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That's Not Fair! Navigating the Duality of Fairness in Insurance

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ABSTRACT

Insurance serves as a social good, providing financial protection against disasters whilst operating within a profit-driven market. This dual role highlights the complex intersection of social and commercial interests, raising a fairness puzzle often portrayed as a trade-off between solidarity and actuarial fairness. Insurance organisations adhere to actuarial fairness by setting insurance premiums proportional to each individual's risk. As extreme weather drives greater losses in high-risk areas, actuarial fairness often results in unaffordable premiums for many. To address this, societies may adopt principles of solidarity fairness to subsidise their premiums. However, this approach threats diminishing personal responsibility to contain risk, as individuals may rely on subsidised protection rather than taking proactive measures. This study draws on a longitudinal qualitative study of a government-legislated insurance organisation to develop a process framework that reconceptualises fairness in insurance as a duality of solidarity and actuarial fairness. It offers insights into designing insurance systems that are socially equitable and financially sustainable.

1 | Introduction

Fairness is central in the context of insurance (Brinkmann and Lentz 2006; Lehtonen and Liukko 2011). At its core, insurance financially protects a pool of insured people from random disasters (Lehtonen and Liukko 2011) while also being a profit-driven business that prices and trades individual risks (McFall 2024). This raises a fairness puzzle between 'solidarity fairness' (Lehtonen and Liukko 2011; O'Neill and O'Neill 2012) and 'actuarial fairness' (Heras et al. 2020; Lindholm et al. 2022; Meyers and Van Hoyweghen 2018).

Solidarity fairness involves pooling the premiums of the many to pay for the losses of the few who suffer damages after a disaster (Lehtonen and Liukko 2011; McFall 2024). Solidarity is about easing the unexpected burden of random misfortune occurring to individuals through no fault of their own. Conversely, actuarial fairness uses sophisticated risk modelling to price insurance premiums according to individual risk (Baker 2003; Frezal and Barry 2020). Based on risk-reflective pricing, higher-risk individuals more likely to claim insurance payouts are charged higher premiums (Heras et al. 2020; O'Neill and O'Neill 2012).

These fairness concepts have been widely explored in the literature (Baker 2000; Meyers and Van Hoyweghen 2018), often considered along a continuum where the two cannot co-exist. While traditionally viewed as inherently oppositional

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(Abraham 1985), some studies highlight ambiguity in public perceptions of fairness (Dixon and Anderson 2024; Kiviat 2021), indicating that solidarity and actuarial fairness may not be strictly opposing but instead reflect a more complex relationship.

Government-legislated insurance pools, typically established to enable the availability and affordability of insurance (Elliott 2021a; Jarzabkowski et al. 2023), are uniquely positioned to navigate this complex fairness puzzle. Yet, very few studies have examined those organisations that provide a salient context for studying the tensions between solidarity and actuarial fairness. Our study is based on a qualitative analysis of one such government-legislated insurance pool, which we call Fair Inc. We closely studied Fair Inc. over 4 years to understand how it navigated both solidarity and actuarial fairness in fulfilling its mission.

Faced with opposing approaches to fairness, Fair Inc. devised a dynamic process to navigate these tensions while staying true to its mission. We present these findings in a conceptual process model that explains how such organisations navigate insurance fairness as a duality rather than opposing ends of a continuum. Our conceptualisation of insurance-based fairness as a duality offers three contributions: first, to the broader issue of fairness in insurance; second, to the decoupling of risk-reflective modelling from a single fairness definition; and third, to provide a repertoire of actions for organisations navigating this fairness puzzle.

2 | Theoretical Framework

Insurance is often conceptualised along a continuum ranging from a 'moral' or social justice perspective to a 'technical' or 'actuarial' perspective (Baker 2000; Baker and Simon 2002; Thiery and Van Schoubroeck 2006). At each end of this continuum, insurance is grounded on one of two key principles: collective, solidarity arrangements and individual, actuarial arrangements (Charpentier et al. 2022; Lehtonen and Liukko 2011; O'Neill and O'Neill 2012) that shape what is considered fair and for whom.

Solidarity fairness. A solidarity approach assumes that those participating in insurance share the risk similarly. In this approach, disasters are considered unaccountable accidents that cannot be assigned to individual agency or social conditions (Ewald 2020). Hence, instead of differentiating between individuals and pricing their participation in the pool based on their likelihood of loss, the guiding principle emphasises equality in sharing the risk of loss (Abraham 1985; Dixon and Anderson 2024). A loss to any specific individual is considered a random misfortune shared collectively by all members, that could happen to any one of them (Lehtonen and Liukko 2011; O'Neill and O'Neill 2012). For example, in the Swiss cantonal insurance system, all homeowners pay a flat-rate premium that protects them from disasters, regardless of their risk exposure (Jarzabkowski et al. 2022). A solidarity view of fairness, rooted in 'social justice' (Lehtonen and Liukko 2011, 39), sees insured individuals implicitly accepting that their premiums may cover other's losses in exchange for equal protection for all (Dixon and Anderson 2024).

Actuarial fairness. The actuarial approach differentiates premiums based on individual policyholders' risk profiles (Abraham 1985; Bouk 2015; Horan 2021; Lehtonen and Liukko 2011). Actuarial capability in gathering data and modelling insured risk has increased dramatically over the past 3 decades (Barry 2020; Horan 2021), allowing for more precise and individualised calculations of who might suffer losses (Barry 2020; Bouk 2015; Meyers and Van Hoyweghen 2018). For example, tracking devices can monitor exercise and other routines, allowing greater precision in considering health risks and associated health insurance premiums (Bouk 2015; McFall 2019). Similarly, in home insurance, detailed data on construction codes, building materials, and loss likelihood enable risk assessment at the household level (Horan 2021).

Actuarial fairness is associated with risk-reflective pricing, with insurance premiums reflecting the specific risk assigned to each individual (Dixon and Anderson 2024; Heras et al. 2020; Meyers and Van Hoyweghen 2018; Palmer 2007). For example, a home beside a river attracts a higher flood insurance premium than a home on a hill. This is considered actuarially fair because each individual's premium is priced according to the flood risk they bring to the collective (Frezal and Barry 2020; O'Neill and O'Neill 2012). One espoused aim of risk-reflective pricing is to encourage policyholders to lower their risk (Abraham 1985), for example, by upgrading their homes to meet new building standards (Bouk 2015; Meyers and Van Hoyweghen 2018). Actuarial fairness thus holds individuals responsible for their losses, pricing their premiums accordingly (Ericson et al. 2000; Frezal and Barry 2020). However, risk-reflective pricing can also confound the principles of insurance. Those at high risk may find premiums too high and the means to reduce them too costly or beyond their control. Conversely, low-risk individuals may choose other means than insurance to cover their potential losses (Abraham 1985). Hence, even within a risk-reflective framework, a degree of solidarity typically persists, as insured individuals still share some collective exposure to risk (Lehtonen and Liukko 2011, 2015).

