manner guide policy in the public interest. Weakly legitimated international agreements to constrain domestic regulatory capacity (such as the proposed regulatory cooperation council, under TTIP negotiations) are thus likely to undermine generalized trust.

Zusammenfassung

Dieses Working Paper ist Teil eines Forschungsprojekts der Hans-Böckler-Stiftung (HBS-Projekt Nr. 2020-431-3). Das Ziel dieses Projekts besteht darin, die umfassenden Auswirkungen von Regulierung in ein Modell zur Abschätzung der Folgen von weltweitem Handel einzubeziehen.

Regulierungen und Standards erhöhen die Kosten im internationalen Handel. Bisherige Modelle betonen meist die makroökonomischen Gewinne durch den Abbau von Regulierungen und niedrigere Handelskosten, vernachlässigen jedoch den wirtschaftlichen und gesellschaftlichen Nutzen von Regulierungen. Dieser einseitige Ansatz war auch bei TTIP und CETA umstritten.

Freihandelsabkommen sind ein politisches Instrument für Handelsliberalisierung. Die Anzahl von Freihandelsabkommen stieg von etwa 50 im Jahr 1990 auf 360 im Jahr 2023 (WTO, 2023). Im Gegensatz zu traditionellen Freihandelsabkommen, die Zölle beseitigen, fokussieren „tiefgreifende und umfassende“ Freihandelsabkommen der neuen Generation auf die Anpassung und Beseitigung nationaler Regulierungen, die mit „nicht-tarifäre Handelshemmnisse“ verbunden sind.

Dadurch entsteht eine Verknüpfung zwischen Handelsliberalisierung mit nationalen Politiken und deren makroökonomischen, sozialen, verteilungsbezogenen und ökologischen Auswirkungen. Der Inhalt von Freihandelsabkommen kann Kernbereiche nationaler Politik wie Gesundheits- und Verbraucherschutz, Arbeitsnormen oder Umweltschutz beeinflussen.

Es ist daher notwendig, mit Hilfe einer neuen Methodik ein tieferes Verständnis für die Bedeutung von Regulierungen zu entwickeln, um realistischere Bewertungen von Freihandelsabkommen auf kritische Politikbereiche zu ermöglichen. Die Herausforderung besteht darin, die Kosten und Nutzen spezifischer Regulierungen zu identifizieren, insbesondere solche, die Gesundheit, Sicherheit und gesellschaftliches Vertrauen beeinflussen.

Dieses Working Paper diskutiert die Verbindungen zwischen Vertrauen, Regulierung und Handel auf Basis einer Literaturübersicht. Es zeigt sich, dass lokale und historisch gewachsene Rechts- und Regulierungssysteme „generalisiertes Vertrauen“ schaffen, welches wirtschaftliche Aktivität fördert. Eine aggressive regulatorische Angleichung durch Handelsabkommen könnte dieses Geflecht von Vertrauen und Aktivität gefährden.

Wir überprüfen zuerst die ökonomische Theorie zu staatlichem Eingreifen zur Korrektur von Marktversagen. Zweitens analysieren wir die Litera-

tur über Vertrauen und das Konzept des generalisierten Vertrauens. Drittens erläutern wir in Anlehnung an die Spieltheorie, wie Vertrauen und Regulierung die Wirtschaft verbessern und ineffiziente Nash-Gleichgewichte vermeiden können. Viertens fassen wir die Belege aus experimenteller und ökonometrischer Forschung zu Vertrauen und Wirtschaftswachstum zusammen.

Unsere Kernergebnisse lauten:

- Generalisiertes Vertrauen und Durchsetzungsmechanismen ergänzen sich, fördern Zusammenarbeit und wirtschaftliche Aktivitäten.
- Generalisiertes Vertrauen ist in organisch gewachsenen Durchsetzungssystemen leichter aufrechtzuerhalten.
- Ökonometrische Beweise deuten darauf hin, dass Vertrauen das Wirtschaftswachstum fördert.
- Regulierungsinstrumente müssen demokratisch legitimiert sein, um Principal-Agent-Probleme zu minimieren.

Diese Erkenntnisse betonen, dass die Beseitigung oder Anpassung von Regulierungen durch schwach legitimierte internationale Handelsabkommen das generalisierte Vertrauen untergraben können.

1. Introduction

What are the linkages between trust, regulation and trade? The rise of trade agreements that cover non-tariff barriers, including potentially any legal and regulatory provision behind the border has rendered this question increasingly important. This paper seeks to provide a framework on how to think about the relevant issues.¹

To fix ideas, consider the controversy over “chlorine chicken.” During negotiations between the United States and the EU on the Transatlantic Trade and Investment Partnership (TTIP) in the first half of the 2010s, significant differences in regulatory standards regarding the production of chicken became a focal point in the public debate (cf., for example Kaf-sack and Roszbach, 2014).

In the United States, slaughtered chicken from flocks with high holding densities are water-chilled in a chlorine solution. The EU does not permit this method. Instead, EU agencies tightly monitor chicken breeding stocks, limit flock densities and require air-chilling slaughtered chicken. Both regulatory approaches limit salmonella outbreaks, but EU production is more expensive. Imports of U.S. chicken are not allowed. The United States would like to gain access to the European market; hence, negotiations over a possible regulatory alignment.

Such “alignment” could take multiple forms. The simplest is *mutual recognition*, where both countries accept the regulatory standards of the other as functionally equivalent even if different. A second is *regulatory harmonization*, where the countries negotiate a common standard that both countries adhere to — which, in principle, could be either country’s current standard. The third is *regulatory cooperation*, where a bilateral council reviews regulatory proposals. The consequences of any of these paths towards alignment can be uncertain.

Mutual recognition could flood the European market with cheap, chlorine-chilled chicken, which consumers might or might not buy. If consumers bite, it will force European chicken producers to switch to the cheaper chlorine-chilling, or out of business, or at least severely reduce their market share. Whether consumers buy chlorine chicken or not could heavily depend on labeling requirements.

Harmonization, in turn, can be very costly for firms in any country that agrees to change its standards, and thus highly unlikely to occur between

¹ This working paper is part of the research project “Modelling regulatory change in trade impact assessments – Towards a comprehensive and balanced approach” funded by the Hans Böckler Foundation. The project seeks to incorporate the comprehensive effects of regulations in an economy-wide model for trade impact assessments (see details of the model in Raza et al. 2016).

countries of roughly equal negotiating power. It is more likely that large and richer countries can force adoption of their standards on smaller and poorer countries. The last option — regulatory cooperation — was put on the table during TTIP negotiations and would have required a bilateral council composed of business and, potentially, civil society groups in respective capitals. The emergence of such an institution was expected to exert a strong regulatory chill.

All three routes can be expected to reduce trade costs, through the removal of barriers by fiat, or their reduction through complex negotiations, or the impact of regulatory chill at least vis-à-vis new non-tariff or regulatory barriers to trade. Not addressed in this and related debates are the *benefits* of regulation. For a critical discussion, see Raza et al. (2014, 2016), Tröster et al. (2023) and references there.

The most immediate benefit from the regulation of chicken production is to limit salmonella outbreaks. Presumably, either U.S. or EU approaches lead there. However, and to stick with this specific example, EU voters and consumers express significant apprehension to consider the U.S. approach as functionally equivalent or even acceptable.

Indeed, it appears that significant but less tangible benefits can accrue to country-specific modes of regulation. Voters and consumers extend a degree of *trust* towards homegrown legal and regulatory systems that they are not willing to extend to unaccountable systems of foreign countries. This, in a nutshell, is our hypothesis: Good regulation fosters trust, and trust facilitates mutually beneficial economic activity.

Regulation is “good” when it effectively addresses externalities, *and* when it is responsive and accountable to local or national democratic control, *and* when it is cognizant and respectful of the historical and institutional development of relevant laws and agencies. Trust, in turn, has to be built over the long term between consumers, businesses, and regulators, as well as voters and politicians.

Mutually and societally beneficial economic activity—consumption and investment, innovation and also trade—unfolds in the context of potentially myriad feedbacks between trust and regulation. By juxtaposition, regulatory alignment risks to undermine this historically grown fabric, by placing consumers at the mercy of a wholly unaccountable regulatory system of a different country.

It is clear from the above that behind-the-border legal and regulatory systems are *not at all* like tariffs. They impose a cost on trade, but are specifically designed to confer benefits on the members of society within those borders—and these benefits are at least in principle *not* about protection from international competition.

