

¹ Big Spenders: Large-N Measures of Urban Regimes in Japanese Cities

² Timothy Fraser^{1,1,1,*}

^a*Systems Engineering Cornell University*

³ **Abstract**

This is the abstract. It consists of two paragraphs.

⁴ *Keywords:* urban regime, cities, policy, social welfare, social capital, Japan

⁵ **1. Introduction**

Who governs? As cities face increasing threats from climate change and climatic hazards, the coalitions and interests of power brokers who govern our cities are likely changing. Since Dahl's (1961) case study of New Haven's mayor posed the famous question, "Who Governs?", scholars have puzzled over the governance of cities: Much attention has been paid to different types of coalitions (Munoz and Henry, 1986; Stone, 1989; Stoker and Mossberger, 1994; Gilliam, 1996; Davies, 2017; Russo and Scarnato, 2018), mayors (Ramirez-Perez et al., 2008; de Benedictis-Kessner and Warshaw, 2016; Freier and Thomasius, 2016; Einstein and Glick, 2018), and interest groups (Logan and Rabrenovic, 1990; Mossberger and Stoker, 2001; Cooper et al., 2005; Portney and Berry, 2016; Anzia, 2019) that govern city politics. Urban regime scholars argue that the powerbrokers together constitute an "urban regime" (Stone, 1993), coined in Clarence Stone's (1989) study of Atlanta politics. "Urban regime" refers to elected officials and unelected powerbrokers alike, such as influential firms, NGOs, or citizens groups, who determine what policy actions a city can and cannot take (Mossberger and Stoker, 2001). As cities experience more disasters, migration, and social change in the face of storms, floods, fires, hurricanes, and other disasters, we would naturally expect these urban regimes to change. But to date, these changes have been difficult to detect systematically, with most work on urban regimes focusing on single city case studies; to date, the largest samples of cities systematically classified by urban regime has been De Socio's (2007) 24-city sample and Kilburn's (2004) 14-city sample, using Stone's (1993) 4 regime type classification.

*Corresponding author

Email address: timothy.fraser.1@gmail.com (Timothy Fraser)

¹This is the first author footnote.

23 This study aims to fill that gap, introducing a framework for measuring city's propensity towards each of
24 4 common urban regime types, and evaluating the change in frequencies of urban regimes over time. I employ
25 Stone's (1993) 4-regime classification, which includes (1) caretaker, (2) developmental, (3) middle-class, and
26 (4) social welfare regimes, discussed in the literature review.

27 These categories raise natural questions in the face of climate change: In the face of crisis, have social
28 welfare regimes become more common, compared to regimes prioritizing business or middle-class interests?
29 Or, have city politics stagnated with a rise in caretaker regimes that simply maintain the status quo?
30 To answer these questions, I apply this framework to a Large-N sample of 1741 Japanese municipalities
31 over 20 years from 2000 to 2020. The Japan Statistical Bureau reports considerable annual data for each
32 municipality, allowing scholars to approximate the basic contours of cities' urban regimes by a simple,
33 publicly available proxy of each cities' governance priorities: *spending rates*. While spending cannot tell
34 us specific actors that govern, it can broadly approximate which of Stone's (1993) 4 types of regimes are
35 driving city policy. Generally speaking, a true developmental regime would spend more city funds in support
36 of business needs; similarly, a true social welfare regime would spend more in support of social welfare needs.
37 Not to replace, but to aid qualitative investigations of urban regimes, this study designs a method to make
38 Large-N comparisons among thousands of cities at a time. I posit that we can detect measurable differences
39 among cities in terms of their spending rates.

40 As a preview of my results, I find that even after accounting for population and inflation, city spending
41 rates vary substantially over time, with certain urban regimes' spending priorities becoming more common
42 with each passing year while others become less common. In particular, I document the 20-year rise of the
43 social welfare regime as the most common type of urban regime, growing from just XX% of cities in 2000
44 to YY% of cities in 2020. I also detect geographic patterns, with coastal areas investing more heavily in
45 social welfare regime priorities over time. These are exciting and heartening findings, because they indicate
46 that while national-level governance on climate has made progress with starts and stops, our cities are not
47 unilaterally gridlocked, stuck in caretaker, status quo regimes. Instead, many cities are transitioning to
48 social welfare regimes, increasing their spending on social welfare issues like food security, housing, and
49 disaster recovery above the median level nationwide.

50 **2. Literature Review**

51 *2.1 Urban Regime Theory*

52 Since Stone's (1989) examination of urban regimes in Atlanta, dozens of case studies have detailed
53 different urban regimes and governance arrangements throughout the world (Stoker and Mossberger, 1994;
54 Mossberger and Stoker, 2001; De Socio, 2007; Camou, 2014; Davies and Blanco, 2017; Rosol et al., 2017;
55 Russo and Scarnato, 2018). Over 30 years since the term's coining, urban regimes received praise (Kilburn,
56 2004; Davies and Imbroscio, 2009) and criticism (Sites, 1997; Davies, 2003; Imbroscio, 2003, 2004) for how
57 easily it can be applied to understand city politics.

58 Many regimes once thought to be long-standing have come undone and changed quickly in recent years
59 (Stone, 2015; Stone et al., 2015), making the field awash in related terms like "urban governance" (Pierre,
60 2014; da Cruz et al., 2019), governance networks (Gissendanner, 2003; Davidson et al., 2019), policy networks
61 (Bulkeley and Betsill, 2013; Hawkins et al., 2016; Wukich, 2022), public-private partnerships (Stoker, 1998;
62 Davies, 2017; Guo and Ho, 2019), and multi-tiered political orders (Stone, 2015; Weaver, 2022), or a just,
63 socially equitable city (Campbell, 1996; Fainstein, 2010). Others extended definitions of urban regimes,
64 applying versions of it to social welfare crisis in the face of mass displacement and other social crises
65 (Lambelet, 2019).

66 Nomenclature aside, these frameworks all generally aim to explain "who governs," but systematic cate-
67 gorizations of many cities at once have been rarer, usually confined to small-to-medium-N analyses (Sellers,
68 2002; Kilburn, 2004; Stone et al., 2015; Davies and Blanco, 2017). Below, I synthesize a basic typology of
69 urban regimes for measurement from the extended literature, and outline the argument for why it matters
70 'who governs' cities in the face of climate change.

71 *2.2 Redistributive Politics*

72 For the purposes of this study, urban regimes also are an effective, local level tool for thinking about
73 the broader class of politics that climate resilience initiatives exemplify: redistributive policies, a familiar,
74 long-standing, and particularly pernicious policy challenge for cities (Meltzer and Scott, 1981; Pierson, 1994;
75 Hacker, 2004; Iversen and Soskice, 2006; Mettler, 2011; Rueda and Stegmüller, 2019). National, regional,
76 and city governments each work with redistributive policies, aiming to provide en masse specific public goods
77 that are particularly difficult for residents to obtain individually, especially for vulnerable residents.

78 Previous literature dealt with electoral (Meltzer & Richards; Iversen & Soskice 2006), institutional
79 (Pierson, 1994; Hacker, 2004; Mettler, 2011), or street-level implementation (Lipsky, 1980; Hupe and Hill,

80 explanations for the success and continuity of redistributive policies. However, these studies dealt less
81 with the community resources available to cities, like partnerships with businesses (Stone, 1989; Mossberger
82 and Stoker, 2001), civil society advocacy groups (Portney and Berry, 2016), neighborhood associations
83 (Logan and Rabrenovic, 1990), and local networks (Aldrich and Meyer, 2015). These often overlooked
84 community resources can play important roles in redistributing resources to residents in need (Aldrich and
85 Kyota, 2017; Klinenberg, 2018).

86 What kinds of redistributive policies, then, were past scholars writing about? The classic example of
87 redistributive policy is social welfare support for low-income families and unemployment insurance (Pier-
88 son, 1994; Hacker, 2004), to abate the health and economic challenges of entrenched poverty (Ahammar
89 and Packham, 2020; Berkowitz and Basu, 2021). In addition to these, governments have tackled many
90 redistributive policy issues in the past. These include, for example:

- 91 • Social security policies aimed to eliminate poverty among the elderly, by redistributing the resources
92 of other age groups (Titmus 1965, Conde-Ruiz & Profeta 2007).
- 93 • Universal health care, or market solutions, both aim to eliminate loss of life and financial ruin due to
94 medical expenses, by redistributing the costs of health care issues to the entire population (Mettler,
95 2011).
- 96 • Public education sought to remedy lack of access of education and opportunity in working class families
97 by publicly funding education through the taxbase (Mettler et al., 2005).
- 98 • Highway systems (Congleton and Bennett, 1995; Zhu and Brown, 2013), electrification (Baker and
99 Phillips, 2019; Breetz et al., 2018), and public transportation (Hood, 2006) seek to connect citizens
100 and expand economic development, important to everyone, but are challenging for any one city or
101 company to pay for (Boarnet and Haughwout, 2000).

102 These redistributive programs frequently develop policy constituencies if the group benefitting from them
103 is sizable enough (Meltzer and Richard, 1981; Campbell, 2012); in some states, these programs' continuation
104 is conditional, becoming political currency for pork-barrel politics (Fukui and Fukai, 1996; Catalinac et al.,
105 2020), while in others, they become permanent fixtures in national policy (Pierson, 1994).

106 However, moving beyond these federal- or state-level examples, in fact, cities have been tackling redis-
107 tributive issues for generations (Peterson, 1981; Saiz, 1999; Tonkiss, 2020). Cities use redistributive policies
108 to remedy unequal access to employment in neighborhoods by funding public transit for all (Frankena, 1973;

¹⁰⁹ Asensio et al., 2003; Glaeser et al., 2009; Fearnley and Aarhaug, 2019; Wiesel and Liu, 2021). They may
¹¹⁰ support local businesses that might struggle to secure consistent customers by providing public venues or
¹¹¹ markets (Tangires, 1997). Cities may use public funds to free up real estate and housing available in various
¹¹² neighborhoods (Dettter and Folster, 2017), or, in the shameful history of many cities, cities can be complicit
¹¹³ in redlining and illegally restricting access to housing (Rothstein, 2017). Lately, cities' efforts at improving
¹¹⁴ health equity are especially visible, as cities conduct and manage public health campaigns, like current city
¹¹⁵ efforts to rollout testing and vaccination during the COVID-19 pandemic (Berkowitz and Basu, 2021). Some
¹¹⁶ national governments lean on cities to provide services that legitimize their state (Wallace, 2013). And in
¹¹⁷ many countries, cities play a key role in the disbursement and coordination of social welfare distribution
¹¹⁸ (Katz and Allen, 2001; Weir and King, 2021), and must secure the necessary funding for these projects
¹¹⁹ (Payson, 2022).

¹²⁰ Climate resilience initiatives, on the other hand, are a new form of redistributive policy. These initiatives
¹²¹ extend critical benefits to society, but often struggle to achieve electoral support because their benefits
¹²² are diffuse, except to the most vulnerable in society who need them. However, not all types of urban
¹²³ regimes prioritize redistributive policies like social welfare support; indeed, three out of the four regime
¹²⁴ types discussed below specifically prioritize other needs. Social welfare's relevance to climate resilience
¹²⁵ makes it especially important to identify whether social welfare-oriented regimes are increasing or declining.

¹²⁶ 2.3 Types of Urban Regimes

¹²⁷ As discussed above, Clarence Stone (1993) and later comparative studies (Kilburn, 2004; De Socio, 2007)
¹²⁸ primarily relied on 4 main types of urban regimes, including (1) caretaker, (2) developmental, (3) middle-
¹²⁹ class, and (4) social welfare regimes. Over 30 years, scholars have created numerous other types of urban
¹³⁰ regimes, sometimes conflicting or concept stretching, as some have argued (Mossberger and Stoker, 2001);
¹³¹ however, these original 4 regime types are still arguably the main types at play today. I outline in Table 1
¹³² a basic typology.

