Genetic Imprints, Party Life Cycles, and Organizational Mortality: An Application of State-Space Duration Models

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It is a classical argument that how parties are born affects how they die. Nevertheless, few studies theorize and rigorously estimate the impact of formative features on the risk of organizational death. Using a life cycle perspective, we theorize how and when party mortality is shaped by four formative features constituting parties' heritage: insider status, societal rootedness, ideological novelty, and roots in preexisting parties. To assess the dynamic influence of these formative features on party death, we fit a state-space duration model to a data set covering 204 party trajectories in 22 consolidated democracies. Our modeling approach outperforms conventional methods and yields results that contradict the notion that formative features lose relevance as parties age. Our findings indicate that insider status affects mortality risk toward parties' midlife, societal rootedness matters early and late in parties' trajectories, while the combination of ideological novelty and roots in preexisting parties matters throughout parties' life spans.

I t is a classical argument that political parties' "genetic imprint" (the way they are born) shapes their long-term evolution in terms of electoral support, parliamentary representation, and (most fundamentally) survival (Duverger 1959; Panebianco 1988; Sartori 1976). Research on party mortality has emphasized the relevance of formative features such as ideological novelty (Lucardie 2000; Meguid 2008; Spoon 2011), societal rootedness (Bolleyer 2013), and insider status (i.e., the involvement of public officeholders in parties' formation; Deegan-Krause and Haughton 2018), alongside the classical distinction between "newly born" or "genuinely new" parties and those emerging from preexisting parties as a result of splits or mergers (Mair 1990; Sikk 2005; Ware 2009; Zons 2015). The relative impact of each of these factors on party mortality, however, has remained largely underexplored, both theoretically and empirically. Moreover, the few studies that

considered several formative features' impact on mortality (e.g., Bolleyer, Correa, and Katz 2019) impose arbitrary and restrictive assumptions—proportional hazards, parametric (linear, logarithmic, quadratic) trends—on the relationship between these characteristics and the risk of party death. Problematically, these ad hoc specifications cannot capture the complex dynamic patterns linking "birth characteristics" to party mortality, limiting our ability to precisely determine when over a party's life span such characteristics matter and for how long.

The current article attempts to bridge these gaps by theorizing the different implications of formative features for party mortality from a "life cycle perspective." Focusing on the maturation of organizations (O'Rand and Krecker 1990, 255), this perspective assumes that a party's temporal trajectory is shaped by "the potential inherent at its foundation." We

define this potential through parties' formative features that, in different ways and to different extents, influence how organizations address basic problems they encounter in the course of aging, irrespective of the specific context and timing of their births (Aldrich and Ruef 2011, 160–61; van Biezen 2005). To test our hypotheses, we fit a state-space competing risks model (Fahrmeir and Knorr-Held 2008) to a novel data set covering the evolution of 204 party organizations from their births to their (potential) deaths in 22 consolidated democracies over nearly five decades (1968–2016). We model and estimate the dynamic influence of each formative feature on two types of death, dissolution and merger, that are qualitatively different: while dissolution refers to situations in which a party is deserted by leaders and members because of its inability to pursue central goals, mergers denote the strategic sacrificing of a party's autonomy in order to increase its weight in the party system (Bolleyer et al. 2019). Pinning down the relationship between formative features and mortality risk at every point throughout parties' life spans provides a nuanced perspective on when and how formative characteristics affect these distinct types of party death.

Our article makes important theoretical, methodological, and normative contributions. Theoretically, it builds on organizational sociology (Aldrich and Ruef 2011) and underscores the relevance of endogenous determinants of party evolution that (compared to exogenous factors) have so far attracted less attention in debates around party (system) development (Kreuzer 2009; van Biezen 2005) and have rarely been explored in cross-national research (but see, on Central Europe, Haughton and Deegan-Krause [2021]). To date, structural approaches on (new) party development have theorized party success and survival as the result of external (societal or institutional) opportunity structures (Zur 2019) or competitive dynamics driven by mainstream parties (Meguid 2008; Spoon 2011). Those approaches have been predominantly contrasted with agency-based perspectives emphasizing the importance of elite choices for the long-term fates of parties or the dynamics of party competition (Haughton and Deegan-Krause 2021). Theorizing the distinct implications of central formative features at different points in parties' life spans (as defined by their age) from a life cycle perspective sits "in between" these major approaches. This perspective defines "genetic imprints" (Panebianco 1988) as *party-level, endogenous characteristics of the founding elite* (i.e., their heritage, not their choices) expected to affect party organizations' ability to cope with generic challenges inherent in their transition from "adolescence" to "adulthood" and then to "old age" (Aldrich and Ruef 2011, 160–61). Integrating "age" and "timing" in theorizing party mortality—as called for in recent work (Haughton and Deegan-Krause 2021, 24)—helps us ratio-

nalize why formative features do matter for mortality beyond or, indeed, only after adolescence, the earliest phase of party development during which an organization is not yet fully consolidated.

From a methodological perspective, this is—to our knowledge—the first application of state-space duration models (Durbin and Koopman 2000) in the comparative politics literature. Following recent calls to develop more dynamic perspectives on party trajectories by borrowing state-of-the-art methodologies from other disciplines (Emanuele and Sikk 2021), we apply a flexible approach to modeling time dependency commonly used in ecological and environmental statistics. Our model is general enough to encompass all the specifications previously used to estimate the impact of formative features on party mortality but does not require determining the form of the time-varying relationship between birth characteristics and the risk of party death ex ante.

Finally, our findings are normatively relevant, as different formative features suggest different "goal orientations." While societally rooted formations tend to aim for societal representation, insider formations are driven by careerist orientations (Krouwel and Lucardie 2008). Our results suggest that the former are not only less likely to dissolve than the latter but also that societal roots matter at several critical stages of party development. Hence, societally rooted newcomers are more likely to have a lasting impact on party systems than those driven by careerist motivations, thereby enhancing democracies' representative capacity and their ability to counter mainstream party decline (e.g., Dalton, Farrell, and McAllister 2012).

GENETIC IMPRINTS, PARTY LIFE CYCLES AND PARTY MORTALITY

Considering the nature of party formation as a "critical juncture" that shapes organizational choices in the long term (Haughton and Deegan-Krause 2021, 147), we theorize the implications of four central formative features for party mortality along three dimensions: (i) whether they affect mortality by themselves or in combination with other features, (ii) how they affect party mortality (i.e., negatively or positively), and (iii) when during parties' life spans we expect them to matter.

