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Berna Fazlıoğlu Steckelberg,

Friedhelm Gross, Stefan Kolev

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A New Framework for Evaluating Legislation in Germany**

Berna Fazlıoğlu Steckelberg[†], Friedhelm Gross[‡], Stefan Kolev[§]

Abstract: This paper develops a three-layer "fountain model" — on the levels of sector, economic order, and society — to assess under which conditions legislation strengthens or weakens resilience. Resilience in this framework focuses above all on the capability of continuous adaptation by individuals, companies, institutions, and society as a whole. This adaptive capability can be fostered or hindered by legislative interventions. This is the core contribution of the paper. Our main unit of analysis is the sector level, whereas the economic order and society levels complement the process of cultivating resilience. The first impulse in our model comes from the society level — a change in preferences or cultural change broadly conceived. This in turn creates a reaction at the economic order level, where the formal institutional rules are shaped. These rules then affect the playing ground at the sector level. Economic freedom and competition are the necessary conditions of resilience, sustaining continuous adaptation through a discovery procedure for new knowledge. Eventually the fountain model is applied to three German legislations — Bundeselterngeld- und Elternzeitgesetz (2006), Gebäudetyp E (2025), and Gebäudeenergiegesetz (2023). This assessment sheds light on whether the legislative interventions foster or hinder the resilience of the German economy.

Key Words: adaptive resilience, cultural change, Ordnungspolitik, regulatory assessment

JEL Codes: B41, H12, K20, O31, P11

[†] Berna Fazlıoğlu Steckelberg, Ludwig-Erhard-Forum für Wirtschaft und Gesellschaft (Oranienburger Str. 4-5, 10178 Berlin). E-Mail: fazlioglu-steckelberg@ludwig-erhard-stiftung.de

[‡] Friedhelm Gross, Ludwig-Erhard-Forum für Wirtschaft und Gesellschaft (Oranienburger Str. 4-5, 10178 Berlin). E-Mail: gross@ludwig-erhard-stiftung.de

[§] Stefan Kolev, Ludwig-Erhard-Forum für Wirtschaft und Gesellschaft (Oranienburger Str. 4-5, 10178 Berlin). E-Mail: kolev@ludwig-erhard-stiftung.de

1. Introduction

Resilience is rarely a central topic in economic or political debates during periods of stability. In such times, risks are calculated, managed, and largely assumed to be under control. During periods of fragility, however, attention shifts toward questions of reaction and recovery. In the current context of heightened uncertainty, supply chain disruptions, geopolitical tensions, and climate-related shocks, resilience has moved to the forefront of public and academic discourse. The central challenge is how economic and societal orders can be flexible enough to adapt under uncertainty without long-term deterioration. This paper develops a framework for what we would like to call 'adaptive resilience' and applies it to assess legal and regulatory interventions, hereby identifying the conditions under which resilience can be cultivated. Unlike absorptive or transformative resilience, adaptive resilience does not rely on structural buffers or fundamental systemic change.

Adaptation and flexibility are key elements of resilience (Folke et al. 2010). It is especially important to remain flexible under conditions of fundamental uncertainty, in the Knightian sense, where the distribution of future shocks is itself unknown (Knight 1921). In such conditions, resilience is more than the capacity to recover; it reflects an adaptive orientation toward learning, flexibility, and the ability to identify a new opportunity within the disruptions (Folke et al. 2010; Martin 2012; Brunnermeier 2021, 2026). Resilience is not merely about surviving disruption, it is about getting back on track – albeit not to the status quo ante – and learning from experience. Simply surviving a crisis may provide short-term relief without addressing the weaknesses that made the order vulnerable in the first place. Resilience goes further: it requires the ability to reorganize and pivot resources to where they are needed thus finding new solutions in the context.

Resilience, when effectively cultivated, contributes to structural and sustainable growth in economic activity, ensuring that progress can be maintained (Caldera Sánchez et al. 2015). However, the concept often suffers from a lack of definitional clarity. Without a precise and shared definition, resilience risks becoming a rhetorical device rather than an analytically grounded and actionable objective (Martin 2012). Part of the problem is that resilience is often treated as an extension of risk management, where shocks are assumed to follow known patterns. What is needed instead is a shift toward resilience as a distinct concept — one that takes seriously the possibility that order faces disruptions they cannot anticipate or prepare for in advance (Brunnermeier 2024).

This framework proposes that sector resilience, understood as continuous adaptive capacity of a sector in an economy, emerges from layered conditions that must simultaneously make the sector flexible enough to adapt and predictable enough to trust. Adaptive capacity is the ability of a system to draw on accumulated knowledge and experience to reconfigure itself when conditions change. The sector is deliberately chosen as the unit of analysis. At the macroeconomic level, causes and effects run in too many directions at once, making it difficult to assess what drives resilience. At the level

of individual firms, the wider relationships that shape adaptability in the interaction among firms are not visible. The sector is located between these two levels: the connections between firms and their supply chains are clear enough to assess, yet rich enough to reveal whether the conditions for genuine resilience are present (Malerba, 2002). In this framework, such conditions require economic freedom and competition as jointly necessary elements, which together sustain a continuous process of discovery and adaptation (Hayek 1946, 1968). Crucially, this process depends not only on the creation of new ventures but also on the productive reabsorption of resources — knowledge, labor, and capital — released through the process of creative destruction when existing activities fail or transform internally (Schumpeter 1942). A resilient sector is one in which failure does not destroy resources but pivots them into new uses.