Table 1: Typology of Urban Regimes

Regime	Definition	Examples	Related	Japanese Examples
Caretaker	maintains status quo, traditional municipal service provision	New Orleans (Whelan et al. 1994)	Maintenance/Status Quo (Stone 1989) Bystander (Portz 1990) Austerity (Davies & Blanco 2017)	-
Developmental	promotes economic growth while preventing economic decline	Atlanta (Stone 1989)	Entrepreneurial Regimes (Euchner 1993) Public-Private Partnerships (Davies 2017) Player (Portz 1990) Castle Towns (Funabashi 2006; Hill & Fujita 1993)	Tokyo (Saito 2003; Tsukamoto 2012; Sorensen et al. 2010) Kitakyushu (Yeum 2002) Minamata (Funabashi 2006) Kobe Post-1995 (Edgington 2010)
Middle-Class	promotes egalitarian policies in education, health, environment, and city planning	Santa Cruz (Gendron & Domhoff 2018)	Progressive (Stone 1989) 'Anti-Regime' (DeLeon 1992)	Mitaka (Takao 2006) Kyoto (Sugiyama & Takeuchi 2008)
Social Welfare	improves conditions for working class, expands social safety net	Early Toronto (Mahon 2007)	Opportunist (Stone 1989) Activist (Clark 2001) Stewardship Regimes (Nissen 1995)	Iida (Fraser et al. 2020) Yokohama (Hayashi 2013) Mikura Ward, Kobe (Yasui 2007)

133 The first type is (1) *caretaker regimes*. In these cities, the incumbent regime seeks to maintain a city's
134 status quo (Turner, 1992; Whelan et al., 1994). The municipality provides basic services, but avoids expand-
135 ing. Past studies labeled the city of New Orleans, pre-Katrina, as a good example. Other terms capture
136 the same approximate meaning, including maintenance regimes (Stone, 1989) or bystander regimes (Portz,
137 1990), which refer to regimes that played no major role when industrial firms closed shop in the US rustbelt.
138 Relatedly, some cities have also organized under austerity regimes, focused on cutting expenses, rather than
139 expanding policies; this subtype lies somewhere between caretaker regimes and developmental regimes, as
140 they usually cut expenditures on social welfare or progressive causes, but not necessarily economic interests
141 (Davies and Blanco, 2017). To the author's knowledge, few studies have tracked caretaker regimes in Japan;
142 this study aims to help remedy that.

143 The second type is (2) *developmental regimes*. These regimes prioritize economic development and
144 business interests, while preventing economic decline (Stone, 1989; Austrian and Rosentraub, 2002; De Socio,
145 2007). A robust literature has covered these, starting with archetypes like Stone's (1989) Atlanta. Scholars
146 have proposed several subtypes over the years that group well under developmental regimes, including
147 entrepreneurial regimes, describing regimes' enticement with sports industries (Euchner, 1993), tourism-
148 focused regimes (Russo and Scarnato, 2018), public private partnerships (Davies, 2017), and player cities,
149 describing those which advocate intensely to bring in or keep industry (Portz, 1990). A related concept in
150 the Japanese literature is "castle towns," referring to cities where the entire city government and economy is
151 closely structured around one industry (Hill and Fujita, 1993). Famous examples include Minamata, which
152 suffered considerable environmental pollution due to the Chisso corporation in the 1950s (Funabashi, 2006);
153 more recent examples of castle towns are nuclear power plant host communities (Aldrich and Fraser, 2017).

154 Developmental regimes and related types have received considerable attention in Japan, with studies
155 emphasizing the neoliberal, developmental priorities of property development in post-Bubble Tokyo (Saito,
156 2003; Tsukamoto, 2012; Sorensen et al., 2010), developmental priorities in reconstruction plans from the Kobe
157 Earthquake (Edgington, 2010), and early efforts to reduce air pollution in industrial cities like Kitakyushu
158 (Yeum, 2002).

159 The third common type is (3) *middle-class regimes* (a.k.a. progressive regimes[^][Usually called progressive
160 regimes, I term these 'middle-class' regimes to avoid confusion with the next type, which support progressive,
161 redistributive policies.]). These regimes support middle-class, progressive interests like environmentalism,
162 health care, education, and quality city planning (DeLeon, 1992; Gendron and Domhoff, 2018; Rosdil, 2016).
163 Past examples include politically left-wing city politics in Santa Cruz, San Francisco, and Seattle, among

¹⁶⁴ others (Gendron and Domhoff, 2018). These regimes focus on a specific type of progressivism, namely
¹⁶⁵ egalitarian ideals, such as environmental conservation and sustainability (Rosol et al., 2017), but these
¹⁶⁶ regimes tend to support middle-class interests, rather than working class interests (Kilburn, 2004).

¹⁶⁷ Famous Japanese examples include Mitaka City, a Tokyo suburb known for progressive environmental
¹⁶⁸ policy, quality of life, and citizen engagement (Takao, 2006). Similarly, large cities like Kyoto (Sugiyama
¹⁶⁹ and Takeuchi) and smaller cities like Iida in Nagano Prefecture (Fraser et al., 2020) have both received
¹⁷⁰ attention for their cities' emphasis and leadership on environmentalism.

¹⁷¹ Finally, the fourth type refers to (4) *social welfare regimes* (a.k.a. opportunist regimes ¹⁷²/*Sometimes called
¹⁷³ ‘opportunist’ regimes, referring to aims to expand the social safety net, this study re-terms this category
¹⁷⁴ ‘social welfare regimes’, to more respectfully characterize these policies.)*. These regimes prioritize social
¹⁷⁵ welfare support for the working class and related redistributive policies, such as unemployment insurance,
¹⁷⁶ public housing, and financial support for families in need, eg. after crisis (Stone, 1993; Thompson III,
¹⁷⁷ 2005; Camou, 2014; Lai and Chui, 2014; Arbaci, 2019). Related monikers include ‘opportunist regimes,’ as in
¹⁷⁸ those aiming to expand the social safety net (Stone, 1989), activist regimes (Clark), which use neighborhood
¹⁷⁹ coalitions and activist groups to push for social equity (Thompson III, 2005), labor coalitions (Camou, 2014),
¹⁸⁰ and stewardship regimes (Nissen, 1995), which negotiate with businesses for fair treatment of workers. While
¹⁸¹ the shape of social welfare policy varies by city and country, Canadian and UK cities are particularly known
¹⁸² for efforts to expand social safety nets (Saraceno, 2002), like Toronto’s early work expanding childcare
¹⁸³ (Mahon, 2007), although Toronto has shifted over time to a developmental/progressive regime. Japanese
¹⁸⁴ urban studies research has highlighted Yokohama for its particularly expansive support for the homeless
¹⁸⁵ (Hayashi, 2013), as well as specific city wards like the working class neighborhood of Mikura in Kobe for
¹⁸⁶ its robust advocacy for social equity in the reconstruction process after the 1995 Kobe Earthquake (Yasui,
2007).

¹⁸⁷ 2.4 Correlates of Urban Regimes

¹⁸⁸ Given how useful social welfare regimes can be in the era of climate change, what kinds of cities develop
¹⁸⁹ social welfare regimes, and which do not? While little literature directly tackles this question, past studies
¹⁹⁰ summarized below suggest several likely correlates.

¹⁹¹ 2.4.1 Demographic and Financial Correlates of Urban Regimes

¹⁹² First, we expect some cities are predisposed towards certain types of urban regimes. Highly populated
¹⁹³ cities, cities with higher income per capita, cities with more revenue per capita, and cities with better

¹⁹⁴ balanced budgets have more funds and other resources to spend on advancing a social welfare regime (or a
¹⁹⁵ developmental or middle-class regime, for that matter). But cities who receive a larger share of their annual
¹⁹⁶ budget from the national or prefectural government may face more pressure to conform with national or
¹⁹⁷ prefectural objectives, which often come in the shape of economic development policy. Such cities might
¹⁹⁸ invest *less* in social welfare.

¹⁹⁹ *2.4.2 Partisanship and Urban Regimes*

²⁰⁰ Second, party interests may push some cities towards or against social welfare spending. The Liberal
²⁰¹ Democratic Party is, despite its name, Japan's long-time conservative party, and traditionally promotes
²⁰² business interests and economic development. Past studies explains that when the LDP accepts social welfare
²⁰³ policies, it usually does so to counter any competitive advantage that policy gives left-leaning opposition
²⁰⁴ parties prior to elections, as was the case in universal health care legislation. Cities where the Liberal
²⁰⁵ Democratic Party performed well in recently elections thus likely have little incentive to adopt social welfare
²⁰⁶ policies; their local officials and prefectural party machine are more likely to push for developmental policies.

²⁰⁷ *2.4.3 Social Capital and Urban Regimes*

²⁰⁸ However, cities with greater collective action potential might be more likely to adopt social welfare
²⁰⁹ regimes, if local residents have strong social capital. Past literature highlights that social capital, the social
²¹⁰ ties that bind residents ([Putnam, 2000](#); [Woolcock, 2010](#)), come in three different forms with distinct impacts
²¹¹ on public participation and policymaking: bonding, bridging, and linking social capital ([Aldrich and Meyer,](#)
²¹² [2015](#)).

²¹³ *Bonding Social Capital.* Bonding social capital refers to strong in-group ties between members of the same
²¹⁴ social strata (eg. race, ethnicity, age, gender, income) ([McPherson et al., 2001](#); [Mouw, 2006](#)). We might
²¹⁵ expect bonding social ties to help residents petition for more middle class interests, which benefit a broad
²¹⁶ swath of residents, but fail to organize broad, cross-community coalitions to support social welfare ([Tsai,](#)
²¹⁷ [2007](#); [Cox and Perry, 2011](#); [Alcorta et al., 2020](#)).

²¹⁸ *Bridging Social Capital.* In contrast, bridging social capital refers to strong inter-group ties connecting mem-
²¹⁹ bers of different social strata (eg. members of different racial, ethnic, age, gender, or income backgrounds)
²²⁰ ([Putnam, 2000](#); [Aldrich, 2019](#)). A vast literature suggests that stronger bridging social ties help residents
²²¹ organize to improve access to public goods for the *entire* community, because they build strong inter-group
²²² trust and reciprocity that encourages folks to mobilize, vote, and participate in civil society.

²²³ *Linking Social Capital.* Finally, linking social capital refers to vertical ties connecting residents to local
²²⁴ officials (Woolcock, 2010; Aldrich, 2019). We might expect that cities with stronger linking social capital
²²⁵ are less likely to be caretaker regimes, but could result in greater social welfare, developmental, or middle
²²⁶ class regimes, depending on residents' interests. In addition to the concepts discussed above, cities with
²²⁷ higher levels of education and lower levels of population turnover also tend to build stronger social ties. To
²²⁸ date however, despite the strong likelihood of a connection between social capital and urban regimes, no
²²⁹ study to the author's knowledge has yet investigated these two concepts together.

²³⁰ *2.5 Timing and Path Dependence*

²³¹ Finally, timing matters. First, social welfare regimes (and spending in general) is notoriously path
²³² dependent, where once governments institutionalize certain spending programs, they tend to stick around.
²³³ Second, regimes may shift according to the social constraints of the time. After the 2011 triple disaster,
²³⁴ a surge of disaster recovery spending occurred in the Tohoku region; we might expect this disaster pushed
²³⁵ some cities towards social welfare regimes in order to provide better for vulnerable families and elders in the
²³⁶ aftermath. Conversely, some cities rebuild primarily according to central government instructions, spending
²³⁷ primarily on infrastructure while neglecting community spending; as a result, the impact of the disaster on
²³⁸ social welfare regime evolution is currently unclear.