How formative features matter for party death: Basic expectations

Participating in elections by nominating candidates for public office sets political parties apart from other organizations such as interest groups (Sartori 1976). Consequently, when a party permanently ceases to nominate candidates for any electoral contest as a separate, autonomous organization, it is considered dead. Bolleyer et al. (2019) distinguish between two types

of party death. Dissolution death results from the unwillingness of party followers and elites to stick with their organization as the latter, confronted with a lack of resources or their party's inability to act coherently, proves unable to achieve basic goals. In contrast, merger death is a proactive attempt by elites to improve their party's position within the party system—at the expense of its organizational autonomy. Each type of death points to a different resource that is difficult to cultivate but central to a party's survival, one organizational, the other ideational (Haughton and Deegan-Krause 2021, 146). For decreasing mortality risk, dissolution stresses as critical whether formative features help build a durable infrastructure, while merger death highlights whether these features provide the underpinning for a distinct identity instead.

The central formative features under study—Insider Status, Societal (group-based) Rootedness, Ideological Novelty, and Roots in Preexisting Parties—can be conceptualized along two dimensions: one referring to the core environment a formation predominantly emerges from, state or society; the other referring to its proximity to other parties in the party system it enters. Based on the former, Insider Status can be defined by its connection to state institutions through public officeholders' (usually MPs' [members of Parliament]) involvement in the founding process, while parties' Societal Rootedness in promoter organizations indicates ties to civil society. Referring to parties' proximity to the party system, Ideologically Novel formations give voice to hitherto unrepresented societal demands that do not coincide with the extant "left-right" lines of political division (Meguid 2008, 4). In advanced democracies, ideologically novel formations are characterized by their distance to the party system they enter, as they challenge class-based politics through a new cultural

dimension. This benefited specifically Green and "new right" parties, which were able to cut across traditional patterns of partisan alignment (Mueller-Rommel 1998, 192). In contrast, formations emerging from splits or mergers have structural Roots in Preexisting Parties, which grounds them in the party system.

Table 1 links the four formative features (categorized along these two dimensions) to whether they bring with them "resources for organization-building" (underlined by the notion of dissolution death) or a "distinct identity" (highlighted by the notion of merger death). Insider Status is not associated with the availability of extraparliamentary resources for organization building or the foundations for a stable collective identity. The reverse holds true for Societal Rootedness. Therefore, as seen in table 1, these two formative features entail unequivocal and opposite implications for party mortality.

Expectations about the impact of Ideological Novelty and Roots in Preexisting Parties on party death are less clear-cut. Unlike the mere highlighting of a neglected group interest (e.g., of senior citizens), Ideological Novelty suggests the introduction of new issues underpinned by ideological assumptions about the nature of society and the role of the state that challenge the dominant economic axis of competition (Lucardie 2000, 176–77; Meguid 2008, 4). It thereby provides strong foundations for a distinct collective identity, which makes it easier for a new party to present a "unique appeal" and, on that basis, to defend its ownership of core issues in the longer term (De Vries and Hobolt 2020, 54–56). Nonetheless, as noted by Lucardie (2000, 177–78), such distinct identity—initially alien to most citizens—needs to be built up and cultivated in order to achieve wider support. Ideologically novel parties, thus, may "die at the doorstep"

Table 1. Formative Features and Their Basic Theoretical Implications for Party Mortality

Formative Feature	Specification of Feature	Basic Expectations Regarding Mortality Risk
Insider Status	Participation of MPs in the formation process (linkage to the state)	No distinct collective identity + unfavorable to extraparliamentary organization building → higher mortality risk
Societal Rootedness	Participation of societal organizations in the formation process (linkage to society)	Distinct collective identity + resources for organization building → lower mortality risk
Ideological Novelty	Unrepresented ideology not aligned with "left-right" axis (separate from the existing party system)	Distinct collective identity + unfavorable to extraparliamentary organization building → *ambivalent*
Roots in Preexisting Parties	Formed through split or merger (emerging from within the party system)	No distinct collective identity + favorable to extraparliamentary organization building → *ambivalent*
Ideological Novelty × Roots in Preexisting Parties	Unrepresented ideology and organization rooted in preexisting parties	Distinct collective identity + favorable to extraparliamentary organization building → lower mortality risk

early on if they fail to mobilize and consolidate a support base, especially when lacking sufficient resources. In contrast, formations arising from splits or mergers have a (former) structural connection to established parties that facilitates organization building, but they tend to lack a new, distinct profile. As mortality is expected to be shaped by both the vehicle for and the content of parties' appeal (Haughton and Deegan-Krause 2021, 146, 155), Roots in Preexisting Parties and Ideological Novelty—by themselves—have ambivalent implications. Combining the two features, however, amalgamates their two advantages. Hence, Roots in Preexisting Parties and Ideological Novelty should jointly lower mortality risk.

While the conceptualization presented in table 1 rationalizes the direction (positive or negative) of the expected relationship between (configurations of) formative feature(s) and mortality risk generally, we now theorize formative features' dynamic effects.

Formative features and their life cycle effects: Hypotheses

We theorize the nature and timing of formative features' impact on the risk of party mortality, assessing how these features shape parties' responses to two fundamental endogenous challenges that membership organizations face during their life cycle (Aldrich and Ruef 2011). The first of these challenges, the replacement of founding leaders as a central marker of consolidation (Panebianco 1988), demarcates parties' transition from adolescence to adulthood. The second one, the generational renewal of the members underpinning an already consolidated party (Tiberj 2013), delineates parties' transition from adulthood to old age. Both challenges therefore stem from the departure of two sets of intraorganizational actors who, as they themselves age, will eventually (have to) leave the organization.[1]

Starting with the formative features as defined by parties' linkages to their core environments, insider parties founded by or with the help of MPs tend to be dominated by those officeholders, who usually take over leading positions in the new organization. Drawing on Panebianco's (1988) notion of party formation through top-down diffusion, and taking into account the interest of the "dominant coalition" of

leading politicians in retaining control over the new organization, founding elites of insider formations are not expected to invest in mechanisms for leadership replacement essential to ensuring the continuation of the party after those elites depart (Bolleyer 2013). Without structures for effective leadership renewal in place, the risk that insider parties dissolve once founding MPs decide to leave is high, especially if defections are motivated by the party's inability to "deliver." Nevertheless, even if the party fails to deliver initially, the considerable personal costs incurred in setting up a new organization means that founders will typically be reluctant to exit before the party has participated in at least a few election cycles (i.e., before a "trial phase" allows them to reliably evaluate organizational performance; Brüderl and Schüssler 1990, 533). Hence, while we expect the involvement of MPs in a party's formation to raise the risk of dissolution, this should be especially marked toward the middle of the insider party's life span. The impact of Insider Status on the probability of dissolution should decline over time, if the party has managed to renew its leadership and transition toward adulthood (the next life cycle stage).