Using a framework like the one developed in this paper, the analysis assesses whether specific legal and regulatory interventions expand or constrain sector-level resilience. This applied direction of the paper reflects the recognition that resilience depends substantially on policy choices, on the rules governing trade, market access, investment, and competition — rather than on macroeconomic performance alone (Duval et al. 2007).

Structural policies (Ordnungspolitik) shape economic resilience by influencing how economies, and here specifically the institutional rule of the game, respond to shocks and reallocate resources. Policy design is not straightforward, because macroeconomic and structural policies do not operate in isolation — they interact in ways that can produce unintended consequences. A policy that provides short-term resilience may at the same time undermine adaptive capacity or create new vulnerabilities in the long run (Caldera Sánchez et al. 2015; Hafele et al. 2023). Typically, policymakers primarily prioritize short-term responses, directing efforts toward mitigating the immediate negative impacts of crises rather than toward strengthening longer-term resilience (Kolev, 2026). For instance, rigid labor market regulations may mitigate the immediate effects of a crisis but can slow recovery by restricting labor mobility. Identifying such trade-offs requires a framework that can assess whether specific interventions strengthen or weaken the underlying conditions for adaptive capacity.

Against this backdrop, the paper applies the framework to the case of Germany. Recent contributions have called for a comprehensive resilience-oriented reform of Germany's economic and societal institutions. The current order was built for a world of predictable shocks and incremental change (Brunnermeier & Kolev 2026). Such an agenda requires as a complement a precise analytical foundation for assessing whether specific legal and regulatory interventions actually strengthen adaptive capacity. This paper provides exactly such a foundation. It first develops the theoretical foundation fountain model of sector-level resilience, and subsequently uses it to assess changes in Germany's legal and regulatory framework.

2. Resilience Definitions

When searching for the term's origin, the etymology corresponds to the common understanding in its cotemporary usage: resilience derives from the Latin verb *resilire*, meaning "to bounce back." At first glance, this suggests a straightforward definition. Yet while this general understanding is widely accepted across scientific disciplines, what drives the "bounce back" and what exactly returns to its prior state vary depending on the field of study and the expectations tied to the concept. The variation in how resilience is understood across disciplines reveals that the concept, despite its intuitive appeal, needs a solid analytical foundation. Therefore, in this section we begin by examining the existing definitions of resilience before constructing our own analytical framework in the subsequent section.

One foundational use of the concept of resilience stems from material sciences. Resilient material bends under stress and returns to its original form rather than breaking. Gordon (1978) formalizes this physical property, describing resilience as the ability of a material to absorb energy and deform elastically under load without suffering permanent damage. Expanding this to a systemic level, Bodin and Wiman (2004) emphasizes the dynamic dimension of this concept, defining resilience as the speed with which a system returns to equilibrium after displacement, regardless of how many oscillations may occur during the adjustment process.

Engineering resilience refers also to a system's speed of return to a single equilibrium after a disturbance. The concept is strongly associated with Pimm (1984), who defined resilience as the rate at which a system returns to equilibrium after a perturbation. In this understanding, the system's structure does not fundamentally change. For example, consider a production system optimized for cost efficiency. A temporary supply disruption occurs and production drops. Once the disruption is resolved, the firm restores operations and returns to its previous level of cost efficiency. In the context of engineering resilience, the "bouncing back" means returning to the single pre-existing equilibrium, with the main focus being how fast this return occurs. Such systems are optimized for stable functioning, with an emphasis on minimizing fluctuations.

In ecological resilience, the relevant measure according to Holling (1996) is the extent of disturbance a system can withstand before undergoing structural change in the variables and processes that regulate its behavior. Unlike engineering models, his approach does not assume a single equilibrium but instead accepts the existence of multiple equilibria. The focus is therefore not on the speed of return, but on how much disturbance a system can absorb while maintaining its core functions in returning to one of the multiple equilibria.

Social-ecological resilience, developed by Carpenter et al. (2001), integrates human systems explicitly with ecological systems. This builds directly on Holling's idea of

resilience but extends it to include social structures such as governance, markets, and norms. In this framework, resilience refers to the amount of disturbance a system can absorb without losing its core functions. In Carpenter's view, resilience is not only about resistance; it also involves learning, innovation, and adjustment. A resilient system does not require constant top-down stabilization but has the capacity to reorganize itself (Carpenter et al. 2001).

Social resilience as developed by Adger (2000, 2003) focuses on the capacity of social groups and communities to cope with external stresses and disturbances, particularly those arising from environmental change, economic shocks, political transformation, and climate-related risks. Unlike social-ecological resilience, which examines the interaction between human and natural systems, Adger's concept centers on the social resources — networks, trust, and collective action — that determine whether a community can withstand and recover from disruption. Communities with strong social networks are better able to cope with crises (Adger 2000).

Development resilience, defined by Pasteur (2011), refers to the capacity of households and communities to withstand shocks and stresses while adapting to long-term environmental, economic, and climatic changes without compromising food security or overall wellbeing. Central elements include secure livelihoods, long-term investment capacity, and governance structures that support adaptive responses. In this view, resilience requires not only the ability to absorb immediate disruptions but also the capacity to make deliberate adjustments to livelihood strategies as conditions change over time.

Psychological resilience at the individual level, as conceptualized by Tugade et al. (2004), is the ability to adapt to stress and adversity. Rather than viewing resilience as a fixed trait, they describe it as a dynamic process that can be developed over time. In this framework, positive emotions play a central role. Tugade et al. argue that resilient individuals are able to experience and cultivate positive emotions even during stressful situations, which supports their capacity to recover effectively from adverse events. According to their findings, the presence of positive emotions helps regulate stress responses and facilitates successful adaptation when facing the challenges.