The extant literature now recognizes these conceptual differences, but no systematic discussion of the benefits of local (or domestic, national or regional) legal and regulatory systems and their potential measurement in trade impact assessments has arisen. Further, the trade literature—either in theory or with respect to trade impact assessment—does not make the connection to the issue of *trust*. To do so in this paper, we have to cast a wide net.

Chapter 2 presents a discussion of the necessity of regulation, or, more broadly, governmental control and guidance of a market economy. In an idealized market economy with perfect competition, complete information and complete markets, individual actions lead to first-best (Pareto-efficient) outcomes. However, real-world economies are not “perfect,” so market failures are pervasive and public policy can achieve second-best outcomes.

Public policy can be built around market mechanisms or, alternatively, direct regulation. In practice, direct regulation dominates: Neither the EU nor the United States caps the number of salmonella outbreaks and let chicken farmers trade certificates for the right to incur one; neither the EU nor the United States limits salmonella outbreaks by letting consumer groups sue chicken farmers for compensation.

Our discussion on these issues follows familiar ground but is worth revisiting in the context of the distinction between theories of *public interest* and *public choice*. Following Weberian views on the role of bureaucracy in administering rules and regulations in complex modern societies, and Pigouvian views on corrective taxation to achieve societal goals, the former suggests that politicians, officials and bureaucracies are indeed willing and able to act in the public interest.

In contrast, following Buchanan, Tullock and others, the latter implies that politicians, officials and bureaucracies will mostly tend to pursue their own interest, and both ideas for and implementation of regulation need to be analyzed with an eye towards such conflicts of interest. As will be seen further below, adherents of public interest theory tend to argue that trust and regulation can be complements, whereas adherents of public choice theory tend to argue that trust and regulation are substitutes.²

Chapter 3 presents an overview of the theoretical literature on trust. This literature is extensive and arises in the broad fields of sociology, political science and economics. Our overview is therefore necessarily selective, and merely seeks to provide a foundation upon which experiments and games in Section 4 can be discussed. The upshot of the discussion here is that writers and thinkers across disciplines recognize that societal

2 For foundational references, see Olson (1965) and Ostrom (1990).

organization in a variety of contexts, including economic activity, requires and is aided by *trust*, and not only institutions such as laws and markets.

Chapter 4 reviews the relevant foundations of game theory. The well-known prisoner's dilemma game provides a concise framework to discuss coordination failures or the "tragedy of the commons."

Consider the simple example of overfishing: Two fishermen can decide to fish their favorite bay as long as daylight allows, or alternatively agree to restrict their hours. If both fish as long as possible, they deplete fishing stocks *and* their incomes will be lower. If they both restrict their hours, fish stocks will be sustainable and their incomes will be higher. However, if one restricts hours and the other does not, a particularly rich bounty awaits the latter.

In short, incentives guide individuals to do what is bad for themselves and society at large. The same logic applies to overgrazing of the commons. These ideas on coordination failures, or the difficulties to cooperate, are not new and go back to Rousseau's stag hunt, where two hunters can collaborate to pursue the rich reward of a shared deer, or individually run after smallish hares. Again, the same logic applies to chicken farming: In the absence of regulation, competition will push breeders to take excessive risks.

Such undesirable outcomes can be avoided if the players of the game *trust* each other. The two fishermen might know each other, and talk to each other, and make a commitment to restrict their hours so both can enjoy shorter workdays and larger hauls. If this does not work, *control* might solve the dilemma: The government could mandate—i.e., regulate—sufficiently short fishing hours, and enforce compliance through fines or other penalties. In turn, if fishing communities, their business associations, and local politicians have a long history of negotiating these pitfalls, the existence of good regulations can foster adherence to norms, and support and maintain prevailing trust (Ostrom, 1990).

The public goods game is of particular importance in the present context. This game is considered the n -person prisoner's dilemma and is used in laboratory experiments to experimentally assess *trust*. The basic premise is that players receive an endowment, part of which they can choose to contribute to a fund that provides public goods. By definition, benefits of public goods are non-exclusionary, so individuals face incentives to free ride.

We conclude this section with a survey of empirical evidence on the prevalence of trust. The principal methods to assess the strength of trust are (i) surveys and (ii) experiments. Both methods find that trust is measurable and significant: People tend to extend a degree of trust to strangers, are in turn trustworthy, and want to cooperate with others and

contribute to common goals. Importantly, *control* (through, for example, punishment for free riding) increases the rate of contributions and in this sense facilitates the attainment of socially desirable outcomes.

Chapter 5 reviews key empirical evidence on the relationship between trust and economic performance. Results indicate that trust and income per capita are positively correlated in cross-country data, and also across European regions and U.S. states. Furthermore, regression results indicate that trust and *growth of* income per capita are positively related, too. Some studies seek to isolate a potential causal effect of trust on growth, with instrumentation of proxies for *inherited trust*, which could be considered exogenous at a specific time. Results suggest this indeed to be the case.

Chapter 6 concludes with an attempt to bring these deep but disparate threads of literatures together. Our goal is to speak to the political economy of globalization.

We acknowledge that the logic of the prisoner's dilemma has been utilized to argue in favor of liberalization. The standard argument here is *mercantilist* in nature: If one country's political leadership could open other countries' markets to exports while retaining protection at home, reelection will be easier. The incentives to defect, i.e., protect, are therefore ever-present, and only *control* in the form of an internationally binding trade agreement can ensure the realization of the mutually beneficial gains from trade. As is well-known, these theoretical gains depend on strong assumptions (price-clearing markets, full employment, etc.) — but the argument is on the table.

We juxtapose this simple idea with two cautionary arguments. First, Polanyi's writing indicates the need to embed markets and their operation in sufficiently accountable and legitimated institutions. Rodrik, more recently, reframes these Polanyian ideas as a globalization paradox, suggesting that between the three poles of democratic governance, the nation state and a hyperglobalized world economy only two are attainable simultaneously.

This echoes our previously made claim that legal and regulatory systems must be to some extent locally accountable to not undermine social cohesion and economy activity more broadly. We reiterate here that tariff reductions on the one hand and cross-border agreements on potentially any behind-the-border regulations on the other are in fundamental ways different.

Second, recent research and public debates suggest that (hyper-)globalization since, roughly, 1980 has been a double-edged sword. It might have offered efficiency gains, spurred the generation of truly global supply

chains, and lifted many citizens of the developing world, in particular in China, out of poverty.

However, it also led to persistent and devastating income and employment losses in local economies, specifically for lower-skilled workers in the United States. Integration of EU economies under a regulatory umbrella triggered virulent anti-EU movements, amplifying regionalist and nationalist tendencies politicians across the common market regularly seek to exploit. In the United States, the election and the administration of Donald Trump serve as a stark warning to consider strengthening anti-globalization sentiments.

2. Market failures necessitate government intervention

Economics as a distinct discipline of the social sciences arose in the late 18th and early 19th century. The publication of Adam Smith's *Wealth of Nations* (1776/2005) and David Ricardo's *Principles of Political Economy and Taxation* (1817/2001) are generally recognized as watershed moments and foundational texts. Notably, Smith and Ricardo wrote about the emergence of new modes of production. They wrote about the emergence of *markets* and wrote about the decline of the feudal order. Both texts contain arguments in favor of the market mechanism, most famously Smith's metaphor of the invisible hand:

"[H]e intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of this intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it." (Smith, 1776/2005, p. 364)

Smith's idea, in a nutshell, was that self-interested (or selfish, or self-regarding) individuals pursuing their own economic goals—profit, income, utility—within a market system would advance the greater public good (or societal goals, or common interests). Smith's objective was to juxtapose the possibilities of decentralized and competitive markets to the strict boundaries of feudalism, with tight control of guilds over production, and even tighter control of lords and monarchs over resources and distribution. In this sense, his, and Ricardo's in a similar manner, objective was to propose a renegotiation of the role of government in social and economic affairs.

2.1. Welfare economics

The seemingly paradoxical claim that markets—rather than mercantilist rulers, or church leaders—could promote public interests has fed debates about these lines of demarcation ever since. Economists belabored the concept for nearly two hundred years, their efforts culminating in the formulation of the neoclassical theory of competitive general equilibrium and

associated welfare theory.³ The upshots of this debate are the two *Welfare Theorems*.