We expect the relationship between Insider Status and merger death to follow a similar pattern. Parliamentarians forming their own party often do so after defecting from their previous party because they could not exercise the level of influence they envisioned (Deegan-Krause and Haughton 2018; Mair 1990). If so, founders of insider formations are unlikely to engage in a merger right away, as mergers require the sharing of leadership positions and resources with merger partners (Ibenskas 2016; Ware 2009). This resistance is likely to be temporary, though, as the willingness to bear the costs of merging for strategic benefits can be expected to increase if the new formation fails to meet its founders' expectations after a few election cycles. By that point, MPs occupying leadership positions may agree to give up their organizational autonomy in order to boost their party's ability to achieve the goals that it cannot attain autonomously. Insider Status should cease to matter for the probability of merging later in parties' life cycles, once founders are replaced by leaders socialized into and recruited from a—by then—consolidated organization less willing to compromise their party's separate identity for strategic reasons.

H1. Insider Status should increase the risks of dissolution and merger death, but only toward the middle of parties' life spans (when transitioning from adolescence to adulthood).

By contrast, Societal Rootedness should have a negative impact on the probability of both types of death. The support

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1. Unlike a party's actual life span (as defined by a party's age in years), the party life cycle is a theoretical construct. Whether an organization makes it through the two transitions we theorize and, if so, when is an empirical question. Although "instant institutionalization is impossible" (Haughton and Deegan-Krause 2021, 23) and both transitions will become unavoidable when central actors' (human) life spans end, parties can survive for several decades without moving to adulthood if (some of the) initial founders remain in charge throughout and the party (because of only partial institutionalization) dissolves once the last of them leaves, as was the case with the Irish Progressive Democrats (Bolleyer 2013, 24, 143–50).

of promoter organizations provides parties with access to resources and to a pool of supporters willing to get involved in the party. These resources help compensate for the party's lack of institutionalization during adolescence, when the organization is not yet consolidated, suggesting a strong negative influence of Societal Rootedness on the risk of dissolution early on. Societal Rootedness should cease to matter during adulthood, though, once the party is fully consolidated. This is because founding elites affiliated to promoter organizations are less likely to be purely career oriented and more likely to support organization building, allowing future leaders to be recruited from within the party itself (Bolleyer 2013). Once an organization approaches old age and faces the challenge to renew a membership that has aged with it (Tiberj 2013), links to promoter organizations with a support base are expected to regain importance for organizational maintenance, as they provide the party with a recruitment pool from which to draw new members. This is especially important as, in increasingly individualized democracies, it becomes more difficult to generate longer term attachments to an organization among more recent generations of potential supporters (Dalton et al. 2012).

Societally rooted parties' ties to promoter organizations and dependence on external loyalties also limit their autonomy (Panebianco 1988; Randall and Svåsand 2002). In particular, to the extent that promoter organizations view the new party as their representative in the electoral arena, party elites will be discouraged from compromising their political formation's separate identity and merging with other parties (Bolleyer et al. 2019). The party's autonomy is likely to increase as it becomes more institutionalized and cultivates its own loyalties, suggesting that this relationship should weaken over time, even if promoter organizations can be expected to retain some influence on central party decisions through formal or informal mechanisms in the longer term (Allern and Bale 2017).

H2. Societal Rootedness should lower parties' risk of dissolving early and late during their life spans (i.e., during adolescence and old age). The impact of Societal Rootedness on the risk of merger death should be strongly negative early on (before parties have transitioned to adulthood) and decline as parties age.

Moving to formative features defined by new formations' proximity to the existing party system, ideologically novel parties do not tap into existing identities, which makes it more difficult to mobilize initial support (Lucardie 2000). However, when endowed with a resource base "inherited" from preexisting parties (Ware 2009; Zons 2015), a forma-

tion tapping into a not yet mobilized identity will find it easier to stabilize and maintain a support base. Hence, the risk of dissolution is comparatively lower even when experiencing initially disappointing performances. The combination of Ideological Novelty and Roots in Preexisting Parties should also render merger death less likely. Research on mergers has stressed that finding an ideologically compatible partner is central for mergers to take place, as this facilitates establishing a common denominator that all partners can agree on and that each partner can convince its followers to embrace (Ibenskas 2016; Ware 2009). The likelihood that a party introducing a novel ideological profile into the party system finds a compatible partner with similar ideological outlooks is bound to be lower than for other parties, especially since niche parties have been shown to be more ideologically rigid (Adams et al. 2006). When, additionally, the new party's support base is stabilized by roots in preexisting party structures, effective internal opposition against a merger becomes more likely.

Importantly, and unlike the time-varying impact on dissolution and merger death anticipated for Insider Status and Societal Rootedness, the joint influence of Ideological Novelty and Roots in Preexisting Parties on either type of death is not expected to fluctuate over parties' life spans. Being shaped by new parties' exogenous relations to competitors, this combination should not affect the ways in which organizations endogenously transition from adolescence to adulthood or from adulthood to old age. Instead of being shaped by endogenous challenges of organizational renewal, Ideological Novelty—in particular—needs to be continuously defended not only against old competitors adapting their profile but also against new competitors who enter the system over time (Meguid 2008; Zur 2019).

H3. Parties that are ideologically novel and rooted in preexisting parties should exhibit lower risks of dissolution and merger than those without both features. The difference between these two groups of parties should persist throughout their life spans.

DATA AND METHOD

To test our hypotheses, we study parties that, from their organizational birth until their (potential) death, operated in fully consolidated democratic settings (i.e., parties that were born after the party systems in which they are embedded had already consolidated). These parties face a range of already established (old) competitors (in principle likely to outlive them), which is critical to ensure that the basic challenges newcomers encountered when trying to ensure survival are comparable both within and across countries—a situation

that is substantially different if most rival parties are new as well (Meguid 2008). Also, the "rules of the game"—in terms of institutional and party system constraints—are exogenous to all parties, which cannot be assumed for parties that have been involved in designing a new democratic regime.

While covering new formations operating in—by now—consolidated party systems, we use a period of 20 years after transition to democracy as a minimum threshold, in order to ensure that party systems were institutionalized, stable government alternatives could form, and every country experienced alternation in government (Casal Bértoa 2016). In total, we cover new entries across 22 democracies (Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom) with consolidated party systems of sufficient durability to allow for full party life cycles of up to almost five decades. We distinguished new entrants from continuations of already consolidated (e.g., successor) parties, including in our sample only those parties that were built from scratch, formed by minor splits from established parties, or jointly built by only new or both old and new parties (i.e., all formation types without a viable infrastructure). We applied these criteria to all new entries that won seats in national parliament or won 2% of the national vote at least once between 1968 and 2016, irrespective of their vote share and ideological profile.

Our selection criteria provided us with a broad sample of 204 parties (3,486 party-year observations), allowing for a comprehensive examination of the impact of formative features on the risk of dissolution and merger over time. Additional details about our case selection and its rationale are given in appendix A.