Community resilience, as conceptualized by Norris et al. (2008), is not understood as a fixed state or stable outcome, but as a dynamic process that enables adaptation. In their view, resilience emerges from a set of interconnected adaptive capacities rather than from isolated resources alone. The effectiveness of these capacities depends both on the availability of resources and on their qualitative characteristics, such as robustness, redundancy, and rapid mobilization. In this sense, resilience reflects not merely the quantity of economic assets, but also their diversity and flexibility. Norris et al. identify four central domains of the adaptive capacity that underpin community resilience: economic development, social capital, information and communication systems, as well

as community competence. Together, these capacities shape a community’s ability to prepare for, respond to, and adapt to disruptive events.

Socioeconomic resilience, as developed in this paper, builds most closely on the institutional resilience concept articulated by Aligica and Tarko (2014, 2023), who, drawing on the work of Ostrom (2005, 2008), define it as the ability of a social system to react and adapt to abrupt challenges — whether internal or external — and to avoid gradually drifting along destructive paths. Crucially, they argue that resilience is more than mere absorptive capacity or speed of recovery: it depends on innovation and creative adaptation made possible by flexible and polycentric institutional processes. Of the definitions surveyed, Aligica and Tarko's institutions-based resilience concept provides the closest foundation for the framework developed here due to the decentralized character of the dynamic processes in polycentric contexts.

Type of Resilience	Key Authors	Unit of Analysis	Core Definition	Key Mechanism
Material	Gordon (1978); Bodin & Wiman (2004)	Materials	Elastic return after deformation	Elasticity, strain energy
Engineering	Pimm (1984)	System	Speed of return after disturbance	Stability, control
Ecological	Holling (1973,1996)	Ecosystem	Capacity to absorb disturbance before regime shift	Buffer capacity
Social-Ecological	Carpenter et al. (2001)	Human + ecological systems	Absorb disturbance + adapt	Learning, self-organization
Social	Adger (2000, 2003)	Community	Capacity of social groups to cope with external stress through networks	Social capital, institutions
Development	Pasteur (2011)	Household	Stay above poverty threshold	Assets, diversification
Psychological	Tugade et al. (2004)	Individual	Adaptation to stress	Positive emotions
Community	Norris et al. (2008)	Community	Dynamic process of adaptation through interconnected adaptive capacities	Economic development, social capital, information, community competence
Socioeconomic	Aligica & Tarko (2014, 2023)	Social system / Institutional arrangements in polycentric contexts	Ability to react, adapt, and avoid destructive drift under uncertainty	Reaction ability, adaptability, avoiding slippery slopes

Table 1: Based on Quinlan et al. (2016) and Norris et al. (2008) (Source: own illustration).

The other definitions of resilience illustrate how the concept can vary while still sharing common ground. Our definition shares similarities with most of them, with the exception of engineering and materials science resilience. The common thread revolves around the

adaptive dimension, as we avoid any rigidity that could come from expecting the status quo to persist.

3. A Fountain of Conditions

Our framework is structured as a three-layer “fountain model”. At the apex sits the sector, where firms, buyers and suppliers interact directly. Below it, the economic order level contains the formal institutional rules and macroeconomic policy framework; the rules govern competition, market access, property rights, as well as fiscal and monetary stability. The society layer, at the base, shapes the cultural foundations of resilience: informal rules especially around the notions of social cohesion, trust, and tolerance toward experimentation and failure. Moving from bottom to top represents a zooming-in effect, with each layer constituting a more specific institutional environment than the one below it. The dynamics within each layer tend to speed up as one moves from the societal level to the sector level. Such a structural configuration mirrors the search for a balance of dynamism and stability which is at the heart of numerous politico-economic research programs, most recently the one focused on resilience (Kolev 2022, 2024). This relatively low rate of change at the societal and economic order levels creates one mechanism through which lower layers can provide predictability to the layers above. Each layer below the sector level conditions the resilience capacity of the layer above it, contributing both predictability and adaptability that the upper layer requires to function. Only when all layers are aligned in contributing to the overall resilience of economy and society, can sector resilience be fully realized. When any layer fails to provide this conditioning, the layers above cannot achieve their resilience potential regardless of how well their own mechanisms function.

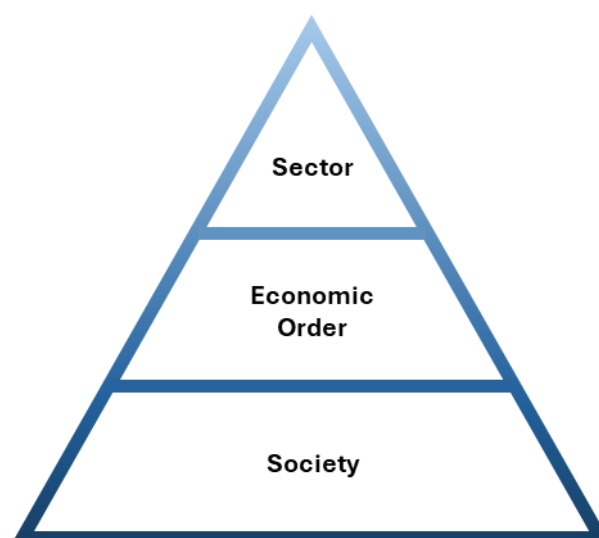


Figure 1: Fountain model (Source: own illustration).