The First Welfare Theorem suggests that *if the economy is competitive, the resulting market allocation will be Pareto efficient*. To understand the import of this statement, we have to consider what a competitive economy is, and what Pareto efficiency means.

The term “competitive economy” is a stand-in for a whole slew of assumptions, but we will here focus on a shortened and selected list of issues:⁴ (i) All agents—firms and households, or producers and consumers—are price-takers, i.e. do not have the ability to set their prices or negotiate over prices; (ii) agents are rational and indeed self-interested, i.e. they maximize utility (as a consumer), or maximize profit or minimize costs (as a producer), and (iii) do so in complete markets with complete information, i.e. they know *everything*.

Pareto efficiency, labeled after the Italian economist Vilfredo Pareto, is the requirement for an allocation of resources that no one can be made better off without making someone else worse off. Put differently, *if the economy is competitive as outlined above, economic outcomes are optimal in the sense that not a single agent could improve their situation without having to worsen someone else's*.

A Pareto efficient allocation implies that *there is no free lunch*. In contrast, if an allocation is *not* Pareto efficient, someone can in fact improve their situation without having to make anyone worse off. The First Welfare Theorem therefore states that a decentralized competitive market effectively exploits any and all opportunities for improvement.

The Second Welfare Theorem turns this around, suggesting that *any Pareto efficient allocation can be attained through a competitive market economy*. The impetus of this theorem is to connect the competitive economy to concerns about the distribution of resources. Note that neither the definition of the competitive economy, nor the concept of Pareto efficiency speak to distributive concerns. In fact, in an economy where the many have almost nothing, and the few have almost everything, *giving the few a little bit more without making the many worse off is a Pareto improvement*.

3 Arrow/Debreu (1954) outlined conditions for the “Existence of an equilibrium for a competitive economy.” The heyday of general equilibrium theory lasted into the 1970s.

4 There are a number of additional assumptions, including on the characteristics of production technologies and consumer demand preferences, without which the neoclassical theory of general equilibrium does not work. We are focused on the juxtaposition of competitive vs. failing markets and will not delve into all the details. For a review of these and related themes, one might consult a standard microeconomic textbook, such as Mas-Colell/Whinston/Green (1995). Kirman (1992) and Ackerman (2002) present critical discussions. Foley (2010) considers out-of-equilibrium trading, and consequences for the welfare theorems, in detail. A classic reference is Kaldor (1972).

The Second Welfare Theorem posits that a competitive market leads to Pareto efficiency from any initial distribution of resources. Following this logic, however, leaves the distribution of resources to realms other than economics. Once a distribution is given, *markets lead to first-best, Pareto-efficient outcomes*.

In summary, welfare economics presents a body of theory that formalizes Adam Smith's notion of the invisible hand. If self-regarding individuals interact in a competitive market, the result is "as good as it can be." If society wants it to be different, it ought to change the initial distribution of resources, but not meddle with the magic of the market—as that, with any such distribution, leads to the best possible outcomes. The competitive economy itself not only does not require government, government might impede the achievement of first-best outcomes.

2.2. Market failures abound

The crux of the matter in all this is, of course, that the economy is *not* competitive as defined above. Welfare economics and indeed a major portion of neoclassical economics presents a justification of markets and market outcomes as optimal, but the welfare theorems are only theorems: the logical deduction of results based on assumptions. And these assumptions are wrong.

Market failures are the rule, rather than the exception.⁵ We summarize four:

The first and most obvious market failure is the failure of competition. Competition might be limited for several reasons. One possibility is that a number of large firms are active in an industry (say, smartphones). These firms might produce and offer products that are similar in principle, but sufficiently differentiated so that the firms have indeed a degree of pricing power. Increasing returns presents another possibility. This arises when a proportional increase in all inputs leads to output growing above-proportionally; this situation corresponds to falling average costs. In such an industry, a natural monopoly might arise.

Other reasons for limited competition are high transportation and information costs. For example, consider a specialized supplier for a cluster of firms in the automobile sector that is located nearby and has longstanding

5 The following discussion draws on Stiglitz/Rosengard (2015), which is the standard textbook on the economics of the public sector. The authors list six causes of market failures: failure of competition, lack of public goods provision, negative externalities, incomplete markets, information failures and macroeconomic concerns (e.g., unemployment, inflation).

ties with customers. An unknown and far-flung competitor would need to overcome transportation and information costs to gain entry; indeed, strategic behavior and pricing to deter entry of competitors is part and parcel of firms' *modus operandi*.

Second, a competitive economy does not provide public goods, or at least does not provide sufficient quantities thereof. A public good is both *non-rival* and *non-excludable*. A good is rival when my use of it reduces yours; a good is excludable when you are able to deny me using it at a low or zero cost. The most commonly used example of a public good is *clean air*. If the air is clean, both you and I can breathe easily—and my breathing does not limit yours. However, if one of us is unwilling to contribute resources to keep the air clean and the other has to shoulder the cost of doing so alone, the uncooperative cannot be excluded from breathing clean air.

The very definition of the competitive economy is that agents act in their own economic interest. Investing in clean air yields no profit barring a mechanism to make the other pay for it. A competitive economy therefore does not have clean air. As already alluded to in the introduction, the challenges of public goods provision are at the very core of the literature on trust. Common pool resources such as the favorite fishing bay are rival but non-excludable, and lead to a prisoner's dilemma. The public goods game itself underpins all of the experimental and behavioral literature on trust.

Third, if negative externalities are present, one agent imposes a cost on another. Again, air pollution is an oft-cited example: Flying a plane gets me from A to B, but also worsens air quality, contributes to climate change, and leads to noise pollution. These adverse consequences arise for many and maybe all agents, aside from me. In the introduction, we considered salmonella outbreaks: Raising chicken unsafely imposes costs and risks on all consumers, and, in fact, other producers, since demand for their safely produced chicken tenders will sag in response to an outbreak.

Fourth, markets and information are incomplete. Markets are incomplete when producers do not offer goods or services for which the cost of provision is less than what consumers are willing to pay. The incompleteness of markets is particularly pervasive in finance and insurance. In both areas, firms create and sustain opportunities to trade in contingent claims: If an event occurs, the firm will pay you a certain stream of money for having invested. If, in contrast, the event does not occur, you lose everything; this might pertain to a derivatives contract. Similarly, a life insurance payment is triggered by accidental death and analogously for other insurance matters, e.g., health or fire.

However, markets do not provide opportunities to hedge against all possible future events, and in this sense are incomplete. Moreover, the relatively well-off face vastly deeper markets to hedge against uncertainties and risks than the relatively poor. Information problems abound in these types of situations. Standard examples of market failures due to asymmetric information include moral hazard and adverse selection.

Additionally, markets do not supply information itself in sufficient quality and quantity. Examples extend to numerous labeling requirements in food and drug provisioning, but go far beyond that. Indeed, one of the assumptions of the fundamental theorems of welfare economics is that *information is complete*, which implies

“that nothing firms or households did had any effect on beliefs or information. In fact, much economic activity is directed at obtaining information, from employers trying to find out who are good employees, to lenders trying to find out who are good borrowers, investors trying to find out what are good investments, and insurers trying to find out who are good risks.” (Stiglitz/Rosengard 2015, p. 92)

It is abundantly clear from this brief discussion that economies of the real world are rife with market failures and are nothing like the idealized competitive economy of neoclassical general equilibrium theory.

Further, the causes of market failures are often interlinked: The production of chicken cannot *a priori* be assumed to unfold under conditions of perfect competition. Safe and salmonella-free production of chicken is a public good in itself. The costs of salmonella outbreaks are a negative externality imposed on society by unsafe production methods. Unregulated chicken production necessitates hedging against salmonella outbreaks, but financial and insurance markets are fundamentally incomplete. And, in the absence of regulation and labeling requirements, consumers will not *trust* chicken producers, and opt for other meats.

2.3. Public interest vs. public choice

The necessity of government intervention follows directly from market failures. The role of government is to correct market failures, or at least buffer against their most severe adverse consequences.

This view rests on the assumption that government officials not only have the expertise but also the desire to do so. For example, one might argue, that the legislative branch should institute taxes on harmful emissions to limit air pollution; Pigou's treatise on *The Economics of Welfare* (1932) forcefully makes the case for such corrective taxes. The predisposition here is that officials—bureaucrats, legislators, public officials of all

kinds—are altruistic in the sense that they act in the public interest rather than their own.