Dependent variables

As mentioned above, we consider a party as organizationally dead when it permanently stops nominating candidates for any elections (irrespective of tier) as a separate, autonomous organization. Dissolution death usually takes place through the formal disbandment of a party, in a membership meeting or by a declaration of the leadership. Alternatively, parties can be absorbed by other parties; that is, they dissolve into a competitor or return to their mother party after a split. In such circumstances—and unlike in the case of mergers—the identity of one of the parties remains intact, while the absorbed party fully dissolves (Ware 2009). We consider as merger death cases in which the name of the merged party differs from that of any of its constituent members. The adoption of a new denomination for the emerging party signals that each merging partner was in a sufficiently strong

position to ask the other(s) to give up its (their) own name—a defining feature of an organization's identity. Eighty-six of the 204 parties (42.16%) in our sample died during the period under consideration: 58 of them dissolved and 28 merged (see app. B).

Independent variables

Our key independent variables operationalize the four formative features expected to influence party mortality risks in our theoretical framework (hypotheses 1–3). Insider Status is a dummy taking the value 1 if a national parliamentarian (current or former) was involved in the founding of and took on a formal role (often but not always its leadership) in the new party and 0 otherwise. Societal Rootedness is an indicator for parties whose foundation was supported by one or several identifiable promoter organizations or groups. For most parties in our data set, we relied on the classification by Bolleyer (2013); the remaining cases were coded using primary sources and secondary literature.

To operationalize Ideological Novelty, we initially identified which new parties in our sample belonged to either the Green or new-right family, the two party families that represented a new cultural axis of competition challenging traditional class-based politics (Bornschier 2009; Mueller-Rommel 1998), and were able to build a distinct collective identity from it. We only considered as ideologically novel, though, the subset of Green and new-right parties that met two conditions ensuring that their core issues were not already "owned" by other new or by old competitors. First, these new parties entered their respective party systems as the first members of their own family, as only then could they be expected to enjoy a "first-mover advantage" and exert an effective monopoly over the issue that would allow them to reap electoral benefits (De Vries and Hobolt 2020, 54–56). Second, their core issues were not already salient in their party systems at the time of their entrance. Building on Abou-Chadi (2016) and Wagner (2011), we relied on manifesto data (Volkens et al. 2021) to verify that the programs of preexisting parties gave little weight to ideologically novel formations' core issues: environmental protection (central to Green parties) or multiculturalism (central to new-right parties).

The last formative feature under study, Roots in Preexisting Parties, is operationalized as a dichotomous variable taking the value 1 if a party arose from either a split or a merger of preexisting political organizations and 0 if it was "newly born," that is, built from scratch without the support of members of existing parties. We consider splits as parties formed with the help of defectors—members of either the elite or the rank and file—from existing parties (Mair 1990;

Zons 2015). Mergers, in turn, are parties formed as unions of several already existing formations (Ibenskas 2016).

Apart from the explanatory variables of interest, our analysis incorporates several covariates to control for the influence that resource and contextual factors may exert on party mortality. Drawing on Bolleyer et al. (2019), we include the following party-level controls: Seat Share (the percentage of national seats held by each party in a given year), Electoral Performance (each party's vote share in the most recent national election), National Government (whether parties held ministerial posts in any given year), State Funding (whether a party qualified for direct state funding in any given year), EP Access (whether a party held seats in the European Parliament in any given year), Regional Government (whether a party occupied regional ministerial positions in any given year), Party Distinctiveness (whether a new formation—ideologically novel or not—faced a competitor belonging to the same party family at any given election), and Party Electoral Coalition (an indicator for parties that were part of a preelectoral coalition in a given year). Additionally, we control for the following system-level variables: Antiestablishment Vote (the percentage of votes obtained by antiestablishment parties at any given election); Party System Fragmentation (the effective number of parliamentary parties); the Seat Product, accounting for the permissiveness of the electoral system; and dummies for Preelection, Election, and Postelection Years to capture potential differences in the risks of merger and dissolution between election years (and the years before and after elections) and other periods.[2]

A detailed description of the coding and sources for all the variables, along with summary statistics, is presented in appendix B.

Estimation approach

Because our theoretical framework distinguishes between two types of party death, we fit a competing risks model (Bolleyer et al. 2019; Zur 2019) to estimate the influence of the explanatory variables on the probabilities of dissolution and merger. However, since we expect the impact of some formative features on both types of death to fluctuate over parties' life spans, commonly used competing risks models—such as the Cox proportional hazards model—with time-

invariant regression coefficients (which assume that the covariate effects are constant ex ante) are ill suited for our analysis. Moreover, functional forms commonly used to model time-varying effects (e.g., quadratic, logarithmic, or linear trends) also constrain the association between formative features and party mortality to follow "regular" paths defined a priori and might therefore overlook unexpected patterns (e.g., peaks, bumps) in their dynamic relationship. Therefore, we adopt a state-space formulation (Durbin and Koopman 2000) for the coefficients of Insider Status, Societal Rootedness, Ideological Novelty, and Roots in Preexisting Parties, allowing—but not forcing—them to vary over time without imposing parametric assumptions about their trajectories.

Let $O_{i,j}$ be a vector of formative characteristics for party i in country j, and let $X_{i,j,t}$ and $Z_{j,t}$ denote additional party- and system- (country-) level controls, respectively. The trichotomous dependent variable $Y_{i,j,t}$ equals $Y_{i,j,t}^D$ if party i in country j dissolved at time t, $Y_{i,j,t}^M$ if the party underwent a merger, and $Y_{i,j,t}^S$ if it did not experience either type of death. The final category comprises (right-) censored observations and is taken as reference. The death-specific hazard probabilities at t are given by

$$h_{i,j,t}^r = \frac{\exp(\eta_{i,j,t}^r)}{1 + \sum_{k \in \{D,M\}} \exp(\eta_{i,j,t}^k)}, \qquad (1)$$

$$\eta_{i,j,t}^r = O_{i,j}'\alpha_t^r + X_{i,j,t}'\beta^r + Z_{j,t}'\gamma^r + \omega_i^r + \tau_j^r, \qquad (2)$$

where $r = D, M$; α_t^r, β^r, γ^r are hazard-specific regression coefficients; and $\omega_i = (\omega_i^D, \omega_i^M)' \sim N_2(0, \sum_\omega)$, $\tau_j = (\tau_j^D, \tau_j^M)' \sim N_2(0, \sum_\tau)$ are party and country random effects accounting for unmeasured cross-sectional variation and potential correlation between the risks of both types of death. The inclusion of bivariate party- and country-level frailties improves on previous applications of state-space competing risks models that neglected unobserved heterogeneity (Fahrmeir and Knorr-Held 2008), which may induce spurious duration dependence.