²³⁹ Similarly, local and national rhetoric on spending has changed over time; concepts like the 1980s' Wash-
²⁴⁰ ington Consensus, the 1992 economic bubble burst in Japan, the 1995 Kobe Earthquake, the 2008 Great
²⁴¹ Recession, and the 2011 disaster each greatly shifted the conversation on spending; some governments post-
²⁴² recession advocated austerity, while the 2011 disaster highlighted great need and vulnerability of residents
²⁴³ to crisis, both in Tohoku and elsewhere, leading to the 2015 Sendai Framework, which advocated a need for
²⁴⁴ investment in local communities to 'build back better' after crisis so as not to leave communities vulnerable
²⁴⁵ again. Each of these influences could propel or hinder the growth of social welfare regimes, begging the
²⁴⁶ question, which direction have Japanese cities moved over time?

²⁴⁷ *2.6 Hypotheses*

²⁴⁸ In summary, these four types capture a wide range of urban regime literature, each with distinct priorities
²⁴⁹ that would lead to *more* or *less* spending in specific areas. I formalize these expectations with two hypotheses:

- ²⁵⁰ • **H1:** First, I hypothesize that these urban regimes are not evenly distributed throughout the country,
²⁵¹ but rather that some types of urban regimes are increasing over time.

- 252 • **H2:** Second, I hypothesize that social welfare regimes, compared to other types, have increased over
253 the last two decades of climatic hazards, opening up new communities to new changes in the social
254 safety net.
- 255 • **H3:** Third, I hypothesize that cities with greater collective action potential, particularly those with
256 greater bridging social capital, were more likely to develop social welfare regimes.

257 Below, I outline set of methods to measure each cities' propensity towards these four regimes.

258 **3. Data**

259 This study aims to describe and characterize the urban regimes of a large-N sample of cities over time, to
260 determine how and under what conditions these cities' regimes have changed. I examine the case of Japan,
261 tracking the full universe of municipalities (cities, towns, villages, and Tokyo's special wards) that govern
262 their own budgetary and administrative affairs, each capable of producing an urban regime that shapes local
263 governance and spending.

264 *3.1 Why Japan?*

265 While the urban regime framework was originally developed in a US context (Stone, 1989), it has been
266 applied widely throughout the world, with strong followings in the US (Kilburn, 2004), UK (Bassett, 1996;
267 Davies, 2017), Europe (Stoker and Mossberger, 1994; Arbaci, 2019), Japan (Child Hill and Fujita, 2000;
268 Saito, 2003; Sorensen et al., 2010; Tsukamoto, 2012), China, Hong Kong (Lai and Chui, 2014), South Korea
269 (Shin et al., 2015), and comparative settings (Mossberger and Stoker, 2001; Ramirez-Perez et al., 2008).
270 Japan is a useful test case as an industrialized democracy and the 3rd largest economy in the world, a
271 useful comparison case for many Global North states like the US, UK, France, Germany, South Korea, and
272 Taiwan, among others. Facing frequent floods, typhoons, and earthquakes compared to peer economies,
273 Japan's experience gives us a glimpse of what kind of urban regime transition we might expect in future
274 years due to climate change in the cities of similar industrialized democracies.

275 *3.2 Unit of Observation*

276 I track the full universe of 1739 municipalities for which spending data was available between 2000 and
277 2018, over 19 years. The final sample narrows into 1738 unique municipalities, which varied over time due

²⁷⁸ to mergers and new divisions, from 1428 cities in 2000 to 1727 cities in 2018, dubbed ‘cities’ below, totaling
²⁷⁹ 31,493 city-year observations. To ensure a comparable sample, this omits 12 outlier cities at times.²

²⁸⁰ *3.3 Urban Regime Indices*

²⁸¹ To represent urban regimes, this study developed new indices. Clarence Stone and likeminded scholars
²⁸² sorted cities into four types of urban regimes, including caretaker (status quo), developmental (pro-business),
²⁸³ middle-class (egalitarian), and social-welfare (working-class) governing coalitions ([Stone, 1989](#); [Stoker and](#)
²⁸⁴ [Mossberger, 1994](#); [Mossberger and Stoker, 2001](#); [Kilburn, 2004](#); [De Socio, 2007](#)). Over time, Stone himself
²⁸⁵ advocated for attention to change over time in urban regimes, arguing that “there is little reason to expect a
²⁸⁶ stable and cohesive governing coalition in today’s cities” ([Stone et al., 2015](#)). For this reason, one might now
²⁸⁷ expect considerable variation in urban regimes among cities, especially over time. Though the inner-workings
²⁸⁸ of governing coalitions in Japan’s municipalities are black boxes, unobservable without detailed qualitative
²⁸⁹ study of each, these coalitions can be generally sorted based on *how strongly each city’s spending reflects the*
²⁹⁰ *interests of a specific urban regime*. This matches Stone’s original conception of urban regimes, about which
²⁹¹ he wrote: “If a governing coalition is to be viable, it must be able to mobilize resources commensurate with
²⁹² its main policy agenda” ([Stone, 1993](#)).

²⁹³ To represent these 4 urban regimes, this study presents 3 new indices, based on 15 spending indicators,
²⁹⁴ depicting how much a city prioritizes spending types expected in a **social welfare** (SW), **middle class**
²⁹⁵ (MC), or **developmental** (D) regime respectively, where low scores among all 3 depicting a **caretaker**
²⁹⁶ regime (C). Each regime index reflects the average (mean) of cities logged spending rates on priorities that
²⁹⁷ regime typically champions (described further below). I trimmed all logged rates to the 99% most common
²⁹⁸ values to protect against outlier bias, clipping any city-years above the 99.5th percentile or below the 0.5th
²⁹⁹ percentile at those limits.³

³⁰⁰ *3.3.1 Indicators*

³⁰¹ Annual spending indicators are logged municipal spending rates, measured in 1000s of yen per capita to
³⁰² account for population, log-transformed to account for right-skew common in rates, and inflation-adjusted
³⁰³ to the year 2020. I transformed each indicator into a mean-centered z-scores, to account for different ranges,
³⁰⁴ and averaged related indicators together into the 3 indices. To demonstrate their internal validity below, I

²I omitted 11 cities in the Fukushima Exclusion Zone from 2011 onwards, plus Yubari, Hokkaido for the full period, totaling 12 cities (n = 107 city-years). I omit these because these extremely depopulated cities face dire social and economic conditions quite different from the rest of Japan.

³I use the mean, rather than median, to give each spending priority equal weight; the mean better captures variation particularly when one of these priorities (eg. social assistance vs. unemployment) exceeds or lags behind others.

305 introduce each indicator and report their correlation with their respective index below, using the Pearson's r
306 correlation coefficient (where -1 shows negative trends, +1 shows positive trends, and 0 shows neither). Each
307 indicator captures a different aspect of that urban regime; no regime must invest equally in, for example,
308 each social welfare indicator to count as such a social welfare regime, so maximal correlations are unlikely,
309 but positive correlations are a good sign of internal validity.

310 Each indicator shows positive correlations with their overall index. This is a great sign, indicating that
311 an increase in any of the three indices does generally correspond to a strong increase in its indicators.
312 Additionally, spending rates produced better internal consistency than percentages of the budget, likely
313 because each city's share of spending on different issues varies depending on external factors.

314 • The **Social Welfare regime** index combines 6 types of spending on working-class interests, which
315 are highly correlated with the final index, according to their Pearson's r correlation coefficient. These
316 including (1) social welfare assistance for low income residents ($r = 0.65$), (2) assistance for children
317 (0.45), (3) assistance for elders (0.66), (4) labor expenditures including unemployment relief and voca-
318 tional training (0.3), (5) emergency services like fire departments (0.58), and (6) public housing (0.32).
319 Correlations vary somewhat, since some social welfare regimes focus more on unemployment while
320 others focus more on social welfare for elders and children, for example, and so our average takes this
321 variation into account.

322 • The **Middle Class regime** index combines spending on 5 middle-class interests, which are highly
323 correlated with the final index. These include (7) education ($r = 0.5$), (8) social education (includ-
324 ing lifelong learning and cultural facilities) (0.42), (9) health care and public health services (0.59),
325 environmental interests like (10) waste and recycling (0.42), and (11) city planning (0.17). (Planning
326 has a weaker, but clearly positive linear relationship with middle class regimes, and it is an important
327 aspect of cities focused on quality of life.)

328 • The **Developmental regime** index combines spending rates on 4 economic development interests,
329 which correlate well with the final index. These include (12) agriculture, forestry, and fisheries ($r =$
330 0.64), (13) commerce and manufacturing (0.49), large infrastructure like (14) roads and bridges (0.69),
331 as well as (15) ordinary construction works (0.62).

332 Each index is mean-centered, where 0 represents the average level of spending nationwide over time on a
333 certain regime's issue areas, and higher/lower values denote more/less spending rates on that regime's issue

³³⁴ areas, on average. -1 represents one standard deviation lower spending than average, and +1 represents one
³³⁵ standard deviation higher than average. Their distributions are highlighted in Figure A1.

³³⁶ *3.3.2 Classifying Cities by Regime Type*

Table 2: Regime Classifications

Name	Code	Index Scores ¹			Percentage of Cases by Threshold ²	
		Social Welfare	Middle Class	Developmental	Median	Mean
Classic Regimes						
Social Welfare	SW	High	Low	Low	8.1	8.5
Middle Class	MC	Low	High	Low	7.8	6.4
Developmental	D	Low	High	Low	5.9	6.9
Caretaker	C	Low	Low	Low	28.6	33.4
Hybrid Regimes						
Social Welfare Hybrid (1)	SW-MC	High	High	Low	5.6	4.4
Social Welfare Hybrid (2)	SW-D	High	Low	Low	7.4	8.3
Hybrid Middle Class Hybrid	SW-MC-D MC-D	High Low	High High	High High	29.0 7.7	25.3 6.9

¹ City-years classified based on three regime scores being above (High) or below (Low) threshold.

² % of cases, when using median as threshold; robustness check uses mean as threshold.

³³⁷ Further, we use these indices to empirically classify cities into urban regime types, using our 3 indices'
³³⁸ medians to demarcate 8 classifications, to represent the general range of regimes a city can occupy, including
³³⁹ our 4 primary urban regimes and 4 hybrids. Table 2 lists each combination. If just 1 index ranked above
³⁴⁰ the median, I classified a city as that type of regime, including Social Welfare (SW = 8.1%), Middle Class
³⁴¹ (MC = 7.8%), and Developmental regimes (D = 5.9%). If all 3 indices ranked below the median, I classified
³⁴² that as a Caretaker regime (C = 28.6%). **Hybrids** describe cities prioritizes interests of 2 or more regimes.
³⁴³ If 2 indices ranked above the median, I classified that as either a Social Welfare Hybrid Regime (SW-MC
³⁴⁴ = 5.6%, SW-D = 7.4%) or a Middle Class Hybrid Regime (MC-D = 7.7%). 3 indices above the median
³⁴⁵ translate to a full hybrid regime (SW-MC-D = 29%). The more common hybrids tend to involve Social
³⁴⁶ Welfare traits (and follow the same increase over time as social welfare regimes). (I repeated this process
³⁴⁷ using the mean as our cutpoint, showing similar proportions of cases in each group.)