Government, in this view, resembles a *deus ex machina*: The invisible hand of the market guides self-regarding individuals to the best possible outcomes, and where that is impossible due to market failures, other-regarding individuals institute rules and regulations that fix things. The paternalistic politician in this Pigouvian ideal thus appears as a contradiction in terms, seemingly incompatible with the underlying conception of *homo oeconomicus*.

The theory of public choice presents an alternative view. Public choice theory is built on the assumption that government officials are just as self-ish or altruistic as other humans, and hence might act in their own interest rather than the public's. The implication would be that large bureaucracies, high taxes or complex regulatory systems might serve to enlarge and entrench the power of officials.

Some authors in this field, such as James Buchanan and Gordon Tullock, who published *The Calculus of Consent* in 1962, have a libertarian streak and draw on the conflicts of interests of public officials to showcase risks of regulatory capture and rent-seeking.⁶

Problems of this type are all too well known. The prime example often put forth is U.S. financial regulation, where a revolving door between regulatory agencies and financial institutions greases the wheels of industry while risking the macroprudential soundness of the system. The success of agricultural lobbyists to maintain high levels of protection and the out-size political influence of the car manufacturing industry are similar examples, on both sides of the pond. The literature considers these issues in principal-agent frameworks, with the general public the principal and public officials their agents, about whose motivations and actions the principal has quite limited information.

The relevant question in the present context is whether regulatory capture becomes more or less likely under differing systems of regulatory alignment across borders. Core to our hypothesis is that national, local or regional systems of regulation facilitate stronger accountability, are robustly legitimated, and therefore would be expected to alleviate principal-

6 A seminal paper in the economics literature in this vein is Djankov et al. (2002), who argue that their “evidence is inconsistent with public interest theories of regulation, but supports the public choice view that entry regulation benefits politicians and bureaucrats.” In a related paper, Aghion et al. (2010) expand on these ideas with a theoretical model that (i) assumes trust and regulation to be strong substitutes, and (ii) explains the paradox of high demand for regulation in distrustful societies, even though government officials are known to be corrupt. Pinotti (2012), in sharp contrast, argues that these proponents of public choice have it all wrong, and empirically reconciles high demand for regulation in low trust environments with market failures.

agent problems highlighted in public choice theory better than internationally mediated systems.

Indeed, we argue in subsequent sections that both theory and evidence suggest that the emergence and sustainability of cooperation (i.e., *not* falling into coordination failures) become more likely with higher degrees of trust and more effective systems of enforcement. These conditions are more likely to be met at the national level.

3. Trust, in theory

What is the role of trust in society and economy, in theory? The literature on trust extends across several disciplines, including sociology, political science and economics. An even remotely comprehensive survey of all relevant contributions on the topic across these disciplines is not possible here. Instead, we begin with a brief note on selected views on trust in sociology and then move on to economics.

Endreß (2002) presents a useful survey of sociological perspectives on trust. The author takes Émile Durkheim and Max Weber, foundational voices in the field, as his starting point, and emphasizes that sociology as a discipline emerges as processes of change in society and economy accelerate. These processes move in the direction of increasing complexity, which in turn necessitates layers of mediating institutions, whom individuals are asked to extend trust.⁷

In fact, Endreß identifies *trust* as a core theme in sociology, even if not always labeled as such, referring here also to the prevalence of mistrust as the Hobbesian ‘state of nature.’⁸

Durkheim (1893/1933) builds on Hobbes’s deliberation on the strength of ties between and fulfillment of obligations across contracting agents. Hobbes’s key oversight, in Durkheim’s view, is to neglect “collective consciousness.” This important concept, developed by Durkheim, rests on the foundation of common beliefs, values and norms, which in turn provide the glue that renders *incomplete* contracting nevertheless effective. Indeed, in Durkheim’s view, collective consciousness arises out of shared beliefs, values and norms, and the resulting morality constrains (otherwise quite self-regarding) individuals to act in pro-social ways.

7 “At the beginning of the development of its own sociological research perspective and the establishment of sociology as an academic discipline lies the experience of fundamental questioning and profound uncertainty about well-established living conditions. This occurs within the context of accelerated, particularly technologically-driven changes in almost all areas of life as part of ongoing societal processes of modernization. The more pronounced people’s awareness becomes regarding the uncertainties and unpredictabilities of life due to the intensity and pace of these transformation processes, the more they are compelled in their daily actions to trust in technical apparatuses, experts, and institutions from which their own agency has been removed.” (authors’ translation of Endreß 2002, p. 7)

8 See also the prominent Hobbes quotation on the first page of Knack/Zak (1999, p. 295). It should be noted that Hobbes’s description of this state of nature is entirely hypothetical. Anthropological research has long discarded the idea that “primitive” pre-enlightenment societies were uncivilized as circumscribed in Hobbes. For a forceful argument along these lines, see Graeber/Wengrow (2021). However, it remains relevant for the purposes of theoretical juxtaposition.

Weber (1920/1986) offers related arguments. Central to Weber's work is, first, the notion that societies are increasingly organized around markets and that this rationalizes and de-personalizes social interaction; and, second, that this move towards markets and specialization implies an increasing complexity which necessitates the management and guidance by bureaucratic, rational agencies.

The transformation of traditional to modern societies, as in Durkheim, therefore requires trust to evolve in a similar manner, namely from a principally personal to a principally impersonal, rationalized conceptualization. This is seen as a critical factor in the emergence of the market-based society,⁹ and is reflected in the persistent distinction of trust as either limited trust (i.e., family and kinship-based) versus generalized trust (i.e., vis-à-vis strangers) (see also Murtin/Fleischer/Siegerink, 2018).

Recent work is even more explicit on the role and importance of trust. Luhmann (1988), for example, discusses differences between familiarity, confidence and trust, and assigns an important systemic role to trust in reducing complexity and thus—in our terminology—opening possibilities for mutually beneficial actions. Giddens (1990) highlights the centrality of institutions in mediating trust, in particular with regard to specialized expertise not everyone can exhibit.

In summary, the themes raised in the sociological literature are closely related to and very similar to the issues raised in economics, to which we now turn our attention. Nearly every piece of research on the role of trust in economics cites Arrow's 1972 paper on "Gifts and exchanges." The most frequently quoted passage states that "[v]irtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time" (p. 357). Arrow, in that sentence, and every author who quotes it, asserts an overarching importance of trust.

However, Arrow's article presents a nuanced discussion that is worth considering in more detail. Arrow was motivated to weigh the tension between *gifts* and *exchanges*, the former being something one gives, presumably of one's own accord, and the other being something one trades for something else. The impulse had been provided by Titmuss (1970) on the provision of blood donations.

The key issue in this debate—for our purposes—was whether offering monetary incentives would be *inefficient*, in the sense that the social cost of ensuring a supply of blood for all sorts of medical needs would be higher

9 "From a historic evolutionary perspective, Durkheim, Simmel, and Weber fundamentally emphasize the shift from personal to impersonal 'rationalized' trust as a crucial factor in the emergence of modern society and the development of capitalism." (authors' translation of Endreß, 2002, p. 26)

than otherwise. Titmuss thought that offering to pay blood donors would lead to a decrease in *voluntary* blood donations. Arrow (1972) argues that

“giving may actually increase efficiency in the operation of the economic system. This is on the face of it a dramatic challenge to the tenets of the mainstream of economic thought. Since the time of Adam Smith, economists have preached the virtues of the price system in enforcing efficiency and penalizing waste. To be sure, there has grown up a tradition, stemming from Alfred Marshall and developed by A. C. Pigou, Allyn Young, F. H. Knight, and more recent writers, which emphasizes that the price system does not always work satisfactorily. There are, in the language of welfare economics, ‘externalities,’ benefits and costs transmitted among individuals for which compensation in price terms is not and perhaps cannot be obtained. [...] A system is inefficient if there is another way of allocating these goods, all the goods that we consider relevant, such that everybody is better off according to appropriate criteria. These criteria might be clean air or the availability of blood when needed as well as automobiles or steak.” (Arrow, 1972, p. 351–352)

Are humans self-regarding, and must therefore be paid to contribute to the greater good? Or are they also other-regarding, and want to voluntarily contribute to society? How should governments and markets be designed in order to ensure that the greater good does not come up short?