The impact of the formative features $O_{i,j}$ on the probabilities of both types of death in (2) is contingent on t and captured by the time-dependent coefficients α_t^r, $r = D, M$. We model the evolution of $\alpha_t = (\alpha_t^{D'}, \alpha_t^{M'})'$ throughout parties' life spans as a latent transition process:

$$\alpha_t = F_t\alpha_{t-1} + \varepsilon_t, \quad t \geq 1, \qquad (3)$$

with F_t a transition matrix controlling the deterministic part of the evolution of α, and $\{\varepsilon_t \sim N(0, Q_t)\}$ a white noise sequence reflecting uncertainty in α's trajectory.

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2. Since some predictors might be highly correlated, we use hierarchical centering to improve the condition of the design matrix (Jackman 2009). Diagnostic tests reported in app. B do not reveal collinearity problems in our data set.

No particular functional form is imposed in (3) for the dependence of α on time. The specification of the dynamic process followed by the coefficients of the formative features is fully general, encompassing all the common parametrizations adopted to model time-varying effects in standard survival analyses, as well as time-invariant effects (i.e., $\alpha_t = \alpha \, \forall \, t$). Importantly, the relationships between each formative feature and each type of party death are estimated from the data at every single point in time, rather than predetermined by functional form restrictions.

We resort to Markov chain Monte Carlo (MCMC) simulations to fit our model (Jackman 2009). As is well known, the Bayesian inferential framework does not rely on asymptotic approximations. This is especially convenient in our setting given that the number of active parties declines steadily over time (see fig. B3), making frequentist inferences based on asymptotic arguments particularly questionable as t grows.[3] Additionally, estimation of the variance parameters—the elements of Q—is automatically "incorporated" into the MCMC algorithm, which renders our approach more appealing than alternative nonparametric techniques like spline or kernel smoothing. Further details about our estimation approach are provided in appendix C.

RESULTS

As a first step in our analysis, table 2 reports the average marginal effects of the covariates on the risks of dissolution and merger death, namely, the expected change in the probability of each type of death associated with a unit change in each explanatory variable, keeping everything else constant. For the formative features, these marginal effects were obtained by averaging the estimated values of α_t across parties' life spans. That is, they represent the life span–averaged difference in h^D and h^M between parties that exhibit a given formative feature and those that do not, holding all other predictors fixed.

Two main findings emerge from the table. First, our estimates substantiate the classical arguments by Duverger (1959) and Panebianco (1988) regarding the influence of genetic imprints on party mortality. Insider Status, Societal Rootedness, and Ideological Novelty all exert a statistically

Table 2. Marginal Effects of the Covariates on the Risks of Dissolution and Merger Death, Averaged throughout Parties' Life Span

Variable	Type of Death	
	Dissolution	Merger
Formative feature:		
Insider Status	1.93	.79
	(.21, 3.48)	(−.03, 2.23)
Societal Rootedness	−2.13	−.14
	(−3.64, −.50)	(−.56, .39)
Ideological Novelty	−.36	−.83
	(−2.09, 1.40)	(−1.78, −.13)
Roots in Preexisting Parties	−.40	−.12
	(−2.57, 1.14)	(−.94, .50)
Party-level control:		
Seat Share	−.46	.09
	(−1.15, .31)	(−.38, .67)
Electoral Performance	.61	.08
	(−.33, 2.08)	(−.39, .68)
National Government	−.71	.15
	(−1.57, .64)	(−.74, 1.12)
State Funding	−.79	−.51
	(−1.71, −.04)	(−1.05, −.02)
EP Access	−1.37	−.44
	(−2.07, −.58)	(−.95, .15)
Regional Government	−1.09	.39
	(−1.79, −.18)	(−.78, 2.42)
Party Distinctiveness	.15	.09
	(−.70, .99)	(−.43, .58)
Party Electoral Coalition	−.38	.14
	(−1.63, 1.56)	(−.98, 1.60)
System-level control:		
Antiestablishment Vote	−.29	.22
	(−.75, .10)	(−.17, .62)
Party System Fragmentation	.32	.06
	(−.17, .94)	(−.28, .34)
Seat Product	.20	.25
	(−.22, .65)	(−.04, .63)
Preelection Year	−1.97	−.69
	(−2.54, −1.32)	(−1.11, −.35)
Election Year	−.75	.08
	(−1.62, .02)	(−.36, .59)
Postelection Year	−.92	.43
	(−1.63, −.28)	(−.27, 1.03)

Note. Posterior means (averaged across t) and 95% highest posterior density intervals (in parentheses) for the marginal effects of the covariates on h^D and h^M, in percentage points. $N = 3,486$; EP = European Parliament.

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3. That the data become sparse as t increases is another reason to adopt a state-space specification, since the fit of a global parametric (e.g., linear or quadratic) trend would be disproportionately influenced by the majority of parties with shorter life spans (Fahrmeir and Knorr-Held 2008). As we discuss below and in app. D, this can affect inferences about the dynamic impact of formative features on party mortality.

significant influence on party mortality. While recent cross-national research has stressed the relevance of specific formative features for party performance and survival (Bolleyer et al. 2019; Zons 2015), the results in table 2 reveal that formative features still matter when examined jointly and after controlling for a wide range of party- and system-level characteristics.

Second, these life span–averaged estimates suggest that each formative feature affects the risk of either dissolution or merger, highlighting the importance of conceptually distinguishing between the two types of death when studying the role of parties' genetic imprint. The involvement of parliamentarians in the foundation of a party is associated with an average increase of 1.93 percentage points in the risk of dissolution, as posited in hypothesis 1. Parties born with the support of preexisting societal organizations, by contrast, are on average 2.13 percentage points less likely to dissolve than those that did not have ties to promoter organizations, in line with hypothesis 2. Nonetheless, and against our expectations, neither Insider Status nor Societal Rootedness seems to have a systematic influence on parties' average probability of merging over their life spans.

Ideological Novelty, in turn, is significantly associated with a reduction in the average probability of merging but not of dissolving. Holding everything else constant, introducing a new ideology in a party system is correlated with a 0.83 percentage point decline in the likelihood of merging over the average sample party's life span. That said, figure 1, which

adds interactions between Ideological Novelty and Roots in Preexisting Parties to our baseline specification, reveals that the negative influence of Ideological Novelty on h^M is driven by parties that also have a structural connection to preexisting parties. The average probability of merging for parties that were built from scratch is statistically indistinguishable from zero, regardless of whether they are ideologically novel.[4] This result lends some credence to hypothesis 3 and underscores the importance of jointly considering these two formative features when evaluating their impact on party mortality, rather than examining them in isolation as done in previous research.