³⁴⁸ *3.4 Change over Time*

³⁴⁹ But are these urban regimes fixed, or fluid? Do cities transition between regime types to accomplish their
³⁵⁰ aims? I examined this with continuous and categorical analyses below. First, in Figure 1, I examined the
³⁵¹ changing median score (**black** line) over time for my 3 urban regime indices. Surrounding the median, red

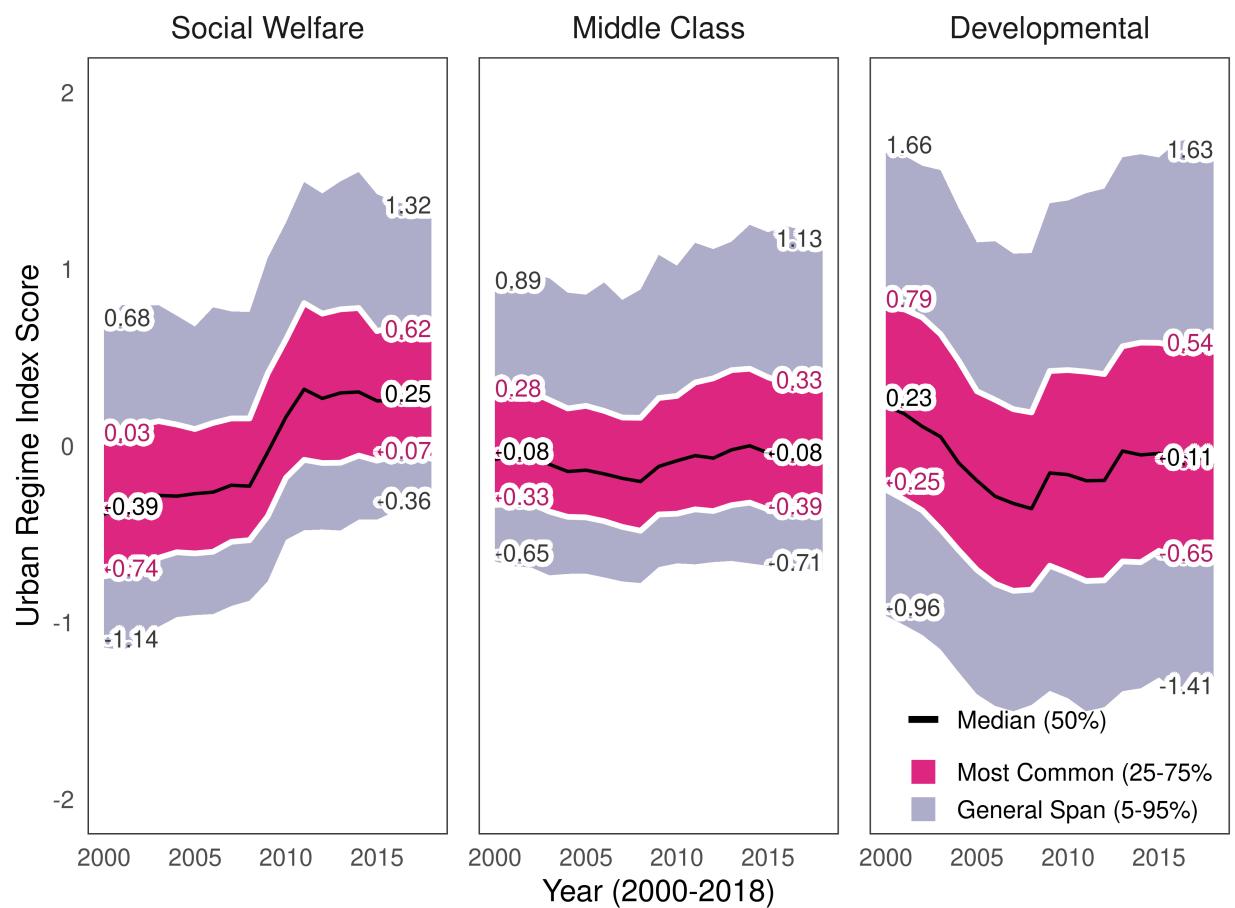


Figure 1: Indices Change Over Time

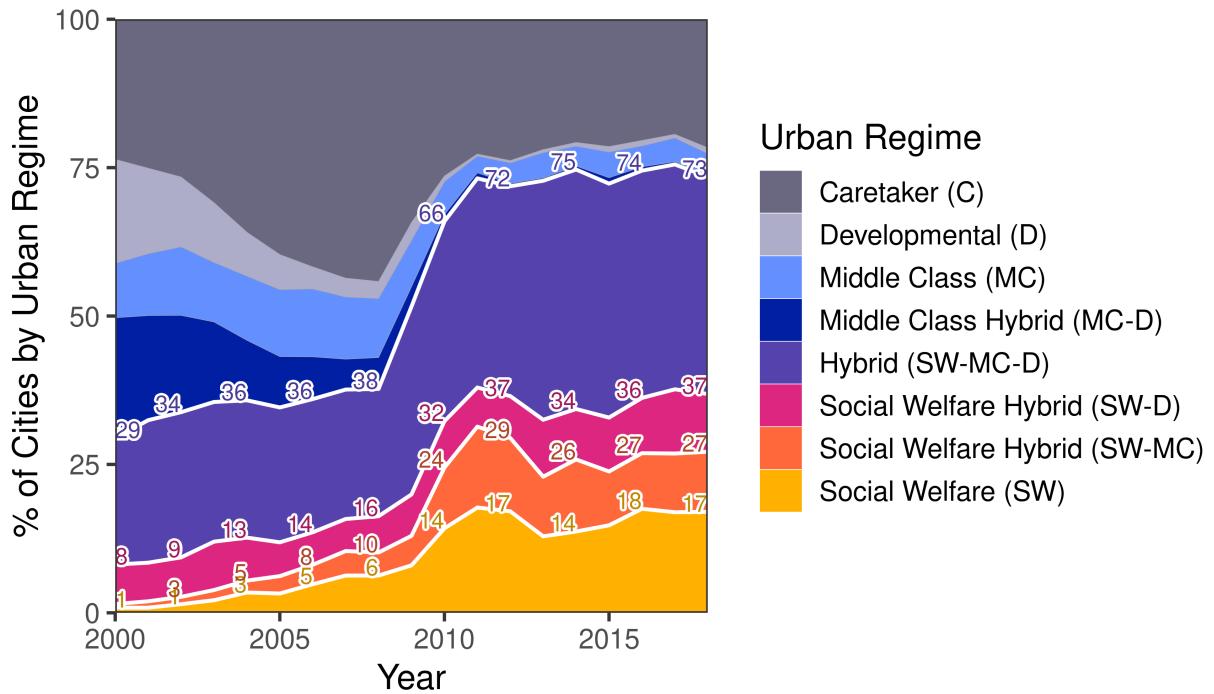


Figure 2: Change in Regime Types by Percentage over Time

bands show the most common 50% of scores, represented by the interquartile range (25-75th percentiles),
 and grey bands show the most commonly occurring 90% scores among cities (5-95% percentiles). This chart
 shows that while cities' status as developmental and middle class regimes (based on their spending) did not
 change especially, the share of cities spending more on social welfare issues sharply increased in the years
 leading up to and after 2011.

Second, to contextualize this, I measured the changing annual percentages of regimes based on their
 urban regime classifications from Table 2; I stack the 4 types of regimes where social welfare regime indices
 were above the median. This highlights the sizable increase in social welfare spending. Social welfare regimes
 (yellow) increased from >1% in 2000 to 13% in 2018, with a max of 14% in 2012. Including social welfare
 hybrid regimes that also focused on middle class (orange) or developmental spending (red), these increased
 from 5% in 2000 to 32% in 2018, surging 18% between 2008 to 2012 to 31% in 2012. When we include hybrid
 regimes that spent above the median on social welfare, middle class, and developmental interests (purple),
 the total share spikes considerably. This combined total represents all cities that spent above the median
 on social welfare, regardless of their other regime scores. Starting at 23% in 2000, the share of cities that
 spent above the median on social welfare share increased considerably between 2008 and 2012, jumping 33%
 from 35% to 68%, ending in 2018 at 70% of the whole sample. During the same period, the frequency of

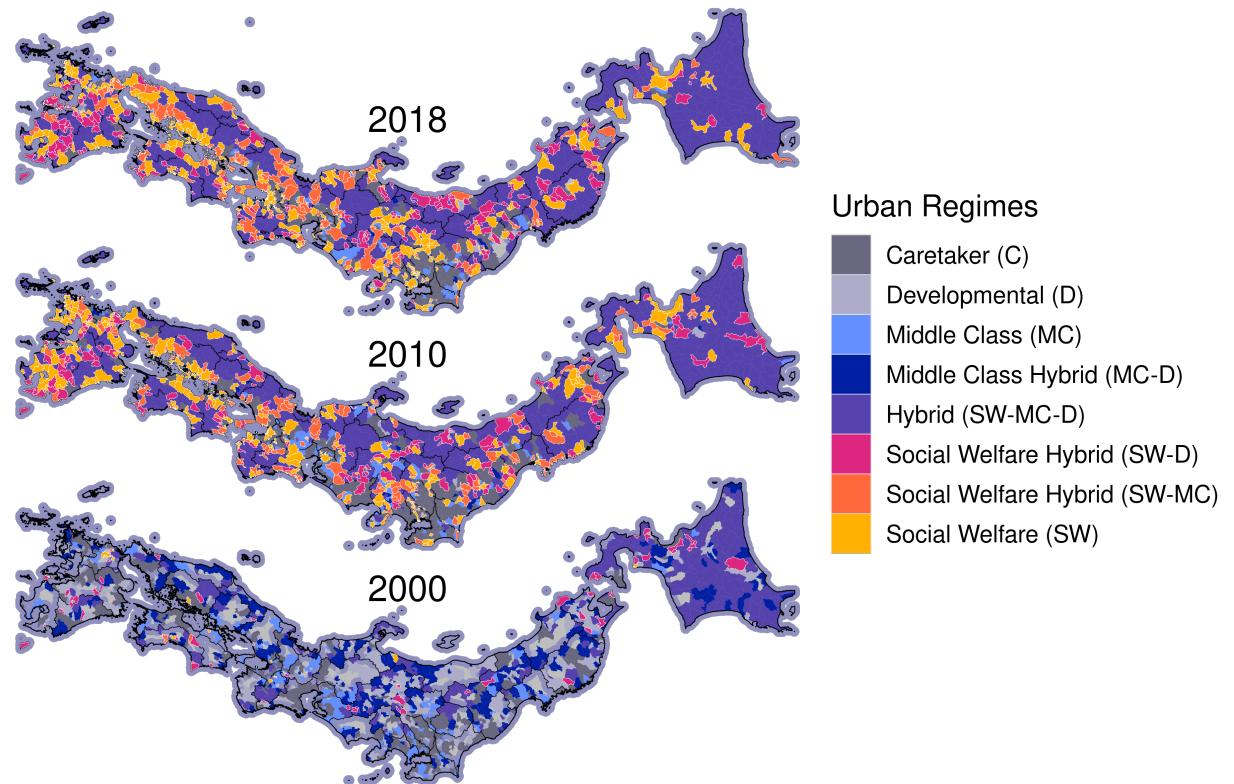


Figure 3: The Spread of Social Welfare Regimes Over Time

368 solely middle class or developmental regimes declined greatly, from above 10% each to below 5% each, while
 369 caretaker regimes surged, then declined, starting and ending at about a quarter of cities.