Arrow cites Adam Smith in defense of the first view, echoing the famous passage from the *Wealth of Nations* on how individual pursuit of self-interest, mediated by the price system, guides society and economy to maximize welfare.¹⁰ Smith, however, also authored *The Theory of Moral Sentiments* (Smith, 1759/1982), and in it posited that “[h]ow selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortunes of others, and render their happiness necessary to him, though he derives nothing from it, except the pleasure of seeing it.”

In other words, the seeds of these debates go back to classical political economy and the founding of the discipline of economics and persist in a variety of ways to the present day. Algan and Cahuc (2014, p. 52) summarize, in modern terms, as follows:

“For trust to have an economic impact and to improve efficiency, one has first to consider the reasons why the economy would depart from the first-best allocation in absence of trust. In his analysis of the limits of organization, Arrow (1972) considers trust as co-substantial to economic exchange in presence of transactions costs that impede information and contracts. Fundamentally, the economic efficiency of trust flows from the fact that it favors cooperative behavior and thus facilitates mutually advantageous exchanges in presence of incomplete contracts and imperfect information. In

¹⁰ “It is not from the benevolence of the butcher, the brewer or the baker that we expect our dinner, but from their regard to their own interest.” (Smith, 1776/2005, p.19)

Arrow's terms, trust would act as a lubricant to economic exchange in a second-best allocation."

The preceding section concluded that incomplete markets necessitate regulation to achieve second-best outcomes. The preceding paragraph, in turn, posits the relevant follow-up: How does *trust* relate to said *regulation*? Are trust and regulation substitutes or complements? To inch in the direction of answer, let us first define both terms.

Trust can be defined as "a person's belief that another person or institution will act consistently with their expectations of positive behavior" (OECD, 2017). Similarly, Coleman (1990) suggests that an "individual trusts if he or she places resources at the disposal of another party without any legal commitment from the latter, but with the expectation that the act of trust will pay off."

More broadly, and drawing on additional research, Algan and Cahuc (2013, p. 10) refer to trust as akin to social capital, which are, in the words of Guiso/Sapienza/Zingales (2011) "those persistent and shared beliefs and values that help a group overcome the free-rider problem in the pursuit of socially valuable activities."¹¹ Further, the literature distinguishes between "limited trust" and "generalized trust," the former of which pertains to networks of family, neighborhood and kinship, whereas the latter includes strangers in complex modern societies (Murtin/Fleischer/Siegerink, 2018, p. 8).

Regulation, in turn, is at the center of our investigation here. We are interested in how laws, rules and regulations in general affect such socially valuable activities. For the purposes of this section, it is advisable to maintain a fairly high level of abstraction, and to that end, regulation is best understood as one instrument of *control*. Control can take many different forms, as alluded to already in previous sections. Control can arise in the form of government intervention, which in turn can be based on price signals in markets, direct regulation, legal constraints, etc. Control can also arise between private agents, based on shared norms, beliefs and values.¹²

Violations of laws and regulations, if effectively enforced, trigger specific costs, i.e., fines or even jail time. Violations of norms lead (potentially)

11 Putnam's writing, referenced widely, is an important source on social capital. Putnam/Leonardi/Nanetti (1993) posited the idea that trust or social capital are largely culturally inherited, and therefore immutable over, say, a few decades. Putnam (2000) questions this with the idea that trust and social capital have significantly eroded with the advent of television, and its adverse effect on neighborhood and sports associations and the like.

12 We borrow the juxtaposition of trust and control from Six (2013), though it is applied in this paper in the specific context of regulation.

to reputational costs, which might or might not have monetary consequences. There are overarching commonalities—concrete laws as well as much more vague norms facilitate cooperation to achieve socially desirable ends—but, clearly, the devil is in the detail.

To parse out what *trust* means in this context, the next section discusses relevant game-theoretic structures. To foreshadow conclusions: Evidence from lab experiments indicates that a significant share of people will extend trust and seek cooperation even if instruments of control and enforcement are unavailable. If enforcement becomes available, it is freely drawn upon and used to drive up the share of cooperators.

Trust therefore appears to have a two-fold nature: Game participants extend it voluntarily and generously, indeed *irrationally* under conditions of imperfect information and without hopes of recouping costs in the long term (i.e., in one-shot games). In this manner, trust appears as an *economic primitive*, opening the door to mutually beneficial cooperation (Berg/Dickhaut/McCabe, 1995). Trust, however, is extended more easily and widely when control and enforcement are available (in repeated games). Under such circumstances, trust is not irrational, since disappointment of trust can be punished.

To oversimplify, consider the complete absence of trust. Such an absence would seem to make cooperation impossible without instruments of control and require tighter control when they are available. In this sense, trust and control might be seen as substitutes. However, where trust exists and is commonly extended, control builds and sustains trust over time. Indeed, enforcement and trust might then be seen as complements in the facilitation of cooperation.

Gintis et al. (2005, p. 8) summarize these themes under the label that people are *strong reciprocators*, which means that they are “conditional cooperators (who behave altruistically as long as others are doing so as well and altruistic punishers (who apply sanctions to those who behave unfairly according to the prevalent norms of cooperation).” Bowles and Polania-Reyes (2012) survey the literature in an important paper, concluding (i) that trust and control can be substitutes, but furthermore that (ii) well-designed elements of control can render “incentives and social preferences complements” (p. 368).¹³

13 We again emphasize the juxtaposition of trust and control in Six (2013), who argues that these are traditionally seen as substitutes, but can and should instead be motivated theoretically as complements. For a contrasting view, see Lesmeister/Limbach/Goergen (2022), who present evidence that trust and control act as substitutes, at least regarding the relatively narrow issue of trust vs. monitoring in the context of shareholder votes on management performance.

4. Trust and cooperation in games and experiments

This section presents three different games: the ultimatum game, the prisoner's dilemma game and the public goods game. The literature on these games is extensive, and for brevity's sake, this review is necessarily incomplete. However, we will draw out key conclusions regarding the emergence and sustainability of *cooperation*, and the role of trust and control in that process.

The ultimatum game highlights that human subjects are altruistic punishers, as they are willing to forego their own economic gains in order to also keep gains from materializing for others when the allocation is seen to violate prevailing norms. The prisoner's dilemma highlights that an equilibrium might be *Pareto inferior*, and that only deep trust, effective control or a combination thereof can rectify this. The public goods game highlights that people who want to contribute to the greater good, tend to want to trust that others will, too, but rely on institutions to enforce that this actually arises.

4.1. Ultimatum game

The setup of the ultimatum game is simple. Two players, strangers to each other, face off. Let us call them Keisha and Mark. Keisha receives an "endowment" of \$10. She has to make one decision: hand over a fraction of this endowment to Mark. Mark, in turn, receives no endowment but only a fraction of \$10 from Keisha. He has to make one decision, too: whether to accept to keep the fraction, which means that Keisha also gets to keep her portion, or alternatively decline—which means that both Mark and Keisha lose the entire \$10 and leave with nothing.

A hypothetical *homo oeconomicus* Mark, rational, self-regarding, and acting according to a well-behaved utility function, would be expected to take any positive offer Keisha makes. Having \$1 beats having no money, even if Keisha gets away with the lion's share of 90 percent of the endowment. A hypothetical *homo oeconomicus* Keisha would know this and would offer exactly that minimum. However, this is not what laboratory experiments show:

"[W]hen the ultimatum game is actually played, *only a minority of agents behave in a self-regarding manner*. In fact, as many replications of this experiment have documented, under varying conditions and with varying amounts of money, proposers routinely offer respondents very substantial

amounts (fifty percent of the total generally being the modal offer), and respondents frequently reject offers below thirty percent.” (Gintis et al., 2005, p. 12, emphasis in original)

This is consistent with the notion of strong reciprocity. The prevailing norm of what is considered *fair* overrides the individual gain.¹⁴ Keisha knows that Mark will find low offers unfair, and hence will tend to avoid making such offers; Mark, in turn, indeed shares beliefs about fairness and rejects low offers. While the ultimatum game is not specifically about *trust*, it powerfully illustrates how central pro-social norms are for guiding interactions with *economic* consequences. Further, if “Keisha” is a computer, instructed to make random offers, and Mark—still human—knows this, *he will accept low offers*, fully understanding that the computer is not bound by these pro-social norms. In such a case, a buck in hand beats to use instruments of control in order to punish computer code (Bount, 1995).