Within this framework, resilience is not primarily grounded in robustness, anticipatory capacity, or coordination speed back to the status quo ante. As briefly outlined above, robustness assumes the system can absorb shocks, which treats the structure of the sector as something to be preserved rather than continuously renewed (Brunnermeier 2021, 2026). Anticipatory capacity relies on the assumption that future shocks can be identified with sufficient accuracy to prepare for them specifically (Wildavsky 1988; Folke 2006). Coordination speed back to the status quo, while valuable under known disruptions, similarly depends on a prior understanding of what is being coordinated toward (Drabek & McEntire 2002).

In contrast to these approaches, this framework adopts adaptation — not absorption — as the core mechanism of resilience. This framework seeks to move beyond such prediction-dependent conceptions and focus on a form of resilience that aims to achieve long-term adaptive capacity towards new equilibria over short-term stability regarding the old one. Changes are treated as a continuous feature of the system but not in the sense that they are predicted and where not only the probabilities but also the scenario structure of future shocks is itself unknown (Knight 1921).

The necessary conditions for this type of adaptive resilience, with its focus on the new, the unknown, and the innovative, are *economic freedom* and *competition*. The first necessary condition, *economic freedom*, generates an environment in which prices reflect relative scarcities accurately and carry the information content of genuine discoveries, signaling how conditions are evolving and enabling an adaptive resource allocation (Hayek, 1945, 1946). Economic freedom also implies the ability to act on discoveries, providing incentives for discovery through property rights and freedom of contract, so that the returns from such discoveries can be appropriated (Krizner, 1978). In this Hayekian perspective, economic freedom is a necessary prior condition for competition, as market informations enable competition to function effectively. Without economic freedom, resilience combined with competition would depend on centrally determined anticipations, and competition would not provide sufficient incentives for discovery and adaptation, reducing it to a formal procedure rather than a genuine knowledge-generating process (Hayek, 1968). The structure of these conditions brings to the fore the old debate about the preferability of an “ordered competition” within an authoritarian political system and “competitive order” in a free economy and society (Kolev 2024).

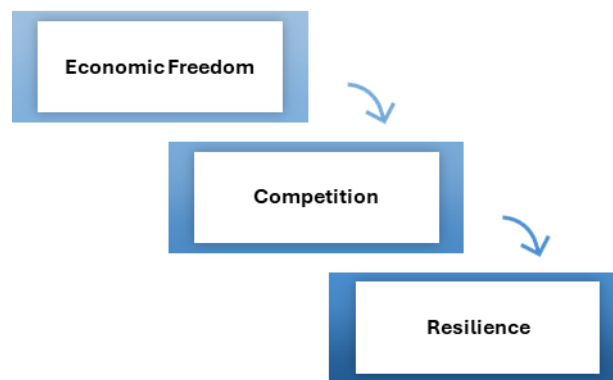


Figure 2: Necessary conditions of resilience (Source: own illustration).

Competition, as the second condition of this framework, is understood as a discovery procedure (Hayek 1946, 1968). Actors in a competitive market seek to increase their income, which leads them to innovate in order to obtain additional profit margins (Porter 2008). According to Hayek, this market process can generate discoveries that were not previously foreseeable. These discoveries propagate through price movements and competitive imitation, creating continuous restructuring toward more manifold configurations. In the long run, this restructuring drives the maximization of total surplus — the aggregate of consumer and producer surplus across the economy — and constitutes what adaptability is about (Schumpeter 1942). Connections between each layer of the fountain are thus enabled by economic freedom and competition.

Society, as the largest system within the fountain, represents culture as a system of informal rules vis-à-vis the market system, expressed through consistent market participation and trust in market mechanisms. When this type of culture is widespread in a society (McCloskey 2006), the functioning of higher-level systems becomes more effective, even in the presence of changes, as predictable behavior provides a signal that changes in the market do not lead to chaos or fear (Luhmann 1979). Changes do not arise solely in the form of external conditions, but also through the emergence of new entrants and new ideas from within the system (Gross & Kolev 2024). When trust extends to novelties and is met with societal tolerance, innovators gain broader acceptance, creating conditions for more continuous adaptation (Mokyr 1990). This stable base provides a solid foundation for the upper levels in the fountain.

Society encompasses everyone within a country and all the systems in which they participate — legal, scientific, governmental, and civic. When something changes at this level — a new need, a problem, or another change in culture — the change can generate a pulse that activates these systems (Zweynert 2009). The formal-institutional output of that activation leads to change at the economic order level, with consequences that reach one or more sectors. The central focus of this framework is to trace how changes

originating in society produce a pulse toward the economic order and assess the resulting consequences for sector-level resilience.

The **economic order** encompasses the formal rules within which economic activity takes place: property rights, liability, freedom of contract, power balance, macroeconomic stability, open markets, and trade openness. This includes the rules governing the labor and capital markets, how workers are hired, retained, and reallocated, and how capital is accessed, allocated, and priced. These rules condition sector resilience because they determine the flexibility with which firms, suppliers, and buyers can use and pivot their resources.

Predictability at this level rests on two complementary foundations. The first is institutional: property rights confer security upon the owner, enabling income to be generated and retained while excluding third-party interference unless the owner consents (Besley & Ghatak 2010). Liability rules serve a dual function: they internalize costs, ensuring that externalities are better reflected in price signals, while simultaneously ensuring that personal exposure from failed innovation does not result in exclusion from economic participation (Hayek 1960). Freedom of contract shifts power from central authority to actors themselves, who set terms, allocate risks, and define obligations (Eucken 1952). The state does not dictate content (“moves of the game”) but enforces what is agreed upon (“rules of the game”), making expectations clear and outcomes predictable. Power balance ensures no actor holds privileges beyond what market conditions warrant (Eucken 1952), so that every supplier is disciplined by price signals (Hayek 1945) and the threat of entry (Porter 1980) rather than by politically granted advantages (North et al. 2009). The second foundation is macroeconomic: consistent monetary and fiscal policies shape the environment so that firms can plan, price, and invest without the noise of inflation or fiscal crises which can easily distort the signals that economic freedom and competition depend upon to function as a discovery procedure (Fischer 1993). Property rights mean little under hyperinflation, and enforceable contracts lose their coordinating power when fiscal instability renders future obligations uncertain. Institutional rules and macroeconomic stability are therefore analytically separable, but nevertheless interdependent conditions of predictability.