370 The spread of social welfare regimes is especially evident in Figure 3, which uses an Azimuthal Equidistant
 371 Projection, tilted for readability (North is on the right), to map *when* and *where* these social welfare-inclined
 372 regimes emerged. East, northeast, and southeast Japan transitioned from caretaker regimes in 2000 to many
 373 new social welfare-related regimes by 2018. While the 2011 tsunami likely impacted this, the change appears
 374 to have preceded the 2011 tsunami, with many social welfare regimes emerging already by 2010. By 2018, a
 375 full 20.9% of cities in Kyushu had become pure Social Welfare regimes, with similar results in Shikoku (18.9%)
 376 and Chugoku (15.9%). After including social welfare hybrids (SW-M & SW-D), social welfare-related regimes
 377 are even more common in Shikoku (47.4%), Kyushu (46.5%), Kansai (39.6%), and Chugoku (36.4%). And
 378 after including pure hybrids (SW-MC-D), this covers almost all cities in some regions, especially frequent
 379 in Hokkaido (97.8% of cities), Shikoku (91.6%), Kyushu (87.2%), Chugoku (84.2%), and Tohoku (84.2%).
 380 These tallies represent a major change from 2000, when pure social welfare regimes were most common in

³⁸¹ Kyushu (2.4%). (Some places do, however, seem to host more hybrid regimes over time; hybrid appear very
³⁸² common in rural regimes in Hokkaido both in 2000 (72.4%) and in 2018 (97.8%), characterized by high
³⁸³ per-capita spending on all three types of spending priorities.)

³⁸⁴ To summarize, these descriptive investigations show that cities do transition between regime types, and
³⁸⁵ that social welfare regimes have become considerably more common over time. But perhaps these increases
³⁸⁶ are merely artifacts of other demographic or political economic changes; to ensure a more accurate picture,
³⁸⁷ I turn to statistical methods with controls below.

³⁸⁸ 4. Methods

³⁸⁹ Next, I turn to statistical models to discern clearer estimates of the effect of time on urban regimes and
³⁹⁰ of key correlates. Using the social welfare regime index as my dependent variable, I applied ordinary least
³⁹¹ squares models with annual fixed effects, the appropriate technique for a normally distributed outcome.
³⁹² Annual fixed effects account for temporal heterogeneity, the appropriate technique for capturing distinct
³⁹³ effects each year. I generated 8 models (see Table A2), each with successively more statistical or design-
³⁹⁴ based controls, to ensure our results are robust to model specification. (Then, for further validation, I
³⁹⁵ repeated these models, predicting as my dependent variable the middle class regime index, in Table A3, and
³⁹⁶ then the developmental regime index, in Table A4).

³⁹⁷ 4.1 Basic Covariates

³⁹⁸ I employ 23 statistical controls with annual and prefectural fixed effects to predict social welfare regime
³⁹⁹ scores. In Model 1, I predicted social welfare regime scores using annual fixed effects plus basic demographic
⁴⁰⁰ controls, including (1) population, (2) inhabitable area in hectares to account for city size, (3) the percentage
⁴⁰¹ of residents over age 65, to account for aging and policy preferences from elders vs. working-age adults, and
⁴⁰² (4) income per capita in 1000s of yen, to account for wealth. Further, I applied basic revenue controls: To
⁴⁰³ represent cities' spending capacity, I controlled for (5) revenue per capita in 1000s of yen; (6) the percentage
⁴⁰⁴ of revenue coming from national or prefectural government funding, to account for financial autonomy or
⁴⁰⁵ lack thereof; and (7) each city's real term budget balance, so as not to overvalue the strength of a regime
⁴⁰⁶ whose spending exceeds its means.

⁴⁰⁷ In Model 2, I added 5 disaster controls. To account for disaster conditions, I controlled for (8) disaster
⁴⁰⁸ deaths and (9) buildings damaged, each per 100,000 residents, as well as (10) whether each town was hit by
⁴⁰⁹ the 2011 tsunami or not (1/0). Further, I controlled for disaster spending rates per 1,000 residents on (11)

410 recovery, meaning in this context physical reconstruction, and (12) disaster relief. None of my urban regime
411 indicators overlap with disaster spending, although we might expect that social welfare and developmental
412 priorities might overlap with recovery and relief efforts, so they are important covariates.

413 Next, in Model 3, I added controls for the other 2 regime indices not being predicted; when predicting
414 social welfare, I controlled for (13) middle class and (14) developmental regime scores, to disentangle their
415 effects.

416 Then, in Model 4, I added partisanship and collective action, alongside necessary controls. To represent
417 support for political parties, I controlled for the percentage of voters who voted for the winning LDP
418 candidate (or its coalition partner Komeito, which competes in separate jurisdiction). This helps account
419 for pork-barrel politics, common among LDP candidates, where winning candidates reward supporting
420 constituents with public works funding and construction contracts. I controlled for this two ways, using
421 votes (15) in the most recent Lower House Election and (16) in the most recent prefectoral election, to
422 account for the more diverse politics of local elections. These are distinct concepts, with weak correlations
423 ($r = 0.12$). These are better controls than, say, mayoral partisanship, because Japanese mayors often run
424 as nonpartisan and *must* collaborate across party lines to govern.

425 In addition to political ties, I also controlled for (17) bonding, (18) bridging, and (19) linking social
426 capital, using Fraser's annual social capital indices (2000-2017), which measure each type of social capital
427 from 0 to 1 by averaging indicators from publicly available proxies. These indices demonstrated strong
428 internal and external validity in their validation study (Fraser, 2021), predicting known correlates in public
429 policy on environment, disasters, and health in 9 studies to date (eg. Fraser et al., 2020; Fraser and Aldrich,
430 2021; Fraser et al., 2021, 2022). The *bonding index* averages 7 proxies of in-group ties that capture much
431 residents in a community hail from the *same* social strata, in terms of nationality, religion, education,
432 employment status, employment by gender, communication capacity, and age. These homophily measures
433 (not sheer demographics) capture the density of potential in-group social ties between members of the
434 same social strata (see Fraser (2021) for extended literature). The *bridging index* averages 8 measures of
435 civil society participation, which tend to facilitate encounters and social ties between members of *different*
436 social strata (Putnam, 2000), including population-normalized rates of nonprofits, religious groups, unions,
437 community centers, libraries, volunteerism, and voter turnout in prefecture and lower house elections. (I
438 simplified the bridging index into equally sized quartiles to avoid collinearity with regime indicators, while
439 still capturing a 4-point gradation from low to high.) Finally, the *linking index* averages 6 rates of access and
440 connection to government officials, including local officials, prefectural officials, police, prefectural assembly

441 members, and voteshare won by the winning party in prefectoral and lower house elections.⁴

442 Last, I added to Model 4 controls for (20) education, using the share of college educated adults, (21) the
443 share of unemployed adults in the labor force, and (21) the total migration rate, reflecting the sum of any
444 in- or out-migration, which might negatively impact social cohesion and is an important control.

445 *4.2 Robustness Checks*

446 Next, I added several further adjustments to ensure robust estimation. In Model 5, I added prefectoral
447 fixed effects, with Hokkaido as the baseline and modal category, to account for geographic heterogeneity.
448 Then, in Model 6, I controlled for path dependence using a 1-year lagged dependent variable; for social
449 welfare, this means controlling for the preceding year's social welfare score. Then, in Model 7, to guard
450 against endogeneity bias, I lagged by 1 year all other predictors (aside from annual and prefectoral fixed
451 effects), to predict the *next* year's urban regime score using the preceding year's data. Lags constrains the
452 sample in Models 6 onwards to 29755 cases (2001-2018), but ensures conservative estimates.

453 Finally, in Model 8, I add a series of standard log, logit, and root transformations to my predictors
454 to better match their distributions and capture clear nonlinear trends, adding a small constant where
455 necessary. Area, income, and migration were logged. Revenue used the square root; the 10th root was
456 used for Population (to avoid collinearity with spending), disaster deaths, damages,recovery spending, and
457 relief spending (since the distributions have frequent, meaningful zeros). Age, voteshares, social capital,
458 education, and unemployment were logit transformed, since they are bounded at 0 and 1; the bridging index
459 was left in quartiles to avoid collinearity with regime indicators.

460 Descriptive statistics and exact transformation for all predictors are shown in Table A1.

461 These transformations made statistically significant improvements in log-likelihood compared to Model 7
462 ($p < 0.001$); similarly, the change in deviance statistic shows statistically significant reductions in the residual
463 sum of squares after adding new variables to each model, indicating that Model 8 fit best. F Statistics
464 shows that each model fits better than an intercept model. No problematic collinearity was observed, with
465 all variance inflation factor scores below 10, the threshold for problematic collinearity. Multiple imputation
466 ($i = 5$) was used to fill in missing data, representing less than 1% of data points (0.3%).⁵

⁴Winning party support is different from my controls for partisanship, which only captures the LDP/Komeito, excluding the Democratic Party of Japan, which was in power from 2009 to 2012). Social capital indices are distinct from partisanship controls; Lower House partisanship is only weakly correlated with bonding ($r = -0.12$), bridging ($r = \sim 0$), and linking ($r = 0.34$); prefectoral partisanship is only weakly correlated with bonding ($r = -0.09$), bridging ($r = -0.05$), and linking ($r = 0.06$).

⁵Variables with missing data included prefectoral votes ($n = 1299, <0.172\%$), lower house votes ($n = 521, <0.069\%$), income ($n = 269, <0.036\%$), and college ($n = 46, <0.006\%$), revenue-derived varaibles ($n = 14, <0.002\%$).

467 Compared to our first model, our final, fully specified, transformed model explains 92% of the variance
468 in social welfare regimes, an extremely high amount. Further, the sigma statistic (residual standard error)
469 in Table A2 shows that my final model predicts each city-year's social welfare regime score with an average
470 error of just 0.18 points, and within a 95% confidence interval of 0.35 points. These are extremely favorable
471 accuracy levels, considering that my outcome has a range of 5.12.

472 Then, I applied the same analyses to middle class and developmental indices, repeating Models 1-8 from
473 **Table A2** as developmental models 9-16 in **Table A3** and middle-class regime Models 17-24 in **Tables A4**,
474 as alternative perspectives. However, my main analysis focuses on social welfare regimes, to distinguish the
475 drivers behind the rise of this regime over time. My best models (Models 8, 16, and 24) explain extremely
476 high shares of variation in social welfare ($R^2 = 92\%$, Table A2), developmental ($R^2 = 93\%$, Table A3), and
477 middle class regime scores ($R^2 = 83\%$, Table A4).

478 4.3 *Hypothesis Testing*

479 Finally, having applied a large set of controls to account for alternative explanations, I formally test
480 my hypotheses on my models using the following strategies. To test my first and second hypotheses, that
481 (**H1**) regimes scores are changing over time and that (**H2**) social welfare regimes are changing more than
482 other regimes, I used linear hypothesis tests in **Table 3**. Linear hypothesis tests can compare two model
483 coefficients within the same model to evaluate whether one coefficient is greater than the other, as well as
484 whether that difference is *statistically significant*.

485 Using the annual fixed effects from the fully specified models for each index (Models 8, 16, & 24), I
486 evaluated whether, for example, the effect of 2002 was significantly different from the benchmark compared
487 to the benchmark year of 2001 (ie. whether the coefficient was significantly different from zero). Then, I
488 evaluated average annual effect across all years *before* the 2011 disaster (2002-2010), and the average annual
489 effect *after* the 2011 disaster (2011-2018). This allowed me to compute the average treatment effect of
490 the post-disaster period compared to the pre-disaster period. Should these effects be significant, it would
491 indicate that urban regimes have, on average, changed greatly over time, even accounting for all other model
492 covariates.

493 Then, to test my second hypothesis, I compare average treatment effects across different regime types,
494 also in **Table 3**. If social welfare regimes saw a significant average treatment effect, but developmental and
495 middle class regimes did not, this would indicate social welfare regimes were disproportionately impacted
496 by this sea-change in urban regimes.