Contested concepts of fairness. Actuarial and solidarity fairness cannot co-exist when placed at opposing ends of a continuum (Abraham 1985). One is based on pricing risk according to individual profiles, while the other is based on sharing risk across a population without pricing individual differences. These opposing approaches are, therefore, contested.

Solidarity fairness is often criticised in the literature as unfair due to moral hazard, where insured individuals may take greater risks knowing their losses are covered by insurance (Baker 2000). If the collective bears financial responsibility for all losses (Lehtonen and Liukko 2011; Thiery and Van Schoubroeck 2006), a fairness problem occurs when individuals fail to take responsibility to reduce their risk. Solidarity fairness thus conflicts with the principle of actuarial fairness, which posits that individuals should pay premiums proportionate to their risk profiles (Stone 1993), as low-risk individuals may perceive it as unjust to subsidise high-risk individuals (Abraham 1985). In

addition to moral hazard, there are also concerns that disproportionate losses by high-risk individuals, subsidised by those at low risk, may undermine or fragment the collective nature of solidarity fairness (Stone 1993).

Actuarial fairness, too, is a contested concept. The focus on individual responsibility, paired with the granular calculation of risks, leads to discrimination that excludes individuals from insurance (Charpentier 2024; Ericson et al. 2000; Frees and Huang 2023). While, ostensibly, individuals can reduce their risk to get affordable insurance, the factors leading to their high-risk classification are often outside their control (Elliott 2021a; Horan 2021). For example, individuals may live in older housing stock not designed to withstand flood, tropical storm, or earthquake damage, and may lack the financial resources to upgrade or move (Elliott 2021a). Actuarially, insurance categorises these individuals as 'bad risks', attracting higher premiums and, often, losing insurance coverage. As technological advancements deepen insurers' use of data for precise risk assessments, these discriminatory practices disproportionately affect socio-economically disadvantaged groups (Frees and Huang 2023). For example, a recent study found that 50% of uninsurable homes in Australia belong to those who are already vulnerable in terms of income security, social background, and education (Paddam et al. 2022), further entrenching systemic inequalities (Charpentier 2024; Ericson et al. 2000). Such financial exclusion has become especially pertinent as climate change increases the frequency and severity of extreme weather events, making more areas high-risk zones (Collier et al. 2021).

Insurance literature, therefore, increasingly questions the fairness of actuarial pricing (Collier et al. 2021; Elliott 2021a; Horan 2021; Lehtonen and Liukko 2011), especially from the perspective of society's moral obligation to protect the vulnerable (Claassen 2015; Elliott 2021a; Moggia 2021). Nonetheless, actuarial principles of fairness have become a hallmark of private-sector insurance, even though subsidised health insurance remains prevalent in most countries (Elliott 2021b; Horan 2021; Meyers and Van Hoyweghen 2018).

Despite these opposing concepts of fairness, empirical research shows a significant 'middle ground' in the way members of society construe fairness in insurance pricing, in terms of whether individuals should be priced according to their risk of loss or whether losses should be shared across the pool of insureds, even if this requires lower-risk individuals to subsidise those at higher risk (Dixon and Anderson 2024; Kiviat 2021). This middle ground is rooted in normative moral judgements about fairness (Baker 2000; Bandelj 2020; Zelizer 2017). Although individuals may be unaware of their moral orientations, empirical research identifies three main rationales for varying opposing concepts of fairness. These are based on whether the factors used to classify high-risk individuals are considered discriminatory, causally linked to their potential losses, and within their control (Abraham 1985; Dixon and Anderson 2024; Kiviat 2021).

First, some studies show that, while factors like ethnicity or gender may correlate with higher risk of loss—such as male drivers statistically having more car accidents—gender-based discrimination may be considered unfair and not universally applicable to all drivers in that group (Abraham 1985). From this perspective, individuals should not be rated based on their membership in social categories. Second, even when data statistically predict losses, their use may be considered unfair if they lack a logical connection to risk or are morally ambiguous. For example, frequent address changes may correlate with motor vehicle claims but lack a clear causal link. Such data could reflect 'bad' attributes, like instability, or 'good' attributes, like pursuing career opportunities (Kiviat 2021). Third, some risk factors, like genetic predispositions to diseases, are perceived as beyond an individual's control, making their use in pricing decisions that lead to insurance exclusion inherently unfair (Dixon and Anderson 2024). Perceptions that individuals with low incomes or limited assets require greater subsidisation further complicate these three considerations (Abraham 1985; Dixon and Anderson 2024). Thus, while actuarial and solidarity fairness represent opposing approaches, both are contested concepts with research showing ambiguity over whether one should prevail.

These contestations and ambiguities are reflected in government interventions in insurance markets aimed at addressing perceived unfairness or exclusion (Elliott 2021a; Jarzabkowski et al. 2023). For example, the National Flood Insurance Program in the USA originated to ensure flood insurance for those unable to secure private market cover, reflecting not only economic but also moral judgements (Elliott 2021a). Government-legislated insurance organisations thus offer salient contexts for examining the complexities of navigating insurance-based fairness and theoretically elaborating on the relationship between the two ostensibly opposing approaches. Our research question explores how a government-legislated insurance organisation, mandated to provide affordable insurance to high-risk individuals, navigates opposing approaches to fairness. This inquiry is particularly pertinent as the number and scope of such organisations are expanding globally—now estimated at over 450 worldwide (AXA 2018) and addressing an increasing range of disaster risks—to tackle the increasing frequency and severity of events, such as extreme weather, pandemics and terrorism.

3 | Data and Methods

3.1 | The Case of Fair Inc.

Why was Fair Inc established? We studied Fair Inc., a not-for-profit national insurance pool established through a collaboration between the insurance industry and the government to address the national problem of unaffordable home insurance.[1] Unaffordability had arisen from increased losses from frequent and extreme weather events and insurers' growing sophistication in accurately pinpointing high-risk homes. An increasing number of homeowners fell into the 'high-risk' category, priced out of the insurance market as their premiums were priced according to actuarial fairness principles. Consequently, Fair Inc. was established with a social mission to address the issue of unaffordability.