4.2. Prisoner’s dilemma

The prisoner’s dilemma gets its title from the bind two bank robbers find themselves in, in separate cells, being suspected of a crime the police has limited evidence for. The authorities offer both Keisha and Mark significant benefits for confessing. If Keisha confesses and Mark does not, the evidence she provides leads to lengthy jail time for Mark, while she is rewarded as a key witness and goes home free. If both confess, they both get jail time. If both remain silent, only limited evidence can be brought against them, and they face only a short prison sentence.

Table 1 summarizes this situation. It is clear from this setup that Keisha and Mark need to *trust each other to achieve the collectively optimal outcome of limited jail time*. Their combined jail time is two years if both do not talk, which is clearly preferable to ten years. However, the allocation of this much greater punishment matters: If Keisha confesses, the entire ten years might fall on Mark, and vice versa. The incentives are thus

14 What the prevailing norm is depends on context. The vast majority of experiments with the ultimatum game have been made with “WEIRD” subjects—people, and mostly undergraduate students, who live in Western, Educated, Industrialized, Rich, and Democratic societies. The modal offer in the ultimatum in less WEIRD contexts can differ substantially and can be higher, but nevertheless, be rejected: Keisha would tend to offer more than 50 percent of the endowment, but Mark would tend to reject that offer as a gift that would imply future obligations. See Henrich (2020) and references therein for an in-depth discussion.

stacked against the players and lead them into the *Pareto-inferior* equilibrium of sharing ten years of jail time equally.¹⁵

Table 1: Prisoner's dilemma, bank robber's version

Keisha	Mark		
		Silence	Confess
	Silence	1 – 1	0 – 10
	Confess	10 – 0	5 – 5

Note: "Payoffs" are years in jail: the lower the better. The first number is Keisha's jail time, the second Mark's.

Source: Authors' adaptation of textbook material, i.e., Bowles/Halliday, 2022, chapter 1

Table 2 translates the basic premise to the *Tragedy of the Commons*, which is the title of Garrett Hardin's influential paper (Hardin, 1968).¹⁶ The term "commons" refers to a *common pool resource* or *common property resource*, which is rival but non-excludable. Standard examples include the commons of the British feudal era, where the commoners enjoyed livestock grazing rights, yet soon to be enclosed as markets encroached on the old order, and fishing stocks, as in Table 2.

¹⁵ The "problem" of defection as confessing to a crime one has committed is greatly reduced—and the fitting analogy—for the case of the mafia, where the threat of violence against the defector and protection and sustaining of family members for long periods of time-limited law enforcement success. Research on organized crime and trust appears in Gambetta (1988).

¹⁶ The specific example is drawn from Bowles/Halliday (2022), which is a textbook of microeconomics that elucidates important advances in our understanding of actual human behavior and interaction in socio-economic settings. Chapter 1 and 2 outlines foundations, including the example of the fisherman's dilemma put forth here; Chapter 5 discuss policy options to avert tragedy.

Table 2: Prisoner's dilemma, fisherman's version

Keisha	Mark		
		8 hours	12 hours
	8 hours	3 – 3	1 – 4
	12 hours	4 – 1	2 – 2

Note: Payoffs are barrels of fish. The first number is Keisha's haul, the second Mark's. The tragedy of the commons manifests when both Keisha and Mark overfish the bay (12 hours of fishing), and the collective haul declines to four.

Source: Authors' adaptation of textbook material, i.e., Bowles/Halliday, 2022, chapter 1

The idea is simple and was already alluded to in the introduction. Keisha and Mark can choose to fish as long as daylight lasts (12 hours) or restrict their hours (eight hours). If they fish long hours, they deplete the fish stocks and their collective haul is limited at four (tons, or whatever). If only one restricts their hours, the collective haul rises to five—but the distribution of this haul is strongly biased in favor of the one who stays out on the water all day.

Lastly, if they both restrict hours, their collective haul rises to the maximum of six, with equal distribution. Clearly, this is the socially optimal outcome: Mark and Keisha together have the most fish possible. Yet, individually, fishing longer is an enticing option with the potential 'super-payoff' of four barrels of cod.

What will Mark and Keisha do? Game theory considers what Mark's best response is to any of Keisha's actions, and vice versa. If Keisha fishes eight hours, Mark's payoff to twelve hours exceeds that to eight hours; and if Keisha fishes twelve hours, Mark's payoff to twelve hours exceeds that to eight hours, too.

The same applies to Keisha: Fishing all day is the *best response* for both players to any of the other player's actions. Fishing twelve hours is therefore a *dominant-strategy equilibrium*, and also the only Nash equilibrium, i.e., the *mutual best response*. Further, both restricting hours is Pareto efficient, since neither player can be made better off without making someone else worse off; in turn, fishing long hours is Pareto inefficient since both players could be made better off.

How might Mark and Keisha escape this trap, how might they end this tragedy? To do so requires *cooperation*. It requires the commitment of

both players to not ‘defect’ from the Pareto efficient equilibrium in search of super-hauls. This is difficult if Mark and Keisha have incomplete information on each other’s actions. *Monitoring* an agreement might be difficult, *enforcing* it even more. Further, the prisoner’s dilemma entails a conflict of interest, since the option to *defect*, i.e., fish long hours, offers the richest reward.

To emphasize the importance of this, consider the assurance game shown in Table 3, which has two Nash equilibria. Keisha and Mark are farmers who decide whether to *plant late* or *plant early*. Planting early risks that birds consume your seeds; planting late risks a smaller harvest overall. As the payoffs in Table 3 show, both players planting early is a Nash equilibrium, but so is both players planting late, as these actions respectively represent the best response. However, one action (both plant early) is superior to the other (both plant late). Crucially, once Keisha and Mark have found a way to cooperate and plant early, neither has a reason to switch to planting late, since their individual payoff exceeds that of defecting. Thus, conflict is muted in the assurance game relative to the prisoner’s dilemma, and cooperation is easier to sustain.

Table 3: Assurance game, farmer’s version

Keisha	Mark		
		Plant early	Plant late
	Plant early	4 – 4	0 – 3
	Plant late	3 – 0	2 – 2

Note: Payoffs are bushels of wheat. The first number is Keisha’s harvest, the second Mark’s.

Source: Authors’ adaptation of textbook material, i.e., Bowles/Halliday, 2022, chapter 1

This is relevant in our context since a repeated prisoner’s dilemma can under certain conditions turn into an assurance game. Key to this is that the game is repeated with high probability, and the introduction of the *Grim Trigger* strategy. Suppose Keisha and Mark play ten rounds of the fisherman’s dilemma. The Grim Trigger strategy means to fish only eight hours in the first round and continue to do so as long as the other does the same.

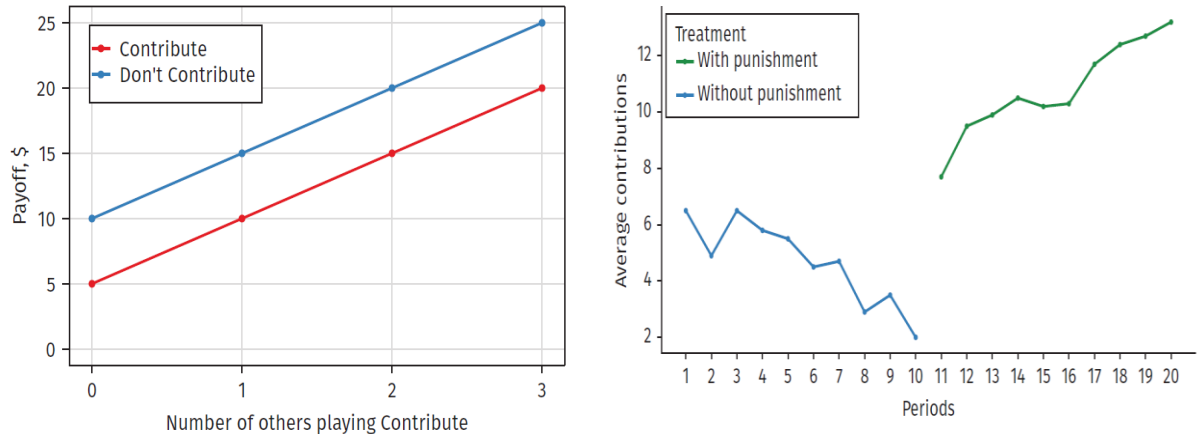
However, the trigger is grim, because once Keisha defects and fishes long hours, Mark does exactly that until the end of the tenth round. In

short, defection triggers punishment, which exacts costs on all. The expected payoffs in this game display the structure of an assurance game (see Bowles/Halliday 2022, p. 261), so that *all the players need to achieve socially (and ecologically) desirable outcomes is to all extend trust in the first round and remain trustworthy throughout*.