Adaptability at this level similarly draws on two complementary sources. Open markets convey a system without artificial barriers to entry or exit, so that prices remain fair and carry correct information about scarcities (Röpke 1937; Erhard 1957). Trade openness extends this logic beyond domestic borders, providing access to new technologies, markets, and knowledge from outside the domestic economy (Grossman & Helpman 1991; Coe & Helpman 1995). Together, these conditions create continuous competitive pressure that generates new information (Hayek 1968), feeding innovation and adaptability at the sector level above (Nelson & Winter 1982).

Compared to the society and sector levels, the economic order layer operates at an intermediate pace, changing faster than societal culture and trust but more slowly than sector-level dynamics. Formal rules tend to shift more rapidly than informal rules of a culture (North 1990), yet macroeconomic frameworks and institutional structures adjust more slowly than market outcomes, positioning this level as the stable but adjustable platform upon which sector level depends.

The **sector level**, the top of the fountain, is our main unit of analysis, while the other layers provide the necessary conditions for its functioning. Our framework analyzes three types of actor within a sector: firms, which are the direct producers; suppliers, which are firms in adjacent sectors that provide inputs; and buyers who purchase the sector's output – firms or households. All three require the same conditions for resilience, because if any actor in the chain is locked in, the sector as a whole cannot reconfigure and pivot.

This framework follows Brunnermeier (2021, 2026) in identifying four sources of resilience that apply to each actor: adaptability, decomplexification, substitutability, and exposure to risk. Adaptability is the core quality. Changing conditions due to a shock do not generate a deep-rooted crisis as long as the actors within the sector adapt to them (Martin, 2012). For firms, this means reorganizing production; for suppliers, adjusting what they deliver and to whom; for buyers, shifting consumption or procurement patterns in response to changed conditions. Bureaucracy can enable those processes, but also undermine adaptation across all three (North 1990). Decomplexification — the establishment of clear rules without long waiting times — reduces the frictions that slow down adaptive responses during periods of shock (Epstein 1997). For all players involved and especially buyers, decomplexification means lower transaction costs when switching between providers or products.

Substitutability at the sector level operates along each link in the chain. For firms, it represents labor substitutability, where workers have the skill set to shift across tasks or jobs, and input substitutability, where production can change inputs without resulting in a halt. For suppliers, it means the ability to redirect capacity toward different buyers or sectors. For buyers, it means the ability to switch between products, providers, or approaches when existing options fail or deteriorate. These capacities presuppose a sufficient variety of actors, technologies, and labor force to ensure that alternatives exist when individual components fail, and that rivalry is not confined to identical products but extends across different products and approaches that can serve the same needs (Teece et al. 1997; Boschma 2014; Porter 2008).

Sectors exposed to recurring shocks undergo structural adjustments and develop an institutional memory — routines, coordination patterns, and expectations — that strengthens their adaptive capacity against future disruptions (Wildavsky 1988; Brunnermeier 2021, 2026).

Firms, suppliers, and buyers as the immediate actors at the sector level are heterogeneous and their resilience management capacities differ, so that they do not respond uniformly to a shock or crisis. Under resilience-enhancing institutional conditions, inefficient or non-adaptive "zombie" firms — surviving only through institutional support rather than productive efficiency (Adalet McGowan et al. 2017) — are more likely to disappear. This allows their resources — labor and knowledge — to be reallocated to more resilient and productive firms (Adalet McGowan et al. 2017). This selection mechanism strengthens sectoral resilience over time. However, this selection process does not apply to households as our framework depends on limited liabilities so that a failed investment or firm collapse does not cascade into personal ruin, thus protecting households by design.

A failed firm's resources can be reallocated within the resilient sector, where absorption is faster as resources only change hands without requiring significant adaptation. However, resources can also move to adjacent sectors or reallocate into the broader economy, processes that typically occur more slowly as some frictions at the sector's borders can slow down the pivoting.

These conditioning layers collectively create an environment where new, secure, and predictable interactions become possible. Sector resilience is therefore evaluated at this level, where reconfigurations in response to changed conditions serve as the observable proxy for sector-level adaptive capacity.