How does it work? Insurers transfer coverage for properties they consider high-risk to Fair Inc. This structure enables insurers to manage their exposure and risk appetite individually while collectively maintaining coverage for homeowners struggling to find affordable policies. Fair Inc. supports a more stable insurance market by taking on the risk for such properties.

How is it governed and funded? Fair Inc. is a commercial company operating on a not-for-profit basis, guided by public legislation that shapes its operations and mission. Like most insurance pools, it functions as a subsidy mechanism, albeit not a direct government subsidy. The funding mechanism involves a small tax levied on all policyholders via their insurance companies and paid to Fair Inc. to enable them to subsidise premiums to high-risk policyholders. While insurers continue to underwrite and service all home policies, premiums are capped based on property type and value to ensure affordability for high-risk homes for policies that insurers choose to transfer to Fair Inc. Fair Inc. is then responsible for reimbursing insurers for claims related to high-risk properties transferred to it.

The scheme operates within a fixed timeframe to support the transition toward more sustainable and risk-reflective insurance practices. In addition to facilitating affordable insurance for high-risk homeowners, Fair Inc. incentivises investments in disaster risk reduction, including enhanced infrastructure in pre- and post-disaster and community-level preparedness measures. By spreading the financial burden across the insurance market and promoting investments in physical resilience, Fair Inc. aims to offer immediate relief for homeowners while fostering long-term sustainability.

Why is Fair Inc a salient case of fairness? Based on the principles of solidarity fairness, all homeowners can have access to affordable insurance, with Fair Inc. subsidising the premiums of those at high risk via a levy on the rest of the insured population. However, Fair Inc. must enable the market to return to risk-reflective principles of actuarial fairness to avoid weakening the link between risk and responsibility. Fair Inc. is thus a salient case to explore how an insurance pool navigates actuarial and solidarity fairness, which are central to its mission.

3.2 | Data Collection

We conducted an in-depth, longitudinal case study (Yin 2009), delving into how Fair Inc. navigates the insurance fairness inherent in its mission. Our primary data source was 69 interviews. We used purposive sampling to select participants directly involved with Fair Inc. or with significant insights into its operations. Of these interviews, 38 were with Fair Inc., including eight members of the executive team and several senior managers involved in implementing its mission. We interviewed most individuals three times over 4 years, starting when Fair Inc. was established and continuing while its mission was evolving. This longitudinal approach enabled us to observe developments in real-time and capture evolving perspectives. Our interest was to unpack how Fair Inc. experienced and managed insurance fairness.

We conducted the remaining 31 interviews with external stakeholders that work directly with Fair Inc., including (re) insurers, brokers, the insurance industry association, and the government. We selected these external participants due to their involvement in key decisions related to Fair Inc.'s mission and operations. For instance, we interviewed insurance managers responsible for deciding whether to transfer policies to Fair Inc. and public-sector and industry association employees who designed and shaped Fair Inc.'s original mission. These interviews enriched our understanding of how fairness manifests in insurance and triangulated our findings from the Fair Inc. interviews. All interviews lasted between about 45 and 90 min and allowed both in-depth exploration and flexibility for participants to share their experiences. We also supplemented our dataset with 238 secondary documents, including media articles, reports, and internal documents.

We triangulated our qualitative data (Lincoln and Guba 1985) by conducting interviews from inside and outside Fair Inc. and corroborating them with secondary data to further verify our findings. Longitudinal engagement allowed us to observe actions over time, providing insights into motivations and reducing reliance on retrospective justifications. To ensure the trustworthiness of our data and analysis, we validated our findings by presenting them to our participants (Miles and Huberman 1994). Specifically, we maintained close contact with Fair Inc., including regular meetings with the top executive team, who provided feedback on and validated our emerging findings about the complex opposing and yet also interdependent nature of solidarity and actuarial fairness inherent in managing their dual mission.

3.3 | Data Analysis

We engaged in several rounds of analysis to surface themes (Langley 1999; Miles and Huberman 1994; Saldaña 2015). First, we developed a detailed chronology of how Fair Inc. intervened in the insurance market to solve the problem of unaffordable premiums for high-risk policyholders. We used tables to create extensive chronological maps of key dates and actions taken by Fair Inc. to address the unaffordability problem and fulfil its mission. This allowed us to identify four key phases: (1) pre-origination, referring to the period before Fair Inc.'s inception; (2) origination, which spanned 18 months; (3) transition, an ongoing phase that we observed over 30 months; and (4) envisioned exit, a defined future point that was discussed during the study period focussing on how it will unfold and its potential impact. We observed the origination and transition phases and discussions of the envisioned exit in real-time during our four-year study while we reconstructed the pre-origination phase from retrospective interviews and secondary data.

Second, we identified a distinct theme on how Fair Inc. approached fairness in insurance. We found that Fair Inc. engaged in continuous navigation between actuarial fairness, where policyholders paid a price that reflected their risk, and solidarity fairness, where high-risk policyholders could be offered affordable premiums. This continuous active navigation

was consistent across the observed phases, as neither form of fairness became 'settled'. Informed by existing literature on insurance fairness, we realised that while actuarial and solidarity fairness were two opposing approaches in insurance, they were interdependent for Fair Inc. due to its mandated dual mission. We thus turned to the literature on organisational dualities from which we theorised Fair Inc.'s approach to insurance fairness as a duality, involving interdependence rather than purely opposition between the actuarial and solidarity fairness.

Third, we identified and coded the actions through which Fair Inc. navigated the tensions between solidarity and actuarial fairness while trying to implement both. By systematically coding our data, generating themes, and looking for patterns across codes and themes (Strauss and Corbin 1998), we found that Fair Inc. engaged in actions that we grouped into two processes occurring in different phases: (1) a process of disconnecting the mission that involved actions of pricing affordably, developing data and models, and engaging insurers; and (2) a process of reconnecting the mission that involved actions of working with insurers for resilient reconstruction, advocating for disaster protection to the government, and improving risk modelling.

These processes answered our research question about how our case organisation navigated competing approaches to fairness. We then iterated further with the literature to probe how these processes addressed subsidisation of disproportionate losses, and unaffordability tensions, consolidating our theorisation of insurance fairness as a duality. These analyses underpin the conceptual process model we develop as the basis for our contributions.