Table 3 compares the fit of our state-space formulation against two alternative modeling strategies for competing risks: the Cox proportional hazards model and a log-normal model. Cox's model is arguably the most widely used approach to estimate the impact of predictors of interest on cause-specific hazards. As is well known, though, a key feature of the standard Cox regression model is that the risk-specific hazards for different values of the covariates are proportional, an assumption that is violated in the presence of time-varying covariate effects such as those anticipated in our theoretical framework (Zhang et al. 2018).[5] The log-normal specification relaxes the assumption of proportional hazards and has been shown to be particularly well suited for modeling the hazard functions of party mortality (Zur 2019). The log-normal competing risks model does, however, impose a specific parametric form on the hazard functions, assuming that the hazards of both dissolution and merger increase at the beginning of parties' life spans, reach their peaks, and then fall off over time.

The results in table 3 show that our state-space specification systematically outperforms both the Cox proportional hazards and log-normal models according to a variety of goodness-of-fit measures and validation methods commonly employed in the literature (Heyard et al. 2020; Hooten and Hobbs 2015). This indicates that adopting a data-driven strategy to modeling the dynamics of the death-specific hazards consistently improves fit and predictive performance vis-à-vis more restrictive specifications. Furthermore, not only do the Cox and log-normal models fit the data worse than our state-space approach, but they also lead to different substantive conclusions regarding the impact of formative features on
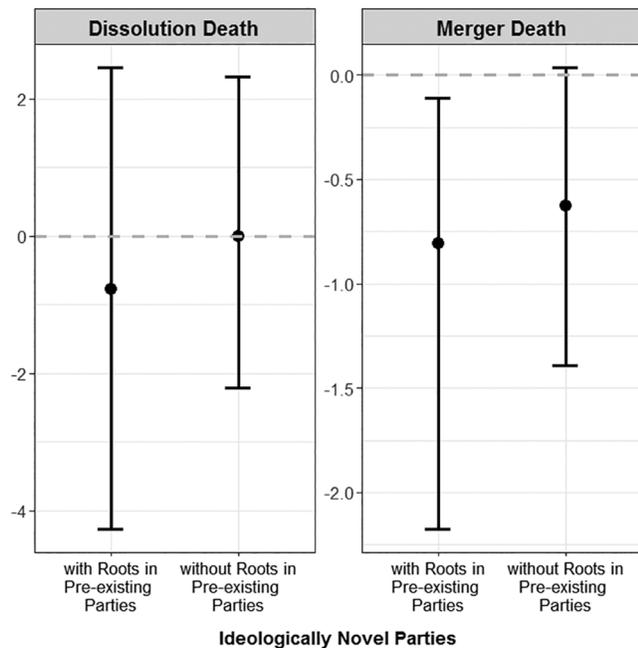

Figure 1. Marginal effects of Ideological Novelty on the risk of dissolution and merger death, conditional on Roots in Preexisting Parties. Circles represent posterior means (in percentage points), averaged across parties' life span; vertical lines give 95% highest posterior density intervals.

4. We also explored whether the life span–averaged hazards h^D and h^M differ for parties that have roots in preexisting parties but are not ideologically novel and those built from scratch (fig. D1). Our estimates indicate that Roots in Preexisting Parties only matters for mortality when it occurs in combination with Ideological Novelty.

5. Schoenfeld's global test (Zhang et al. 2018) indicates that the proportional hazards assumption is indeed violated in our application.

Table 3. Comparing the Fit of the State-Space Model Vis-à-Vis Alternative Specifications

	Models		
	State-Space	Cox	Log Normal
Akaike Information Criterion (AIC)	804.08	1,045.80	842.39
Bayesian Information Criterion (BIC)	877.96	1,870.77	1,088.65
Consistent AIC (CAIC)	889.96	2,004.77	1,128.65
Watanabe Information Criterion (WAIC)	637.54	645.81	654.96
Integrated prediction error (IPE, ×100)	.79	.91	1.94
C index (×100)	88.47	68.27	86.75

Note. Models with lower AIC/BIC/CAIC/WAIC values fit the data better; models with lower IPEs and higher C indexes exhibit better predictive performance. See Heyard et al. (2020), Hooten and Hobbs (2015), and the references therein for a description of the formulas used to calculate these goodness-of-fit measures.

h^D and h^M This is shown in figure 2, which plots the marginal effects of formative features on the risks of dissolution and merger death computed from these alternative specifications.[6]

Unlike the marginal effects reported in table 2, the estimates in figure 2 indicate that the impact of Insider Status on the life span–averaged risk of dissolution is statistically indistinguishable from zero under both the Cox and the log-normal models, while Societal Rootedness is significantly associated with a reduction in the two death-specific hazards. The interaction between Ideological Novelty and Roots in Preexisting Parties is also significantly and negatively correlated with the average probabilities of dissolution and merger, obscuring the differential influence of this combination on the two types of death observed in figure 1.

Our state-space formulation has another crucial advantage relative to these alternative specifications: whereas the standard Cox proportional hazards and log-normal models do not accommodate time-varying covariate effects, our approach is able to capture the dynamic relationships between formative features and party mortality without stringent regularity or shape constraints. This is particularly relevant for our purposes. Although the life span–averaged estimates reported in table 2 provide preliminary support for our theoretical framework, a rigorous test of our hypotheses requires a fine-grained analysis of the influence of formative features on the probabilities of dissolution and merger death at different points of parties' life spans. Consequently, figure 3 explores the impact of Insider Status and Societal Rootedness on the (log-hazard) probabilities of the two types of death throughout parties' trajectories.

Echoing Duverger's (1959) prominent distinction between political formations inside and outside institutions (parliament in particular), Insider Status affects the risk of both types of death at some point of parties' life spans. More specifically, and in accordance with hypothesis 1, the upper-left panel of figure 3 reveals that Insider Status is associated with a significant increase in the risk of dissolution toward the middle of parties' life spans. While we do not observe significant differences in the likelihood of dissolution between insider parties and those founded without the support of
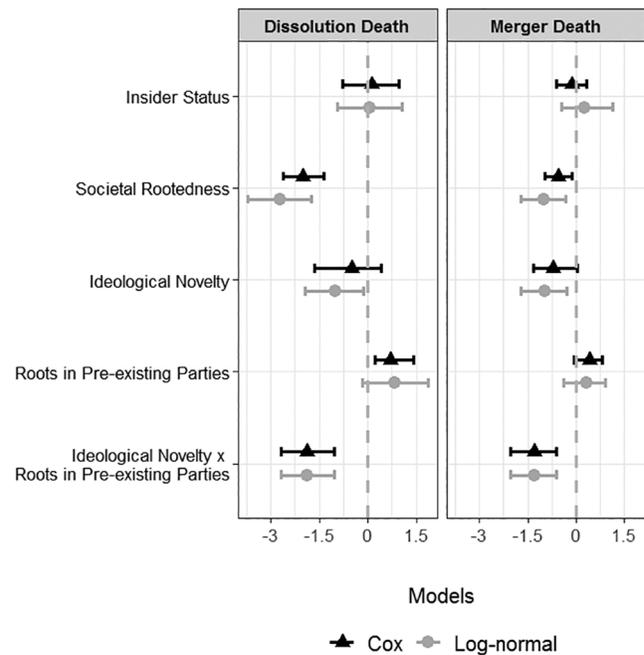

Figure 2. Life span–averaged marginal effects of formative features on h^D and h^M estimated from the Cox and log-normal competing risks models. Circles represent posterior means (in percentage points); horizontal lines give 95% highest posterior density intervals.