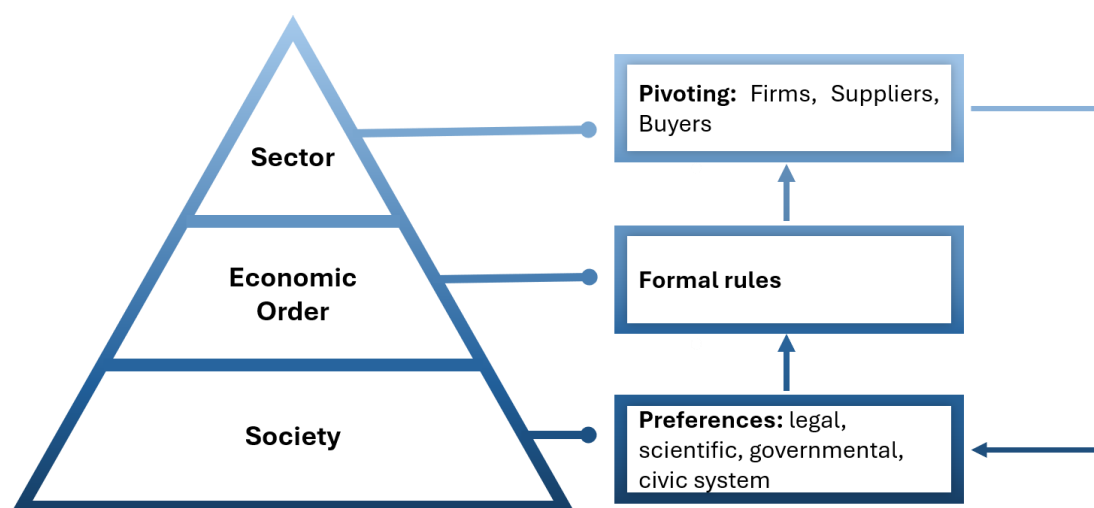


Figure 3: Dynamics within the fountain model (Source: own illustration).

4. Policy Examples

4.1. Bundeselterngeld- und Elternzeitgesetz (BEEG)

The **Bundeselterngeld- und Elternzeitgesetz (Federal Parental Allowance and Parental Leave Act)** was not a new concept in the period we discuss here. This rule was first introduced in the GDR in 1972 as the “baby year” (Babyjahr), granted exclusively to mothers (Geisler & Kreyenfeld 2019). In the Federal Republic, employed mothers could access up to six months of paid parental leave prior to 1986, when the parental leave (Erziehungsurlaub, later renamed Elternzeit) extended leave entitlements and opened eligibility to fathers (Kreyenfeld 2004). The 2006 BEEG reform introduced a new incentive structure, as the redesigned benefits incentivize fathers sufficiently to take parental leave. Previously, a flat rate of €300 per month made the rational economic decision tilt toward mothers taking leave, as at the time they tended to earn less than fathers. The reform replaced the flat rate with an income-related benefit amounting to 67 percent of previous net income, with a minimum of €300 and a maximum of €1,800. It also introduced partner months: when both parents take at least two months of parental leave each, the family receives an additional two months of parental benefit (Elterngeld).

At the **society level**, a shift in preferences toward greater gender equality had already begun to take hold, reflected in rising female labor force participation. This change in social preferences generated a pulse — a demand from civic life for formal institutions to support and consolidate what was already changing — to which the economic order responded. The BEEG reform is the legislative expression of that response.

At the **economic order level**, this law primarily targets households as its main addressees, with firms affected through the labor market incentives it creates and the expansion of the available labor force. Liability is assessed accordingly, ensuring that a change of the cost of parental leave does not cause personal financial ruin for the primary addressees. The reform aimed to remove barriers that disadvantage people in the labor market based on gender (Rocha 2020). So, it opened the labor market to broader participation by creating institutional incentives for women to return to or enter the workforce, moving toward gender equality as an institutionalized condition. While the 67 percent replacement rate represented a significant improvement over the flat benefit, the resulting income reduction of roughly one third remains a considerable obstacle, particularly in families where the father is the higher earner, and the €1,800 cap can translate into an even steeper income loss for higher-income households (Rocha 2020).

When the conditions set by the economic order take hold, **sector level** resilience can be more fully cultivated. The effect on fathers' participation in childcare was substantial — the participation rate rose from 3.5 percent in 2006 to approximately 39 percent by 2016 (Rocha 2020). A key driver of this shift was the introduction of two partner months —

benefits that are lost entirely if both parents do not participate, which encouraged fathers to take parental leave as well.

When firms expect that only women will take parental leave, they plan their teams around that expectation. This means fewer women in key roles, less diversity of thought, and ultimately a weaker ability of firms and sectors to adapt when conditions change (Azmat & Boring 2020). Firms that treat parental leave as something both parents should do keep more women in the workforce and end up with a broader, more capable talent pool (Bennett et al. 2023). Greater diversity of talents improves adaptability in changing times, thereby strengthening sector resilience. When both men and women have reason to invest in their skills, sectors as a whole become better at moving the right people to the right roles. When more people develop their abilities, combined with a wider mix of perspectives, more possibilities for finding new solutions arise when they are needed. A deeper talent pool also makes workers more interchangeable in a practical sense: if someone leaves or if a role shifts, others are able to step in. This kind of built-in flexibility strengthens the sector's ability to pivot without losing productive capacity. Broader labor force participation ensures that this capacity is sustained over time, as more people remain skilled, employable, and active (Elborgh-Woytek et al. 2013).

This reform reduces the participation barrier where parental incomes are relatively equal; however, the problem persists for families where the father earns significantly more, as the income reduction and the €1,800 cap remain a substantial obstacle, limiting the full realization of the talent pool gains described above.

A further counter-effect arises on the administrative side: the shift from a flat rate to an income-related benefit introduced documentation requirements that did not exist before, adding friction for families navigating the system during an already demanding period.

Over time, changes at the sector level can shift further cultural attitudes at the **society level**, especially toward shared parenting and tolerance for non-traditional career paths, as the benefits of greater gender equality become visible. The law contributes to this shift as well: at the societal level, with fathers now being part of parental leave, the norm changes in a way that creates stability in women's workforce participation, making future labor supply behavior more predictable (Earle et al. 2023). This cultural shift is not driven by the law itself, but by the gradual change in preferences and social expectations that follows from it (North 1990; Weizsäcker 1971, 2024). This type of preference change can extend the sector's resilience capacity beyond the immediate reform context by conditioning adaptive capacity in related or adjacent areas as well.