4 | Findings

We now explain the pre-origination, origination, transition, and exit phases. First, we explain how solidarity and actuarial fairness were treated as opposing concepts in the pre-origination phase, resulting in Fair Inc.'s origination. Then, we show how Fair Inc. navigated the opposing solidarity and actuarial approaches inherent in its government-mandated mission. We find two distinct processes of (1) disconnecting and (2) reconnecting the dual missions, each unfolding within specific actions, that enabled Fair Inc. to navigate these fairness approaches as a duality. Finally, we explain how Fair Inc. navigates concepts of fairness as it envisions its exit from the market.

4.1 | The Pre-Origination Phase

Before Fair Inc., insurers offered high-risk homeowners very high premiums or excesses (i.e., the amount the policyholder is liable to pay before insurance can be claimed). As an industry association representative noted, high prices and excesses meant that '*they basically were not offering insurance*'. While actuarially fair, reflecting the likelihood of those homeowners making a claim, this pricing made insurance largely unaffordable:

> If I talk to our actuaries about pure risk-reflective pricing on a high-risk home, well, I've seen premiums of sort of $35–50,000 for a $350,000 home. Ludicrous and nobody is actually going to pay it! So, it might be risk-reflective, but it's not real world. (Interview, Fair Inc.)

Hence, before Fair Inc., actuarial and solidarity fairness were grounded in two fundamentally opposing business models that could not coexist to provide homeowners insurance. In the free private market, actuarial fairness tied premiums to individual risk, ensuring personal accountability. Yet solidarity fairness, which ensures universal access, was impossible, as many homeowners stopped buying insurance because it was unaffordable. In this pre-origination phase, actuarial fairness was negating solidarity fairness, as those at high risk could no longer afford insurance to protect their homes. This problem led to the development of Fair Inc.

4.2 | The Origination Phase

Fulfilling the affordability mission. Fair Inc. was set up with a legislatively-mandated dual mission to secure affordable home insurance for high-risk homes (the affordability mission) while also returning the private market to risk-reflective pricing (the risk-reflective pricing mission) over a defined period. This dual mission is captured by a Fair Inc. manager: '*Fair Inc will enable the affordability of insurance, and over time it will kind of kick-start the market that has failed*' (Interview, Fair Inc.). Rather than subsidising the high-risk policyholders through a government fund, only insured individuals participate in the subsidy by paying a small levy on their annual policy to fund the move towards affordable pricing. The levy is essentially a solidarity mechanism funded through a small surcharge imposed on every policy:

> (Fair Inc's) model is essentially an insurers' cross-subsidy across domestic properties and, you know, it's fine for my elderly mother with her insurance to be subsidising someone in (a different part of the country) for a small amount a year, because of that social solidarity. (Interview, Fair Inc.)

Yet, Fair Inc. was not navigating fairness on a continuum, resolving the issue of affordability by focussing solely on solidarity fairness. Fair Inc.'s mandated dual mission meant it also had to attend to actuarial fairness to support a risk-reflective insurance market that could work for policyholders and insurers without Fair Inc.'s pricing intervention. While Fair Inc. had come about because actuarial fairness was undermining solidarity fairness (see pre-origination), it could not privilege solidarity fairness but had to find a way to reintroduce actuarial fairness, a task they considered almost impossible: '*And there's always a balance, that it's almost impossible to get right, between how do you make something really, really affordable whilst how do you (…) transition to a risk-reflective market.'* (Interview, Fair Inc.). Fair Inc. managers thus needed to find a way of navigating

their mission to attend to these opposing but, as we show below, also interdependent approaches to fairness.

The process of disconnecting the dual mission. The opposing nature of the two parts made it challenging for Fair Inc. to focus on both elements of its dual mission. Risk-reflective pricing, part of the dual mission, was also the initial reason for unaffordability (see pre-origination). To overcome this issue, Fair Inc. engaged in a process of disconnecting its dual mission during the origination phase. Instead of fulfilling both elements of its dual mission, Fair Inc. temporarily prioritised solidarity fairness to enable affordable insurance. A Fair Inc. manager argued:

> They (affordable and risk-reflective pricing) are in conflict. ... But we have to be relevant now. And that is really what we're doing, getting that pricing right, which is completely illogical ... But it's about making that right societal aspect (solidarity fairness) ... benefitting the right element of a population that needs that. (Interview, Fair Inc.)

We identified three critical actions for Fair Inc. to prioritise and enact solidarity fairness: (a) pricing affordably, (b) developing data and models, and (c) engaging insurers.

Pricing affordably (a). Fair Inc. intervened in the insurance market with a pricing mechanism for high-risk homes that used only the estimated value of each home, ignoring their disaster risk profile: *'Insurers pass the risk from high-risk households to Fair Inc. Premiums for the risk will then be calculated based on the value of the home. (...) Premiums are charged at a set of fixed prices according to which valuation band each home belongs to'* (Document, Insurers association). Fair Inc. then encouraged insurers to transfer high-risk policies to them, as it could price insurance for high-risk homes in a way that was not risk-reflective, aiming instead to ensure affordability:

> So, give us all the stuff you don't want at a fixed price, because our success really is about building up that pool (of high-risk homes) and showing essentially that, as a result of that, there's been a change in affordability. So, you know, a commercial firm would seek to reject the highest risks, we actually welcome them, so it is topsy-turvy. (Interview, Fair Inc.)

Reducing the premiums for high-risk homes to this 'fixed price' occurred at the expense of the second part of Fair Inc.'s dual mission—risk-reflective pricing—but its managers willingly took this step to secure affordability, even though the likelihood of these homes being damaged was disproportionally higher. However, as shown below, this was not a blatant case of solidarity fairness undermining actuarial fairness, since insurers continued to employ risk-reflective pricing.

Developing data and models (b). Fair Inc. realised that they needed to access new data and further develop insurance models to understand better which homes were at high-risk, and how that might evolve. At their origination, they knew some home insurance was unaffordable. However, there was no register of all the uninsured high-risk homes, with data explaining their value, construction, and probability of loss. As one Fair Inc. manager explained, they would need to mine new data and develop models:

> We are beginning to take steps, now that we are launched, to make sure that we are absolutely at the forefront of understanding. (...) And we will make sure that [it] is factored into our modelling and our assessment of what that might mean in terms of our insurance risk, and we'll include that in our thinking in terms of looking at the level of risk that we need to be able to bear at any point in time. (Interview, Fair Inc.)

These actions were essential to enacting solidarity fairness. If Fair Inc. was to fulfil its mission to provide affordable insurance to high-risk homes and have enough funds to cover their potential claims, it had to develop models to identify those homes and provide them with affordable policies while also estimating the potential claims costs to their portfolio.