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6. The marginal effects of the party- and system-level controls estimated from the Cox and log-normal models are reported in app. D.
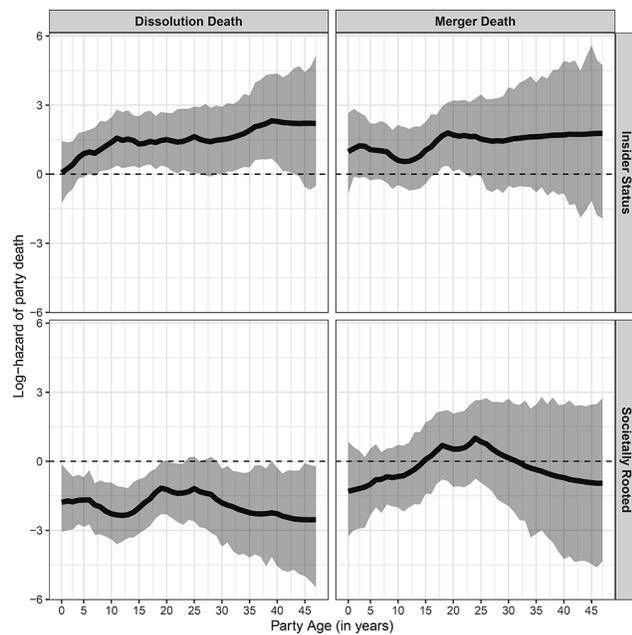
Figure 3. Time-varying impact of Insider Status (*top*) and Societal Rootedness (*bottom*) on the (log-hazard) probabilities of dissolution and merger death. Solid lines represent point estimates; shaded areas give the 95% highest posterior density intervals.

elected officials in the first few years of their existence, the former become 3.15 percentage points more likely to dissolve a decade after their foundation. By then, the MPs who helped build the new formation may have deserted it (e.g., because the party failed to meet their expectations), or their political careers may have ended (Deegan-Krause and Haughton 2018; Mair 1990). The departure of these founders—interested in protecting their own position of power—tends to disrupt insider parties, as they are unlikely to have invested in procedures for leadership renewal earlier on (Bolleyer 2013; Krouwel and Lucardie 2008).

As noted in the theory section, this effect is likely to lose relevance once insider parties have outlived their founding generation. Consistent with our expectations, the difference in the probabilities of dissolving between insider and extra-parliamentary formations becomes statistically indistinguishable from zero eventually.

The upper-right panel of figure 3 shows that Insider Status has no significant impact on the probability of merging in early stages, when instrumentally oriented incumbents who left their previous party to create a new political formation might still be strongly disinclined to compromise their recently acquired power. Nevertheless, if the—political or electoral—benefits founders expected to achieve by building the new formation do not materialize after several election cycles, competing as a separate player may lose its allure. By that point, the advantages of a merger (e.g., the opportunity to

rebrand the party and appeal to a broader electorate; Ware 2009) may outweigh its costs. This rationalizes why, 15 years after their birth, the likelihood of merging becomes almost 2 percentage points higher for organizations with Insider Status than for those without it. As seen in the figure, though, this difference remains significant for about 17 years and becomes statistically indistinguishable from zero afterward: by then, the leadership of an insider party will have been fully socialized into and recruited from the party organization and, thus, may be more inclined to protect its separate identity. The moderate and relatively ephemeral impact of Insider Status on the probability of merging also helps explain the null marginal effect of this variable on h^M reported in table 2, as this effect was averaged across parties' entire life spans.

Altogether, the results in the upper panels of figure 3 indicate that hypothesis 1 is borne out by the data, once the assumption of a time-invariant relationship between Insider Status and party mortality is relaxed. Unlike the life span–averaged estimates reported in table 2, the findings in figure 3 lead to the conclusion that being formed with the support of politicians shapes both types of death as parties transition to adulthood. This again underscores the value added of studying the time-varying relationships between formative features and mortality and, more generally, of adopting a dynamic approach to the study of party success and failure through the application of innovative empirical methods (Emanuele and Sikk 2021). Importantly, hypothesis 1 would have been rejected if standard modeling strategies had been implemented or predetermined parametrizations had been adopted for the coefficients of the formative features (see also figs. D2–D4).

While hypothesis 1 is decidedly backed by the empirical analysis, the evidence for our second hypothesis is less conclusive. This is illustrated in the bottom panels of figure 3, which trace the evolution of the relationship between Societal Rootedness and the two types of party death. The lower-left panel of the figure shows that, as stated in hypothesis 2, Societal Rootedness is associated with a systematic decline in h^D early and late during parties' life spans (i.e., during adolescence and old age). Keeping all other variables constant, a party formed with the support of a preexisting societal organization is 1.77 percentage points less likely to dissolve than a formation without a societal base in the first 18 years of its existence. As argued above, having links to a societal group provides the new party with access to material and nonmaterial resources (e.g., candidates, committed activists, members) that help stabilize its support base, thereby enhancing its self-sufficiency. These resources can be critical in limiting the risk of dissolution—especially during adolescence, when the organization is not yet institutionalized and is therefore particularly vulnerable (Panebianco 1988; Randall

and Svåsand 2002). As parties mature organizationally and broaden their support base, promoter organizations matter less. Accordingly, the probability of dissolution between parties with and without external societal support becomes statistically indistinguishable over the next decade of their lives. The impact of Societal Rootedness on h^D again becomes significantly negative late in parties' life spans, in congruence with hypothesis 2: this formative feature regains relevance when an organization transitions to old age and needs to renew a support base that has aged with it. The nuances of this dynamic relationship between Societal Rootedness and h^D are lost when conventional models or specifications imposing "known" functional forms on α_t are fitted (see also app. D).

The bottom-right panel of figure 3 shows that Societal Rootedness has no significant influence on the probability of merger death at any point in time. This finding is in agreement with the results in table 2 but contradicts hypothesis 2 as well as the results of prior work that constrained the dynamic relationship between Societal Rootedness and h^M to conform to functional forms defined a priori (Bolleyer et al. 2019). Once a less restrictive modeling approach is adopted, the association between the two variables vanishes.

Finally, to assess hypothesis 3, figure 4 plots the relationship between Ideological Novelty and the risk of dissolution and merger over time. Since both our theoretical framework and the estimates in figure 1 suggest that Roots

in Preexisting Parties moderates the impact of Ideological Novelty, figure 4 distinguishes between ideologically novel formations that are rooted in preexisting parties (upper panels) and those that are not (lower panels).