4.2. Gebäudetyp E

The purpose of **Gebäudetyp E (Construction Type E)** in the coalition agreement of April 9, 2025 is not to create a completely new category of buildings, but rather to provide

clearer guidelines for this existing type of housing while ensuring that buildings remain safe and functional. This initiative had already been deliberated under the previous traffic light coalition (Ampelkoalition), with joint framework principles published in 2024 (BMJ & BMWSB 2024). Because courts have treated DIN standards as de facto mandatory minimums in liability cases, construction companies follow them to avoid legal risk even though they are not formally required by law. This situation leads to higher construction costs (BMUB 2015). Consequently, housing becomes more expensive than it needs to be, and by far not everyone can afford housing built under these conditions. The urgency of this objective is underscored by Germany's deepening housing crisis, with an estimated 800,000 housing units projected to be missing by 2027 (Wulfers 2024). The law aims to change this imbalance by allowing parties to explicitly agree on a simplified building standard. Deviations from commonly accepted technical rules should no longer automatically be considered a construction defect, as long as safety and long-term usability are ensured. This is intended to reduce construction costs, enable more innovative building approaches, and increase the supply of affordable housing. The law also recognizes that simplified building standards must not come at the expense of customers. Constructors must therefore clearly inform customers if a simplified standard is used, including possible risks and expected cost savings.

At the **society level**, a decline in housing affordability polarizes society and deepens divisions between those who can access adequate housing and those who cannot (Ansell & Cansunar 2021). Housing affordability remains a pressing challenge in Germany (Deutsche Bundesbank 2024; JLL 2024). When a significant share of the population is excluded from this basic need, social cohesion deteriorates (OECD 2021) and trust in the political economic order erodes (Uslaner 2002). This deterioration generated a pulse — a broadly felt demand for political responses to housing scarcity — to which the economic order responded with the Gebäudetyp E reform.

At the **economic order level**, this law primarily targets firms as its main addressees, with households benefiting indirectly through lower construction costs and expanded housing supply. Liability is assessed accordingly, ensuring that costs are internalized without discouraging the entrepreneurial spirit of the primary addressees. This law focuses on freedom of contract, allowing participants to decide on the context and expected outcomes, since the parties involved understand their specific needs better than centrally determined standards can reflect (Stone 2024). This fosters resilience for all parties involved. On liability, the law fulfills this principle by distributing costs according to the requirements of the agreement rather than placing them solely on construction companies. Clearer rules could reduce the financial buffers that firms hold for contingencies, allowing these resources to be used for investment (Kolev & Randall 2024), making risk more calculable and manageable. The law is also expected to lower barriers for firms for which the construction market may not have been viable before due to the high cost of regulatory compliance (Parker & Kirkpatrick 2012).

At the **sector level**, resilience is strengthened by improving decomplexification and adaptability across firms, suppliers, and buyers. For firms, decomplexification reduces the costs spent on meeting unnecessary technical requirements and preparing legal documentation (Parker & Kirkpatrick 2012), freeing up labor hours that can be reallocated to production or used to transition faster to new projects (Coffey et al. 2020). A wider range of viable construction options lowers production costs, which is expected to expand demand and support revenue growth. As lower costs draw in households across a wider range of income levels, buyer substitutability improves — more households can switch between providers, locations, or housing types rather than being locked into whatever they can afford. Flexibility in production allows firms to experiment with new materials and methods, which over time generates new knowledge and thus innovation (Nelson & Winter 1982) and is expected to increase income as costs go down (Aghion & Howitt 1992). This experimentation generates upstream demand for a broader range of inputs, attracting a more diverse supplier base into the sector and reducing dependence on individual input sources — thus strengthening substitutability along the supply chain.

According to the findings of Hamburg's Senate Department for Urban Development and Housing (BSW 2025), regulatory simplification under the so-called Hamburg Standard — a simpler building construction approach — could reduce construction costs by up to 30 percent, from approximately €4,600 to €3,000 per square meter of living space before land costs. These projections, developed by over 200 experts across public and private institutions, are currently being tested through pilot projects, with sector-level effects yet to be empirically confirmed. These projections illustrate how regulatory simplification at the economic order level can condition sector-level cost structures.

There is also a counter-effect regarding the compliance burden. While technical specification requirements are condensed, companies may need to invest more time in contract communication and explanation toward clients and partners. It is currently unclear how this will affect overall efficiency.

The law may also increase performance differences between companies. Highly efficient firms are likely to benefit more because they can optimize design, procurement, and standardization of simpler solutions faster. At the same time, there may be spillover effects through information sharing across the sector. However, some companies may be forced out of the market faster if they cannot adapt to the increased flexibility due to rigid internal structures. Companies that survive the challenges arising from this change in conditions demonstrate their resilience.

As more affordable housing becomes available through sector-level adjustment, the social and political pressures generated by housing scarcity can ease. A society in which basic needs are broadly met is more likely to sustain the social cohesion needed to tolerate experimentation, accept failure, and support the processes of change on which adaptive resilience crucially depends (Brunnermeier 2021, 2026; Brunnermeier & Kolev

2026). These effects do not need to remain confined to the construction sector — increased acceptance of market mechanisms and greater tolerance toward institutional experimentation at the society level can improve the conditions for adaptive resilience across the economy as a whole.