Engaging insurers (c). Third, Fair Inc. engaged with insurers to inform them about its work, strengthen their relationships, and thus increase the use of Fair Inc. Although some insurers were involved in Fair Inc.'s origination, others had to be made aware of Fair Inc. and its benefits. This led to hiring a dedicated Fair Inc. staff member who *'had the responsibility for liaising with the insurance market'* (Interview, Fair Inc.). This was important, as insurers were not obliged to use the scheme—they could continue to offer very high premiums to high-risk homeowners who would not buy insurance because it was unaffordable. Thus, private market risk-reflective pricing continued, ameliorated through targeted communication and support to explain to insurers how they could benefit from passing high-risk homes to Fair Inc.:

> Fair Inc would convey it (how it works), they do a lot of seminars, a lot of talks outside to get the industry onboard (...) So, when the customer buys a policy, our algorithm calculates the flood risk cost and how much it would cost us to cede it to (Fair Inc) on a policy-by-policy basis. Is A greater than B? And, if we think the flood risk cost is greater than the ceding premium, then we cede the policy. (Interview, Insurer)

This engagement was vital to provide insurers with sufficient information and support to ensure that they could assess which homes were high-risk and then offer them affordable, rather than risk-reflective, insurance by transferring them to Fair Inc. Interestingly, while solidarity fairness is advanced through affordable pricing for high-risk properties, insurers uphold actuarial fairness by determining which properties to transfer to Fair Inc. based on a risk-reflective pricing mechanism.

The process of disconnecting the dual mission enabled Fair Inc. to prioritise solidarity over actuarial fairness to secure

affordability for high-risk properties. However, even as Fair Inc. shifted its focus away from the risk-reflective pricing mission for high-risk properties by pricing affordably (action a), actuarial fairness had not disappeared. Fair Inc. had to determine through its risk-reflective models (action b) which homes were most disadvantaged by risk-reflective pricing to know which should fall under their new pricing mechanism. Likewise, insurers never ceased relying on actuarial fairness to price home insurance. They were still using actuarial models (see action c) to determine whether it would make economic sense to pass the risk on to Fair Inc. or to insure these homes themselves.

The three actions reveal a strong interdependence between the two opposing parts of the duality. Even when prioritising one fairness approach over the other through the process of disconnecting the dual mission, actuarial and solidarity fairness are interdependent, because Fair Inc. uses actuarial fairness tools to identify those who will benefit from solidarity fairness. For Fair Inc., the relationship between these two forms of fairness was not opposing ends of a continuum but a duality where distinct yet interdependent principles coexisted in tension.

The issue of disproportionate loss. Fair Inc. fulfilled its affordability mission in the origination phase by reducing premiums significantly: '*We are at a situation where eight out of ten people are saving 50% or more, and that happened very quickly, and it has been sustained'* (Interview, Fair Inc.). However, setting aside the risk-reflective pricing mission gave rise to fairness tensions. The new solidarity pricing mechanism Fair Inc. introduced, was not necessarily fair to all stakeholders and raised tensions, as one manager pointed out: '*there's a level of trust, but again if you push that to the extreme and say we trust everyone, then those who game the system will ruin the party for everyone*' (Interview, Fair Inc.). To fulfil its affordability mission, Fair Inc. prioritised solidarity fairness by disconnecting the two elements of its dual mission. However, doing so led to new fairness tensions, as solidarity fairness overlooked the different levels of risk individuals' contribute, potentially leading to disproportionate losses borne by some members of the collective.

4.3 | The Transition Phase

Fulfilling the risk-reflective pricing mission. Having fulfilled its affordability mission, Fair Inc. had to focus on the risk-reflective part of its dual mission, as a manager explained: '*We focused on affordability as the primary statutory purpose of Fair Inc. We're now starting to think well what are the things that (...) allows us to transition to (risk-reflective) pricing that's affordable'* (Interview, Fair Inc.). Fair Inc. needed to facilitate a transition to a home insurance market where pricing reflects risk but without making insurance unaffordable again.

The process of reconnecting the dual mission. We found that Fair Inc. navigated the fairness duality in this phase by focussing on both parts of its dual mission, engaging in a process of reconnecting its dual mission.

> There are two aspects to Fair Inc. One is to drive affordability of insurance for those homes at high-risk. The second leg is to move to risk-reflective pricing, to which we added the word affordable (...) because there's not much point in Fair Inc being here and when you take Fair Inc away, you've got the market dysfunctioning again. (Interview, Fair Inc.)

Through this labelling of 'affordable risk-reflective pricing', Fair Inc. reconnected the dual mission to balance solidarity fairness (affordable insurance) with actuarial fairness (risk-reflective pricing). We found three sets of actions that were critical in navigating this duality: (d) working with insurers for resilient reconstruction, (e) advocating for disaster protection to the government, and (f) improving risk modelling.

Working with insurers for resilient reconstruction (d). Typically, insurance claims restore a property to its pre-loss condition using similar materials and construction methods, essentially, a like-for-like repair. However, that means that no new resilience features are added, making further losses in the event of another disaster highly likely: '*There are real examples of homes being repaired by their insurer no better than they were before. And they have a reasonable likelihood of (being damaged by the disaster) again'* (Interview, Fair Inc.). Fair Inc. introduced a scheme to fund home resilience measures, which they paid for as part of post-disaster repairs to reduce the cost of future disasters. To do so, Fair Inc. partnered with insurers to offer resilient reconstruction to as many policyholders as possible:

> We must throw the traditional principles of insurance to one side. This means thinking of future resilience and rebuilding resiliently after a disaster, rather than simply returning a home to how it was before. Several insurers have already partnered with us to offer this to customers, and we are truly making a difference. (Interview, Fair Inc.)

Incorporating resilience into rebuilding strengthens the interdependence between actuarial and solidarity fairness. By enhancing the resilience of homes, the anticipated losses in the event of future disasters are reduced. This not only mitigates insurers' exposure to high claims but also helps maintain affordability by keeping future insurance premiums lower than they would be if affected homes were rebuilt on a like-for-like basis. This required a radical shift in how insurance operates in practice, involving greater flexibility in how claim payments are used, ultimately funding resilient reconstruction to support a transition to affordable risk-reflective pricing. In this way, actuarial fairness benefits from a lower risk profile that aligns with risk-reflective pricing, while solidarity fairness is supported by the broader accessibility of insurance through reduced premiums. This interconnected approach highlights how resilience serves as a bridge between the two fairness approaches.