4.3. Public goods game

The public goods game is generally considered the n -person prisoner's dilemma. A textbook version is structured as follows (Bowles/Halliday, p. 81): There are four players. Each is given an endowment of \$10 and has to decide whether to contribute the entire amount of \$10 to the production of public goods or to contribute nothing. One's own payoff is calculated as $\text{Own payoff} = \text{Endowment} - \text{Contribution} + \text{Productivity} \times \text{Total contributions}$, where "productivity" refers to a parameter, say 0.5, that specifies what individual payoff arises from total contributions.

Figure 1: Public goods game



Note: Left panel: payoff for Player 4 as a function of the choices of the other three players. Right panel: evidence on a repeated public goods game with punishment as an option.

Source: Bowles/Halliday, 2022, chapter 2, based on Fehr/Gächter, 2000

The left panel of Figure 1 illustrates Player 4's payoff as a function of the other player's choices. If no one contributes, and Player 4 does neither, she retains the endowment of \$10. Had she contributed, she would have

lost half her endowment. At the other end of the spectrum, when three players contribute while she “defects”, she earns a payoff of $10 - 0 + 0.5 \times 30 = 25$; when she contributes, she only earns 20.

In other words, not contributing appears the only rational choice. At worst, one’s fallback option of \$10 materializes, at best, one free rides to riches. However, the socially desirable outcome is for all to cooperate: Four contributions lead to a total of payoffs of 80 and fall from there to 70, 60, 45 and, with all defecting, 40. Just like in the fisherman’s dilemma, defecting promises a “super haul,” as long as others stick to the socially desirable action. The lure of these super profits (or *economic rents*) renders not contributing as the predicted equilibrium of the game.

However, repeated games with the option to punish free riders substantially increase contributions. The right panel of Figure 1 illustrates experimental evidence on this. Crucially, punishing free riders is costly for the punisher. While increasing the likelihood of a return to cooperation, it reduces the payoff of the punisher. Importantly, Fehr/Gächter (2000) implement a version of the game where players are matched randomly such that the returns to punishment—i.e., increased contributions in the next round—*do not materialize for the punisher herself*. In this manner, punishment itself becomes a public good, and people punish and incur the costs of enforcing compliance with norms.

Murtin/Fleischer/Siegerink (2018) present evidence on a series of trust-related issues for six OECD countries. Evidence includes *self-reported trust* based on surveys, and what is labeled as *behavioral trust* based on laboratory experiments.¹⁷ Key results from this study can be summarized

17 The OECD “TrustLab” initiative conducted representative surveys and experimental games. Surveys include the Rosenberg question, which asks people about the extent of their generalized trust: “Generally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people?” An updated OECD version of this question asks: “On a scale from zero to ten, where zero is not at all and ten is completely, in general how much do you trust most people?” The latter question excludes the so-called “caution rider,” which can elicit people’s cautiousness rather than trust. Survey results are labeled as self-reported trust.

Experimental games, in contrast, are considered behavioral trust. Games conducted include a two-person trust game, a four-person public goods game, and a two-person dictator game. The trust game modifies the ultimatum game, in that (i) both players receive an endowment, and (ii) Keisha’s fraction of the endowment sent to Mark is multiplied. Mark then responds not with the decision to accept or decline, but in turn, sends back to Keisha a fraction of the total. As such, the trust game elicits measures of behavioral trust as well as trustworthiness. The public goods game is interpreted here to elicit attitudes towards cooperation and reciprocity.

The dictator game—which asks Keisha to decide, dictatorially, what fraction of an endowment to send to Mark, without the latter’s option to make any decision at all—is reported to elicit a measure of altruism. Further, the TrustLab initiative conducts an “Implicit Association Test” to uncover attitudes towards government.

as follows: Across the board, and in line with previously discussed literature, results confirm that a very significant share of participants extend trust and are trustworthy even in one-shot games; that is, in situations without control or enforcement.

Further, “[s]elf-reported measures of trust in others capture a belief about trustworthiness (as well as altruistic preferences), whereas experimental measures rather capture willingness to cooperate and one’s own trustworthiness” (Murtin/Fleischer/Siegerink, 2018, p. 1). Importantly, experimental trust in government is higher than self-reported trust, likely because self-reported trust in government is considered a norm-violation itself. On the other hand, self-reported trust in government is positively correlated within a country with experimental measures of trust in government.

In summary, game theory, experiments and survey results provide ample and deep evidence that generalized trust matters greatly in all manners of socio-economic interactions. It is measurable. The prevalence of trust allows for cooperation and mutually beneficial actions.

5. Trust and economic growth: Econometric evidence

The trust literature translates the structure of the foundational public goods game to the *investment game*, where players have to choose whether to cooperate in a world where contracts are necessarily incomplete, yet cooperation promises the Pareto-efficient payoffs (see Algan/Cahuc, 2014, Section 2.1, and Berg/Dickhaut/McCabe, 1995, for a seminal paper on this experimental design). The relevance of the investment game is clear in the context of our hypothesis that trust and trustworthiness have a causal effect on economic growth, which is principally driven by investment in capital goods and the innovation embedded therein.

Algan/Cahuc (2014) present a comprehensive survey of the literature on trust and growth, and we focus here on a summary of the main results. To begin, it should be noted their survey assesses trust by the Rosenberg question, asked across a very large number of countries in the World Values Survey; see also footnote 19. Their proxy for trust therefore corresponds to (i) a measure of generalized rather than limited trust, which, given the discussion of TrustLab evidence above, (ii) is a self-reported measure of trust that nevertheless correlates positively with experimental trust.

In the following, we simply refer to *trust*:

- **Trust correlates positively with various measures of economic performance:** with cross-country levels of income per capita (Fig. 2.5, p. 74), as well as income per capita across 69 European regions (Fig. 2.6, p. 76) and 49 U.S. states (Fig. 2.7, p. 77). Trust also positively correlates with financial development (Fig. 2.10, p. 90), as measured by the ratio of private credit to GDP, total factor productivity (Fig. 2.11a, p. 92) and expenditures on research and development (Fig. 2.11b, p. 92).
- **Trust correlates positively with decentralization of decision-making in firms** (Fig. 2.12, p. 94), which appears to be an important indication of the role of trust to facilitate effective modes of cooperation and management in production processes.
- **Trust, in contrast, correlates negatively with product market regulation** as measured by the number of steps required to open a business (Fig. 2.13, p. 95). While using this “red tape” measure as a proxy for product market regulation can be criticized, it highlights that questions about the relationship between trust and regulation persist.
- **Further, trust correlates positively with the quality of governance** (Fig. 2.15, p. 100), and trust correlates negatively with the degree of

income inequality (Fig. 2.16, p. 107) as measured by the Gini coefficient.

These correlations conform, broadly, to the underlying hypotheses. An exception and vexing question is presented with regard to regulation, and this will need to be revisited further below. However, the crux of the matter and the weight of the evidence is offered in regressions, summarized in Table 2.5 (Algan/Cahuc, 2014, p. 81), which builds on Knack/Keefer (1997) and Knack/Zak (1999).

In the regressions, the dependent variable is average GDP per capita growth between 1990 and 2009 (from the Penn World Tables, version 7). The right-hand side includes average trust between 1981 and 1990.

“We control for initial income and initial education. Trust is positively associated with economic growth. The correlation between trust and growth is statistically significant at the 10 percent level. A one standard deviation increase in trust, about 0.14, increases growth by 0.5 percentage points or 20 percent of its sample mean. Column 2 controls for the initial level of investment and the correlation becomes statistically significant at the 5 percent level. Column 3 includes an interaction term between trust and initial income per capita. This interaction term captures the fact that trust should have a stronger effect on growth in poor countries that lack credit markets and appropriate rule of law. Both trust and trust interacted with initial income are statistically significant. The interaction term is strongly negative, which provides support for the view that trust is more important when enforcement of formal institutions is weak.” (Algan/Cahuc, 2014, p. 79)

The authors further attempt to single out an (econometrically acceptable) causal effect from trust on growth. This could be important, since correlations and regressions are subject to endogeneity bias: High growth might cause high trust, rather than the other way around. To do so, the authors seek to proxy *inherited trust*, which would be given and exogenous at a particular point in time. Results based on these methods confirm, broadly, that trust fosters growth.