497 4.4 Simulating the Median City

498 Finally, to test my third hypothesis, that collective action potential is associated with cities' transition
499 to social welfare regimes, I investigated the effects bonding, bridging, and linking social capital on each
500 regime index using effects simulated from my fully specified models (Models 8, 16, & 24). I simulated
501 quantities of interest from these highly accurate models using 1000 statistical simulations in R. Simulation
502 is a frequently used method for generating model predictions (King et al., 2000; Imai et al., 2008; Choirat
503 et al., 2016), accounting for both estimation uncertainty (using a multivariate normal distribution) and
504 fundamental uncertainty (by averaging over random draws), which allows us to estimate expected outcomes
505 with precise confidence intervals based on 1000 simulations. My simulations calculate the expected outcome
506 for a hypothetical average city-year by varying just one predictor while holding all other predictors constant
507 at their medians (or for categorical variables, their modes).

508 Unless stated otherwise, all simulations below use Model 8 in Table A2 to predict social welfare regime
509 scores for the median city. This city has a population of 24,750 residents, spans 4,170 hectares of inhabitable
510 land, hosts an income per capita of 1,199,190 yen per capita (~\$9,183 USD), with 28% of residents over age
511 65. The median city in Japan during this period also has low rates of adults with some college education
512 (25%), moderately high unemployment (4.6%), and shares of high total migration (6%). It received 503,740
513 yen per capita in revenue last year, 16% of which came from national or prefectural government, and has a
514 real term budget balance of +4.7. The city voted for winning LDP/Komeito candidate in moderate-to-high
515 rates, at 51% in Lower House elections and 32% in prefectural elections. Further, we assume median levels
516 of bonding (0.71), bridging (0.32 ~ 2nd quartile), and linking social capital (0.25). Then, to ensure our
517 estimates are unaffected by disaster or other regimes, we hold all disaster conditions and spending variables
518 at 0, for a city unaffected by 3/11, and hold all regime scores from the preceding year at 0 (the natural
519 mean of these Z-scores, very close to the median); to account for time and geography, simulations assume a
520 context of Aichi prefecture in 2018, as an 'ordinary' prefecture with cities large and small.

521 5. Results

522 5.1 Testing Temporal Effects

523 This study set out to examine (**H1**) whether urban regimes in Japanese have changed measurably in terms
524 of spending priorities over the last 20 years, (**H2**) whether social welfare regime in particular have grown
525 more common, after accounting for alternative explanations with statistical controls, and (**H3**) whether

⁵²⁶ collective action potential is related to the hypothesized rise in social welfare regimes. Below, we outline our
⁵²⁷ findings.

Table 3: Linear Hypothesis Tests of Temporal Effects

Year	Social Welfare Regime			Developmental Regime			Middle Class Regime		
	Estimate	SE	95% CI	Estimate	SE	95% CI	Estimate	SE	95% CI
Pre-Disaster									
2002	0	0.01	[-0.01, 0.01]	-0.04***	0.01	[-0.05, -0.03]	+0.01	0.01	[-0.01, 0.01]
2003	-0.02	0.01	[-0.04, -0.01]	-0.08***	0.01	[-0.1, -0.06]	-0.07***	0.01	[-0.09, -0.05]
2004	+0.03**	0.01	[0.01, 0.05]	-0.06***	0.01	[-0.07, -0.05]	-0.02	0.01	[-0.04, 0.01]
2005	+0.04***	0.01	[0.01, 0.07]	-0.07***	0.01	[-0.08, -0.06]	-0.01	0.01	[-0.03, 0.01]
2006	+0.02*	0.01	[0.01, 0.03]	-0.09***	0.01	[-0.1, -0.08]	-0.03***	0.01	[-0.05, 0.01]
2007	+0.03***	0.01	[0.01, 0.05]	-0.1***	0.01	[-0.12, -0.1]	-0.06***	0.01	[-0.08, 0.01]
2008	+0.01	0.01	[-0.01, 0.03]	-0.07***	0.01	[-0.08, -0.06]	-0.05***	0.01	[-0.07, 0.01]
2009	+0.1***	0.01	[0.01, 0.2]	+0.11***	0.01	[0.01, 0.22]	+0.07***	0.01	[0.01, 0.18]
2010	+0.15***	0.01	[0.01, 0.25]	-0.04***	0.01	[-0.05, -0.03]	+0.02	0.01	[-0.01, 0.05]
Mean Pre	+0.04***	0.01	[-0.01, 0.05]	-0.05***	0.01	[-0.06, -0.04]	-0.01	0.01	[-0.01, 0.03]
Post-Disaster									
2011	+0.18***	0.01	[0.01, 0.35]	-0.06***	0.01	[-0.07, -0.05]	+0.04***	0.01	[-0.01, 0.05]
2012	+0.13***	0.01	[0.01, 0.28]	-0.06***	0.01	[-0.07, -0.05]	-0.02	0.01	[-0.04, 0.01]
2013	+0.16***	0.01	[0.01, 0.31]	+0.03**	0.01	[0.01, 0.05]	+0.02	0.01	[-0.01, 0.05]
2014	+0.18***	0.01	[0.01, 0.33]	-0.03**	0.01	[-0.04, -0.02]	+0	0.01	[-0.01, 0.01]
2015	+0.09***	0.01	[-0.01, 0.1]	-0.02	0.01	[-0.03, -0.01]	-0.04***	0.01	[-0.06, 0.01]
2016	+0.15***	0.01	[0.01, 0.28]	-0.09***	0.01	[-0.1, -0.08]	-0.03**	0.01	[-0.05, 0.01]
2017	+0.13***	0.01	[0.01, 0.26]	-0.02*	0.01	[-0.03, -0.01]	-0.02	0.01	[-0.04, 0.01]
2018	+0.12***	0.01	[0.01, 0.25]	-0.08***	0.01	[-0.09, -0.07]	-0.05***	0.01	[-0.07, 0.01]
Mean Post	+0.14***	0.01	[-0.01, 0.31]	-0.04***	0.01	[-0.05, -0.03]	-0.01	0.01	[-0.01, 0.03]
Average Treatment Effect									
Post - Pre	+0.1***	0	[-0.01, 0.01]	+0	0	[-0.01, 0.01]	+0	0	[-0.01, 0.01]
Net Gain over Time									
2018 - 2002	+0.12***	0.01	[-0.01, 0.03]	-0.04***	0.01	[-0.05, -0.03]	-0.06***	0.01	[-0.07, 0.01]

Note:

Statistical Significance: *** p < 0.001, ** p < 0.01, * p < 0.05, . p < 0.10. All p-values and asterisks reflect two-tailed hypothesis tests. Based on annual fixed effects from Models 8, 16, & 24 in Tables A2, A3, & A4, respectively.

528 First, I hypothesized that (**H1**) urban regimes have changed measurably over the last 2 decades. Our
529 linear hypothesis tests presented in **Table 3** reveal consistent evidence that urban regime scores changed over
530 time. After controlling for numerous alternative explanations listed in the Methods, time had a positive,
531 statistically significant impact on social welfare scores: the annual impact in 2018 was +0.12 standard
532 deviations greater than in 2002 ($p < 0.01$), and when comparing annual effects post-disaster to annual effects
533 pre-disaster, cities saw their social welfare scores rise each year an average of +0.1 standard deviations more
534 post-disaster than they did pre-disaster ($p < 0.001$). Indeed, each consecutive year from 2004 onwards
535 yielded increases in social welfare regime scores. (14 years saw increases significant of at least the $p < 0.05$
536 level.) These findings also complement the descriptive evidence of considerable changes in social welfare
537 regimes presented in Figures 1 and 3.

538 Second, I hypothesized that (**H2**) social welfare regimes increased annually *moreso* than did other urban
539 regimes. Indeed, my fully specified models project that, independent of other traits, between 2002 and 2018,
540 a city's social welfare regime score was expected to increase +0.12 standard deviations ($p < 0.01$), while their
541 developmental and middle-class regime scores were expected to decrease by -0.04 ($p < 0.01$) and -0.06 ($p <$
542 0.01) standard deviations, respectively. Further, comparing the pre- and post-disaster periods, an average
543 year post-disaster saw a +0.1 standard deviation increase in their social welfare score ($p < 0.001$), but their
544 developmental and middle-class regime scores saw no substantive or statistically insignificant changes.

545 5.2 Collective Action Effects

546 Third, I hypothesized that (**H3**) cities with greater collective action potential, as measured by types of
547 social capital, saw greater increases in their social welfare regime scores. Indeed,

548 6. Discussion

549 This study measured cities' proclivities towards each of 4 types of urban regimes, commonly discussed in
550 urban policy in the US or Japan ([Stone, 1989](#); [Stoker and Mossberger, 1994](#); [Bassett, 1996](#); [Child Hill and](#)
551 [Fujita, 2000](#); [Kilburn, 2004](#); [Ramirez-Perez et al., 2008](#); [Sorensen, 2011](#)). These included regimes that aim to
552 maintain the (1) **status quo** in their city (rather undesirable for climate resilience initiatives); regimes that
553 focus on promoting (2) **economic development** in their city (helpful for accelerating renewable energy
554 booms, but perhaps not for ensuring equitable development with public support); regimes that focus on
555 promoting (3) **progressive middle class interests** like health care, education, and environmentalism
556 (helpful for renewable energy, but not as common in less prosperous communities); and regimes that focus
557 on increasing (4) **opportunity through social welfare policies**.

558 In the cases examined in Japan, cities with this last regime type (social welfare) tended to be deeply
559 interested in disaster resilience, where city officials were deeply concerned with residents' vulnerability during
560 crisis.

561 Yet, as I show above in the results of this study, some cities' governing coalitions are overcoming these
562 collective action barriers and spending more on redistributive policies than others. This is critical, consider-
563 ing that my findings show *social welfare regimes* are becoming increasingly common in Japan, and are often
564 mid-size or rural communities where great changes in social welfare are not generally expected.

565 *6.1 Contributions to Literature*

566 This study's measures also provide a resource for scholars building new theories of urban politics. After
567 a wealth of investigation of urban politics in Japan over the last 30 years, some case studies may no longer
568 be representative of the current state of their city. Until now, the field has lacked a tool for systematically
569 identifying *which* cities need re-investigation. **Table 4** demonstrates an example of how scholars can utilize
570 these new indices to evaluate commonly cited case studies whose urban regime type may have since changed.

571 **Table 4** lists several notable cities, selected for their relevance to the literature. For each city, columns
572 report (1) the citing literature, (2) this study's numeric and categorical regime classifications for each city
573 in 2000, compared with (3) their classifications in 2018. Each city's index scores are represented as relative
574 percentiles (0-100%), showing *how much* they lean towards that given regime.

575 On the one hand, these indices also point to the intractability of regimes in some cities. For example,
576 several cities have retained their classification. Mitaka, an affluent suburb of Tokyo, remains a caretaker
577 regime ([Steiner, 1957](#); [Fukuchi and Yamaguchi, 1997](#); [Ohashi and Phelps, 2021](#)), insulated from economic
578 decline in other suburbs. Sendai, the metropolitan hub of the Tohoku region, remains a middle-class,
579 progressive regime, with stable, continuity in leadership even after substantial impacts of the 2011 triple
580 disaster ([Morris, 2012](#); [Tsuji, 2017](#)). Finally, the rustbelt city of Muroran ([Edgington, 2013](#)) continues to
581 focus strongly on social welfare even after 20 years, albeit with some change towards a hybrid regime.

582 On the other hand, some cities have changed greatly, and may merit renewed investigation from scholars.
583 Fukushima City originally ranked as a developmental regime, but has since transitioned to a caretaker regime,
584 as the city has had to balance competing interests from national government, local families, weakened
585 agriculture, and decontamination efforts ([Otsuki, 2016](#); [Abeyasinghe et al., 2022](#)), each aiming to stem out-
586 migration through different means ([Zhang et al., 2014](#)).