Advocating for disaster protection to government (e). Fair Inc. also began advocating for disaster protection measures to governmental agencies, such as investing in disaster defences and developing stricter planning regulations. Below, we explain some of these actions:

> Fair Inc is engaging with the government about investment in risk reduction. It has recently worked with (modelling company) to quantify the benefit of the existing national risk reduction measures. It found that such measures reduce (disaster) losses by $[X]bn annually, which corresponds to an (~80 per cent) reduction of (disaster) losses nationally. Fair Inc will have less chance to achieve its mission if the level of Government spending falls, resulting in greater requirements for cross-subsidisation. (...) Fair Inc also points out planning decisions which might increase the housing stock in high-risk areas as an important point. Fair Inc is involved in actions including working with (government department), (government agency 1), and (government agency 2) and industry partners to shape long-term strategies in enabling sustainable development with (disaster) risk in mind. (Internal report, Fair Inc.)

Fair Inc. managers aimed at ensuring the government would be motivated to undertake wider disaster protection measures as part of a national strategy to reduce the risk of disaster reaching homes and causing losses in the first place.

Improving risk modelling (f). Before Fair Inc., many insurers would simply use claims history to categorise homes as high, medium or low risk, as an insurance broker reveals:

> Before the development of Fair Inc, quite often the insurers would be underwriting in a selection way rather than a pricing way. So red, amber, green, if it's in the red they are not touching it, if it's in the amber they'll chuck a bit more money at it and put the excess up, and green they go ahead. (...) So, they use the sledgehammer, if you've made a claim before, I'm putting you in Fair Inc (as a high-risk home). (Interview, Broker)

Decision-making around premium pricing and transfer to Fair Inc. was often based on the respective home's claims history. Claims history is not inherently a poor indicator. However, it relies on the traditional assumption that the past predicts the future. Investing in resilient reconstruction challenges this notion, as it reduces future risks, making homes that have had claims less vulnerable than before. Fair Inc. managers wanted to increase insurers' confidence in keeping homes in their portfolios at an affordable price by better distinguishing the likelihood of loss. To do so, Fair Inc. further developed its modelling expertise to help insurers make well-informed decisions about disasters and associated losses, as a Fair Inc. manager explains:

> We've improved (insurance models). One of the biggest parts of that was further investigation of what do we like, what do we not like with the models, what are they covering, what are they not covering (...) And so one of the (insurers) who is a market-leader has done a massive rework of their modelling on the back of our work. (Interview, Fair Inc.)

Improved risk modelling enhances the insurance market's ability to map disasters better, ensuring that risk-reflective pricing is based on a more accurate understanding of the underlying risk profile rather than relying solely on claims history. This refinement directly supports actuarial fairness by aligning premiums more closely with actual risk levels. When combined with resilient reconstruction and risk mitigation via insurance and government mechanisms, this action allows homes previously classified as high risk to be reclassified as lower risks. As a result, the properties can attract more affordable premiums, advancing solidarity fairness by improving accessibility to insurance. This dynamic interaction demonstrates how advancements in risk modelling and resilience work in tandem to build interdependence between seemingly opposing actuarial and solidarity fairness, ensuring a fairer and more inclusive insurance system.

These actions are integral to reconnecting the affordability mission with the risk-reflective pricing mission, navigating the duality of solidarity and actuarial fairness to ensure both principles are addressed. For instance, while Fair Inc. provides affordable insurance to high-risk homes (solidarity fairness), rebuilding disaster-hit homes resiliently further reinforces solidarity by reducing their risk and minimising potential future losses. This also benefits the collective by lowering the overall threat these homes pose. In turn, this facilitates a transition in the insurance market towards pricing that can be affordable while being risk-reflective (actuarial fairness): '*The whole idea is to (...) reduce people's risk, and transition to risk-reflective pricing* that is *affordable .... If you don't do anything, then that risk-reflective pricing is going to look pretty bad for these high-risks*' (Interview, Insurance Industry Association). During the origination phase, Fair Inc. had to prioritise solidarity over actuarial fairness. However, in this phase, Fair Inc. reintroduced a focus on actuarial fairness while maintaining the importance of solidarity fairness, carefully navigating the balance between these two opposing principles.

The issue of resilience. Balancing the fairness duality has inherent tensions that came to the fore in reconnecting Fair Inc.'s dual mission. In particular, Fair Inc. lacks the control in the insurance market and the government necessary for transitioning to an affordable risk-reflective pricing market:

> Fair Inc has limited powers. We rely on developing strong relationships with the Government, government agencies, insurers, consumer groups and others to ensure that they take the necessary action. (Interview, Fair Inc.).

Fair Inc. is restricted to an enabling role, such as working with the insurance market (action d) and advocating for protection to the government (action e). However, without formal control, it can only encourage rather than enforce resilience.

4.4 | The Envisioned Exit Phase

As an intervention in the market, Fair Inc. is legislated to exit that market in the future. However, premiums for some homes at the greatest risk will remain unaffordable, as a government official states: '*Well for those properties where the risk cannot be mitigated by the sort of resilience measures that took place, when they gradually revert to risk-reflective pricing, then you would get the issue of unaffordability*'. (Interview, Government). In transitioning to an affordable risk-reflective pricing insurance market, several homes with unaffordable insurance premiums will remain. Fair Inc., thus, envisions that even if it is successful in bringing about all the disaster risk reduction measures it aims to achieve, when it exits the market, the fairness duality might again become imbalanced as this residue of high-risk homes threatens solidarity (similar to the pre-origination phase).

5 | Discussion

Our paper examined the question of how a government-legislated insurance pool, mandated to provide affordable insurance to high-risk individuals, navigates opposing approaches to fairness. We found that such organisations shift from viewing these as opposing or dualistic to embracing them as a duality of interdependent concepts (Farjoun 2010; Jackson 1999; Putnam et al. 2016) that enables them to balance both dynamically. We now develop a conceptual process framework that explains our findings on fairness as a duality that such organisations navigate over time (see Figure 1).

First, our framework clarifies that opposition between the two approaches remains inherent and strongly present in insurance. With private insurers increasingly prioritising actuarial fairness over solidarity, risk-reflective pricing renders insurance unaffordable for high-risk homes (Jarzabkowski et al. 2023). This private-market context, characterised by the absence of a government-legislated insurance organisation, is reflected in the pre-origination phase of our case. To address unaffordability, such organisations intervene in the market by prioritising solidarity. However, this can lead to high-risk properties causing disproportionate losses to the collective, if they are unable to take responsibility for reducing those risks. We have thus shown that treating these inherently opposing approaches as if they exist on a continuum—and prioritising one over the other—creates tensions that manifest as either unaffordability or potential for disproportionate loss.