The patterns observed in the figure provide only mixed support for hypothesis 3. Against our expectations (but again consistent with the estimates in table 2), the left panels of figure 4 show that being the first formation to introduce a novel ideology in a party system has no systematic influence on h^D, irrespective of whether the formation was born with the support of preexisting parties. Nonetheless, the right panels of figure 4 show that, in line with our hypothesis, Ideological Novelty reduces the probability of merging throughout most of parties' life span, although only among formations rooted in preexisting parties. As discussed earlier, this configuration not only grants a party a distinctive position within its party system but also helps underpin and stabilize its novel organizational identity in the longer term. Combining Ideological Novelty and Roots in Preexisting Parties hampers parties' ability to find an ideologically suitable merger partner while simultaneously rendering it more difficult for the leadership of potential partners to convince their structurally more embedded followers to give up their parties' autonomy in a merger deal. Again, these findings would have been missed if commonly used models for competing risks had been fitted or ad hoc parametrizations had been assumed for α_t (see also figs. D5–D7).[7]

CONCLUSION

The notion that parties' formative features (i.e., the way they are born) shape their long-term evolution and chances of survival is little contested in research on political parties (Duverger 1959; Panebianco 1988; Sartori 1976). Nonetheless, to date no analysis has theorized and empirically tested the—individual and joint—implications of the full range of formative features identified as relevant in the literature over the course of parties' life spans. To close this gap we proposed a life cycle perspective integrating "age" and "timing" to theorize party mortality (Haughton and Deegan-Krause 2021, 24) and formulated three hypotheses on how and when four key formative features discussed in the literature—Insider Status, Societal Rootedness, Ideological Novelty, and Roots in Preexisting Parties—influence party mortality.

A rigorous test of these hypotheses was made possible by using—to our knowledge for the first time in comparative
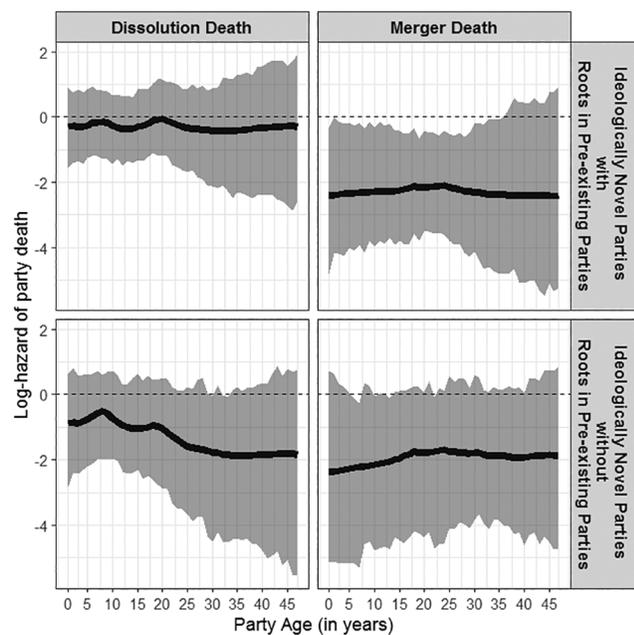

Figure 4. Time-varying impact of Ideological Novelty on the (log-hazard) probabilities of dissolution and merger death, conditional on Roots in Preexisting Parties. Solid lines represent point estimates; shaded areas give the 95% highest posterior density intervals.

7. Note also that the estimates in the right panels of fig. 4 are nearly time invariant. Our state-space model is thus able to accommodate situations in which the impact of formative features on party mortality is stable over time without the need to treat the parameters as constant.

politics—a state-space duration model (Durbin and Koopman 2000). This empirical strategy allows the nature of the dynamic relationship between formative features and party mortality risk to be determined by the data, rather than forced to follow predefined specifications—as is the norm in extant research. The adoption of a state-space formulation to account for time-varying covariate effects greatly improved model fit vis-à-vis standard approaches and allowed us to gain a more refined understanding of the influence of formative features on the risk of party mortality. State-space models thus constitute valuable methodological tools for researchers interested in comprehending and thoroughly examining the over-time dynamics of political phenomena.

Substantively, our results call into question the intuitive notion that formative features matter most in parties' adolescence and lose relevance once they age. In consonance with our theoretical expectations, Insider Status is associated with an increase in mortality risk toward parties' midlife, Societal Rootedness decreases the probability of dissolution early and late in parties' trajectories, and the combination of Ideological Novelty and Roots in Preexisting Parties reduces the hazard of merger death for most of formations' life spans. That these patterns hold after controlling for central measures of party performance (party vote and seat shares), institutional opportunity structures (state funding access), and systemic features (e.g., the permissiveness of the electoral system and party system fragmentation) underlines that parties cannot escape the conditions of their births (Haughton and Deegan-Krause 2021).

Furthermore, while previous studies inspected one or a subset of the relevant formative features in isolation, our work underscores the added value of analyzing configurations of birth characteristics. Theorizing that combining Ideological Novelty and Roots in Preexisting Parties links resources for party building to a distinct identity, we expected them to jointly affect whether parties are inclined to give up their organizational autonomy throughout their life span, which is what we found. This highlights "that embracing new issues can be difficult" (Sikk 2012, 481) and that emerging from outside the party system that represents lines of conflict known by voters is a double-edged sword (Lucardie 2000, 177–78). However, the challenges faced by ideologically novel parties can be mitigated when such formations emerge from already established parties.

Although we focus on new formations in established party systems, the implications of our research are wider. In particular, our finding that Insider Status is the only formative characteristic that increases the risks of both dissolution and merger death is relevant for younger party systems like those in Central and Eastern Europe. Such systems tend to be dominated by parties built with the support or involvement of incumbent officeholders (Deegan-Krause and Haughton 2018; Haughton and Deegan-Krause 2021; Sikk 2005; van Biezen 2005). Our life cycle perspective sheds light on the endogenous challenges these organizations face when moving from adolescence to adulthood (Aldrich and Ruef 2011; O'Rand and Krecker 1990) and points to the vulnerability that insider parties experience when undergoing this critical transition toward consolidation. In view of the high levels of party and party system instability in new democracies (Sikk 2005), future studies should examine how insider parties experience a leadership vacuum in "real time," if and when they manage to consolidate or, alternatively, decline (Harmel, Svåsand, and Mjelde 2018). As demonstrated by recent work on Central Europe (Haughton and Deegan-Krause 2021), a focus on party agency with an acute awareness of context can help address such questions, which are most suitably examined by in-depth case studies tracing processes of party evolution over time to capture the motivations of the actors driving them.

ACKNOWLEDGMENTS

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