587 Ishinomaki City, formerly a middle-class regime, has become a hybrid regime, adding considerable spend-
588 ing relative to its peers on social welfare and economic development to attempt to recover after the tsunami

589 devastated its local industry, agriculture, and tourism businesses ([Dimmer and Lindenberg, 2014](#); [Matthews, 2017](#); [Ji and Imai, 2022](#)). Such findings raise questions for other Tohoku cities investigated after the disaster
 590 ([Aldrich, 2019](#); [Cheek, 2020](#)).

592 Similarly, Kobe transitioned from a 2000-era focus on middle-class interests and economic development
 593 ([Nunokawa, 2007](#); [Funck, 2007](#)) to a new focus on social welfare and middle-class interests; much has written
 594 about Kobe's less-than-ideal recovery policies from the 1994 disaster, where developers gentrified many low-
 595 income neighborhoods and displaced families from housing ([Yasui, 2007](#); [Edgington, 2010](#); [Aldrich, 2012](#);
 596 [Maly and Shiozaki, 2012](#)). This shift away from developmental-approaches raises exciting questions about
 597 what has changed in Kobe since their early-recovery period. The author hopes that this table might provide
 598 a spotlight for cities in need of further study.

Table 4: Urban Regime Change in Key Cities from Literature

Prefecture	Municipality	Literature	Type	Regime in 2000			Regime in 2018		
				SW	MC	D	Type	SW	MC
Tokyo	Mitaka	Steiner 1957; Fukushima & Yamaguchi 1997; Ohashi & Phelps 2021	C	25	26	2	C	51	10
	(former) Kagoshima-ken		D	27	41	55	NA	NA	NA
Fukushima	Fukushima	Otsuki et al. 2016; Abeysinghe et al. 2022	D	8	27	53	C	44	36
Miyagi	Sendai	Morris 2012; Tsuiji 2017	MC	14	68	48	MC	48	58
Miyagi	Ishinomaki	Dimmer & Lindenberg 2014; Matthews 2017; Ji & Imai 2022	MC	4	53	22	SW-MC-D	85	81
Hyogo	Kobe	Nunokawa 2007; Funck 2007; Yasui 2007; Edgington 2010; Aldrich 2012; Maly et al. 2012	MC-D	42	74	65	SW-MC	68	49
Hokkaido	Muroran	Edginton 2013	SW	54	46	37	SW-MC	70	64
									38

¹ SW = Social Welfare. MC = Middle Class. D = Developmental. C = Caretaker.

² Numbers rank city-year as a percentile (0-100) compared to all other city-years.

599 6.2 Limitations

600 Finally, this study does come with several limitations. In addition to the aforementioned challenges of
 601 approximating urban regime shifts using spending as a proxy measure, recent scholarship has highlighted
 602 cases where urban regimes are more difficult to characterize. Depending on the country, urban governance
 603 and levels of local autonomy may vary due to institutional differences, laws, and tax structure.⁶²⁻⁶³ Some

604 cities lack stable governing coalitions, dubbed 'non-regimes'.⁶⁴ In practice, these either would not spend
605 consistently on the same priorities, or would spend little on any new priorities, resembling a caretaker
606 regime.

607 Neighborhood organizations, nonprofits, and labor movements can also motivate and structure these
608 cities' regimes (Logan and Rabrenovic, 1990; Nissen, 1995; Takao, 2006; Camou, 2014; Stone et al., 2015)
609 as can higher levels of government (Sellers, 2002; Tsukamoto, 2012; Shin et al., 2015). These limitations
610 aside, urban regimes, even amidst varying governance conditions, remain a useful way to characterize that
611 development remains so prioritized in some cities, while opportunity-expanding policies remain prioritized
612 in others (Funck, 2007; Ji and Imai, 2022). This study's measurement using developmental, opportunist,
613 and progressive regime indices helps achieve that aim.

614 **References**

₆₁₅ (APPENDIX) Appendix

₆₁₆ *Table of Contents*

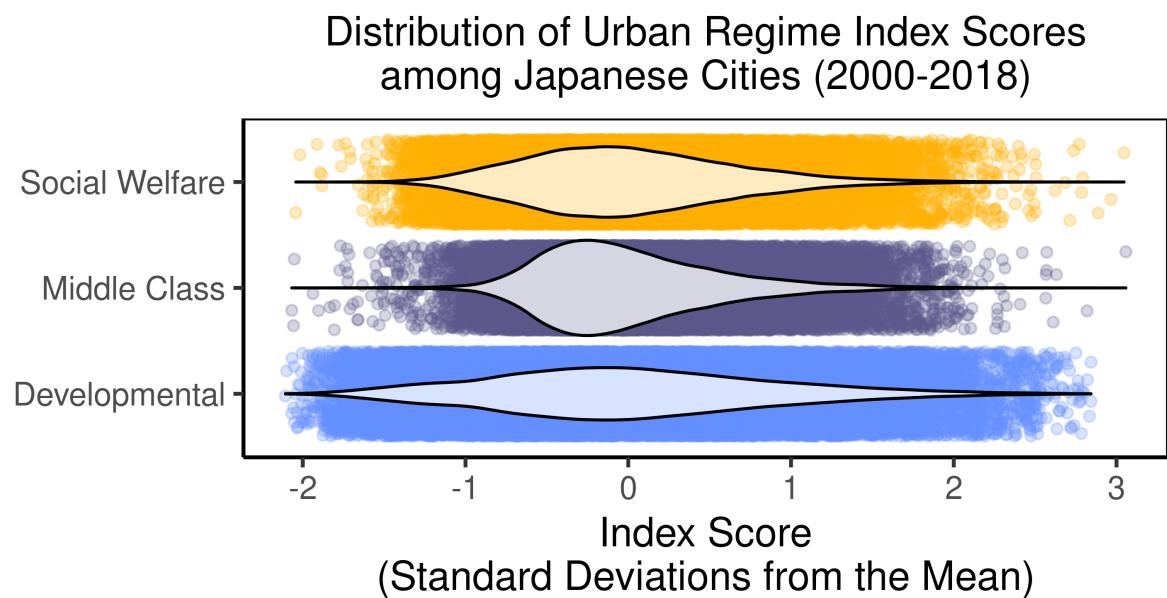


Figure A1: Distributions of Urban Regime Indices

⁶¹⁷ *Table A1: Descriptives*

Table A2: OLS Models of Social Welfare Regimes.

Dependent Variable: Social Welfare Regime Index (Z-score).

Unit of Observation: 31493 Japanese municipality-years (2000-2018), with annual fixed effects.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Best Model Model 8 Transformed ⁴
	Basic Controls	Disaster Controls	Other Regimes	Collective Action	Prefecture Effects ¹	Lagged Outcome ²	Lagged Controls ³	
Demographics								
Population	-0.00*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.04*** (0.01)
Inhabitable Area (ha)	0.00*** (0.00)	0.00*** (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	0.01*** (0.00)
% Over Age 65	3.40*** (0.04)	3.39*** (0.04)	2.41*** (0.04)	2.38*** (0.05)	1.87*** (0.05)	0.43*** (0.03)	0.47*** (0.04)	0.06*** (0.01)
Income per capita (1000s of yen)	-0.00*** (0.00)	-0.00** (0.00)	0.00* (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00* (0.00)	-0.00*** (0.00)	-0.09*** (0.01)
Revenue								
Revenue per capita (1000s of yen)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
% National & Prefectural Funding	0.42*** (0.03)	0.72*** (0.04)	0.90*** (0.03)	0.78*** (0.03)	0.41*** (0.04)	0.23*** (0.02)	0.06** (0.02)	0.01. (0.00)
Real Term Budget Balance (+/-)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.00*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	0.00 (0.00)
Disaster Conditions								
Disaster Deaths (per 100,000)	-0.00*** (0.00)	0.00. (0.00)	0.00*** (0.00)	-0.00. (0.00)	-0.00** (0.00)	-0.00*** (0.00)	0.00 (0.00)	0.00 (0.01)
Disaster Damage (per 100,000)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.01* (0.00)
Hit by 2011 tsunami (1/0)	0.01 (0.01)	0.00 (0.01)	-0.01 (0.01)	0.11*** (0.01)	0.03** (0.01)	0.03** (0.01)	0.02* (0.01)	0.02* (0.01)
Disaster Spending								
Disaster Recovery Spending Rate	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	0.00 (0.00)	0.00 (0.00)
Disaster Relief Spending Rate	-0.00*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	
Other Urban Regimes								
Middle Class Regime Index			0.16*** (0.00)	0.15*** (0.00)	0.12*** (0.00)	0.04*** (0.00)	0.02*** (0.00)	0.01*** (0.00)
Developmental Regime Index			0.23*** (0.00)	0.20*** (0.00)	0.23*** (0.00)	0.07*** (0.00)	0.02*** (0.00)	-0.00 (0.00)

Political Parties							
% LDP Coalition Votes: Lower House		-0.03*	0.03.	0.01	0.00		
% LDP Coalition Votes: Prefecture		(0.01)	(0.01)	(0.01)	(0.01)		
Collective Action							
Bonding Social Capital (0-1)		-0.77***	-0.97***	-0.28***	-0.32***	-0.07***	
Bridging Social Capital (Quartiles)		(0.05)	(0.08)	(0.05)	(0.05)	(0.01)	
Linking Social Capital (0-1)		0.02***	0.04***	0.01**	0.01***	0.01**	
Extra Controls							
% College Educated		-0.67***	-0.38***	0.01	-0.13***	-0.01	
% Unemployed		(0.03)	(0.04)	(0.02)	(0.03)	(0.01)	
Total Migration (per capita)		2.03***	0.66***	-0.45***	-0.45***	-0.04***	
Lagged Outcome (1 year prior)		1.29***	0.44***	0.08	0.13**	0.00	
Constant	-1.47*** (0.02)	-1.54*** (0.02)	-1.21*** (0.02)	-0.81*** (0.04)	-0.37*** (0.07)	-0.09 (0.05)	0.12* (0.05)
Model Fit							
N (city-years)	31493	31493	31493	31493	31493	29755	29755
Max VIF	2.30	2.33	4.36	5.16	8.12	8.16	8.40
F-statistic (df)	3011.7*** (25)	2619.8*** (30)	3182.5*** (32)	2769.3*** (39)	1590.6*** (86)	4105.5*** (86)	3803.8*** (86)
Change in Deviance (df)	- (5)	-113.1*** (2)	-636.5*** (2)	-133.4*** (7)	-495.4*** (47)	-1298.9*** (1)	-1410.5*** (17)
Sigma (Avg. Error)	0.35	0.34	0.31	0.30	0.28	0.18	0.18
R ²	0.71	0.71	0.76	0.77	0.81	0.92	0.92

Note:

Statistical Significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$. All p-values and asterisks reflect two-tailed hypothesis tests. (F-statistic is one-tailed by default.)

¹ Annual Fixed Effects included in every model. Prefectural effects added starting in Model 5. Excluded from table to conserve space.

² Lagged Outcome by 1 year in Models 6-8, to control for path dependence and any temporal correlation. Constrains final models to 2001-2018.

³ Lagged Controls: All other numeric predictors lagged by 1 year in Models 7-8 to avoid endogeneity bias. Despite the 1% drop in R^2 , lagging controls ensures more conservative estimates.

⁴ Transformations: In Model 8, predictors were log-, logit-, or root-transformed to fit their distribution and nonlinear trends, adding a small constant where necessary. These made statistically significant improvements in log-likelihood compared to Model 7 ($p < 0.001$). Area, income, and migration were logged. Revenue used the square root; the 10th root was used for Population (to avoid collinearity with spending), disaster deaths, damages, recovery spending, and relief spending (since the distributions have frequent, meaningful zeros). Age, voteshares, social capital, education, and unemployment were logit transformed, since they are bounded at 0 and 1. Bridging social capital was split into quartiles, to avoid collinearity with regime indicators.

Table A3: OLS Models of Developmental Regimes.