Second, our framework shows how government-legislated insurance pools can navigate solidarity (Charpentier et al. 2022; Lehtonen and Liukko 2011; O'Neill and O'Neill 2012) and actuarial fairness (Heras et al. 2020; O'Neill and O'Neill 2012) not as opposing approaches but as a duality in which they are interdependent over time (Farjoun 2010; Putnam et al. 2016). We established that such organisations can prioritise these approaches differently across time by alternately disconnecting (1) and reconnecting (2) their dual mission: focussing on affordability to countering the dominance of risk-reflective pricing

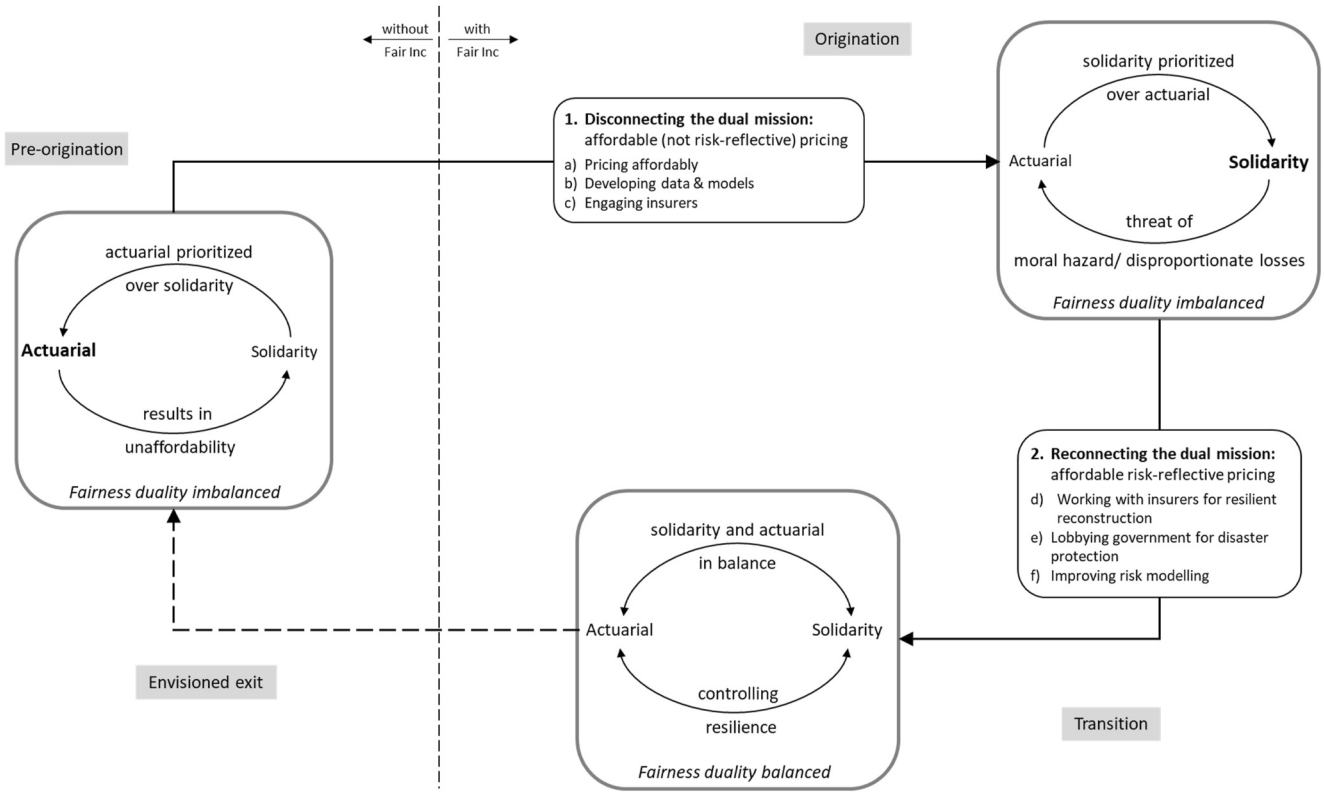

FIGURE 1 | Navigating the duality of fairness in insurance.

(actions a–c) and supporting the transition to risk-reflective pricing while maintaining affordability (actions d–f), respectively.

While temporally separating the two elements of a duality is a common strategy (see Jackson 1999; Putnam et al. 2016), the two approaches remain interdependent during Fair Inc.'s origination phase. The insurance industry continues to emphasise risk-reflective pricing, leveraging actuarial modelling to identify high-risk homes. This increased precision not only enables risk assessment but also facilitates the transfer of high-risk properties to Fair Inc., where coverage prioritises principles of solidarity. This process illustrates how actuarial fairness tools can be employed to support solidarity fairness, even during phases where solidarity is prioritised. Nonetheless, while separating is temporary, the elements of the duality must eventually recombine (Farjoun 2010; Putnam et al. 2016). By emphasising resilience measures to reduce disaster risk and losses, Fair Inc. reinforced the interdependence between the two approaches to fairness. Resilient homes reduce the overall risk exposure, making risk-reflective pricing (aligned with actuarial fairness) more affordable. At the same time, risk-reflective pricing tools empower Fair Inc. to enhance the inclusion of high-risk properties within the insurance collective, thereby promoting solidarity fairness. Yet our findings also underscore the challenge of control over the means of risk reduction. As such control fell outside Fair Inc.'s remit, managers actively sought to address these challenges through the actions they could take, including leveraging claims to incentivise risk mitigation on homes and advocating for broader risk reduction initiatives across society.

Third, this interdependence is fragile and demands continuous navigation, underscoring the enduring importance of government-legislated insurance pools in navigating concepts of fairness in insurance. Extreme weather and associated inequalities are escalating, leading to price-based exclusions that are beyond the control of homeowners (Collier et al. 2021; Elliott 2021a; Jarzabkowski et al. 2023). This necessitates ongoing adjustments in how fairness is interpreted and implemented, as the balance between actuarialism and solidarity must adapt to these shifting realities. As shown in our case, if Fair Inc. exits the market as envisioned, opposing concepts may again prevail as some homes remain intrinsically high-risk or uninsurable. Hence, navigating the fairness duality in insurance is a continuous rebalancing process, inherent to markets grappling with fairness dualities, which may require new roles or actors within the insurance system (Bednarek et al. 2021; Farjoun 2010; Jackson 1999; Putnam et al. 2016).