6. Concluding thoughts on the political economy of globalization

We can now try to walk the fine line of connecting threads across these sources and say something about regulation vis-à-vis globalization. Our overarching conclusion is that there is no simplistic way out of the puzzles presented throughout.

Above all, care and nuance are required in evaluating the relationships between trust and regulation, and their impacts on economic activity in general and trade in particular. However, on the basis of theoretical arguments and clear empirical evidence on certain aspects of these relationships, we surmise that broad regulatory alignment, and in particular mutual recognition, in international trade treaties is a potentially problematic idea.

In a nutshell, (1) generalized trust and enforcement mechanisms can complement each other over time and facilitate cooperation for the sake of economic activity and other socially desirable activities and ends. (2) Generalized trust is easier to maintain in organically and “homegrown” systems of enforcement that tend to be superior to externally imposed structures. Further, (3) such instruments of regulation and control must be (democratically) legitimated. Robust legitimacy appears as the “best bet” to minimize principal-agent problems between members of society and public officials, and in that manner guide policy in the public interest. In the next few paragraphs, we elaborate on these insights.¹⁸

To illustrate, consider again the logic of the prisoner’s dilemma. It has been applied also to globalization, in two fundamentally different ways. The first is the textbook, free-trade version of the argument, where trade liberalization enshrined in internationally binding agreements is the only way to stop self-dealing public officials from reneging on the pursuit of the common good.

¹⁸ The empirical literature on the role of globalization in the formation (or lack thereof) of generalized trust is thin. An important exception is Polillo (2012), who “finds empirical support for the propositions that globalized competition decreases generalized trust in the countries most exposed to it” (p. 45).

Table 4: Prisoner's dilemma, trade warfare version

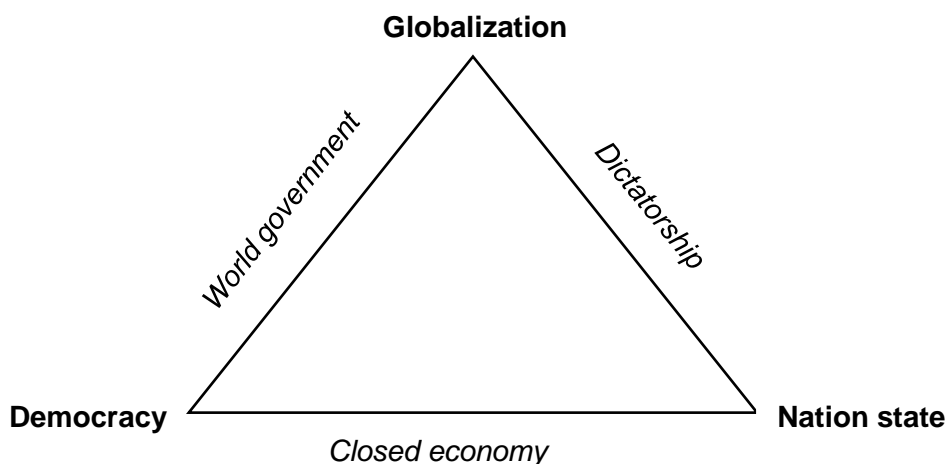
Keisha	Mark		
		Free trade	Protectionism
	Free trade	3 – 3	1 – 4
	Protectionism	4 – 1	2 – 2

Note: Payoffs are votes for Keisha (first number) and Mark (second number), who are public officials in charge of trade policy.

Source: Authors' adaptation of Krugman/Obstfeld/Melitz, 2022, chapter 1

Table 4 summarizes the situation; the example is adapted from the leading textbook on international trade (Krugman/Obstfeld/Melitz, 2022, Chapter 10). The authors emphasize that “free trade” would in theory—based on excessively strong assumptions—be the best response to gain economically even if the other country would maintain protection. However, game payoffs are not about economic performance, but in terms of *votes* or other benefits for policy officials. Here, Keisha and Mark face clear penalties for liberalization. In other words, free trade is in the public interest, but public officials are following public choice theory, and pursue only their own. Trade agreement to the rescue.

Figure 2: Rodrik's globalization paradox



Source: Authors' figure, based on Rodrik 2011

Against this, we set the Polanyian vision that markets need to be embedded within society to function. Karl Polanyi's *Great Transformation* (Polanyi, 1944/2021) in fact presents strong arguments in favor of democratic and sufficiently *local* control. In our terminology, Polanyi convincingly makes the case that supervision of markets by democratically legitimated institutions is a precondition to avoid dysfunction and unrest. Dani Rodrik condensed the deep insights of Polanyi into "the globalization paradox."¹⁹

Figure 2 reproduces the basic idea. Of the three corners of the triangle—globalization, national politics, or democracy—only two are simultaneously achievable. In italics across the sides of the triangle are keywords on how the respective combination is attained. For example, truly embedding, controlling and managing hyper-globalization with democratic institutions requires a "world government."²⁰ In its absence (which can be safely assumed), governments need to carefully manage the extent of globalization to not lose legitimacy.

19 The concept borrows from the "international trilemma," which poses the trade-offs a country's officials face between (i) an independent monetary policy, (ii) an open financial account, and (iii) exchange rate stability. See Krugman/Obstfeld/Melitz (2022, Part 4) for an overview, and Rodrik (2011) for the book-length treatment of the globalization paradox.

20 In a more recent lecture, Rodrik (2019, p. 2) elaborates on this "deeply Polanyi-esque argument. It's fundamentally about how markets and in particular global markets are embedded. In the national setting, we have national markets that require a wide range of institutions—regulatory, stabilizing and legitimizing institutions—to make the outcomes of markets compatible with legitimacy and with public expectations. And in turn, in well-functioning societies the design that those institutions take, whether its regulatory, whether its labor market institutions, whether it's the ordering of finance, whether it's social insurance mechanisms and the welfare state, the parameters of those institutions, the designs, are the product of democratic deliberation and accountability. That's the full embeddedness of market in societies that function well. But what exactly is the global equivalent of that?"

Table 5: Prisoner's dilemma, race-to-the-bottom version

Keisha	Mark		
		High road	Low road
	High road	3 – 3	1 – 4
	Low road	4 – 1	2 – 2

Note: Payoffs are in terms of national income for two countries that seek to integrate economically and increase trade. High (low) road is a regulatory strategy that increases (decreases) costly barriers to export but also decreases (increases) social costs from negative externalities.

Source: Authors' adaptation of textbook material, i.e., Bowles/Halliday, 2022, chapter 1

This brings us to the alternative application of the logic of the prisoner's dilemma to the topic of globalization: the race-to-the-bottom. Table 5 summarizes the idea. Keisha and Mark both must choose one of two strategies. The high road means maintaining policies in the public interest to guard against market failures, even if these imply a cost to trade. The low road means to dismantle such policies, to achieve the overriding objective of price competitiveness.

The payoff structure presents a conflict of interest: The globally Pareto efficient outcome of both "countries" choosing the high road is threatened by the extraordinary rents gained with defection. How do Mark and Keisha cooperate to sustain to travel along the socially desirable high roads in both countries? Existing multilateral institutions are ill-equipped to do so.

The race-to-the-bottom is most commonly put forth in the context of labor market institutions, or rather the pressure to dismantle these. It appears fitting in the context of regulatory systems, too. Indeed, regulatory alignment through mutual recognition very specifically increases the pressure to adopt cost-minimizing production methods, even if these are in contradiction to homegrown consumer preferences and institutional culture.

This alternative perspective follows more nuanced thinking. Regulation is a complement to trust and enables Pareto-improvements in otherwise failing markets. Regulatory alignment enshrined in an international agreement undermines these complementarities and undermines the capacity of officials to act in the public interest.

Further, if bureaucrats are rent-seeking and the making of rules and regulations subject to regulatory capture, *domestic control and accountability limits downside risks*. Put differently, weakly legitimated international agreements to constrain domestic regulatory capacity (such as the proposed regulatory cooperation council, under TTIP negotiations) are far more likely to exert either regulatory chill or rent seeking by large corporations and bureaucrats.

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