4.3. Gebäudeenergiegesetz (GEG)

The 2023 **Gebäudeenergiegesetz (Building Energy Act)** reform initiates the decarbonization of building heat by requiring renewable energy in new heating installations, phased in through municipal heat planning and cushioned by subsidies and tenant protections. Every newly installed heating system must draw at least 65 percent of its energy from renewable sources (Deutscher Bundestag 2023a). This can be met through multiple technology options: heat pump, district heating connection, biomass boiler, solar thermal hybrid, gas system running on at least 65 percent certified renewable gas, H₂-ready gas boiler in designated hydrogen network areas, or any combination that reaches 65 percent through individual calculation (Deutscher Bundestag 2023a).

The 65 percent renewables rule only applies at the moment when a new heating system is installed, it never forces the replacement of a working heater. For new builds in new construction areas, the rule started applying from 1 January 2024 onward (Deutscher Bundestag 2023a). For existing buildings and infill new builds, the rules that apply depend on when the installation happens relative to the municipal heat planning deadline (Deutscher Bundestag 2023b). After the deadline, any new installation must meet the full 65 percent renewables requirement.

On tenant protection, landlords can pass on modernization costs through a rent increase of up to 10 percent of the costs, but no more than 50 cents per square meter per month (a maximum of €50/month for a 100m² apartment) (Deutscher Bundestag 2023b). This pass-through is only permitted if the landlord uses the Federal Funding for Efficient Buildings (Bundesförderung für effiziente Gebäude) subsidy, and subsidy funds themselves may not be passed on to tenants.

On subsidies, the law provides a 30 percent basic grant for all heating replacements, a 30 percent income bonus for owner-occupiers earning up to €40,000 per year, a 20 percent speed bonus for early replacement, and a 5 percent innovation bonus for heat pumps using natural refrigerants or ground/water/wastewater heat (Deutscher Bundestag 2023b). The maximum combined subsidy is 70 percent, and the maximum eligible cost is €30,000 for single-family houses (Deutscher Bundestag 2023b).

At the **society level**, the rise the sensitivity to the topic of climate change created pressure from the scientific community and parts of civil society demanding immediate action toward climate neutrality. This generated a pulse — a broadly felt demand for

institutional responses to carbon-intensive systems — to which the economic order responded with the GEG reform.

At the **economic order level**, this law primarily targets private households as its main addressees, with firms affected mainly as market participants in the heating sector. Liability is assessed accordingly, ensuring that the cost burden does not lead to personal financial ruin for the primary addressees. The law constrains homeowners' choice and thus touches upon freedom of contract and property rights. It prescribes which heating technologies may be installed once the 65 percent rule applies, drawing criticism as an encroachment on ownership (Haus & Grund Deutschland 2023). Both restrictions are deliberate, they channel individual decisions toward a coordinated transition, paired with subsidies rather than uncompensated compulsion. On liability, the law fulfills this principle through subsidies of up to 70 percent of investment costs and tenant protection provisions, ensuring transition costs do not cascade into personal financial ruin.

On macroeconomic stability, the subsidies' productivity depends on two conditions: regulatory stability, if the law is revised, as is now happening with **Gebäudemodernisierungsgesetz (GModG) (Building Modernization Act)**, investment incentives are undermined (Kolev & Randall 2024), and geographic alignment, ensuring disbursements are matched to regional infrastructure planning. On open markets, the law's direction toward renewables creates conditions for new market entry across heat pumps, geothermal, district heating, and energy consultation, with technology-neutral fulfilment options allowing competition across multiple pathways.

At the **sector level**, premature large-scale commitment to heat pumps risks creating a technological lock-in that constrains adaptability across all actors in the chain (Arthur 1989). With only around 7 percent of German houses less than 13 years old (Deutscher Bundestag 2023c), two prior questions remain unresolved: whether the electrical grid can handle the additional load, and how the high energy demand in poorly insulated older buildings can be addressed. Without resolving these questions first, capital, supply chains, and workforce skills consolidate around one solution before the infrastructure preconditions are in place and as firms lock in, suppliers follow, narrowing the input base and reducing the diversity of components, materials, and labor available to the sector. Buyers face the same constraint from the other direction: a sector consolidated around one technology offers fewer options and less price competition, removing the ability to pivot when that technology underperforms or becomes costly. The lock-in does not arise because heat pumps are the wrong technology in principle, but because the sequencing is inverted — large-scale deployment precedes the infrastructure debate rather than following from it. Were the incentive structure maintained steadily and sequenced correctly, growing demand could attract a wider supplier base, improving input substitutability and expanding buyer options, strengthening resilience across all three

actor types. The tension is not between heat pumps and resilience, but between deployment that outruns its preconditions and deployment that follows from them.

Unlike the other cases examined here, the return to the **society level** does not reinforce the conditions for adaptive resilience but narrows them. Because the transition was experienced as imposed rather than enabled, and because many households were never engaged with environmental technology markets in the first place, the GEG did not cause households to lose trust in market mechanisms — most were never engaged with them to begin with. What the law did was impose a costly transition on households for whom heating is a budget issue rather than an ideological question, generating a sense of exclusion rather than market distrust. These risks deepened a fracture in social cohesion, not because people turned against environmental goals but because they experienced implementation as coercive signals where their economic reality carries little weight in the political calculus. When a transition is experienced as being imposed top-down rather than enabled bottom-up, tolerance toward experimentation hardens rather than opens — a society-level condition that diminishes rather than strengthens the sector's capacity to innovate. A reform that generates exclusion and hardens resistance does not merely fail to positively condition the sector; it actively narrows the societal base which is indispensable for the cultivation of adaptive resilience.

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