6 | Contributions

Our process framework moves beyond existing views of actuarial and solidarity fairness as opposing ends of a continuum that cannot coexist by conceptualising them as a duality; always in tension but also interdependent and enabling of each other. This enables us to make three key contributions to the study of insurance fairness.

First, existing research has often treated actuarial and solidarity fairness as mutually exclusive concepts (Abraham 1985; Barry 2020; Charpentier et al. 2022; Frezal and Barry 2020; Lehtonen and Liukko 2011; Meyers and Van Hoyweghen 2018; Palmer 2007). Our central contribution extends this literature by moving beyond the oppositional view of fairness as either solidarity (Lehtonen and Liukko 2011; O'Neill and O'Neill 2012) or actuarial (Heras et al. 2020; Lindholm et al. 2022; Meyers and Van Hoyweghen 2018) approaches that cannot coexist. We reframe insurance fairness as a duality, offering rare insights into how it is navigated. Prioritising solidarity fairness, often framed as a moral obligation (Elliott 2021a; Moggia 2021), ensures affordable insurance, but can also negate individual responsibility to contain risk (Abraham 1985; Baker 2000). Conversely, prioritising actuarial fairness, which ties premiums to risk profiles, can be a point of contention when it excludes individuals from the insurance system (Baker 2000; Dixon and Anderson 2024; Lehtonen and Liukko 2011; Thiery and Van Schoubroeck 2006). As policymakers grapple with unaffordable insurance (Jarzabkowski et al. 2023), our framework shows that government-legislated schemes that subsidise premiums to secure affordability can intensify oppositional tensions because they pit solidarity against actuarial fairness (Ericson et al. 2000).

However, by reframing insurance fairness as a duality, as in our case, such schemes may reconstruct a societal understanding of actuarial and solidarity fairness not just as opposing but also as fundamentally interdependent. Our findings demonstrate that the attempt to balance them necessitates addressing the factors that excluded individuals from the insurance system. Here, a government scheme such as ours, even where it lacks controls, can encourage collaboration between private-sector insurers and government actors to address these exclusionary factors. Following Beck's (2009, 138) call to explore the 'simultaneous collapse and expansion' of insurance, we offer a conceptual extension in understanding of insurance fairness as a duality. Discussions of insurance are marked by urgent calls to expand coverage for climate-related risks, alongside warnings that without effective mitigation or adaptation measures, existing insurance arrangements may collapse (Collier et al. 2021). Our research helps frame these debates, highlighting the tension between the interdependence of solidarity and actuarial fairness, with significant implications for the future relevance and sustainability of private insurance in the face of increasing disasters (Collier et al. 2021), financial exclusion, and inequality (Elliot 2021a).

Second, this interdependence is grounded in a revised understanding of risk-reflective modelling that decouples it from actuarial fairness, showing its role in supporting both actuarial and solidarity fairness. Risk-reflective modelling, driven by advances in computing and statistical data (Jarzabkowski et al. 2015) over the past 3 decades, traditionally reinforces actuarial fairness (Frezal and Barry 2020; Heras et al. 2020) by tying premiums directly to risk profiles. Indeed, risk-reflective pricing is often seen as in opposition to solidarity fairness (Dixon and Anderson 2024) where ignorance of who will ultimately bear the costs of unforeseen events creates a community of fate (Ewald 1986). For instance, the Affordable Care Act prevents insurers from denying coverage or adjusting premiums based on personalised health status or data from self-tracking technology, like wearable fitness devices (McFall 2019). However, our findings reveal that better modelling can instead serve solidarity. In our case, these risk-reflective modelling tools were

used to identify and subsidise rather than increase premiums to high-risk homes. Fair Inc. provided a means to develop this knowledge base further, not to exclude but to identify ways to reduce individuals' risks, aiming, ultimately, to reduce their premiums and increase inclusion. While increased knowledge of individual risk is a hallmark of modern data-driven society (Beck 1992; Collier 2008; Ericson and Doyle 2004), we demonstrate that it is not the technology or the knowledge itself that drives responsibilisation (Ericson et al. 2000; Ewald 2020; Luhmann 1998), but rather how their use shapes the approach to fairness and vice versa. This insight challenges this prevailing association of data with actuarial fairness, demonstrating how decoupling them can be leveraged to build interdependence with which to navigate fairness as a duality.

Finally, our paper provides rare insights into how organisations increasingly tasked with managing moral obligations to society can develop new ways to reconcile the tensions these obligations create, particularly as market systems face growing threats such as climate change (e.g., Brinkmann and Lentz 2006; Ericson et al. 2000; Moggia 2021). While normative moral orientations are often invisible, moral understandings nonetheless transcend economic market categories (Bandelj 2020; Baker 2000; Christophers 2019; Elliott 2021a; Kiviat 2021; Zelizer 2017). Furthermore, the application of these moral understandings shifts over time, as evidenced by changing perceptions of the fairness of discriminatory categories, such as ethnicity and gender in insurance (Abraham 1985). A recent study by Dixon and Anderson (2024) shows that, even in countries where individual responsibility for risk is grounded in neoliberal concepts of markets (Christophers 2019; Kiviat 2021; Starr 1992), there is considerable tolerance for price subsidisation of those at high-risk. This tolerance arises when individuals are perceived to lack control over their circumstances and to have a lower income base and assets with which to address those circumstances. Hence, as more property owners find themselves excluded from the insurance system due to a combination of extreme weather, legacy assets, and patterns of urbanisation (Jarzabkowski et al. 2023), concepts of morality in markets and societal expectations of them may also change (Bandelj 2020; Elliott 2021a). Our study of an organisation navigating insurance fairness as an interdependent duality indicates one potential way forward for markets to attend to such changes in moral judgement. Our findings and conceptual framework provide considerations for organisations and policymakers to reconstitute relationalities around the moral obligations that increasing climate risk and inequality constitute within existing market systems (Beck 1992, 2009; Ericson et al. 2000), such as insurance (Collier et al. 2021; Elliott 2021a, 2021b; Palmer 2007).

Data Availability Statement

Data cannot be shared in full to protect confidentiality and anonymity of the participants. Data have been anonymized and used in the paper to support the findings.

Endnotes

[1] We conceal the real name of the organisation and the country it operates in to preserve the confidentiality of our participants' identities, in line with our data collection protocol.

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