Dependent Variable: Developmental Regime Index (Z-score).

Unit of Observation: 31493 Japanese municipality-years (2000-2018), with annual fixed effects.

	Model 9 Basic Controls	Model 10 Disaster Controls	Model 11 Other Regimes	Model 12 Collective Action	Model 13 Prefecture Effects ¹	Model 14 Lagged Outcome ²	Model 15 Lagged Controls ³	Best Model Model 16 Transformed ⁴
Demographics								
Population	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00* (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.12*** (0.01)
Inhabitable Area (ha)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.05*** (0.00)
% Over Age 65	3.38*** (0.05)	3.32*** (0.05)	1.66*** (0.05)	1.88*** (0.06)	2.02*** (0.06)	0.46*** (0.04)	0.48*** (0.04)	0.06*** (0.01)
Income per capita (1000s of yen)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00*** (0.00)	-0.12*** (0.01)
Revenue								
Revenue per capita (1000s of yen)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)
% National & Prefectural Funding	-0.91*** (0.05)	-0.41*** (0.05)	-0.51*** (0.04)	0.04 (0.04)	0.23*** (0.04)	0.52*** (0.03)	-0.41*** (0.03)	-0.04*** (0.00)
Real Term Budget Balance (+/-)	-0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Disaster Conditions								
Disaster Deaths (per 100,000)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	0.05*** (0.01)	
Disaster Damage (per 100,000)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00 (0.00)	
Hit by 2011 tsunami (1/0)	0.05* (0.02)	0.05** (0.02)	0.11*** (0.02)	0.05** (0.02)	-0.00 (0.01)	0.03* (0.01)	0.00 (0.01)	
Disaster Spending								
Disaster Recovery Spending Rate	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)
Disaster Relief Spending Rate	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01* (0.00)
Other Urban Regimes								
Social Welfare Index		0.38*** (0.01)	0.31*** (0.01)	0.33*** (0.01)	0.11*** (0.00)	0.05*** (0.00)	0.02*** (0.00)	
Middle Class Regime Index		0.31*** (0.01)	0.27*** (0.01)	0.25*** (0.01)	0.11*** (0.00)	-0.01* (0.00)	-0.02*** (0.00)	

Political Parties							
% LDP Coalition Votes: Lower House		0.01 (0.01)	-0.00 (0.02)	-0.00 (0.01)	0.02 (0.01)		
% LDP Coalition Votes: Prefecture		-0.01 (0.01)	0.02* (0.01)	-0.00 (0.01)	0.01 (0.01)		
Collective Action							
Bonding Social Capital (0-1)		0.55*** (0.06)	-0.21* (0.09)	-0.13* (0.06)	-0.16* (0.07)	-0.04** (0.01)	
Bridging Social Capital (Quartiles)		0.07*** (0.00)	0.05*** (0.00)	0.01 (0.00)	0.02*** (0.00)	0.01*** (0.00)	
Linking Social Capital (0-1)		-0.18*** (0.04)	0.24*** (0.07)	0.04 (0.04)	0.05 (0.05)	0.01 (0.01)	
Extra Controls							
% College Educated			-1.70*** (0.04)	-1.34*** (0.04)	-0.23*** (0.03)	-0.23*** (0.03)	-0.01* (0.01)
% Unemployed			-5.60*** (0.15)	-6.55*** (0.17)	-1.65*** (0.11)	-1.92*** (0.12)	-0.09*** (0.01)
Total Migration (per capita)			0.42*** (0.08)	0.19* (0.08)	-0.07 (0.05)	0.31*** (0.06)	0.04*** (0.01)
Lagged Outcome (1 year prior)					0.72*** (0.00)	0.81*** (0.00)	0.77*** (0.00)
Constant	-0.68*** (0.03)	-0.82*** (0.02)	0.02 (0.02)	-0.26*** (0.06)	0.05 (0.09)	0.03 (0.06)	0.13* (0.06)
Model Fit							
N (city-years)	31493	31493	31493	31493	31493	29755	29755
Max VIF	2.30	2.33	3.86	4.92	8.12	8.17	8.06
F-statistic (df)	3146.4*** (25)	2893.6*** (30)	3718.3*** (32)	3720.6*** (40)	2128.6*** (86)	5488*** (86)	4723.9*** (86)
Change in Deviance (df)	- (5)	-458.6*** (2)	- (1323.9*** (2))	-805.5*** (8)	-651.8*** (46)	-1923*** (1)	-2127*** (1)
Sigma (Avg. Error)	0.46	0.44	0.39	0.36	0.33	0.21	0.22
R ²	0.71	0.73	0.79	0.83	0.85	0.94	0.93

Note:

Statistical Significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$. All p-values and asterisks reflect two-tailed hypothesis tests. (F-statistic is one-tailed by default.)

¹ Annual Fixed Effects included in every model. Prefectural effects added starting in Model 13. Excluded from table to conserve space.

² Lagged Outcome by 1 year in Models 14-16, to control for path dependence and any temporal correlation. Constrains final models to 2001-2018.

³ Lagged Controls: All other numeric predictors lagged by 1 year in Models 15-16 to avoid endogeneity bias. Despite the 1% drop in R^2 , lagging controls ensures more conservative estimates.

⁴ Transformations: In Model 16, predictors were log-, logit-, or root-transformed to fit their distribution and nonlinear trends, adding a small constant where necessary. These made statistically significant improvements in log-likelihood compared to Model 15 ($p < 0.001$). Area, income, and migration were logged. Revenue used the square root; the 10th root was used for Population (to avoid collinearity with spending), disaster deaths, damages, recovery spending, and relief spending (since the distributions have frequent, meaningful zeros). Age, voteshares, social capital, education, and unemployment were logit transformed, since they are bounded at 0 and 1. Bridging social capital was split into quartiles, to avoid collinearity with regime indicators.

Table A4: OLS Models of Middle Class Regimes.

Dependent Variable: Middle Class Regime Index (Z-score).*Unit of Observation:* 31493 Japanese municipality-years (2000-2018), with annual fixed effects.

	Model 17	Model 18	Model 19	Model 20	Model 21	Model 22	Model 23	Best Model Model 24
	Basic Controls	Disaster Controls	Other Regimes	Collective Action	Prefecture Effects ¹	Lagged Outcome ²	Lagged Controls ³	Transformed ⁴
Demographics								
Population	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.07*** (0.01)
Inhabitable Area (ha)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00 (0.00)	0.00*** (0.00)	0.03*** (0.00)
% Over Age 65	1.26*** (0.05)	1.24*** (0.04)	-0.44*** (0.05)	-0.44*** (0.06)	0.11 (0.07)	-0.15*** (0.04)	0.14** (0.04)	0.00 (0.01)
Income per capita (1000s of yen)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	-0.00 (0.00)	-0.04*** (0.01)
Revenue								
Revenue per capita (1000s of yen)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
% National & Prefectural Funding	-0.86*** (0.04)	-0.53*** (0.04)	-0.59*** (0.04)	-0.63*** (0.04)	-0.58*** (0.05)	0.07* (0.03)	-0.27*** (0.03)	-0.04*** (0.00)
Real Term Budget Balance (+/-)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	0.00* (0.00)	0.00 (0.00)
Disaster Conditions								
Disaster Deaths (per 100,000)	-0.00*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03** (0.01)
Disaster Damage (per 100,000)	-0.00* (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Hit by 2011 tsunami (1/0)	-0.01 (0.02)	-0.03 (0.02)	-0.03* (0.02)	-0.02 (0.02)	-0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)
Disaster Spending								
Disaster Recovery Spending Rate	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00* (0.00)	-0.00* (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Disaster Relief Spending Rate	-0.00*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00** (0.00)	0.01 (0.00)	0.01 (0.00)
Other Urban Regimes								
Social Welfare Index		0.23*** (0.01)	0.23*** (0.01)	0.19*** (0.01)	0.06*** (0.00)	0.04*** (0.00)	0.03*** (0.00)	
Developmental Regime Index		0.27*** (0.01)	0.27*** (0.01)	0.28*** (0.01)	0.11*** (0.00)	0.00 (0.00)	-0.02*** (0.00)	

Political Parties								
% LDP Coalition Votes: Lower House		0.03. (0.02)	0.02 (0.02)	0.00 (0.01)	-0.00 (0.01)			
% LDP Coalition Votes: Prefecture		-0.02* (0.01)	-0.01 (0.01)	-0.00 (0.01)	0.01 (0.01)			
Collective Action								
Bonding Social Capital (0-1)		-0.53*** (0.07)	0.25** (0.10)	0.04 (0.06)	-0.11 (0.07)	-0.03* (0.01)		
Bridging Social Capital (Quartiles)		-0.01*** (0.00)	0.02*** (0.00)	0.00 (0.00)	0.02*** (0.00)	0.01*** (0.00)		
Linking Social Capital (0-1)		0.15*** (0.04)	0.10 (0.07)	-0.00 (0.05)	-0.01 (0.05)	0.00 (0.01)		
Extra Controls								
% College Educated		0.25*** (0.04)	0.09. (0.05)	0.16*** (0.03)	-0.08* (0.03)	0.00 (0.01)		
% Unemployed		-1.50*** (0.16)	-1.27*** (0.18)	-0.01 (0.12)	-1.18*** (0.12)	-0.07*** (0.01)		
Total Migration (per capita)		1.02*** (0.08)	1.33*** (0.08)	0.21*** (0.06)	0.33*** (0.06)	0.02*** (0.01)		
Lagged Outcome (1 year prior)					0.75*** (0.00)	0.80*** (0.00)	0.80*** (0.00)	
Constant	-0.74*** (0.02)	-0.82*** (0.02)	-0.24*** (0.02)	0.19** (0.07)	-0.45*** (0.09)	-0.09 (0.06)	0.13* (0.06)	-0.01 (0.08)
Model Fit								
N (city-years)	31493	31493	31493	31493	31493	29755	29755	29755
Max VIF	2.30	2.33	4.38	5.32	8.12	8.16	8.06	8.40
F-statistic (df)	1039.7*** (25)	921.8*** (30)	1242*** (32)	1016.3*** (40)	552*** (86)	1872.4*** (86)	1715.6*** (86)	1727.8*** (86)
Change in Deviance (df)	-	-148*** (5)	-867.7*** (2)	-54*** (8)	-365.3*** (46)	-2177.3*** (1)	-2337*** (1)	-29.7*** (17)
Sigma (Avg. Error)	0.41	0.40	0.37	0.36	0.35	0.22	0.23	0.23
R ²	0.45	0.47	0.56	0.56	0.60	0.84	0.83	0.83

Note:

Statistical Significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$. All p-values and asterisks reflect two-tailed hypothesis tests. (F-statistic is one-tailed by default.)

¹ Annual Fixed Effects included in every model. Prefectural effects added starting in Model 21. Excluded from table to conserve space.

² Lagged Outcome by 1 year in Models 22-24, to control for path dependence and any temporal correlation. Constrains final models to 2001-2018.

³ Lagged Controls: All other numeric predictors lagged by 1 year in Models 23-24 to avoid endogeneity bias. Despite the 1% drop in R^2 , lagging controls ensures more conservative estimates.

⁴ Transformations: In Model 24, predictors were log-, logit-, or root-transformed to fit their distribution and nonlinear trends, adding a small constant where necessary. These made statistically significant improvements in log-likelihood compared to Model 23 ($p < 0.001$). Area, income, and migration were logged. Revenue used the square root; the 10th root was used for Population (to avoid collinearity with spending), disaster deaths, damages, recovery spending, and relief spending (since the distributions have frequent, meaningful zeros). Age, voteshares, social capital, education, and unemployment were logit transformed, since they are bounded at 0 and 1. Bridging social capital was split into quartiles, to avoid collinearity with regime indicators.

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